2023 TRAINING COURSE CATALOG

Training for the Upstream O&G Industry
Public, In-House, & Live Online Formats

SCA
SUBSURFACE CONSULTANTS

Featured Training Programs:

- Live Online Courses (**p 6**)
- Principles of Mapping with Petrel© (**p 22**, **29**)
- The Daniel J. Tearpock Geoscience Certification Program (**p 32**, **67**)

We practice what we teach.

SUBSURFACE CONSULTANTS & ASSOCIATES, LLC

Serving the Upstream Oil & Gas Industry Since 1988

www.scacompanies.com • @scacompanies

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SCA HAS TRAINED OVER **27,000** GEOSCIENTISTS AND ENGINEERS WORLDWIDE.

We are pleased to present SCA's 2023 Course Catalog. Our program offers an extensive lineup of over 95 different training options including Geoscience, Engineering, Unconventional Reservoirs, Formation Evaluation, Multi-Disciplinary & Introductory, and Field Courses in addition to our flagship classes:

- Applied Subsurface Geological Mapping
- Quality Control Techniques for Reviewing Prospects & Acquisitions
- The Daniel J. Tearpock Geoscience Certification Program (aka 'Geoscience Boot Camp')
- Principles of Mapping with Petrel©

For over 30 years, SCA has been providing upstream petroleum professionals across the experience spectrum with the highest quality continuing education and technical training in the industry. SCA instructors are industry leaders, trained in delivering engaging learning solutions, and the consulting segment of our business allows SCA to stay abreast of industry trends in oil and gas exploration and development.

For more information, please contact us at training@scacompanies.com.

SCA
SUBSURFACE CONSULTANTS

OUR SERVICES

TRAINING SERVICES

Our mission at SCA is to provide a quality training experience that brings added success to our upstream oil and gas industry clients. From its founding in 1988, SCA has provided leading edge, technical training services around the world to over 27,000 petroleum industry professionals of all experience levels. We offer both in-person and live online training courses in the following categories:

- Geoscience
- Engineering
- Unconventional Reservoirs
- Formation Evaluation
- Multi-Disciplinary & Introductory
- Field Courses

CONSULTING & DIRECT HIRE SERVICES

SCA is a world leader in providing petroleum exploration, development, and production consultancy and direct hire services. Our experts have conducted consulting assignments in over 50 countries and in virtually every major producing basin around the world. We can provide consultants or direct-hire support in various areas of expertise including:

- Geologists
- Geophysicists
- Geoscientists
- Petrophysicists
- Geotechnicians
- Engineering Technicians
- Petroleum Engineers
- Reservoir Engineers
- Completions Engineers
- Production Engineers
- Drilling Engineers
- Facility Engineers
- Accounting Professionals
- Land Professionals

PROJECTS & STUDIES

SCA provides teams of seasoned professionals to conduct projects and studies at your office, in remote locations around the world, or in our Houston-based Team Rooms. Examples of the type of projects SCA conducts include:

- Integrated, Multi-Disciplinary Studies (Exploration, Development, Production)
- Basin Studies
- Exploration and Development Prospect Generation and Evaluation
- Acquisition or Divestiture Evaluation
- Asset/Portfolio Evaluation
- Structural and Stratigraphic Interpretation and Mapping
- Post-drilling Evaluation and Assessments
- Structural Analysis
- Resources and Reserves Studies

QUALITY ASSURANCE

SCA provides teams of expert consultants with global experience in quality assurance to conduct reviews at the corporate strategy, play assessment, prospect portfolio, or major capital project sanctioning level. These reviews can help identify technical flaws or failures of logic (example: prospect appears reasonable but does not fit the geologic context), reduce uncertainty, mitigate risk, enhance decision quality and instill functional excellence. SCA experts can provide:

- Industry recognized expertise in specific disciplines
- Independent perspectives that may identify internal technical or strategic bias
- Experience with global analogs/best practices
- Mentoring to reinforce key skills or supplement teams on a short term or periodic basis
- Training options to upgrade internal skills

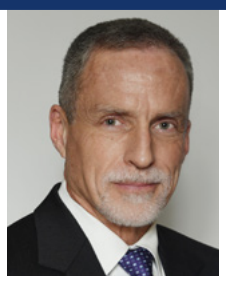
OIL & GAS ADVISORY

SCA offers Oil & Gas Advisory Services to E&P companies as well as non-industry clients considering the acquisition of or investment in producing properties, exploration, or development opportunities. Using available information, we conduct independent, unbiased 3rd party evaluations for financial institutions, private or public equity investors, family offices or ultra-high net worth individuals, asset managers, intermediaries and advisors including:

- Confirm technical validity of the opportunity
- Assess risk factors and identify risk abatement strategies
- Identify reserves/resources potential and probabilistic distributions
- Determine asset value range and upside potential

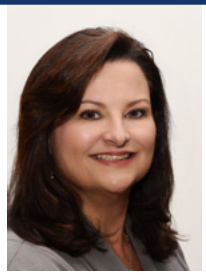
SCA MANAGEMENT TEAM

HAL F. MILLER, PRESIDENT



Mr. Hal Miller, President of Subsurface Consultants & Associates, LLC, is responsible for managing SCA's global operations and guiding the company's strategic direction. Prior to joining SCA in 2004 as Vice President of Operations, Hal spent a total of 26 years working at Conoco and ConocoPhillips. During that time he held a variety of positions including operations, exploration, and human resource management at the business unit level, and corporate level skills management for the geoscience and reservoir engineering disciplines. Hal received his undergraduate degree in 1974 from Williams College in Massachusetts and his M.S. in Geology from the University of Colorado in 1979.

MARY ATCHISON, VICE PRESIDENT OF TRAINING OPERATIONS



Mary Atchison became Vice President of Training Operations for SCA in September 2012. Prior to joining the company in 2009 as Training Services Business Development Manager, Mary spent over 10 years providing total turnkey training packages worldwide for the oil and gas industry. She is currently responsible for the overall management of SCA's training services department which provides upstream geoscience and engineering training to clients around the world. Mary received her BA in Marketing from Sam Houston State University.

SUSAN HOWES, PE, PHR, VICE PRESIDENT OF ENGINEERING

Susan Howes joined SCA in 2016 as Vice President of Engineering. In 1982, Susan began her career with Anadarko as an Engineer in Denver, Colorado. Through the years she held a variety of engineering positions of increasing responsibility. In 2007, she joined Chevron as Horizons Program Manager and afterwards moved into their Reservoir Management function providing functional leadership that resulted in improved production and reserve trends. Susan has coauthored articles on the topics of uncertainty management, risk management, and talent management for SPE. She previously served as SPE Regional Director for Gulf Coast North America, is a recipient of the SPE DeGolyer Distinguished Service Medal and is an SPE Honorary Member. Howes holds a BS degree in Petroleum Engineering from the University of Texas.

MATT NOWAK, DIRECTOR OF BUSINESS DEVELOPMENT

Matt Nowak has been working in the oil and gas industry since 2000. He works directly with senior-level professionals at major international oil companies, as well as independent producers. He joined SCA in 2006 as a Business Development Manager and currently serves as one of the Directors of Business Development. In this role he is responsible for overseeing sales and recruiting efforts and promoting SCA's internal Projects & Studies teams. Matt received his Bachelor's Degree in Marketing from Texas A&M University.

TIM RIEPE, DIRECTOR OF BUSINESS DEVELOPMENT

Tim Riepe joined SCA in 2008 and currently serves as Director of Business Development. In this capacity he manages the recruiting and sales efforts around SCA's core competencies. He maintains professional relationships with a large network of geological and engineering Independent Consultants, and promotes SCA's Consulting services, internal Projects & Studies teams, Direct Hire services and the 95+ training courses SCA offers. Tim earned his Bachelor's Degree in Marketing from Texas Lutheran University.

INNOVATIVE TRAINING VENUE OPTIONS

SCA offers over 95 courses in six disciplines. Register using our website at **scacompanies.com** or by e-mail at **training@scacompanies.com**. All of SCA's course materials are regularly updated to reflect the latest information and recent developments in technology. We understand the importance of producing quality training courses and the impact it has on your company's most valuable assets. We hope you will choose SCA when it comes to training your employees.

REGISTER FOR A PUBLIC COURSE:

- Gain fresh perspectives from others in the industry through classroom discussions
- Public classes take you away from the distractions of the office and allow you to focus on learning
- Tuition includes continental breakfast, lunch, afternoon snacks and beverages
- Courses are held regularly at SCA's training center in Houston, Texas, as well as international venues

ARRANGE AN IN-HOUSE COURSE:

- Save on travel and per student costs
- Conveniently select the dates that fit with your company's schedule
- Customize the content of our in-house courses to fit your work programs, incorporating your data where possible, into exercises, examples and workshops, or by simply modifying the information that is most important to your company. Additional fees may apply for course customizations

PARTICIPATE IN A LIVE ONLINE COURSE:

- SCA offers Live Online versions of select courses from our catalog (see **P6** for details)
- Cover the same content at a fraction of the in-person classroom cost
- Enjoy the conveniences of learning remotely, including saving on travel expenses
- Courses are scheduled in half-day sessions so that attendees can manage key job responsibilities concurrently

HOST A PUBLIC COURSE:

- In exchange for providing the venue and lunches, your company will receive discount pricing
- The convenience of setting the course dates to fit your company's schedule
- The cost savings of having us send our instructors to you, eliminating your company's travel costs

LUNCH & LEARNS, SEMINARS & CONFERENCES:

- SCA experts can deliver hour-long talks on a variety of technical topics well-suited for in-house lunch and learn presentations or society functions
- All talks qualify for continuing education credits

For more information about SCA's Training services, contact:

Mary Atchison, VP of Training Operations
matchison@scacompanies.com • 713.789.2444

COURSES OFFERED IN A LIVE ONLINE FORMAT

Cover Image: Svartifoss Waterfall and Basalt Columns, Vatnajökull National Park, Iceland

LEGEND: Flagship Course | Boot Camp Course | Laptop Required | NEW New Course | Live Online Version Available

Contact SCA's Training Department at **training@scacompanies.com** or (713)789-2444.

LEGEND: Flagship Course · Boot Camp Course · Laptop Required · NEW New Course · Live Online Version Available

LEGEND: Flagship Course · Boot Camp Course · Laptop Required · NEW New Course · Live Online Version Available

This course is offered in English or Spanish

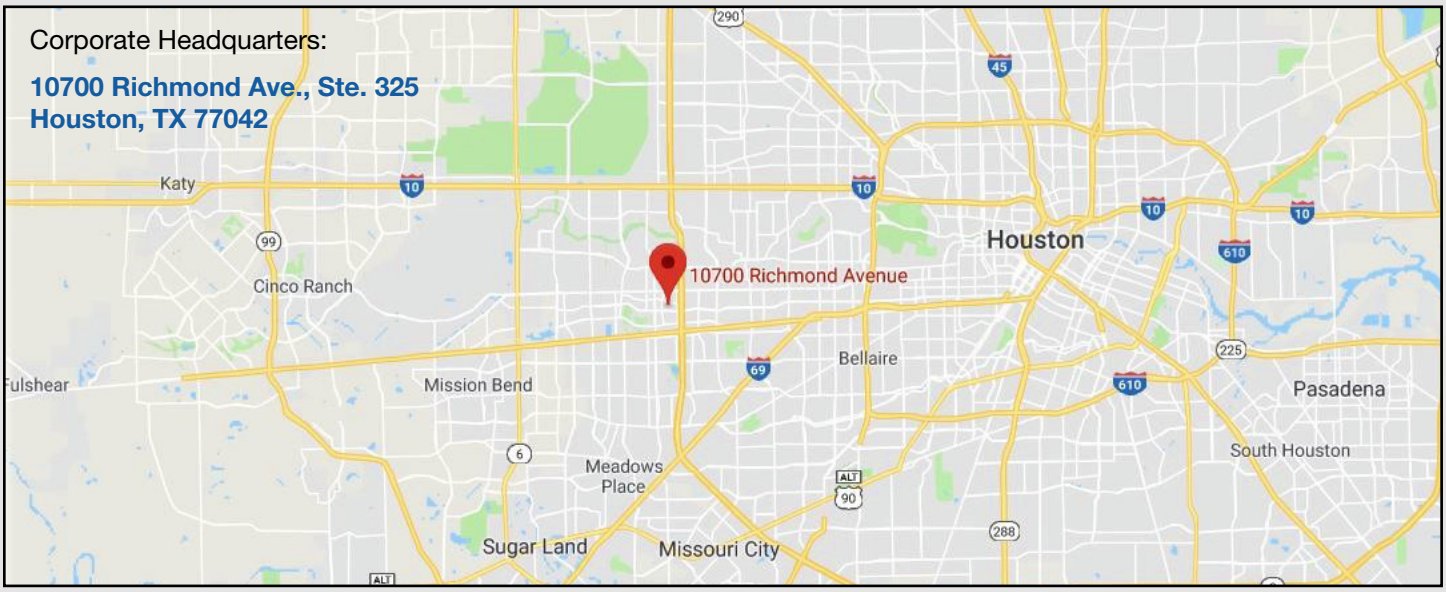
LEGEND: Flagship Course Boot Camp Course Laptop Required NEW New Course Live Online Version Available

Use our website at scacompanies.com or contact us by e-mail at **training@scacompanies.com** to register for a public course, host a public course, arrange an in-house course, participate in a live online course, or schedule a seminar.

All of SCA's course materials are regularly updated to reflect the latest information and recent developments in technology. We hope you choose SCA to train your employees.

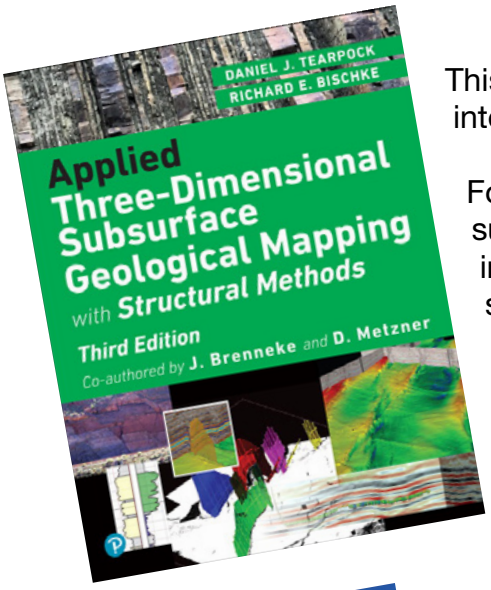
Corporate Headquarters:

10700 Richmond Ave., Ste. 325
Houston, TX 77042



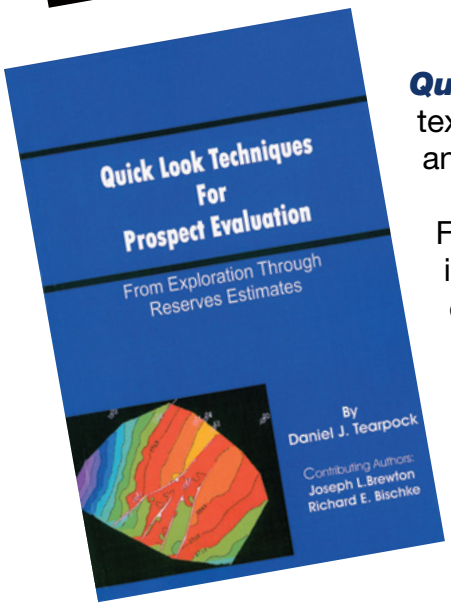
WE WROTE THE BOOK ON SUBSURFACE MAPPING

SCA's flagship course, ***Applied Subsurface Geological Mapping***, draws from the techniques collected and explained in the renowned textbook co-authored by SCA founder Daniel J. Tearpock, ***Applied Three-Dimensional Subsurface Geological Mapping with Structural Methods, 3rd Edition (2020)***. Participants of the course will receive a copy of this newly released textbook.



This textbook is one of the world's most referenced texts on subsurface interpretation, mapping and structural geological methods.

For those interested in learning about and applying the techniques on subsurface interpretation, SCA offers a five-day course in our training facility in Houston, Texas and locations around the world for your convenience - see the full description on pages **15** and **28**.



Quick Look Techniques for Prospect Evaluation is another "must have" textbook. It will benefit anyone who screens deals, reviews interpretations and maps, or evaluates prospects or potential resources or reserves.

For those interested in learning about and applying Quick Look Techniques in a classroom environment, SCA offers one, two and three-day versions of the class, ***Quality Control Techniques for Reviewing Prospects and Acquisitions*** - see the full description on pages **23** and **30**.

SCA
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To purchase publications, please visit our website at **scacompanies.com**
or call (713)789-2444 to speak with the Training Department.

TERMS AND CONDITIONS

Due to limited seats in each course, it is recommended that participants register at least one month in advance. However, we will accept paid registrations up to the last business day before the class, provided there are seats available. Registrants will receive a confirmation email within 48 hours of registration and will receive complete venue information at least two weeks prior to the first day of class. The final decision to hold a course is usually made about two weeks prior to the course start date.

As a reminder, your seat in a course is not confirmed until payment is received.

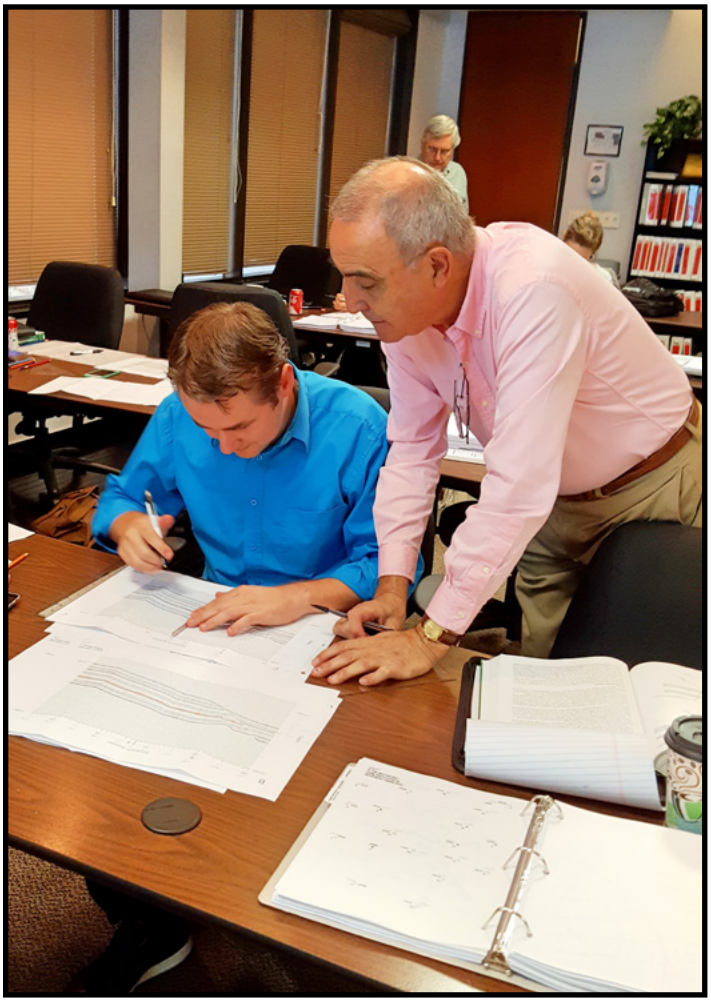
TUITION FEES are due at the time of registration. An invoice can be provided via email as long as payment is received before the start of class. Tuition fees are payable in US dollars and do not include the cost of accommodation and travel. The fees include the tuition, course materials, and daily refreshments.

TRANSFERS and SUBSTITUTIONS are accepted if received at least seven (7) days before a course begins. In the event that the registrant cannot attend a scheduled course for which he or she is enrolled, registration can be transferred to another course or another person can be substituted. Substitutions may be made without penalty. In addition, SCA reserves the right to substitute course instructors as necessary.

CANCELLATIONS and REFUNDS: If it is necessary to cancel an enrollment, the tuition will be reimbursed in full provided notification of the cancellation is received at least 10 days prior to the first day of class. For cancellations received less than 10 days in advance, a 150.00 nonrefundable portion of the tuition will be retained by SCA.

SCA reserves the right to cancel any course session at any time. The final decision to hold a course is usually made about two weeks prior to the course start date. If we cancel a course, enrollees will be notified via email and given the opportunity to transfer to another course or receive a refund. NOTE: Should there be a difference in the tuition, the difference will be paid/refunded on or before the start of the class. SCA is not responsible for any penalties charged for canceling or changing your travel arrangements. Please keep our cancellation policy in mind when planning your travel.

VISIT OFTEN: Due to the addition of new training courses throughout the year, please visit our website frequently for the latest calendar of courses. SCA strives to offer the best curriculum and schedule possible.



Pictured Above: SCA's instructor **Sia Agah** assisting a student during an offering of **Applied Subsurface Geological Mapping**.

Serving the Upstream Oil & Gas Industry Since 1988

Excellence That Runs Deep

SCA's upstream training courses are designed for all experience levels, including early career engineering or geoscience graduates, newcomers to the oil & gas industry, investors, mid-career and senior-level professionals, and managers looking to hone and update their skills.

Geoscience • Engineering

Unconventional Reservoirs • Formation Evaluation

Multi-Disciplinary & Introductory • Field Courses

APPLIED BIOSTRATIGRAPHY IN OIL AND GAS EXPLORATION AND PRODUCTION

Instructor: William Krebs, PhD
Discipline: Geoscience
Length: 2 Days (Classroom), 3 Half-Day Sessions (Live Online)
CEUs: 1.6
Availability: In-House & Live Online

Who Should Attend:
Geoscientists in exploration and production interested in using biostratigraphic data in their projects.

Course Description:
This two-day course will introduce the microfossil groups that are commonly used in the petroleum industry, their strengths and limitations, and their application to chronostratigraphic and paleoenvironmental analysis. Biozonation schemes will be compared to graphic correlation analysis---constructing and using composite standards, their calibration to geologic time, and interpreting the results in the framework of sequence stratigraphy and chronostratigraphy. A key outcome of the course is the identification of unconformities and condensed sections, paleoenvironments and provenance, potential reservoir, seal, and source rocks, the calibration of seismic and geologic data to geologic time, estimates of sedimentation rates and the duration of hiatuses, and the correlation of rock and seismic sections to help find and produce hydrocarbons.

Learning Outcomes:
- Know the key microfossil groups and when and how to use them.
- Compare the traditional biozonation approach to graphic correlation analysis.
- Learn how to construct composite standards from biostratigraphic data and how to use them for graphic correlation analysis.
- Using graphic correlation in sequence stratigraphy and chronostratigraphy.
- Integration of the results with seismic and geologic datasets.

Course Content:
- Useful microfossil groups, their application and limitations.
- Biozonations vs. graphic correlation analysis.
- Graphic correlation, the use of composite standards, their calibration to geologic time and interpretation of the results.
- Graphic correlation, sequence stratigraphy, chronostratigraphy, and chronosequence stratigraphy.
- Well correlations, seismic and geologic integration, and interpretation.

Participant Testimonials:
"Likely one of the best instructors I have ever encountered."

"Dr. Krebs taught with enthusiasm and deep knowledge of the subject matter." - Kim C.

"A well put together program with the perfect balance of lecture and practice work." - Anna E.

APPLIED CONTOURING WORKSHOP

Instructor: Sia Agah
Discipline: Geoscience
Length: 3 Days
CEUs: 2.4
Availability: Public & In-House

Who Should Attend:
Geologists, geophysicists, petrophysicists, reservoir engineers and managers who are exploring for and developing oil and gas fields in conventional and unconventional petroleum systems.

Course Description:
Participants will learn proper subsurface interpretation and contouring methodology through hand-contoured mapping exercises. Hand contouring encourages formulation of a geologic model which will guide or validate subsequent interpretation utilizing the workstation. A primary objective is to enable editing of workstation products by manually inserting control points and contours prior to gridding to generate geologically valid maps, especially when the computer-generated map is deemed geologically unreasonable or invalid.

Situations where manual editing may be required include mapping with widely scattered data (e.g., porosity, net sand and net pay values from wells), mapping 2D seismic data, dealing with poor resolution deep 3D seismic events, editing fault blocks on workstation generated maps which lack contour compatibility, or adjusting net pay maps when the mapping software is incapable of correct net pay contouring.

Learning Outcomes:
- The benefits of performing hand contouring in the age of 3D seismic and computers.
- Rules of contouring and methods of contouring by hand.
- Correct understanding and mapping of the vertical components of faults including throw and vertical separation.
- Understanding of contour compatibility or continuity of structural style across faults.
- Fault patterns and additive property of faults (a balancing principle), with contouring examples.
- Adjusting the contouring of a 3D data set to remediate a possible "screw fault" interpretation (faults which appear to change their sense of displacement along strike).
- Contouring widely-spaced well and 2D data, including mapping a reef reservoir with incompatible top and base surfaces.
- Generating a stratigraphic oil play by imposing a channel sand porosity model on the contour maps.
- Generating net pay maps for edge-water reservoirs with top- and base-reservoir (derivative) structure maps, net-to-gross ratio, and net sand (derivative) maps.

Course Content:
Short lectures with exercises requiring generation of contour maps including structure, isochore, net-to-gross ratio, porosity, net sand, net pay and derivative maps made by cross contouring of other relevant maps.

APPLIED DEEP-WATER SEDIMENTOLOGY & STRATIGRAPHY

Instructor: Jonathan R. Rotzien, PhD
Discipline: Geoscience
Length: 5 Days (Classroom), 10 Half-Day Sessions (Live Online)
CEUs: 4.0
Availability: Public, In-House, & Live Online

Who Should Attend:
This course is designed for employees primarily interested in siliciclastic sedimentation, stratigraphy and petroleum reservoirs as they pertain to the exploration and development of oil and natural gas. Professionals may be engaged in technical to management positions.

Course Description:
This five-day seminar is designed to provide professionals with a modern awareness of the spectrum of deep-water sedimentation, stratigraphy and depositional environments. Taught from the perspective of an upstream oil and gas business unit, diverse industry datasets are used throughout the course to illustrate the broad variation of deep-water sedimentation and the implications for petroleum reservoirs and their quality. This course explores the transport processes and depositional products in a variety of deep-water depositional systems along active and passive margins using outcrop, core, borehole image and seismic data.

This course is designed to give industry professionals an appreciation of the predictive attributes of deep-water sedimentation, stratigraphy and resulting petroleum reservoirs, as well as knowledgeable insight into the scale of the wide range of deep-water depositional environments. This course draws from materials presented in field courses to world-class outcrops and petroleum basins in North America, Europe and Asia Pacific.

The modifying term "deep-water" is often misunderstood, and it does not imply that these types of rocks are found only in modern offshore environments. Rather, many of the petroliferous basins onshore today are filled with shallow- and deep-water marine and freshwater (lacustrine) strata including turbidites and intervals of interbedded mudstone.

Learning Outcomes:
- Describe transport and depositional processes for the different types of sedimentary deposits that function as important parts of a total petroleum system.
- Characterize turbidites, debrites, transitional to hybrid flow type deposits, reworked deposits and contourites, hemipelagic to pelagic deposits and describe their distribution in deep-water environments.
- Understand the different types of deep-water siliciclastic depositional environments for turbidite, debrite, contourite, mass-transport and mixed depositional systems and their implications to petroleum reservoir architecture and reservoir quality.
- Use lithofacies analysis to understand 3D variations in rock properties pertaining to reservoir type, reservoir quality, and seal.
- Understand how grain-scale variations largely determined by sedimentary provenance, weathering and transport factors affect reservoir quality.
- Integrate seismic, outcrop, core, and other oil and gas industry data at multiple scales to learn about sedimentary transport processes and depositional products.
- Use modern and ancient DW depositional systems to understand geologic risk and uncertainty pertaining to reservoir presence, reservoir quality and seal presence.

APPLIED SEISMIC INTERPRETATION

Instructor: James J. Willis, PhD
Discipline: Geoscience
Length: 2 Days (Classroom), 4 Half-Day Sessions (Live Online)
Ceus: 1.6
Availability: Public, In-House, & Live Online

Who Should Attend:
Petroleum geoscientists, petroleum engineers and those interacting with or supporting these professionals in the search for or the exploitation of hydrocarbons.

Course Description:
In this two-day course, participants review and apply the basics of seismic interpretation as related to oil and gas exploration, development and production. During the first morning, there is a review of the geophysical principles of reflection seismology without getting deeply into the math. This includes a brief look at seismic acquisition and processing. The first afternoon focuses on tying well data to seismic lines and structural (fault) interpretation. A major exercise has students generate a time structure map in a complexly faulted area.

Day two covers three main topics: (1) mapping seismic sequence boundaries, (2) interpreting depositional environments and likely sedimentary facies, and (3) estimating ultimate recovery for a prospect or newly discovered field.

Learning Outcomes:
- Understand the basic physics behind reflection seismology.
- Comprehend the seismic display and its limitations.
- Explain the main types of seismic interpretation methods.
- Conduct a well-to-seismic tie (transfer of horizons and faults).
- Identify and map a series of major faults using seismic data.
- Recognize and map seismic sequence boundaries.
- Develop a time structure map, including fault traces.
- Use reflection geometries and attributes to predict depositional environments.
- Determine the EUR (estimated ultimate recovery) for a prospect or discovery.

Course Content:
- What generates seismic reflections?
- What happens before interpretation begins?
- Seismic displays and their limitations
- Basic seismic interpretation methods
- Relating well data to seismic data
- Extracting structural information
- Extracting stratigraphic information
- Generating time structure maps
- Predicting depositional environments & facies
- Estimating EUR (estimated ultimate recovery)

"Learning never exhausts the mind."
Leonardo da Vinci

Featured Instructor:

Sia Agah

Sia has taught Applied Subsurface Geological Mapping (ASGM) over 150 times, having first taught it in 2002 under the guidance of SCA's founder and class creator, Dan Tearpock. Sia holds an MA in Petroleum Geology from the University of London. He was with the National Iranian Oil Co. (NIOC) in Tehran for 13 years, working as a geologist, a wellsite geologist, a senior geologist, and a geological advisor until 1979 when he joined Conoco. While there, he worked as Senior Geologist, Chief Geologist, Exploration Manager, and New Ventures Vice President in Houston, Tunisia, Angola, and the UAE (Dubai), respectively. After early retirement in 1997, Sia moved to UMC/Ocean Energy to set up and manage their South Asia - Middle East Exploration Department and manage seven exploration blocks in Pakistan, Bangladesh, and Yemen. He has an extensive knowledge of the petroleum geology of the Middle East, South Asia, North Africa, and Offshore West Africa, and Brazil.

Courses Taught:
- Applied Contouring Methods
- Applied Subsurface Geological Mapping

Featured Instructor:

Jim Brenneke

James (Jim) Brenneke graduated from Augustana College with a BA in Geology and an MS in Geology from the University of Illinois. He joined Shell Oil Company (US) and worked for various Shell subsidiaries in research, international exploration, and domestic exploration and production. He then joined Subsurface Consultants and Associates, LLC (SCA) as a consulting geoscientist. In addition to consulting, he assumed various management roles with SCA including Technical Manager, Vice President of Geology & Engineering, and Treasurer. He then joined BP's deepwater Gulf of Mexico (GoM) Production organization. Jim has contributed to numerous exploration discoveries, field extensions, and development wells in his 40 years in the industry. He has published on deep sea carbonates and on assessing fault traps.

Course Taught:
- Applied Subsurface Geological Mapping

APPLIED SUBSURFACE GEOLOGICAL MAPPING
"SCA's Flagship Course"

GEOSCIENCE

Instructor: Sia Agah, Bob Shoup, or Jim Brenneke
Discipline: Geoscience
Length: 5 Days
CEUs: 4.0
Availability: Public & In-House

Who Should Attend:
Geologists, geophysicists, engineers, managers, support staff involved in exploration or development.

Course Description:
This course covers fundamental and advanced methods of subsurface mapping used by the most proficient exploration and development geoscientists in the industry, as well as an introduction to recent advances in interpretation. Mapping techniques, examples and exercises for extensional and compressional tectonic settings are the core of the course. Diapiric and strike-slip faulted structures are discussed. Volumetric mapping is presented, and numerous pitfalls in reservoir volume determinations using isochore maps.

This course provides the applied, hands-on knowledge required to generate sound subsurface maps. Subsurface geologic maps are important and widely used documents in petroleum exploration and development. Geoscientists and engineers must understand and be able to efficiently and accurately generate many types of subsurface maps. Many geoscientists have not had formal training in the fundamental principles and methods that underlie accurately constructed subsurface maps, whether the data source is a seismic interpretation, well log correlation or both. Participants of this course will receive the *Applied Three-Dimensional Subsurface Geological Mapping with Structural Methods* textbook and a lab manual with exercises.

Learning Outcomes:
- Understand the application of different hand contouring and the pitfalls of selected computer contouring methods.
- Capability of integrating fault data from well logs and seismic data.
- Generate fault surface interpretations and maps.
- Understand the construction and application of various types of cross sections.
- Generate net pay isochore maps for both bottom and edge water reservoirs.

Course Content:
- Philosophical doctrine, workflow and methodology of mapping
- Contouring and contouring techniques
- Directionally drilled wells and directional surveys (applications to mapping)
- Log correlation techniques for vertical and deviated wells (applications to mapping)
- Integration of geophysical data in subsurface mapping
- Cross section construction for extensional, compressional strike-slip and diapiric tectonic settings
- Fault surface mapping using well log and seismic data
- Structure mapping in extensional, compressional, strike-slip and diapiric tectonic settings
- Isochore map construction (bottom water and edge water reservoirs)
- Net sand and pay correction factors for directionally drilled wells
- Structure vs porosity top mapping
- Walking wells
- Fault wedge mapping
- Pitfalls of computer generated maps
- Volumetric calculations
- Isopach map construction

AVO, INVERSION AND ATTRIBUTES: PRINCIPLES AND APPLICATIONS NEW

Instructor: James J. Willis, PhD
Discipline: Geoscience
Length: 5 Days
CEUs: 4.0
Availability: Public & In-House

Who Should Attend:
Geologists, geophysicists, petrophysicists, reservoir engineers, and exploration/production managers.

Course Description:
This course provides an understanding of the evolving role of seismic petrophysics through the use of amplitude variations with offset or angle (AVO/AVA), attributes, and inversion techniques. Understanding rock physics and the behavior of the propagating seismic waves represents an integral part of the course, especially in the context of specific applications including enhanced seismic interpretation, rock and fluid characterization, including hydrocarbon identification and quantification, fracture identification, and stress/geomechanical analysis. Course concepts are enhanced by numerous practical exercises and case studies..

Learning Outcomes:
- Understand the fundamentals of seismic wave propagation and specific attributes of seismic measurements toward enhanced interpretation and petrophysics.
- Learn the pros and cons of various attributes in various facets of investigation, including stratigraphy/sedimentology, structural geology and geomechanics, and seismic petrophysics.
- Learn how to determine elastic properties from AVO/AVA analysis for fluid and lithologic discrimination.
- Learn how to integrate well data through seismic inversion techniques.
- Understand the role of seismic attribute analysis and related techniques in understanding risk elements from exploration, drilling and completion, and development stages.

PLEASE NOTE: PARTICIPANTS ARE REQUIRED TO BRING THEIR OWN LAPTOPS.

Course Content:
- Introductory Interpretation Exercises
- Review of the Seismic Process
  - Review of seismic fundamentals
- General Seismic Interpretation
- Seismic Attributes Analysis
- AVO Analysis
  - In-depth investigation into amplitude versus offset (angel) analysis
- Seismic Inversion
  - Examination of techniques and benefits of seismic inversion
- Borehole Seismology
  - Borehole seismic measurements and techniques
- Enhanced Fault Interpretation from Seismic Attributes
  - Extracting more fault information from seismic data
- Seismic Anistropy Analysis
  - Fracture ID
  - Stress Analysis from Seismic Data
- Reservoir Characterization and Understanding Risk
  - Summary discussion of the role of seismic data and analysis in integrative studies
- Case Studies
- Exercises
  - Numerous hands-on exercises throughout the course to enhance understanding of key concepts and topics

CARBON CAPTURE UTILIZATION AND STORAGE - A GEOLOGICAL PERSPECTIVE NEW

Instructor: Stephen A. Sonnenberg, PhD
Discipline: Geoscience, Engineering, Multi-Disciplinary & Intro
Length: 2 Days (Classroom), 4 Half-Day Sessions (Live Online)
CEUs: 1.6
Availability: Public, In-House, & Live Online

Who Should Attend:
Geologists, geophysicists, and engineers who are interested in geologic carbon capture utilization and storage.

Course Description:
This course will discuss carbon capture utilization and storage (CCUS) from a geologic perspective. Examples from carbon capture utilization (CCU) including enhanced oil recovery (EOR) projects will be shown. Known and proposed carbon capture storage (CCS) examples will also be covered.

Learning Outcomes:
- CCUS Options.
- Screening Criteria for CCU.
- Screening Criteria for CCS.
- Relevant Mineral Reactions to Consider.
- Monitoring of Projects.
- Induced Seismicity.

Course Content:
- Introduction and Geologic Considerations
  - Greenhouse gases
  - CCUS options
  - CO_2 phase behavior
  - Subsurface brines
  - Some mineral reactions
  - Hydrocarbon traps (key elements)
  - Induced seismicity
- CO_2 Storage in Depleted Oil and Gas Reservoirs
  - Screened for production volume, depth, proximity of anthropogenic CO_2 source
  - Reservoir size and properties
  - Trap
  - Seal
- Enhanced Oil Recovery and Enhanced Gas Recovery
  - What is it?
  - Where is it applied?
  - How does it work?
  - Examples
  - EOR in unconventionals
- Gas Storage Fields and CO_2 Options
  - Review of gas storage field types
    - Depleted oil and gas fields
    - Salt caverns, mines, etc.
    - Aquifer storage fields
  - CO_2 Options
- Enhanced Coalbed Methane (CBM) and CO_2 Storage in Deep Coal Seams
  - CBM basics
  - Enhanced CBM with CO_2
  - CO_2 options in deep un-mineable coal seams
- Enhanced Shale Gas and CO_2 Storage
  - Shale gas basics
  - CO_2 options
- CO_2 Injection in Saline Aquifers
  - Selection criteria
  - Examples
- CO_2 Fields and Options
  - Review of CO_2 fields
  - CO_2 options
- Enhanced Geothermal Options
- CO_2 and Carbonation Options
  - Geological disposal - mineralization
  - Mineral reactions
  - Examples
- Summary and Wrap-Up

CARBON CAPTURE UTILIZATION AND STORAGE - AN ENGINEERING PERSPECTIVE NEW

Instructor: Christine Ehlig-Economides, PhD and Dimitrios Hatzignatiou, PhD
Discipline: Geoscience, Engineering, Multi-Disciplinary & Intro
Length: 3 Days (Classroom), 5 Half-Day Sessions (Live Online)
CEUs: 2.4
Availability: Public, In-House, & Live Online

Who Should Attend:
Petroleum engineers and geoscientists interested or already engaged in methane and carbon dioxide (CO2) capture from industrial and agricultural sources and from the air, CO2 utilization for enhanced oil recovery (EOR), and CO2 storage in depleted reservoirs and saline aquifers.

Course Description:
The primary topics of discussion during this course are (1) Methane leak avoidance and CO_2 emissions capture, (2) CO_2 EOR, (3) Blue hydrogen and CO_2 transport and storage, (4) Saline aquifer storage with Monitoring, Reporting and Verification (MRV), and (5) Economics.

Learning Outcomes:
- Estimate CO2 storage capacity, well injectivity, a suitable Monitoring, Reporting, and Verification (MRV) plan, and storage cost in $/tonne, based on geologic models and (where applicable) reservoir production data in both clean and shaley intervals.
- Explain quantitative evidence for sustainable CO_2 storage in terms the public can understand.
- Locate information essential to storage asset evaluation from digital publications and online data.

Course Content:
- Course Rationale
  - Uses for fossil resources
  - Greenhouse gas (GHG) emission sources
  - GHG storage options
  - CO_2 capture and utilization
- Decarbonizing Oil
  - Maximized CO_2 storage in depleted oil reservoirs
  - Currently active EOR+ projects
  - Carbon neutral crude oil
- Decarbonizing Natural Gas
  - CO_2 storage in depleted gas reservoirs
  - CO_2 storage in a blue hydrogen economy
  - Hydrogen storage
- CO_2 Storage in Saline Aquifers
  - CO_2 storage in deep saline aquifers
  - Wells and CO_2 injection
  - Monitoring, Reporting, and Verification
- Economics
  - Are we making money yet?
  - Incentives
  - Value products

At SCA, our motto is:

"EXCELLENCE THAT RUNS DEEP"

This same commitment extends to our other upstream services, which include consulting, projects and studies, oil and gas advisory services, quality assurance, and direct hire recruiting. At all levels of our organization, we are led by years of direct, applied industry experience.

Whether for hiring decisions or strategic investments, SCA's recommendations are grounded in professional ethics, and supported by respected authorities and decision makers.

CARBONATE SEDIMENTOLOGY AND SEQUENCE STRATIGRAPHY

Instructor: Oscar Lopez-Gamundi, PhD
Discipline: Geoscience
Length: 5 Days (Classroom), 10 Half-Day Sessions (Live Online)
Ceus: 4.0
Availability: Public, In-House, & Live Online

Who Should Attend:
Designed for geologist, geophysicists, and engineers actively working in the exploration and production of carbonate rocks.

Course Description:
This five-day course covers the basic concepts of carbonate sedimentology and sequence stratigraphy with emphasis on their practical applications for oil and gas exploration, appraisal and production. All concepts are illustrated with examples of outcrop well-log, core and seismic data.

Learning Outcomes:
The ultimate objective of the course is to provide the geologists, geophysicists and engineers with tools and methodologies of carbonate sedimentology and sequence stratigraphy to effectively predict the presence and quality of reservoir, source rock and seal.

Course Content:
- Principles of Carbonate Production
  - Modes of marine precipitation, carbonate-specific aspects of deposition and erosion.
  - Differences with clastic sedimentation. Carbonate mineralogy and diagenesis.
  - Classification of carbonate rocks.
- Marine Modern Carbonate Environments and Facies Models.
- Carbonate Depositional Systems: Marine shallow-water and deep-water carbonates.
- Non-Marine (lacustrine) Carbonates.
- Geometry of carbonate accumulations: ramp, platforms, slope, localized accumulations, reefs and subtypes. Wilson's facies belts.
- Carbonate Sequence Stratigraphy.
  - Systems tracts: lowstand (LST) transgressive (TST) and highstand (HST) system tracts.
  - Relative sea level changes deduced from seismic. Shoreline trajectory.
  - The catch-up and keep-up highstand platform models.
  - Lowstand deposits: allochthonous wedges, autochthonous wedges and platform/bank margin wedges.
- Selected Examples:
  - Anatomy of a reef: The Capitan Reef (Permian), Texas, USA
  - An isolated carbonate platform: the supergiant Tengiz Field (Carboniferous), Kazakhstan
  - A seismically well-imaged, back-stepping platform, the Tertiary of the Maldives Islands
  - Microbial limestones as reservoirs: the pre-salt (Cretaceous) of offshore Brazil

DEEPWATER OPERATIONS GEOLOGY AND THE TECHNOLOGY TO ACQUIRE & EVALUATE DATA DURING OPERATIONS NEW

Instructor: John Keasberry
Discipline: Geoscience
Length: 5 Days
CEUs: 4.0
Availability: In-House

Who Should Attend:
All geoscientists, petroleum engineers, well engineers, and technical personnel who in the course of their career will attend or direct subsurface and wellsite operations.

Course Description:
Participants will review a series of technical challenges for deepwater exploration operations through lectures, operations management models and key technologies, and discuss the possible solutions to problems encountered in deepwater exploration operations. They will also improve their understanding of geological operations in general. All sessions relate to geology, whether it covers geophysics, petrophysics, drilling or reservoir engineering.

Course Content:
- **Session 1.** Introduction. Scope and Course brief.
- **Session 2.** Geophysical overview. Covers all geophysical data acquisition with particular emphasis on seismic and interpretation, with some exercises.
- **Session 3.** Drilling Operations overview. In this session, deepwater and ultra-deep wells will be highlighted. Basic drilling operations in various environments will be discussed as well. UDW, UDWW, Macondo-1 and its failure will also be reviewed.
- **Session 4.** Wellsite Geology. The main topic of discussion is the collation of geological data at the wellsite, this including responsibilities and reporting of that collation. Operations at the wellsite are also discussed.
- **Session 5.** Mudlog and Cuttings. Discussion followed by a major hands-on exercise. This is essential in all drilling operations as it constitutes the first geological information to the surface.
- **Session 6.** Cuttings and Core description. A number of samples and cores will be provided for the participants to describe and interpret.
- **Session 7.** Operations Geology for Deepwater. Discussions around management of the collated data at the wellsite. Highlights include proper (re)presentation of the data, pre-spud operations and reporting, reporting-while-drilling, and post operations reporting.
- **Session 8.** Well logging Operations overview. Theory and application of the most common logging tools are covered. Emphasis will be put on the implication of logging in UDW and UDWW.
- **Session 9.** Well Testing overview. This session covers geological information which could be obtained away from the wellsite leading to a better understanding of the target reservoir.

(Note: cutting samples and cores, exercises, and videos are provided)

EFFECTIVE PETROLEUM SYSTEMS ANALYSIS NEW

Instructor: Bob Shoup
Discipline: Geoscience
Length: 3 Days
CEUs: 2.4
Availability: In-House

Who Should Attend:
Prospect generators, property and prospect evaluators, supervisors, managers, bankers, investors and anyone involved in preparing, reviewing, or evaluating subsurface interpretations, prospects, fields and reserves or resources.

Course Description:
This course is designed to provide geoscientists with an understanding of all the elements of the petroleum system including how to put those elements together to define plays and to find leads and prospects in those plays. Moreover, the class includes a number of industry best practices that can be used to ensure that the interpreters have made valid maps and interpretations so that they can properly evaluate and risk those prospects.

Learning Outcomes:
- Understand the various types of data needed to understand the "Earth Model".
- Learn how to use the data as well as geologic models and principles to understand and delineate each element of the petroleum system.
- Be able to bring the petroleum system elements together in order to define plays and to find, evaluate, and risk prospects.
- Generate Common Risk Segment maps to define play fairways.
- Ensure geological and geophysical interpretations are valid and internally consistent by honoring all the data.
- Uncertainty and risk assessment in prospect evaluations.

Course Content:
- Day 1 Morning
  - Introduction, 10 Habits of Highly Successful Oil Finders, Logical Thinking On-screen Exercises
  - Data Integration, Data Types, Data Linkages
  - Earth Model and Play Based Exploration
  - Various Log Correlation and Cross Section Exercises
- Day 1 Afternoon
  - Cross Section Exercise, Contouring Review, Rules and Methods, and Exercise
  - Tectonic Framework, Rift Basin Geometries, Basement Mapping (Seismic, Gravity-Mag)
  - Chumphon Basin Mapping Exercise
  - Discussion of Structural Framework Exercise, Tectonic Framework; Inversion
- Day 2 Morning
  - Tectonic Framework, Salt Tectonics, Shale Tectonics, Compressional Tectonics, Strike Slip Tectonics, Seismic Correlation and Mapping Exercises
- Day 2 Afternoon
  - Stratigraphic Framework, Clastics; Delivery Systems, Dispersal Systems, Meandering River Mapping Exercise
  - Stratigraphic Framework, Clastics; Dispersal Systems (Alluvial Fan Deltas, Submarine Fans); Alluvial Fan Mapping Exercise; Submarine Fan Interpretation and Mapping Exercise
- Day 3 Morning
  - Carbonate Reservoirs, The Petroleum System, Source Rock Types, Depositional Systems, Migration, Exercise
- Day 3 Afternoon
  - Chumphon Common Risk Segment Mapping Exercise
  - Prospect Evaluation, PRMS, Uncertainty

ELEMENTS OF PETROLEUM GEOLOGY

Instructor: Stephen A. Sonnenberg, PhD
Discipline: Geoscience, Multi-Disciplinary & Intro
Length: 3 Days (Classroom), 6 Half-Day Sessions (Live Online)
CEUs: 2.4
Availability: Public, In-House, & Live Online

Who Should Attend:
Geologists, geophysicists, & engineers who are interested in learning about petroleum geology (the basics to advanced topics).

Course Description:
The course will use a petroleum system approach, reviewing the elements (source, reservoir, seal, and overburden rocks) and processes (generation, migration, entrapment, and preservation). We will examine: a) those basic factors that control hydrocarbon generation, migration, and accumulation; b) procedures used to discover and produce those hydrocarbons; c) data collection and interpretation techniques; d) the roles and skills required of exploration and development professionals, and e) the worldwide occurrence of hydrocarbon deposits.

This course is appropriate for those wanting a comprehensive understanding of important aspects of petroleum geology. Exercises are interspersed with lectures to emphasize learning outcomes. Enhance your professional growth in the areas of geology, geophysics and engineering related to petroleum exploration and development.

Learning Outcomes:
- The participant will become familiar with elements of petroleum geology.
- This includes petrophysics (log analysis), source rock evaluation, capillary pressure analysis, subsurface pressure analysis (including hydrodynamics), DST analysis, subsurface water analyses, and subsurface mapping and correlation techniques.

Course Content:
- Introduction & world resources
- Sedimentary basins, plate tectonics
- Petroleum systems
- Reservoir rocks, reservoir heterogeneity
- Fractured reservoirs
- Sweet spots
- Porosity and permeability
- Petroleum traps
- Formation evaluation, Pickett, Buckles, Hingle plots
- Low resistivity & low contrast pays
- Review of chemistry of petroleum
- Organic matter types in recent sediments
- Kerogen & maturation
- Lab methods, interpretation of data, biomarkers
- Composition of crudes, natural gas
- Primary & secondary migration
- Capillary pressures
- Subsurface pressures/DST analysis
- Fluid pressure compartments
- Subsurface temperatures
- Subsurface waters
- The importance of subsurface shows
- Unconventional traps
- Risk
- Resources and reserves

ENERGY TRANSITION FOR PETROLEUM PROFESSIONALS NEW

Instructor: D. Nathan Meehan, PhD, PE
Discipline: Geoscience, Engineering
Length: 3 Days (Classroom), 6 Half-Day Sessions (Live Online)
CEUs: 2.4
Availability: Public, In-House, & Live Online

Who Should Attend:
Reservoir engineers, petroleum engineers, production engineers, geologists, geophysicists, managers, independent operators, marketing personnel and anyone who needs a practical understanding of the energy transition and how it will affect future oil and gas activities and what the opportunities are to be "part of the solution."

Course Description:
This course is designed for energy professionals with an understanding of oil and gas operations and activities but not necessarily any background in climate change, energy transition, life cycle analysis or alternative fuels. The course emphasizes the role of fossil fuels in a world with increasing drivers away from such fuels. Practical approaches to minimize the carbon impact of oil and gas operations are presented.

Learning Outcomes:
- Understanding of key drivers for alternative energy and the energy transition.
- Understanding of quantitative ways to evaluate carbon intensity of oil and gas operations and ways to lower that impact.
- Understanding of key policy issues associated with the energy transition.
- Understanding of carbon capture, utilization, and storage (CCUS) and other major opportunities to profit from the energy transition.

Course Content:
- History of energy
- Drivers for the transition
  - Macroeconomics
  - Climate change
  - Goverment and policy
  - Technology and cost
  - Differing regional baselines and transition pathways
- Not all zero-carbon power comes from renewables, not all renewables are carbon-free
- Decarbonizing oil and gas
- CCUS
- Industry-specific issues
- Case studies
- The way ahead

FOUNDATION OF PETROPHYSICS NEW

Instructor: James J. Willis, PhD
Discipline: Geoscience
Length: 5 Days
CEUs: 4.0
Availability: Public & In-House

Who Should Attend:
Geoscientists and engineers with less than twelve months experience using petrophysical data, and other technical staff at all experience levels wanting a fundamental background in the petrophysics discipline.

Course Description:
Petrophysics is essential to all aspects of the petroleum business. The integration and application of petrophysical information for reservoirs will be discussed. The course will follow and use the textbook, *Basic Well Log Analysis, Second Edition, AAPG Methods in Exploration No. 16*, by George Asquith and Daniel Krygowski. Additional supplemental materials will be used to enhance the primary text. The course is designed from an applied standpoint, with numerous examples and exercises from the petroleum industry.

Course Content:
- Introduction – the "need" for petrophysical analysis and formation evaluation, with worldwide case examples illustrating their importance to hydrocarbon exploration and production.
- Sedimentary Petrology – classification of clastic and chemical sedimentary rocks; impact of weathering, burial, and lithification on sedimentary rocks; cement types and origin.
- Porosity and Permeability – definitions and equations; primary versus secondary (or further); absolute, effective, and relative; isotropic versus directional; impact of grain packing arrangements, matrix materials, and fluid types.
- Formation Fluid Properties – fresh versus saline water; hydrocarbon types; mixed systems and fluid saturation; API gravity equation; pressure regimes; temperature.
- Resistivity Logging and Analysis – concepts in well logging; formation fluids versus drilling fluids; depth of invasion; the Archie Equation; resistivity log types and analysis (induction logs, micrologs, and laterologs); interpretation examples.
- Spontaneous Potential Logging and Analysis – basic concepts and theory; shale effect; hydrocarbon response; bed thickness effect; inversion effects; correlation and sedimentologic analysis; interpretation examples.
- Gamma Ray Logging and Analysis – basic concepts and theory; borehole corrections; shale index; interpretation examples.
- Density Logging and Analysis – basic concepts and theory; bulk density and porosity determinations; effects of shale, mud cake, borehole irregularities, residual hydrocarbons and other phenomena; interpretation examples.
- Acoustic Logging and Analysis – basic concepts and theory; acoustic wave propagation; compressional versus shear waves; acoustic log types; porosity determination; determination of abnormal formation pressures, rock mechanical properties, and cement quality; fracture detection; interpretation examples.
- Neutron Logging and Analysis – basic concepts and theory; neutron log types; exponential versus logarithmic methods; porosity determination; effects on neutron log measurements; interpretation example.
- Other Log Types, Integrative Analysis of Multiple Log Types, Summary and Concluding Remarks.

GEOLOGY-BASED TOPICAL CONTOURING WORKSHOPS NEW

Instructor: Bob Shoup
Discipline: Geoscience
Length: 3-5 Days (Classroom), 12 Half-Day Sessions (Live Online)
Course CEUs: 2.4 - 4.0
Availability: Public (5 Classroom Days or 12 Half-Day Sessions), In-House (Customizable Duration), & Live Online (12 Half-Day Sessions)

Who Should Attend:
Geologists, geophysicists, petrophysicists, reservoir engineers and managers who are exploring for and developing oil and gas fields in conventional and unconventional petroleum systems.

Course Description:
This is a unique training program in which clients can design a customized three- to five-day training course comprised of critical skill modules (see workshops detailed below) coupled with hands-on exercises. There are two common management complaints: 1} My staff does not understand the geology of their prospects, and 2) My staff does not understand their maps. These workshops are designed to address and remedy both of those complaints.

Interpreters must know what they are contouring to generate a valid map. Simply relying on a computer contouring algorithm without having a fundamental understanding of what that map should look like all but guarantees bad maps and dry holes.

In each workshop, participants will learn the fundamental aspects of the geology of the setting covered in that workshop. This combined hand-contouring exercises will help interpreters better understand not just their maps, but the geology of their prospects as well.

Geological Contouring Workshops:
- Introduction: Basic Contouring
- Workshop 1: Fault Mapping (This workshop is a prerequisite for Workshops 2-6)
- Workshop 2: Rift Basin Structures
- Workshop 3: Growth Fault Structures
- Workshop 4: Salt Structures
- Workshop 5: Compressional Structures
- Workshop 6: Strike Slip Structures
- Workshop 7: Clastic Reservoirs
- Workshop 8: Carbonate Reservoirs
- Workshop 9: Formation Attributes
- Workshop 10: Isochore Maps and Resource Evaluation
- Workshop 11: Cross Section Workshop (Vertical Maps)

Format: Each workshop is a mix of lecture and paper-pencil exercises. The class can be attended in-person or in a live online format.

Learning Outcomes:
- Understand how to evaluate and validate contour maps generated in the workstation.
- Understand the methods and techniques needed to generate valid structure maps.
- Improved understanding of the geology of their plays and prospects.

GEOSTEERING: BEST PRACTICES, PITFALLS, & APPLIED SOLUTIONS

Instructor: SCA Staff
Discipline: Geoscience, Unconventional Reservoirs
Length: 2 Days (Classroom), 4 Half-Day Sessions (Live Online)
Course CEUs: 1.6
Availability: Public, In-House, & Live Online

Who Should Attend:
Geologists, engineers, managers, and field team involved with geosteered horizontal wells.

Course Description:
This course covers topics that impact geosteering efforts, including best practices that address sources of difficulty, a review of "good outcomes", plus examples from a variety of plays. Explore four categories of potential problems, their origins, how to recognize them, and how to mitigate them. With these issues in mind, best practices for each of the following phases are covered: pre-drill phases, drilling the curve, landing the curve, drilling the lateral, and post-drill best use of results.

Learning Outcomes:
- Learn importance of geosteering and what defines a geosteering success.
- Look critically at pre-drill geologic work-up, potential impacts.
- Learn pitfalls inherent to geosteering techniques.
- Learn to recognize LWD-MWD telemetry problems, some pre-drill considerations to avoid LWD telemetry problems, mitigation options.
- Recognition of deficient LWD data, simple approaches to problems.
- Learn Positional Uncertainty
- Focus on cultural issues within horizontal well team, communication strategies.
- Learn best practices for each phase of horizontal well.

PLEASE NOTE: PARTICIPANTS ARE REQUIRED TO BRING THEIR OWN LAPTOPS.

Course Content:
- Definition of Successful Geosteering
  - Specifically, what is the main priority?
  - A realistic definition; examples of effectively steered wells
  - Geosteering: A nightmare for perfectionists
  - Terminology: Not in textbooks, but critical!
- Pre-Drill Geologic Analysis - Common Relevant Pitfalls
  - Matter of resolution plus over-dependence on technology, over-confidence in deficient data, and interpretive bias
  - Mapping styles, mistakes, impacts
  - Stratigraphic: "Layer Cake Geology"? White space in maps
  - Structural: invisible, detail-scale complexities
- Geosteering Techniques - Advantages/ Disadvantages
  - Surface logging, relying on simple measured depth data, relying on measured depth plus TVD logs, software: 3D modeling tools, KBTVD-based software, common procedural issues
- Pitfalls in Directional Data
  - Telemetry problems; MWD-LWD log curves
  - Surveys - positional uncertainty
- Inter-Disciplinary Culture/Communications
  - Priorities of geologists/engineers/well site team; individual backgrounds
  - Resulting conflicts/intra-team diplomacy; handling a difficult team member
  - Communication is critical!
- Best Practices at Each Stage, from a Practical Standpoint
  - Pre-drill phase, drilling curve, lateral drilling, post-TD: leveraging new data effectively

INTEGRATED DEEPWATER DEPOSITIONAL AND PETROLEUM SYSTEMS

Instructor: Bradford E. Prather
Discipline: Geoscience
Length: 5 Days
CEUs: 4.0
Availability: In-House

Who Should Attend:
Geologists, geophysicists, petroleum engineers, supervisors, managers, and technical support staff who are interested in learning the fundamentals of deepwater (turbidite) petroleum systems for application to frontier exploration.

Course Description:
The play based exploration approach is extensively used in the oil industry and relies on developing a thorough understanding of the evolution of key sedimentary sequences through time using Gross Depositional Environment (GDE) Maps. This course provides the knowledge needed to make GDE maps of deepwater stratigraphy and their use in making Common Risk Segment (CRS) maps, leading eventually to the development of a final Yet-to-Find (YTF) analysis of a deepwater play segment. The course is designed around a well-established industry approach (play based exploration). Exercise objectives are to identify and assess a portfolio of prospects from an existing deepwater play.

Learning Outcomes:
- Hands-on experience building and using gross depositional environments (GDE) maps to assign risks to a portfolio of prospects.
- Understand the methodologies for construction of Common Risk Segment (CRS) maps.
- Experience assembling a portfolio of deepwater prospects.
- Gain an appreciation of the factors that control the distribution or reservoir, seal and source rocks
- Learn how to risk a prospect inventory
- Risk reservoir, seal, charge and structure of an individual prospect.

Course Content:
- Seismic resolution of deepwater depositional stratigraphy
- Basic slope depositional processe
- Classification of gross depositional environments
- Deepwater Gross Depositional Environment (GDE) mapping
- Techniques for the classification and mapping of seismic facies
- Slope sediment partitioning
- Construction of CRS maps of reservoir, seal and source rock.
- Identification of a portfolio of prospect/leads
- Identification of the "flagship" prospect
- Assignment risks, volumetric inputs and distribution types
- Generation of a probabilistic volume distribution for "flagship" prospect
- Assessment of play scale reservoir, source, seal and structure risks

IN-WELL FIBER-OPTIC SENSING NEW

Instructor: Dennis Dria, PhD
Discipline: Engineering, Geoscience
Length: 2 Days
CEUs: 1.6
Availability: Public & In-House

Who Should Attend:
Completion, drilling, production, surveillance, and reservoir engineers who need an introduction to the design and use of fiber-optic instrumented well installations, as well as geologists and geophysicists who need an understanding of the capabilities of in-well fiber-optic sensing.

Course Description:
This two-day training event introduces petroleum engineers and geoscientists to fiber-optic sensing technology that is used for well and reservoir diagnostics and surveillance. Each day may be taken individually to satisfy a particular need (technology awareness, review prior to beginning FO field projects, introduction to current preferred practices) or as a sequence to obtain a more thorough understanding (to move user through "awareness" to "knowledgeable" level).

Learning Outcomes:
- How fiber-optic sensors work.
- Where and how fiber-optic sensing can create value.
- Technical and economic factors that influence the selection and justification for installing DAS/DTS systems in specific well types.
- Completion and monitoring components needed to deliver a DAS/DTS-monitored well.
- Installation and commissioning operations.

Course Content:
In-Well Fiber-Optic Sensing: Introduction to the Technology and Applications (Day 1)
- What is Fiber-Optic Sensing (FOS): basic physics and engineering of the FOS system components: fibers, coatings, cabling, connectors optical fibers, sensor types, instrumentation.
- Why we would want to use FOS: advantages and disadvantages vs. other sensing/ monitoring technologies.
- Overview of the different applications
- Survey of FOS system deployment methods
- Data management and analysis/ interpretation
- Factors that influence FOS system selection
- High-level screening of candidate wells and justification for installing FOS

In-Well Fiber-Optic Sensing: Applications and Deployment (Day 2)
"Applications for Diagnostics and Surveillance"
- Introduction to "Life-of-Field" monitoring with Fiber-Optic Sensing (FOS)
- Using FOS for completion and stimulation diagnostics
- Life-of-field surveillance
- What FOS provides (where it works), what it misses (advantages/disadvantages vs. other monitoring tools)
- Integration (synergy) with other monitoring methods

"Deployment of Fiber-Optic Sensing Systems: Well Design and Installations"
- Fiber-optic sensing (FOS) well architectures
- FOS system – component selection and specification
- Well design modifications needed to accommodate FOS
- Installation operations
- Commissioning

MANAGING MATURE OILFIELDS WITH CAPACITANCE-RESISTANCE MODELLING NEW

Instructor: Larry Lake, PhD and Jerry Jensen, PhD
Discipline: Geoscience, Engineering
Length: 2 Days (Classroom), 4 Three-Hour Sessions (Live Online)
CEUs: 2.4
Availability: Public, In-House, & Live Online

Who Should Attend:
Engineers and geoscientists with 2 or more years of experience in managing and/or developing mature oil fields. Students should have basic proficiency in Excel and bring their own laptop.

Course Description:
Developing and managing mature oil fields can have many challenges. Ideally, a history-matched reservoir simulation model using a comprehensive reservoir model will guide choices, such as well locations and water injection rates. Many fields, however, lack such tools and need simpler, less sophisticated methods to improve results. This is where the capacitance-resistance model (CRM) can help.

The CRM evaluates injector-producer connectivity using injector and producer flow rates and bottom hole pressures (if available). It is a simplified model capturing the effects of injection on production and does not require any geological model to operate. Results can be used to adjust injection rates, identify fluid escape, and compare with geological information. CRM results can also help reservoir simulation model development.

This course provides prospective users with the knowledge to use the CRM and apply its results to manage mature fields. Through numerous field examples, we show how the CRM can be applied and the results interpreted. Both engineers and geoscientists will see how the results can help their challenges.

Learning Outcomes:
- Introduce CRM method.
- Describe CRM versions and their advantages.
- Illustrate CRM capabilities.
- Provide case studies showing applications.

Course Content:
- CRM basics and variations (4 hours)
  - Basic flow equations
  - CRMT + exercise
  - CRMP + spreadsheet demo
  - CRMIJ
  - ICRM
- CRM uncertainty (2 hours)
  - Data sufficiency and CM number
  - CRM parameter sensitivities to noise and well interventions
  - CRM behavior
- Applications 1 (2 hours)
  - Primary recovery
  - Flow capacity curves
  - Tracers and CRM
- CRM modified versions (2 hours)
  - Segmented
  - Compensated
  - Pseudo well
- Applications 2 (4 hours)
  - Segmented
  - Oil production modelling
    - Gentil model
    - Koval model
    - Application to CO_2 flooding
- Percolation basics (2 hours)
  - Percolation; relevance to reservoir behavior
  - Non-linear behavior of connectivity
  - Geological uncertainty and effects on connectivity
- Case studies (4 hours)
  - Comparison to seismic
  - Integration with geology
    - Heavy, conventional, tight oil waterfloods

MAPPING & INTERPRETING CLASTIC RESERVOIRS

Instructor: Bob Shoup
Discipline: Geoscience
Length: 4 or 5 Days
CEUs: 4.0
Availability: In-House

Who should attend:
E&P professionals involved in the prediction or delineation of clastic reservoirs. Professionals early in their career, experienced professionals new to working with clastic reservoirs.

Course Description:
Ability to predict reservoir presence/map net reservoir in clastic depositional systems is dependent on understanding depositional geometries of depositional systems and variation of patterns within those systems. Processes associated with sediment delivery/sediment dispersal is a fundamental control on architectural geometry of depositional system. Processes associated with interplay between sediment input/accommodation space are fundamental controls on lateral/vertical stacking patterns.

Geometry of depositional systems is similar regardless of depositional location/scale. Patterns within geometries are similar/predictable. Whether the reservoir being studied was deposited on land or on a submarine fan, the geometry of deposition is similar. Interpreters should become familiar with the geometries of clastic depositional systems and patterns that occur within those geometries.

Modern/outcrop analogs are used along with subsurface examples to provide interpreters with an understanding of reservoir distribution and the quality of clastic depositional systems. The exercises are deigned to provide a strong working knowledge of depositional settings, how to recognize them from well logs, and how to map them. Day 5, optional, is a core workshop.

Learning Outcomes:
- Understand basics of correlating well logs in clastic sequences utilizing shale/resistivity markers, interval thickness, sequence. stacking patterns, cross-sections
- Review fundamental controls that influence clastic depositional systems.
- Understanding of lateral/vertical reservoir distribution, reservoir characteristics, connectivity of braided, meandering, anastomosing, entrenched river systems, alluvial fans, deltas, submarine fan systems.
- Improved ability to construct accurate sand percent maps for reservoir prediction, net sand/net pay isochore maps for accurate reservoir characterization.
- Learn to read core, interpret depositional environment.

Course Content:
- Day 1: Interpreting Clastic Reservoir Systems
- Day 2: Architectural Geometrics of Clastic Reservoir Systems
- Day 3: Architectural Geometries of Clastic Reservoir Systems
- Day 4: (Optional) Final Exercise
- Day 5: (Optional) Core Workshop

Participant Testimonials:
"After taking this class, our geoscientists gained a new appreciation of the thinking process that needs to take place before making a map. Computers have made mapping a quicker and much less painful job but unfortunately making these requires no geological skill which then puts into question the real value of the map generated. Is this a good map (geologically reasonable) or a bad map (no obvious geological thinking used). Going back to the basics of the geology and placing the data into the context of a depositional system will ensure that the most geologically real maps are constructed whether they are created by hand or by computer." - Tim K.

Featured Instructor:

Alan Cherry

Alan Cherry is a Senior Geoscientist with over 35 years of industry experience. He has been associated with SCA since 2005 as one of the company's principal geoscience consultants. His integrated skill set includes 2D and 3D geophysical interpretation, exploration play analysis and prospect generation, field development, reservoir engineering, formation evaluation, economic assessment, reserves evaluation, drilling, completion, and production operations. He is highly proficient in the use of multiple geologic and seismic interpretation tools. Alan received his BS in Geology at State University of New York and did his graduate studies at the University of Houston and Wright State University. He is a Licensed Professional Geologist in Texas and a Certified Professional Geologist in Indiana.

Courses Taught:
- Mapping Seismic Data Workshop
- Well Tie Workshop

Featured Instructor:

Robert "Bob" Shoup

Bob serves as Chief Geologist for SCA. He has over 35 years of experience in basin analysis, regional studies, new play generation, prospect evaluation, field studies and development planning, and project management. He has a MS in Geology from the University of Oklahoma, and began his career at Shell Oil in 1980. He is an active contributor to the professional community, currently serving as VP, AAPG Regions for 2019-2021. Bob served as the Chair of the House of Delegates for AAPG, a Past President of AAPG's Division of Professional Affairs (DPA), and past Secretary-Editor of the AAPG House of Delegates, among other roles. He is a recipient of AAPG's and the DPA's Distinguished Service Award and was granted Honorary Life Membership in the DPA, while also having served as an ethics lecturer for the DPA.

Courses Taught:
- Applied Subsurface Geological Mapping
- Effective Petroleum Systems Analysis
- Geology-Based Topical Contouring Workshops
- Mapping & Interpreting Clastic Reservoirs
- Project Management for Exploration and Development Projects
- QC Techniques for Reviewing Prospects & Acquisitions
- Quality Assurance/Quality Control Skills for Subsurface Mapping (QAQC)

MAPPING SEISMIC DATA WORKSHOP

Instructor: Alan Cherry
Discipline: Geoscience
Length: 3 Days
CEUs: 2.4
Availability: Public & In-House

Who Should Attend:
Entry to intermediate level geologists/ geophysicists with basic experience interpreting seismic data.

Course Description:
This course is for new interpreters of 2-D/3-D seismic data. This class covers hands-on interpretation of seismic data and construction of various maps from interpreted data. Participants conduct interpretation of 2-D seismic lines, and integrate well log fault and formation tops to seismic interpretation.

The project is a lease block in an extensional tectonic basin with normal growth faults, non-growth faults and hanging wall anticlines. The complex geology in the project area challenges participants in interpretation of geological/ geophysical data.

Participants learn mapping by hand, using interpretation skills and knowledge, which can be applied to mapping on a workstation. They generate and integrate fault and horizon maps. They integrate horizon(s) with faults, position fault polygons, understand and map fault vertical separation, and generate structure maps in faulted areas.

Learning Outcomes:
- Gain knowledge of data for hands-on interpretation.
- Learn to tie well log data to seismic sections.
- Understand correlation of synthetics with seismic data to establish geologic horizons.
- Interpret and mark faults and horizons on seismic lines.
- Generate time and depth structure maps from seismic data.
- Generate fault surface maps and integrate fault maps with horizon data to generate integrated structure maps.

Course Content:
- Geologic background of area
- Pick and mark a major fault on all seismic lines
- Loop tie fault and horizon picks
- Pick points along fault surface on seismic lines
- Tie synthetic trace to seismic reflections and mark horizons
- Pick a horizon, starting with a line close to a well. Continue to pick intersecting lines, and tie picked horizons
- Interpret and correlate a specific horizon and jump correlate across main fault wherever necessary
- Generate a fault surface map in time
- Post fault cut data from wells on a base map
- Convert time fault surface map to depth using time map as a guide, well control and TD chart
- Contour a horizon in time
- Contour horizon in depth
- Review your picks, conversions, contouring, and make any necessary changes to your interpretation and maps
- Integrate fault and structure maps in depth and define upthrown and downthrown fault traces
- Make a short presentation on your interpretation, maps and overall project

GEOSCIENCE

PETROLEUM SYSTEMS MODELING NEW

Instructor: Lothar Friberg, PhD, PMP
Discipline: Geoscience, Unconventional Reservoirs
Length: 2 Days
CEUs: 1.6
Availability: Public & In-House

Who Should Attend:
Designed for geologists, geophysicists, and engineers actively working in exploration.

Course Description:
This course covers the basic concepts of what a petroleum system is comprised of and the benefits of integrating petroleum systems modeling as a discipline in your exploration workflow. In this context participants will learn about the key parameters required to conduct a petroleum systems modeling study.

Learning Outcomes:
- Define source rock organofacies and appropriate kinetic for basin model.
- Understand heat sources contributing to the temperature field of a sedimentary basin and how the basin fill lithologies are affecting it.
- Become aware of standard calibration parameters used in basin models.
- Develop a general knowledge about the wealth of information stored in geochemical data such as maturity and facies, and how this information can be utilized in constraining and calibrating your basin model.
- Identify the critical input parameters for a basin model.
- Understand the different modeling program approaches in order to choose the most appropriate package/dimension for a given problem.
- Learn how to differentiate between strengths and weaknesses of a basin model.

Course Content:
- Introduction: Define petroleum systems
- Source rocks
  - Depositional environments & organofacies
  - Source rock analysis & kinetics
  - What is a good source rock? Examples from around the world
- Temperature
  - Heat sources
  - Conditions affecting the temperature field in a sedimentary basin
- Maturity
  - Definition of thermal maturity
  - Common thermal maturity parameters
- Fluid flow
  - Compaction
  - Pressures and fluid flow/migration
- Geochemistry
  - Analytics (GC, GCMS, Isotopes)
  - Biomarkers and their applications
  - Natural gases
  - Factors and processes affecting petroleum properties
  - Surface geochemistry
- Basin modeling
  - Purpose for modeling
  - Petroleum systems modeling workflow and data requirements
  - Modeling dimensions and techniques
  - Addressing and mitigating uncertainties (scenario testing)

Featured Instructor:

Laurie Green, MSc, PG

Laurie has extensive international and domestic experience as a geophysical interpreter, geomodeler, and project manager in conventional and unconventional assets for both E&P and service companies. She has broad experience in computer-based mapping and modeling systems as an interpreter, programmer, and technical trainer. Laurie has performed integrated field studies for global clients using different software systems and understands how computer-generated maps can be used and misused in real-world projects.

Laurie's career started in the early 1980's with Conoco in the Permian Basin, developing prospects in the Ouachita Overthrust, Midland Basin and Northwest Shelf of New Mexico. After roles as a geophysicist and computer programmer, she joined a Houston-based international consultancy where she developed expertise in geological modeling for field development projects in the Middle East, Mexico, South America, and Africa. Laurie worked as an expat in Russia and Malaysia with Halliburton before returning to Houston with Hess Corporation where she held roles as a technical professional and manager before retiring in January of 2018.

Laurie received her BS in Geological Sciences from Cornell University and her MSc from the University of California at Santa Cruz. She is a registered Professional Geoscientist in the state of Texas.

Course Taught:
- Principles of Mapping with Petrel©

PRINCIPLES OF MAPPING WITH PETREL©

Instructor: Laurie Green, MSc, PG
Discipline: Geoscience
Length: 4 Days
Ceus: 3.2
Availability: In-House

Who Should Attend:
Geologists, geophysicists, and reservoir engineers who want to integrate sound mapping practices into their workstation interpretation workflow.

Prerequisite:
Attendees should have prior exposure to subsurface mapping interpretation skills and practices, and a basic knowledge of Petrel© software applications and user interfaces. This course is ideally suited for those who have previously attended SCA's *Applied Subsurface Geological Mapping* course.

Course Description:
This course provides participants with the knowledge and techniques needed to make more accurate and geologically correct maps through: 1) proper data management, 2) integration of fundamental geologic mapping principles with Petrel© mapping software tools, and 3) establishing an iterative process for ensuring consistency between the maps and data. The course bridges the gap between the "tried and true" geologic principles taught in traditional pencil and paper mapping courses, and the advanced computational tools available from the workstation interpretation platform.

This course covers Petrel's© mapping workflows and the geologic principles behind those workflows. Emphasis will be placed on generating geologically valid maps of faulted surfaces, and the inclusion of horizontal well data in unconventional plays. Exercises will include procedures for selecting appropriate gridding algorithms, creating control contours and verifying results.

The instructor and participants will perform various workflows presented in the course, offering an interactive exploration and dynamic visualization of the data in different structural settings. Participants will manipulate data to solidify their understanding of the principles being taught and will leave the course with the ability to apply core knowledge to projects on their own Petrel© workstations.

PLEASE NOTE: PETREL© GEOLOGY AND GEOPHYSICS CORE LICENSES (2015 OR LATER) ARE REQUIRED.

Learning Outcomes:
Provide a basic understanding of:
- Subsurface geologic mapping methods as implemented in Petrel©.
- Petrel's© mapping workflow.
- Data selection and quality control.
- Gridding simple and faulted surfaces with well and seismic data.
- Creating consistent surfaces with horizontal well data.
- Grid modification and quality control.
- Single and multi-surface operations (Grid math).
- Mapping well properties (e.g., porosity).
- Quick-look volumetrics and introduction to uncertainty.
- Other map types – bubble maps, log signatures, curvature.
- Automating the workflow.
- Creating effective presentations with standardized templates.
- Documenting procedures and results.

PROJECT MANAGEMENT FOR EXPLORATION AND DEVELOPMENT PROJECTS NEW

Instructor: Bob Shoup
Discipline: Geoscience, Engineering
Length: 2 Days
CEUs: 1.6
Availability: Public & In-House

Who Should Attend:
Any member of a multidisciplinary team (geologists, geophysicists, engineers, landmen, technologists, etc.), or anyone involved with managing multidisciplinary team projects including team leaders, project managers, and advisors.

Course Description:
The success of many projects falls squarely on the shoulders of the team leader or project manager. Good project management is a must if your exploration, development, acquisition or divestiture projects are to be completed on time, within budget, and result in success. This course teaches the A to Z of managing, organizing, and implementing a successful project plan. Learn why certain projects succeed while others fail. What are your project drivers – time, budget, and/or performance? The answer to this question will impact the success of your project.

Course Content:
- What is project management?
- Fundamentals of planning, organization, and documentation
- Defining desired results
- Organizing the project and team
- Analysis tasks
- Project management models: CPMs and Gantt
- Dynamics of project management: Plan versus Planning
- Project and physical plant organization
- Project management exercise

"The only thing worse than training your employees and having them leave is not training them and having them stay."
Henry Ford

QUALITY ASSURANCE/ QUALITY CONTROL SKILLS IN SUBSURFACE MAPPING (QAQC)

Instructor: Bob Shoup
Discipline: Geoscience
Length: 5 Days
CEUs: 4.0
Availability: In-House

Who Should Attend:
Prospect generators, exploration and development geoscientists, property and prospect evaluators, supervisors, managers and anyone involved in preparing, reviewing or evaluating subsurface interpretations, maps, exploration or development prospects, producing fields and reserves or resources.

Course Description:
This program is designed to provide the participants with a number of mapping techniques before venturing into Quality Control Techniques for Subsurface Maps. It does not replace SCA's five (5) day mapping class but does provide the key mapping fundamentals necessary for the quality control and verification of subsurface maps. The exercise section (actual global exploration, development and production projects) is divided into three (3) parts. The Projects are reviewed immediately after the participants have completed each segment of about five (5) projects per day. New example projects are added to provide customization by client request.

Learning Outcomes:
- Develop an understanding of how to evaluate a variety of subsurface maps including fault, structure, and isochore maps.
- Understand the types of questions to ask when reviewing interpretations, maps, and prospects.
- Evaluate the 3-D viability of an interpretation, map, or prospect.
- Evaluate whether the resources or reserves attributed to completed interpretation or map are under or over-estimated.
- Determine whether an interpreter has applied sound, industry-accepted, geoscience principles and methods to generate an interpretation, map, or prospect.

Course Content:
- Philosophical Doctrine for Subsurface Interpretation and Maps
- General Introduction to Quality Control Techniques of Subsurface maps
- Contouring Techniques
- Log Correlation Techniques
- Fault Interpretation Mapping
- General Cross Section Construction
- Structure Maps
- Isochore Mapping

Participant Testimonials:
"Bob did a great job. He is very knowledgeable and did an excellent job of explaining concepts and their applicability." - Jonathan R.

"I enjoyed the course, learned a lot, and noticed many things that I needed to develop in my own understanding. Would recommend this course to anyone, regardless of experience!" - Ollie M.

"Great course. Really valuable information which helped fill a huge gap in my subsurface mapping knowledge." - Steve T.

QUALITY CONTROL TECHNIQUES FOR REVIEWING PROSPECTS AND ACQUISITIONS

Instructor: Bob Shoup
Discipline: Geoscience
Length: 3 days
CEUs: 2.4D
Availability: Public & In-House

Who Should Attend:
Prospect generators, property and prospect evaluators, supervisors, managers, bankers, investors and anyone involved in preparing, reviewing, or evaluating subsurface interpretations, prospects, fields and reserves or resources.

Course Description:
Do you want to avoid drilling dry holes? Do you want accurate reserve assessments? Almost all maps generated in a workstation are wrong, sometime significantly so. Reserves estimated from those maps are inaccurate. Prospects drilled on those maps are often dry holes.

This course addresses the need for a systematic approach for quickly screening interpretations, maps, and prospects to ensure that the potential resources or reserves estimated from those maps are accurately assessed. Through a combination of lecture and exercises, students will learn how to review maps and interpretations with the aim of identifying fundamental interpretation, mapping and estimating errors.

The most common errors found on subsurface interpretations and maps are illustrated with numerous examples from around the world. The course begins with a review of examples of interpretation and mapping errors that led to poorly located wells that were uneconomic or dry, as well as inaccurate reserves or resource estimates. Attendees will learn a number of Quick Look Techniques they can use to identify critical interpretation or mapping errors that cause dry holes or inaccurate resource and reserve estimates. Attendees will then apply these Quick Look Techniques to review actual maps and interpretations. The course manual is our textbook Quick Look Techniques for Prospect Evaluation.

Learning Outcomes:
- Learn how to quickly audit a map for accuracy and validity.
- Evaluate the three-dimensional viability of an interpretation or map.
- Evaluate whether the resources or reserves attributed to a completed interpretation or map are under or over estimated.
- Determine whether an interpreter has applied sound, industry accepted geoscience principles and methods to generate a map.

Course Content:
- Quality Assurance/Quality Control overview with examples
- Philosophical doctrine of subsurface interpretation and mapping
- Dry hole analysis

RESERVOIR CHARACTERIZATION FOR MUDROCK RESERVOIRS

Instructor: Stephen A. Sonnenberg, PhD
Discipline: Geoscience, Engineering, Unconventional Reservoirs
Length: 3 Days (Classroom), 6 Half-Day Sessions (Live Online)
CEUs: 2.4
Availability: Public, In-House, & Live Online

Who Should Attend:
Geologists, geophysicists, & engineers who are interested in exploring and developing resources in mudrock formations. The course is intended to be an overview of various successful and unsuccessful mudrock systems.

Course Description:
This course is an introduction to mudrock resource plays. A wide range of topics will be covered to familiarize the participant with the important nuances of both successful and unsuccessful mudrock plays. The petroleum system approach will be used. A key emphasis of this course will be to show the important elements and processes for continuous oil and gas accumulations. The participant will learn screening techniques (check list) which may help identify continuous types of accumulations.

Learning Outcomes:
- What exactly is a mudrock?
- Understand factors related to tight oil & gas mudrock production.
- Working model for unconventional tight petroleum systems.
- Recognize technologies available for tight reservoirs.
- Determine if a pervasive hydrocarbon exists.
- Determine the type of source rocks present and maturity.
- Use geological and geochemical reconnaissance.
- Mudstone facies.
- Reservoir characterization for mudrock reservoirs.
- Mudrock sequence stratigraphy.
- Understand the importance of mechanical stratigraphy.
- Identify matrix porosity and permeability.
- Identify reservoir drive mechanisms.
- Discuss various tools and techniques for reservoir characterization.
- Discuss structural styles associated with mudrocks (e.g., polygonal fault systems).
- Identify the presence of natural fractures.
- Discuss secondary and tertiary recovery potential in mudrock systems.
- Discuss latest drilling and completion techniques.

Course Content:
Successful mudrock plays discussed in this course include Bakken (Williston Basin), Niobrara (Rocky Mountain Region), Vaca Muerta (Neuquén Basin), Eagle Ford (Gulf Coast), Haynesville (Gulf Coast), Greenhorn (Denver Basin), Marcellus (Appalachian Basin).

RESERVOIR CHARACTERIZATION OF CLASTIC (SANDSTONE) RESERVOIRS

Instructor: Lesli J Wood, PhD
Discipline: Geoscience
Length: 5 Days (Classroom), 10 Half-Day Sessions (Live Online)
CEUs: 4.0
Availability: In-House & Live Online

Who Should Attend:
Geologists, geophysicists new to reservoir characterization, who want to broaden experiences beyond exploration; petroleum engineers who want to improve understanding of geologic aspects of oil/gas reservoirs. Managers who want a firmer understanding of roles that each team member plays in exploration/development process.

Course Description:
Reservoir characterization is an integrated process of understanding physical nature of clastic reservoirs, how to bring that knowledge to an earth model. This course examines types of clastic reservoirs within context of regional influences, controls on nature. Emphasis is placed on variety of styles, causes of compartmentalization of reservoirs, associated development/production issues. We focus on how to recognize/define compartmentalization in various types of data, to predict problem prior to development using an understanding of contextual stratigraphic framework. We discuss importance/recognition of key bounding surfaces, processes associated with deposition leading to complexity in reservoir architecture. Reservoir types discussed include fluvial, deltaic, paralic, shelf/off-the-shelf slope, deeper water systems. Topics in the course include importance/process of building a stratigraphic framework, interpretation of clastic reservoirs in logs, core, outcrop, seismic, seismic geomorphology of clastic reservoirs, using quantitative analogs, integrated earth models, modelling process, bias in risking, decision making. Case studies are used to explain various topics. In-class exercises are completed to demonstrate principles/techniques.

Learning Outcomes:
- Participants gain a working knowledge of reservoirs common to fluvial, paralic, shelfal, deltaic, deepwater settings, how they distribute themselves in a regional stratigraphic framework.
- Participants will learn to map clastic depositional systems in subsurface, how to integrate those data in reservoir models.
- Participants will gain knowledge in recognizing criteria which differentiate clastic reservoir types.
- Participants will learn scales and types of heterogeneities that characterize clastic reservoirs, and understand influence that heterogeneities exert on reservoir performance.
- Participants will understand bias/risk, how to account for issues in assessment/modeling.

Course Content:
- Geologist, geophysicist, engineer roles
- High-frequency sequence stratigraphy
- Source-to-sink clastic systems
- Clastic reservoir dimensions, architecture
- Modelling clastic reservoirs
- Calculating geo-body dimensions
- Recognition of facies, facies associations
- Porosity/permeability of clastic elements
- Flow units, upscaling, shale architecture
- Influence of structure on gravity deposition
- Practical exercises in clastic systems
- Cognitive bias in risk, assessment

SEAL AND RESERVOIR PRESSURES ANALYSIS FOR E&P PROSPECT'S RISK ASSESSMENT

Instructor: Selim Shaker, PhD
Discipline: Geoscience, Engineering
Length: 5 Days (Classroom), 6 Half-Day Sessions (Live Online)
CEUs: 4.0
Availability: In-House & Live Online

Who Should Attend:
Prospect generator geoscientists, geologists, geophysicists, drilling and reservoir engineers, well log analysts, managers, and support staff involved in exploration, development and drilling. This course is exceptionally helpful for explorationists that are keen on appraising prospects in-house and farm in/out.

Course Description:
The optimum trap is a reservoir capable of confining and economically delivering hydrocarbon under a competent sealed cap and / or un-breached faulted structural closure. Sealing integrity is essential for trapping, migration, and lateral and vertical distribution of hydrocarbons in a prospective reservoir. The sealing capacity also impacts reservoir flow rate and the driving mechanism of the initial natural flow and the secondary recovery process. Subsurface geopressure compartmentalization plays a critical role in determining seals, reservoirs and consequently the reserve's volume and flow duration.

This course will demonstrate to participants how to use measured pressure data from wire-line tests (MDTs, RFTs etc.) and production tests to design pressure-depth plots which reveal permeability barriers (sealed), communications, and breached reservoir (seal failure).

It will also examine how seismic velocities and well logs' petrophysical properties establish seal integrity via subsurface pressure drift. Moreover, participants will gain the fundamental knowledge of predicting pore-fracture pressure and estimate the drilling tolerance window (DTW) that leads to successful drilling prognosis of the trajectory bore-hole to the targeted reservoirs formation. Exploration risk in salt basins will be thoroughly discussed with multiple case histories.

PLEASE NOTE: PARTICIPANTS ARE REQUIRED TO BRING THEIR OWN LAPTOPS (WITH MS OFFICE SUITE INSTALLED).

Learning Outcomes:
- Understand the causes, concepts and graphic representations of vertical and horizontal compartmentalization due to reservoirs partitioned by seals.
- Comprehend pressure gradient in seals versus reservoirs and the causes of disparity between measured and predicted values.
- Recognize sealed vs. breached reservoirs.
- Calculate hydrocarbon columns in four ways vs. three way faulted closures.
- Evaluate and assess the trapping risk of a prospect before and post drilling.

Course Content:
- Subsurface Compartmentalization
- Reservoirs
- Seals
  - Cap Seals (four ways)
  - Fault Seals (faulted three ways)
  - Salt - Sediments Interface
- Prospect Evaluation
  - Pre drilling
  - While drilling
  - Post drilling

SEQUENCE STRATIGRAPHY APPLIED TO OIL AND GAS EXPLORATION

Instructor: Oscar Lopez-Gamundi, PhD
Discipline: Geoscience
Length: 5 Days (Classroom), 6 Half-Day Sessions (Live Online)
CEUs: 4.0
Availability: Public, In-House, & Live Online

Who Should Attend:
Geologists, geophysicists and engineers in exploration and production.

Course Description:
This five-day course covers the concepts and practical applications of sequence stratigraphy for oil and gas exploration, appraisal and production. All concepts are illustrated with examples of seismic, well-log, core, and outcrop data. The exercises emphasize the recognition of termination patterns, sequence stratigraphic surfaces and systems tracts on seismic lines, well logs and outcrops. The ultimate objective of the course is to provide the practitioner with tools and methodologies of sequence stratigraphy to effectively predict the presence and quality of reservoir, source rock and seal and define the key architectural elements of stratigraphic traps.

Learning Outcomes:
- Learn to identify in well logs and seismic the different types of sequences and systems tracts.
- Identify the basic concepts of seismic facies and log-based facies for the definition of systems tracts and sequences.
- Understand the utility of systems tracts in terrestrial, transitional and marine depositional environments for the recognition and reservoir, source, and seal predictions.

Course Content:
- Fundamental Concepts
- Methodology for Sequence Stratigraphic Analysis
- Internal Architecture of Sequences (System Tracts)
- Sequence Stratigraphy in Carbonate Environments
- Controls on carbonate sedimentation
- Carbonate slopes and platforms in seismic. Seismic Facies.
- Sequence-stratigraphic models of carbonate platforms
- Sequence Stratigraphy and Growth Strata

Participant Testimonials:
"Very good instructor! He fielded questions well and had great time management - super informative class." - Joy B.

"Dr. Lopez-Gamundi has a great combination of teaching skills and good humor, and he really challenged us." - Lauren S.

"Extremely knowledgeable in the subject and related topics; he paid attention to our abilities and needs." - Brent V.

"Excellent instructor with a great attitude combined with a strong knowledge of the subject matter." - Jade T.

SHALE RESERVOIR WORKSHOP: ANALYZING ORGANIC-RICH MUDROCKS FROM BASIN TO NANO-SCALE

Instructor: Ursula Hammes, PhD
Discipline: Geoscience, Unconventional Reservoirs
Length: 2, 4 or 5 Days
CEUs: 1.6, 3.2 or 4.0
Availability: In-House

Who Should Attend:
Geoscientists, reservoir engineers, and managers who desire to develop a better understanding of the geological, mechanical, and chemical character of mudrock systems and how mudrock attributes vary in the context of shale gas/oil reservoir exploitation.

Course Description:
This unique training course can be customized to your staff's skill needs by choosing between the modules below. The class will utilize lectures, core examination and exercises, to address the reservoir characterization, sedimentology, facies, sequence stratigraphy, petrophysics, fractures, and geochemistry of shale-gas/oil bearing mudrocks.

This workshop focuses on rock-based interpretation of mudrocks from basin to nano-scale. Participants will learn how to use core, cuttings, geochemical, and petrophysical data to characterize mudrocks and apply mudrock depositional, sedimentological, sequence stratigraphic, geochemical and petrophysical principles to exploration areas and production assets in shale basins. Subsurface data from a variety of oil and gas shale plays will be examined.

Client management will pre-select 2, 4 or 5 of the Modules below for their private / in-house course.

Learning Outcomes:
- Appraise the variety of shale systems from basin to nano-scale.
- Characterize mudrock facies and identify facies and sequences in cores and be able to tie those to well-log character.
- Assess and interpret geochemical data critical to understanding mudrock systems.
- Judge controls on source rock deposition, reservoir heterogeneities, and determine frackable intervals.
- Recognize and quantify the rock properties that will have an impact on completion success.
- Learn how to characterize shale reservoirs.

Course Content:
- Module 1: Approaches to understanding geology of shale-gas/oil plays
- Module 2: Stratigraphic/depositional processes in shale basins
- Module 3: Geochemical tools and geochemistry review
- Module 4: Reservoir characterization and reservoir quality of mudrocks
- Module 5: Production and well completion

OPTIONAL: 3 hour afternoon field trip to Eagle Ford/Austin Chalk outcrops in Austin

STRUCTURAL GEOLOGY & TECTONICS AS APPLIED TO UPSTREAM PROBLEMS

Instructor: James Granath, PhD and Catalina Luneburg, PhD
Discipline: Geoscience
Length: 5 Days
CEUs: 4.0
Availability: In-House

Who Should Attend:
Exploration and production geologists

Course Description:
A unique training program in which clients can design a customized, three to five-day training course comprised of half day, critical skill modules (see below) coupled with hands on consulting/mentoring. Blended learning techniques will be integrated through a variety of teaching styles and materials such as PowerPoint presentations, handouts, videos and online activities. The content of each module reflects science or expertise related to an oil and gas workflow, topic, or problem, especially integration of geological and seismic data into a valid and reasonable structural interpretation.

Onsite Consulting Service Option:
Each training module can be further expanded with individualized consulting/mentoring by subject-matter experts to further enhance the learning experience. These consulting services can address the client's own data and specific challenges.

Sample 5-Day Course Content:
Day 1:
- Introduction: Compressional HC traps
- Deformation mechanisms and mechanical stratigraphy
- Mechanics of faulting and fracturing

Day 2:
- Folding and fault-fold relationships
- Basement-involved compressional block uplifts

Day 3:
- Thin-skinned fold and thrust belts
- Inversion tectonics

Day 4:
- Restoration and cross section balancing
- Advanced restoration techniques

Day 5:
- Consultation/Mentoring: Special problems: hands-on restoration workflow with client's data sets

Optional Modules available below for customized in-house training. Design your custom training course with guidance from SCA. All modules are half-day and are designed for exploration and production geoscientists at any career level.

- Applied Rock Deformation Concepts
- Deformation Mechanisms/Mechanical Stratigraphy
- Mechanics of Faulting and Fracturing
- Folding and Fault/Fold Relationships
- Natural fractures and fracture modeling
- Geomechanics
- Physics of sealing and sealing faults
- Fundamentals of salt and shale tectonics
- Restoration and cross section balancing
- Advanced restoration techniques
- Structural styles and HC traps overview
- Structure of continental rifts
- Rifting to passive margin: hyperextension
- Thin-skinned extensional structural geology
- Basement-involved compressional block uplifts
- Thin-skinned fold and thrust belts
- Fundamentals of strike-slip tectonics
- Inversion tectonics
- Epi-cratonic basins and foreland basins

GEOSCIENCE

STRUCTURAL STYLES IN PETROLEUM EXPLORATION AND PRODUCTION

Instructor: Lansing Taylor, PhD
Discipline: Geoscience
Length: 4 Days (Classroom), 8 Half-Day Sessions (Live Online)
CEUs: 3.2
Availability: Public, In-House, & Live Online

Who Should Attend:
Exploration and production geologists, geophysicists and engineers who need to develop knowledge in a broad range of global structural styles; understand the structural geometry of trap-forming structures and to apply structural techniques to make improved seismic interpretations, balanced cross sections and structural maps in complex areas.

Course Description:
Structural geology is often the fundamental key to successful interpretation and prospecting. This course provides a strong fundamental background in structural geology of the various tectonic settings. It covers common structural styles in sedimentary basins worldwide and the geometry and evolution of trap-forming structures associated with compressional, extensional, salt, strike-slip and reactivated structures. Techniques for constructing balanced cross sections, maps and 3-D interpretations through these structures are discussed in detail. Examples of trap-forming structures from a number of basins worldwide are used to illustrate the concepts. Problem sets provide hands-on experience in interpreting and validating subsurface structures using surface, seismic and well log data.

Learning Outcomes:
- Understand structural styles of trap-forming structures in different tectonic provinces.
- Study the kinematic evolution of compressive, extensional, diapiric, strike-slip and reactive structures.
- Interpret subsurface structure using seismic, surface and well data.
- Construct structure maps of common trap-forming structural styles.
- Review structural geometry of major fields from different provinces and use them as analogs for structural interpretation of exploration prospects and newly discovered fields.

Course Content:
- Introduction to comparative structural styles
- Methods of cross section and map construction
- Fold-thrust structures Foreland basement structures
- Rift structures
- Listric growth faults
- Salt structures
- Inversion and reactivated structures
- Strike-slip structures
- Validation of 2D and 3D interpretations and common pitfalls

Participant Testimonials:
"Lans was exceptional. I feel I could ask any question and he had the answer in detail. He was enthusiastic and fun, and exceeded my expectations for what could be put into one week of class." - Carly M.

"I learned so much from this course - very brilliant professor." - Paula C.

"Very excellent instructor! Extremely effective in getting as much material as possible into a small amount of time while still teaching effectively. His energy also helped to keep us engaged and excited about the content." - Randy B.

Featured Instructor:

W. Lansing Taylor, PhD

Dr. W. Lansing "Lans" Taylor is an accomplished structural geologist with extensive industry and field experience specializing in structural geology, fractured reservoirs, geomechanics, and field geology. He joined SCA as an instructor in 2008, and his two courses are consistently very highly rated by our students. His development and EOR experience includes Hugoton, Golden Trend, Permian Basin, Ozona, and the Austin Chalk, while his exploration experience includes Alaska, North Africa, Middle East, and SE Asia.

Lans has had both technical and management roles over his career, with experience in structural evaluation, providing in-house training, implementing new technology, interfacing with academic research and structural consortia, petroleum systems analysis, and risk assessment from basin to wellbore scale. During his time at Anadarko, he worked as a project advisor and fractured reservoir specialist aiding exploration and development teams in solving issues related to structural geology.

He found three discovery wells on the Gulf Coast, one in Alaska, and a new basin entry for Anadarko in Indonesia. Following the merger with Kerr McGee, he managed the evaluation of their mid-continent and west Texas fields, and made all G&G presentations for the subsequent divestiture of assets (proceeds ~$2 billion).

Dr. Taylor received his B.A. in mathematics and geology at Skidmore College. There he received department honors of Summa Cum Laude. He received his Ph.D. in Quantitative Structural Geology, "Fluid flow and chemical alteration in fractured sandstone", Department of Geological and Environment Sciences, from Stanford University.

Courses Taught:
- Carbonate Reservoirs of the Permian Basin NW Shelf
- Structural and Sequence Stratigraphic Field Course (Hill Country, TX)
- Structural Styles and Tectono-Stratigraphy for the Mid-Continent
- Structural Styles in Petroleum Exploration and Production

THE PRACTICE OF SEISMIC STRATIGRAPHY IN DEEPWATER SETTINGS

Instructor: Bradford E. Prather
Discipline: Geoscience
Length: 3 Days
CEUs: 2.4
Availability: Public & In-House

Who Should Attend:
Geologists, geophysicists, petroleum engineers, supervisors, managers, and technical support staff who are interested in learning the fundamentals of deepwater (turbidite) depositional systems for application to development and exploration.

Course Description:
Play-based exploration as used in the oil industry relies on developing a thorough understanding of the evolution of key sedimentary sequences through time in the form of Gross Depositional Environment (GDE) maps. This course provides techniques for making GDE maps of deepwater stratigraphy, and the language concepts required to articulate a basin-to-prospect-scale, deepwater depositional model needed for the quantification of prospect risk and uncertainty. The course integrates slope depositional process understanding with sequence stratigraphy, and seismic facies analysis used in the construction of GDE maps.

Learning Outcomes:
- Understand the role GDE maps play in frontier exploration.
- Achieve a general understanding of deepwater depositional models.
- Learn how to classify slope systems
- Practice classification and mapping of seismic facies, interpreting environments of deposition, and developing depositional models.
- Apply sequence stratigraphic concepts in an analysis of deepwater systems.
- Strengthen confidence in using depositional models to assemble appropriate analogs to benchmark distributions used as part of play and prospect evaluation processes.

Course Content:
- Products expected of an industry seismic stratigrapher
- Basics of gravity flows and sediment transport
- Dynamics of basin subsidence and sediment flux
- Seismic resolution of deepwater depositional stratigraphy
- Classification of slope systems
- Techniques for the classification and mapping of seismic facies
- Regional depositional processes of continental slopes
- Classification of gross depositional environments
- Controls on reservoir distribution and architecture in submarine valley, leveed-channel complexes and submarine aprons
- Application of sequence stratigraphy concepts to deepwater systems
- Partitioning of sediment across slopes

Participant Testimonials:
"Phenomenal instructor. Brings a lot of valuable real-world experience. Very hands-on. He sought lots of input from the class too." - Jeff K.

"Very knowledgeable and effective at communicating the material and answering any questions." - Matthew H.

UNCONVENTIONAL RESOURCE PLAYS - WORKSHOP

Instructor: Stephen A. Sonnenberg, PhD
Discipline: Geoscience, Engineering, Unconventional Reservoirs
Length: 3 Days (Classroom), 6 Half-Day Sessions (Live Online)
CEUs: 2.4
Availability: Public, In-House, & Live Online

Who Should Attend:
Geologists, geophysicists, petrophysicists, reservoir engineers and managers who are exploring for and developing oil and gas fields in unconventional, basin-centered petroleum systems. Basic knowledge of well log evaluation is recommended.

Course Description:
This three-day workshop introduces sound evaluation techniques used in choosing and developing "unconventional resource new ventures." It combines geology, reservoir engineering, reserves evaluation, economic forecasting and the concepts of multivariate analysis to develop skills that help predict productivity in oil and gas systems. The workshop covers gas and oil plays in shale and stacked tight sands that are developed with horizontal and vertical wells, and completed and stimulated with hydraulic fracturing.

Learning Outcomes:
Attendees will be able to:
- Demonstrate knowledge of reservoir attributes (variables) pertaining to unconventional resource play viability and scale.
- Screen (evaluate) all play types. For example, what will work, what is economically feasible, what play has critical flaws, what play is basin-centered but is marginal because of its size and depth.
- Develop an idea of the viability of new venture oil/gas plays, compare them to other global plays, and develop a clear idea of reservoir/geologic mechanisms and acceptability.
- Recognize and appraise how a play will perform and forecast potential resources. Include examples of winners and losers, using actual cases. REALLY know what you are evaluating quantitatively with comparison to other global play results.
- Evaluate tight gas sands over a long vertical interval and shale gas over a finite interval developed with horizontal wells. Evaluation of plays with an inverted fluid column (water to oil to gas transitions). Prevent grave and costly mistakes.
- Integrate mixed parameters such as electric log values of porosity, resistivity, and "cross-over gas effect." Identify key reservoir "drivers" versus depth and location (sweet-spot identification). Integrate with thermal maturity and pressure data (always as a function of depth, subsea depth or depth to stratigraphy.
- Apply intuitive principles to more accurately predict oil/gas productivity in tight rocks.
- Understand the hydraulic fracture stimulation treatments employed by operators.

Course Content:
- DAY 1: Unconventional Tight Gas
- DAY 2: Unconventional Tight Oil Reservoirs
- DAY 3: Unconventional Resource Assessment

(A variation taught by Ruben Caligari in Spanish is also available)

VISUAL ROCK CHARACTERIZATION

Instructor: Robert Merrill, PhD
Discipline: Geoscience, Formation Evaluation
Length: 5 Days
CEUs: 4.0
Availability: In-House

Who Should Attend:
Geologists who desire to enhance ability to get more information from existing sample datasets, describe lithology from cuttings/cores for stratigraphic interpretation, facies mapping, reservoir characterization.

Course Description:
Information extracted from visual analysis of rock samples focuses on fundamentals of exploration/development. This data is found in existing cores, cuttings during drilling at wellsite. Information is extracted from cuttings, even those chewed up by a PDC bit. Cuttings, core description brings out details of reservoir pore systems, depositional environments, facies description, supplements/enhances modern wireline logs, aids in recognizing by-passed pays. Quantitative description has progressed from thin sections to enhanced imaging techniques. There is a role for cuttings/core description in this changing environment. Grain size, framework, fossils, color/texture distinguish subtle facies changes, subsidence patterns, regional structures.

Rock description provides a tool to calibrate wireline logs to rocks for quality assurance, better interpretation, early calibration to geophysical properties. The character of matrix/accessory minerals in rock affect wireline logs, decreasing uncertainty in wireline log calculations. Shows from samples, cores exist in rock, highlighting potential pay zones.

Diagenetic changes within rock are visible in cores as well as cuttings; these changes both create/destroy porosity. The nature/amount of porosity is qualitatively described, including, not only pore types, but also pore distribution, type, amount of cement. Recognition of multiple pore types has resulted in identifying overlooked pay zones, as finest pores have higher adsorbed water percentage, larger pores will flow hydrocarbons. When dealing with unconventional reservoirs, mineralogy, hardness correlate to brittleness, fractures, microfractures are evident.
Practical applications of concepts/methods for characterizing rocks are demonstrated through exercises to reinforce key concepts. Participants are expected to independently view/describe a sequence of samples for final exercise.

Learning Outcomes:
- Understand principles of describing cuttings/cores, including important rock properties,
- Understand criteria to differentiate cavings in a cuttings sample.
- Describe clastic rocks including shale, siltstone, sandstone, components, porosity physical characteristics.
- Describe/differentiate limestone, dolomite, evaporites, physical characteristics/diagenesis.
- Describe a sequence of samples, generate a log from cuttings.

Course Content:
- Principles of cuttings, core examination with binocular microscope, including sample properties, wireline log response
- Sandstone, sandstone components, porosity, physical characteristics
- Siltstone/shale
- Carbonate classification, limestone, dolomite characteristics, diagenesis
- Fossils
- Evaporates, miscellaneous rock types
- Logging exercises

WELL TIE WORKSHOP NEW

Instructor: Alan Cherry
Discipline: Engineering
Length: 3 Days
CEUs: 1.6
Availability: Public & In-House

Who Should Attend:
Geologists, geophysicists, and senior-level geotechnicians who want to learn good practices for proper integration of seismic and well data using IHS Kingdom software.

Prerequisite:
Attendees should have prior experience using Kingdom Geophysics/Geology software.

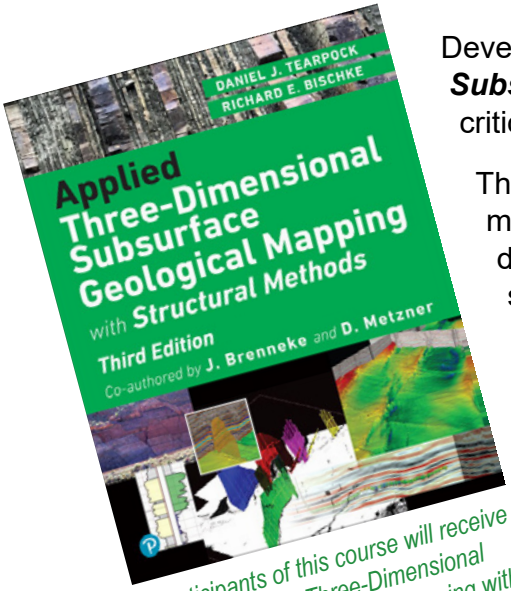
Course Description:
This course provides participants an opportunity to learn how to properly tie well data to seismic data. The course will deal with techniques using seismic in the Time domain; however, issues associated with mis-ties that occur with Depth domain seismic will be addressed too. Kingdom has multiple workflows for integrating well and seismic data and each of these will be addressed in detail. Potential "pitfalls" using Kingdom's built-in well tie workflows will be identified.

Learning Outcomes:
- Quality-check of tops and "quality" assignment.
- Vertical displays and data input and readout in measured depth (MD), true vertical depth (TVD) seismic, and subsea (SS) depth.
- One-way vs two-way time.
- Generating time depth charts from tops and horizon pairs for both individual wells and interpreted horizons and many wells.
- Inputting and editing check shot data with potential pitfalls.
- Curve fitting of check shot data.
- Assignment of "shared" TD charts, regional and vertical variability – Are selected shared TD charts "valid"?
- Converting sonic DT to interval and average velocity.
- Integrated sonic logs, generation and their use and potential pitfalls.
- Identification of seismic phase and potential effects of hydrocarbons on phase.
- Velocity anomalies such as fault and gas sag.
- QC and editing of log curves (spike removal and/or filtering) to be input into synthetics.
- Creation of synthetics from sonic and density logs.
- Use of other "substitute" logs in place of sonic and density and or creation of "synthetics".
- Extracted and "created" wavelets use and pitfalls.
- Stretching a squeezing of synthetic to seismic and associated benefits and pitfalls.
- Identification of mis-ties prior to mapping (saving yourself a lot of grief).

PLEASE NOTE: PARTICIPANTS ARE REQUIRED TO BRING THEIR OWN LAPTOPS (WITH KINGDOM AND MS EXCEL INSTALLED).

Course Content:
- Effects (issues) of setting the Seismic Reference Datum (SRD) for both time and depth domain seismic data.
- Inputting tops and setting the "quality" attribute to tops.
- Manual input of check shots.
- Fit well picks to Interpreted seismic (TD pairs without check shots).
- Generate artificial check shots from TD pairs.
- Curve fit TD pairs and check shot data for QC and use as shared check shots.
- Sonic logs, density logs
- Synthetic creation, stretching synthetics

APPLIED SUBSURFACE GEOLOGICAL MAPPING



Participants of this course will receive the Applied Three-Dimensional Subsurface Geological Mapping with Structural Methods 3rd Edition texbook (2020).

Developed and authored by SCA's Founder, Daniel J. Tearpock, our ***Applied Subsurface Geological Mapping*** course and associated textbook provide critical skills that are essential to successful oil finding.

This course covers both fundamental and advanced methods of subsurface mapping that have been used by the most proficient exploration and development geoscientists in the industry, as well as an introduction to some of the more recent advances in interpretation. Mapping techniques, examples and exercises for extensional and compressional tectonic settings are the core of the course. Diapiric and strike-slip faulted structures are also discussed. In addition, volumetric mapping is presented as well as some of the numerous pitfalls in reservoir volume determinations using isochore maps.

From the newly graduated geoscientist or engineer to the seasoned professional, this course provides the applied, hands-on knowledge required to generate sound subsurface maps.

Course Content:

- Philosophical doctrine, workflow and methodology of mapping
- Contouring techniques
- Directionally drilled wells and directional surveys (applications to mapping)
- Log correlation techniques for vertical and deviated wells (applications to mapping)
- Integration of geophysical data in subsurface mapping
- Cross section construction for extensional, compressional strike-slip and diapiric tectonic settings
- Fault surface mapping using well log and seismic data
- Structure mapping in extensional, compressional, strike-slip and diapiric tectonic settings
- Isochore map construction (bottom water and edge water reservoirs)
- Net sand and pay correction factors for directionally drilled wells
- Structure vs porosity top mapping
- Walking wells
- Fault wedge mapping
- Quality control of computer generated maps

Private, In-House sessions of *Applied Subsurface Geological Mapping* may be scheduled according to instructor availability.

For more information, please contact SCA's Training Department at (713)789-2444 or email **training@scacompanies.com**.

PRINCIPLES OF MAPPING WITH PETREL©

ABOUT THE INSTRUCTOR:

Principles of Mapping with Petrel© was designed by SCA Senior Geologist and Training Instructor, Laurie Green. Laurie has extensive international and domestic experience as a geophysical interpreter, geomodeler and project manager in conventional and unconventional assets for both E&P and service companies. Laurie has broad expertise in computer-based mapping and modeling systems as an interpreter, programmer and technical trainer. She has performed integrated field studies for global clients using different software systems and understands how computer-generated maps can be used and mis-used in real-world projects. Laurie received her BSc in Geological Sciences from Cornell University and her MSc from the University of California at Santa Cruz. She is a registered Professional Geoscientist in the state of Texas.

WHO SHOULD ATTEND:

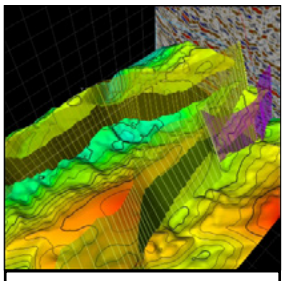
Geologists, geophysicists, and reservoir engineers who want to integrate sound mapping practices into their workstation interpretation workflow.

PREREQUISITE:

Attendees should have prior exposure to subsurface mapping interpretation skills and practices, and a basic knowledge of Petrel© software applications and user interfaces. This course is ideally suited for those who have previously attended SCA's *Applied Subsurface Geological Mapping* course.

LEARNING OUTCOMES:

- Subsurface geologic mapping methods as implemented in Petrel©
- Petrel's© mapping workflow
- Data selection and quality control
- Gridding simple and faulted surfaces with well and seismic data
- Creating consistent surfaces with horizontal well data
- Grid modification and quality control
- Single and multi-surface operations (Grid math)
- Mapping well properties (e.g., porosity)
- Quick-look volumetrics and introduction to uncertainty
- Other map types – bubble maps, log signatures, curvature
- Automating the workflow
- Creating effective presentations with standardized templates
- Documenting procedures and results



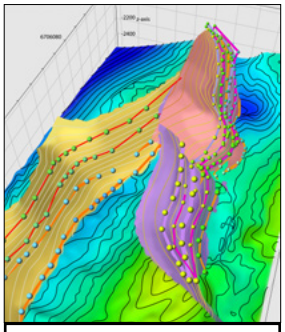
Fault connectivity patterns defined

This course provides participants with the knowledge and techniques needed to make more accurate and geologically correct maps through:

1) proper data management
2) integration of fundamental geologic mapping principles with Petrel© mapping software tools
3) establishing an iterative process for ensuring consistency between the maps and data

The course bridges the gap between the "tried and true" geologic principles taught in traditional pencil and paper mapping courses, and the advanced computational tools available from the workstation interpretation platform.

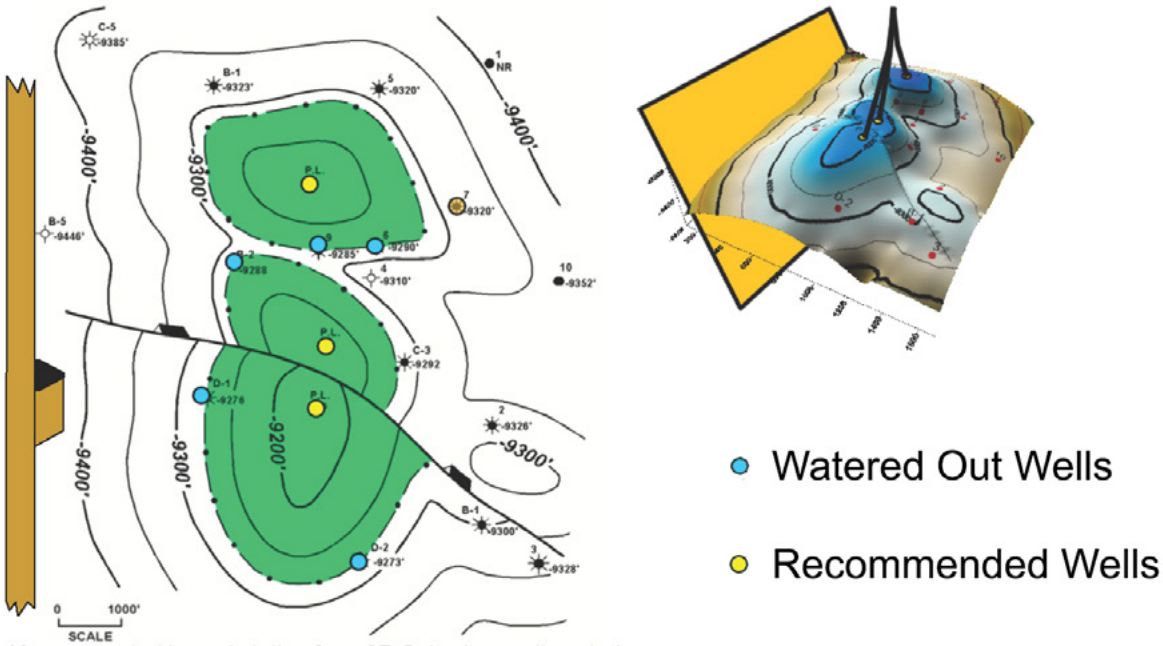
Participants will learn Petrel's© mapping workflows and the geologic principles behind those workflows. Emphasis is placed on generating geologically valid maps of faulted surfaces and the inclusion of horizontal well data in unconventional plays. Exercises include procedures for selecting appropriate gridding algorithms, creating control contours and verifying results. The instructor and participants will perform various workflows presented in the course, offering an interactive exploration and dynamic visualization of the data in different structural settings. Participants will manipulate data to solidify their understanding of the principles being taught and will leave the course with the ability to apply core knowledge to projects on their own Petrel© workstations.



Surface gridded with fault polygons

Avoid Dry Holes and Accurately Assess Reserves

Exercise: Would you approve these wells?



Map generated in workstation from 3D Seismic + well control

Several wells have watered out on this growth fault rollover structure. Three wells have been recommended to drain the attic reserves.

If you approve them, you just approved *two dry holes!*
Do you know why?

If not, *you need this class!*

Quality Control Techniques for Auditing Maps

- **Was the data loaded and used properly?**
- **Does the map honor the data?**
- **Do the contours exhibit contour compatibility?**
- **Do the contours honor vertical separation?**
- **Are the fault traces properly positioned?**
- **Does the map match the seismic?**
- **Does the map honor the geology?**

DIRECT HIRE RECRUITMENT

SCA's foundation in oil & gas consultancy and technical training services makes us an excellent resource for the recruitment of professionals for full-time opportunities. Our recruiting team is committed to understanding each client's unique requirements, and knows how to assess candidates to meet specific staffing needs.

We identify potential candidates for direct employment on a contingent or exclusive basis. As part of these services we recruit and screen candidates, coordinate client interviews with the qualified candidates, and guarantee your satisfaction with your selection.

SCA also provides contract consultants to work on an hourly basis or daily rate for a trial period with the expectation that the assignment may lead to a direct full-time position with the client.

For additional information on SCA's Direct Hire Recruitment, contact:

Matt Nowak at mnowak@scacompanies.com or Tim Riepe at triepe@scacompanies.com

SCA
SUBSURFACE CONSULTANTS

THE DANIEL J. TEARPOCK
Geoscience Certification Program
("Geoscience Boot Camp")

"How do we jump-start a new hire into a contributing geoscientist to help find and develop new resources and reserves of oil and gas?"

The answer is SCA's *Daniel J. Tearpock Geoscience Certification Program*, more commonly known as "Geoscience Boot Camp." This intensive 12-week training program includes six weeks of classroom courses taught by SCA's top instructors, followed by a six-week interpretation and mapping project.

Participants learn fundamental interpretation, engineering, and mapping skills, and then put those skills to the test using seismic data, well logs, and production information from an actual development prospect. During the project phase, SCA engages a team of senior-level geoscientists to serve as mentors to the participants and help guide their interpretation and decision-making process. The program is designed to raise the competency level and knowledge of the participants in a short period of time.

Since its debut in 2008, SCA's Boot Camp has trained scores of participants from around the world. Many of our participants are employees of national oil companies that are seconded to major US-based oil and gas companies. Major oil companies have found our program valuable in meeting training obligations for foreign nationals.

Due to popular demand, we have started offering the program twice a year, and can also accommodate additional sessions upon special request with a minimum commitment of ten attendees.

Who should register?

This program is recommended for new university graduates with up to three years of experience and entry-level employees from different disciplines such as mining, environmental geology, earthquake seismology, etc. It is highly recommended for employees of national oil companies that are seconded to major US-based oil and gas companies. New managers overseeing exploration and development programs will also benefit.

2023 Public Boot Camp Dates

SCA's Houston Training Center

April 17 - July 07, 2023

September 25 - December 15, 2023

(A private boot camp may be scheduled subject to instructor availability)

12-Week Schedule Overview

Six-Week Classroom Phase:

- Basics of the Petroleum Industry
- Structural Styles in Petroleum Exploration and Production
- Structural & Sequence Stratigraphy Field Course
- Applied Seismic Interpretation
- Applied Contouring Workshop
- Practical Interpretation of Open Hole Logs
- Sequence Stratigraphy Applied to O&G Exploration
- Applied Subsurface Geological Mapping
- Mapping Seismic Data Workshop
- Basic Petroleum Engineering for Non-Engineers
- Modern Coastal Systems of Texas Field Course

Six-Week Project Phase:

This intensive six (6) week project is designed to provide hands-on training that will result in the participants developing a solid foundation in geological and geophysical interpretation and mapping, as well as an understanding of the application of reservoir engineering, log analysis, risk analysis, and probabilistic and deterministic resources estimation..

For more information about SCA's Geoscience Certification Program, contact Mary Atchison, VP of Training Operations
matchison@scacompanies.com
(713)789-2444

Testimonials from Former Boot Camp Students

Chris, New Orleans, LA

"The experience is something that I will always remember! It helped me grow as a geoscientist and I already feel the impact of what I have learned. Each instructor really took their job seriously and wanted to help us grow and it really showed. We were always busy with something and the project really reinforced the first 6 weeks… This certification program was extremely helpful and informative. I highly suggest any one associated with oil and gas complete it, as it covers many aspects of the industry. Well worth my time and investment and already see the benefits of the knowledge I've gained."

Ghada, BAPCO

"…The boot camp helped me become more mature technically. It's an amazing training program with all the hands-on activities. The hand mapping was very useful. Having the ability to QC maps is the best thing I learned here. The program changed the way I look at logs. It definitely helped me be a better interpreter."

Gadzama, NPDC

"I came without experience in 3d seismic interpretation. However, I am now better equipped to take the knowledge gained and build on it. Working with paper seismic sections logs and maps enabled me to understand fundamental subsurface methods and techniques."

Ahmed, BAPCO

"The course in its entirety, for someone who has just started working in the industry, is an excellent addition after university. The myriad skills and experience gained through the hand's on training during the project phase are directly relevant to the exploration work I am expected to do (Lead/prospect generation and evaluation, Seismic Interpretation, Time/Depth map generation etc). Doing everything manually on paper has given me a better appreciation of the work one does at the workstation. Taking this course has greatly improved my understanding of the fundamental workflow and techniques required for such tasks."

Carly, Juneau Exploration

"This program far exceeded my expectations. I have been in Academia for too long because I expected it to be slower paced, less efficient, and definitely less application-oriented. I was thrilled when I found that everything I learned could be applied directly at work. I actually do feel like a functioning and competent geoscientist at the moment, where I truly was not before the program as I only had 2 months experience in the industry. I expect to use ALL of the skills we applied in the project phase. I think I do now possess the knowledge and technical skills to contribute competently to my company's future endeavors."

STRUCTURAL GEOLOGY & TECTONICS AS APPLIED TO UPSTREAM PROBLEMS

In a cooperation with the **TerraEx Group***, Subsurface Consultants & Associates is proud to offer a unique training program in which clients can design a customized, three to five-day training course comprised of half day, critical-skill training modules coupled with hands on consulting/mentoring. The modules can be selected from eight subject matter domains.

DOMAINS	MODULES
Structural Geology Fundamentals	• Applied Rock Deformation Concepts • Deformation Mechanisms/Mechanical Stratigraphy • Mechanics of Faulting and Fracturing • Folding and Fault/Fold Relationships
Fractures and Unconventional Topics	• Natural fractures and fracture modeling • Geomechanics • Physics of sealing and sealing faults
Unconventional Reservoirs	• Geomechanics • The structural habitat of unconventional resources • Case Studies
Salt Deformation and Tectonics	• Fundamentals of salt and shale tectonics • Mechanics of allochthonous salt bodies
Structural Restoration	• Restoration and cross section balancing • Advanced restoration techniques
Sealing Science and Fault Seals	• Physics of Sealing • Fault Seal Overview and Fault Uncertainty • Techniques to evaluate fault sealing: Allan Maps, etc.
Structural Styles, Setting, and Tectonics Structural Field Trips	• Structural styles and HC traps overview • Structure of continental rifts • Rifting to passive margin: hyperextension • Thin-skinned extensional structural geology • Basement-involved compressional block uplifts • Thin-skinned fold and thrust belts • Fundamentals of strike-slip tectonics • Inversion tectonics • Epi-cratonic basins and foreland basins

Consulting: Each training module can be further expanded with individualized consulting/mentoring by subject-matter experts to further enhance the learning experience. These consulting services can address the client's own data and specific challenges involving seismic interpretation, restorations of sections derived from seismic data, or other techniques and workflows that derive from the training modules.

COURSE MODULES

James W. Granath, PhD

Catalina Luneburg, PhD

The list of modules is constantly changing and growing in response to industry demand, and advanced versions (presented in greater depth and with more case studies) are also available. All modules consist of lectures, individual and team exercises (many emphasizing seismic applications), examples and case studies, and group discussion. By advance agreement, exercises can be built upon the client's own project material.

Blended learning techniques will be integrated through a variety of teaching styles and materials such as PowerPoint presentations, handouts, videos and online activities. The content of each module reflects science or expertise related to an oil and gas workflow, topic, or problem, especially integration of geological and seismic data into a valid and reasonable structural interpretation.

All modules are designed for exploration and production geoscientists at any career level.

Sample 5-Day Course

Client subject matter request: Emphasis on techniques for evaluation of compressional structures, including collaboration on client's structural problems.

Eight half-day modules, plus one day of consultation.

Day 1:
- Introduction: Compressional HC traps
- Deformation mechanisms and mechanical stratigraphy
- Mechanics of faulting and fracturing

Day 2:
- Folding and fault-fold relationships
- Basement-involved compressional block uplifts

Day 3:
- Thin-skinned fold and thrust belts
- Inversion tectonics

Day 4:
- Restoration and cross section balancing
- Advanced restoration techniques

Day 5:
- Consultation/Mentoring: Special problems: hands-on restoration workflow with client's data sets

To request a customized structure course tailored to your needs, contact SCA:
Mary Atchison, matchison@scacompanies.com ph +1-713-789-2444

***TerraEx Group, LLC** is a Colorado-based association of structural geology experts, each with over 20 years of experience in their specialty field, extensive experience in exploration and development, and multi-faceted training and lecturing pedigrees.

TerraEx GROUP


Robello Samuel, PhD

Applied Drilling Engineering Optimization for Drilling Engineers

Topics covered include the following: techniques of optimization, basic concepts, different optimization methods, hydraulic optimization, different nozzle selection criteria, diamond and roller cone bit weight on bit, rotary speed drilling optimization, hydraulic optimization with special downhole tools, well cost estimation, minimum cost casing design. Students will study algorithms and optimization techniques used in the various stages of drilling and well completions.

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Principles and Practices of Mud Motor

Participants will develop an understanding of positive displacement motors, commonly called mud motors. A mud motor is a simple but elegant machine that has become an integral part of the BHA particularly when drilling shale wells. Even though tremendous advancements have been made, challenges still remain with its use. The course covers concepts, performance, advancements, future designs, and how and when to use mud motors during difficult scenarios.

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Rajan N. Chokshi, PhD

Artificial Lift and Production Optimization Solutions

Ever increasing demands related to cost savings and efficiency improvement require that the existing as well as planned oil and gas production assets are fully and optimally utilized. Since most-all oil and gas wells require artificial lift for most of their productive life, the artificial lift systems are important part of production operations for the entire lifecycle of an asset. Careful selection, design and operation of artificial lift equipment is extremely important for profitability. Efficient and cost-effective production workflows involve field management using digital oilfield concepts.

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Artificial Lift and Real-Time Optimization for Unconventional Assets

Unlike conventional production, unconventional production is highly dynamic. Traditional approaches to artificial lift applications are inefficient or even unsuccessful. The artificial lift life-cycle is different for unconventional wells. Production dynamics requires rethinking of the application of real-time downhole and surface sensing. This three-day course will help attendees understand and appreciate these facets while providing applicable solutions. The course gives an overview of artificial lift and related issues that are applicable to unconventional and tight oil/gas wells.

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Christine Ehlig-Economides, PhD

Carbon Capture Utilization and Storage - An Engineering Perspective

Participants will learn about the following topics: Methane leak avoidance and CO_2 emissions capture; CO_2 estimated oil recovery (EOR); Blue hydrogen and CO_2 transport and storage; Saline aquifer storage with Monitoring, Reporting and Verification (MRV); and Economics. Learning objectives include being able to explain quantitative evidence for sustainable CO_2 storage in terms the public can understand, and to locate information essential to storage asset evaluation from digital publications and online data.

Page 41


Dimitrios Hatzignatiou, PhD


James Smolen, PhD

Cased Hole and Production Log Evaluation

This comprehensive course covers new and traditional wireline diagnostic techniques for cased wells and emphasizes three major factors: 1) Evaluation of formation through casing focuses on locating oil, gas, and water downhole, determining their saturations, and monitoring their movement over time, 2) Well integrity applies a variety of cement bond logging and casing inspection techniques to confirm zonal isolation and detect mechanical damage, corrosion, scale, perforations, and 3) Water identification and fluid contribution emphasizes techniques to quantify the source of water, oil, and gas production for control of the production profile or as inputs to reservoir modeling.

Page 41


Srini Prasad

Developing Robust Production Forecasts: Do's and Don'ts

Developing and sustaining a production delivery track record of meeting or exceeding expectations is a critical component of ensuring that an upstream oil/gas company is properly valued by the industry and the investment community. Success depends upon creating the right production forecast (and range) and then delivering the promise. Developing robust production targets is critical for planning and making sound business decisions. This class teaches students how to identify the key factors in developing a production forecast, how to account for uncertainties in a forecast, factors impacting short-term and long-term forecasts, and provides recommendations to improve forecast reliability.

Page 42


Jennifer Miskimins, PhD

Hydraulic Fracturing: Theory and Application

Take an in-depth look at hydraulic fracturing. Approached from a theoretical viewpoint at first, a discussion of how the theory translates into application of the technique follows. The course starts by covering the goals of hydraulic fracturing and the economic justifications that go along with them, and then transitions into a dissection of reservoir characteristics such as in-situ stresses, rock mechanical properties, and their impacts on hydraulic fracture behavior. A large section of the course is dedicated to diagnostic techniques such as DFIT's, tracers, microseismic, and fiberoptics. The course concludes with a discussion of economic considerations for hydraulic fracturing design, specifically in horizontal wells.

Page 45


Siddharth Misra, PhD

Introduction to Subsurface Machine Learning

Students of this course will acquire a working knowledge of using Python programming and open-source packages essential for data analytics and machine learning. Live demos of codes and workflows in the Jupyter Notebook environment serve as the basis for the entire course. The course will help geoscientists, geophysicists, and petroleum engineers learn python programming at a beginner to intermediate level. Various types of data are used including well logs, core data, well performance data, and production data.

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Robert 'Bob' Barba

Practical Interpretation of Open Hole Logs

This course requires no prior knowledge of logs or log interpretation. Attendees will acquire understanding and basic interpretation techniques needed to interpret open hole well logs. Both quick-look qualitative interpretations and more rigorous quantitative interpretations are covered. Equations are solved by hand with a calculator. Both the theory and practice of practical, applied interpretation are covered as well as practical advice, applied exercises, discussions and the study of actual logs. The accompanying manual provides a useful reference for attendees to use after the conclusion of the course.

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Christine Ehlig-Economides, PhD

Pressure Transient Test Design and Interpretation

This course provides a comprehensive analysis of pressure transient test design and interpretation with emphasis on understanding how well and reservoir parameters of practical interest can be quantified from well tests. A brief derivation of the models used for pressure transient analysis and hands on interpretation basics is covered first and then elaborated on to include gas reservoirs and the effects of heterogeneity due to natural fractures. Emphasis is placed on characterizing vertical and lateral reservoir limits and how the latter relates to seismic data interpretation. Both pressure transient and production data analysis are considered for horizontal and hydraulically fractured wells. Finally, multiwell and interference testing is examined.

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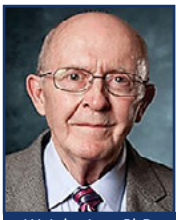
W. John Lee, PhD

PRMS and SEC Reserves & Resources Regulations

This course summarizes the PRMS resources classification system and the SEC regulatory system for reporting reserves. Also summarized are the PRMS guidelines, which were the basis for many of the modernized SEC reserves guidelines and which also provide a systematic procedure to inventory resources, especially important for resources other than reserves (ROTR). SEC reserves definitions, reporting requirements, and guidance are included. Participants will be able to apply the PRMS resources classification system, the SEC reserves reporting guidelines, both deterministic and probabilistic resources estimation procedures, and PRMS-compliant procedures to unconventional resources.

Page 50


Shah Kabir

Reservoir Management of Unconventional Reservoirs: From Inception to Maturity

This workshop provides a fundamental understanding of well performance with the use of several tools such as RTA and DCA. Suitability of these tools for reserves forecasting will be the cornerstone of this workshop. Although deterministic reserves estimation is emphasized, probabilistic approaches will also be outlined. We will explore some issues while tackling some of the field responses. Finally, beyond the early production period, production of water can complicate the lift issue. We will discuss a simplified plunger-lift model to tackle this flow problem at hand. Tools involved include Kappa (RTA and PTA modules), and simple analytical diagnostic and analysis methods.

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Lee Richards, PhD

Well Control for Drilling Engineers and Senior Rig Personnel

This course is designed to break out of the formula-driven well control techniques taught by many commercial well control education providers. The courses offered for well control certification often simply teach personnel to plug numbers into formulas for the answers that they seek. The courses rarely focus on the actual principles governing the equations that are commonly used in well control calculations. Attendees will learn what fundamentally governs well control theory, decision-making, and operations. They will also be able to determine theoretical pressures throughout the wellbore during well control situations in order to improve decision making in both wellbore design and during well control events.

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Leo Roodhart, PhD

Well Stimulation: Practical and Applied

In the drive towards more technically challenging completions and the development of unconventional reservoirs, not enough attention is paid to the details of inflow performance optimization. This can result in poor or less than optimum production. Asset managers, advisors, and engineers involved in the planning, execution, and evaluation of well completions need to have an understanding of possible situations using modern well stimulation techniques and tools. The course includes acidizing and fracturing design, quality control, conducting a treatment, analyzing pressures, and other critical parameters during and after treatment.

Page 53


Gerrit Nitters

ADVANCED ARTIFICIAL LIFTING WITH ESP NEW

Instructor: Rajan N. Chokshi, PhD
Discipline: Engineering, Unconventional Reservoirs
Length: 3 Days (Classroom), 4 Six-Hour Sessions OR 6 Four-Hour Sessions OR 8 Three-Hour Sessions (Live Online)
CEUs: 2.4
Availability: Public, In-House, & Live Online

Who Should Attend:
Production, reservoir, completion, drilling, and facilities engineers, and anyone interested in learning about the implications of Electrical Submersible Pumping (ESP) systems for their fields and reservoirs.

Course Description:
ESP is one of the predominant forms of artificial lift used for lifting prolific quantities of liquids from conventional, unconventional, onshore, and offshore assets. Proper application of ESP is a must in any environment to improve the profitability of an oil producing asset. ESP in its various configurations enables various well lift possibilities when selected and applied correctly. This course gives trainees a thorough understanding of ESP artificial lift technology and related application concepts.

Learning Outcomes:
- Provide a thorough introduction about the theory and application of ESP.
- Demonstrate the advantages and limitations of ESP systems.
- Acquaint the student with ESP system evaluation, design, installation, and operation concepts.

Course Content:
- Introduction
  - Artificial Lift: The When / Why / What of Lift Mechanisms
  - Similarities and differences of ESP compared to other lift forms and relative market position
- ESP Basics
  - Advantages, Limitations, and Operating Principles
  - System Components: Downhole & Surface
- ESP Installation Design
  - Basics of Nodal Analysis for ESP
    - Systems/NODAL Analysis
    - Reservoir Performance
    - Vertical lift performance
    - Total Dynamic Head (TDH)
  - Design & Optimization
    - Pump Curve
    - Affinity Laws
    - Equipment selection and sizing
    - VSD application concepts
- ESP Operations
  - Role of real-time measurements & SCADA applications
  - Challenging applications & mitigation approaches
  - Lessons from Unconventional fields
  - Importance of ESP reliability and DIFA (Dismantle Inspection Failure Analysis)
  - ESP lift lifecycle
- Advances in ESP and Emerging Applications
  - Permanent Magnet Motors
  - Wireline and coiled tubing deployed systems
  - High-temperature and high-viscosity applications
  - Ultra-high-speed applications
- Digital Oilfield and ML Applications for ESP

ADVANCED SUCKER ROD PUMPING NEW

Instructor: Rajan N. Chokshi, PhD or Gabor Takacs, PhD
Discipline: Engineering
Length: 5 Days (Classroom), 10 Half-Day Sessions (Live Online)
CEUs: 4.0
Availability: Public, In-House, & Live Online

Who Should Attend:
Production, reservoir, completion, drilling and facilities engineers, analysts, operators, and anyone interested in learning about the implications of sucker rod-pumping systems for their fields and reservoirs.

Course Description:
This course covers the principles of one of the most common artificial lift methods, Sucker Rod Pumping (SRP) also known as beam pumping or reciprocating rod lift. The course introduces participants to important concepts of sucker rod pumping, illustrated with classroom examples and hands-on exercises. Class teaches beam pumping system components from the downhole to the surface including the real-time optimization infrastructure. It covers challenges facing reciprocating rod lift applications and presents how these challenges are addressed. Special well conditions like high viscosity fluids, free gas production, and abrasive materials require special equipment completely covered during the course. A brief discussion on RRL application in unconventional wells is also included.

Trainees solve examples and class problems throughout the course. Animations and videos reinforce the concepts under discussion. The special feature of this course is a discussion of digital oilfield and a brief review of machine learning applications in the operations of RRL. Recent advances in real-time approaches to the rod lift management are also discussed using field case studies.

Learning Outcomes:
- Understand the fundamental theories and procedures related to SRP operations.
- Easily recognize the different components of the SRP system and their basic structural and operational features.
- Be able to design an SRP installation and select the optimum components.
- Have a basic understanding of the SRP system's power efficiency and system losses.
- Be able to conduct basic troubleshooting of SRP installations.
- Understand how digital oilfield tools help address SRP challenges.
- Recent advances in real-time approaches to the production monitoring and lift management.

Course Content:
- Pre-test
- Introduction to Sucker-Rod Pumping
- The Components of Sucker-Rod Systems
- The Sucker-Rod String
- The Sucker-Rod Pumping Unit
- Pumping System Design with the API RP 11L Procedure
- Production Rate Calculations
- Calculation of Gearbox Torques
- Power Conditions of Sucker-Rod Pumping
- Design of the Sucker-Rod Pumping System Using QRod
- Analysis and Troubleshooting of Sucker-Rod Pumped Installations
- SRP Challenges in Unconventional Production
- Digital Oilfield for Production Optimization
- Real-Time Downhole & Surface Measurements & Role of Data Analytics
- Brief Discussion on Use Cases for Data Analytics; post-test

APPLIED DRILLING ENGINEERING OPTIMIZATION FOR DRILLING ENGINEERS NEW

Instructor: Robello Samuel, PhD
Discipline: Engineering
Length: 2 Days (Classroom), 4 Half-Day Sessions (Live Online)
CEUs: 1.6
Availability: Public, In-House, & Live Online

Who Should Attend:
Drilling engineers, well operations personnel, who would like to gain greater understanding of mud motor design and their applications in drilling.

Course Description:
Topics will include techniques of optimization, basic concepts, different optimization methods, hydraulic optimization, different nozzle selection criteria, diamond and roller cone bit weight on bit, rotary speed drilling optimization, hydraulic optimization with special downhole tools, well cost estimation, minimum cost casing design. This course envisages studying algorithms and optimization techniques used in the various stages of drilling and well completion operations. The course will also focus on presenting different optimization methods and expose the participants to variety of problems and solve them successfully. The training price includes *Applied Drilling Engineering Optimization* (400 pages, color) authored by Dr. Robello Samuel.

Course Outline:
- Optimization of the following:
  - Well Planning (Key factor)
  - Drilling Rig (Major factor)
  - Wellpath
  - Drilling Fluid
  - Hydraulic
  - Drilling Parameters
  - Shale Stabilization
  - Real-time
  - Well Cost
  - Wellbore Size
  - Flat Time

"Learning is not attained by chance; it must be sought for with ardor and attended to with diligence."
Abigail Adams

ENGINEERING

APPLIED DRILLSTRING MECHANICS FOR DRILLING ENGINEERS NEW

Instructor: Robello Samuel, PhD
Discipline: Engineering
Length: 2 Days (Classroom), 4 Half-Day Sessions (Live Online)
CEUs: 1.6
Availability: Public, In-House, & Live Online

Who Should Attend:
Drilling engineers, well operations personnel, rig supervisors, drilling supervisors, and pipe manufacturers who would like to gain greater understanding of mud motor design and their applications in drilling.

Course Description:
The course provides a comprehensive treatment of drill string design, practices with theoretical underpinnings. Various operational loads and limits discussed will provide more comprehensive view of the drillstring mechanics. It also covers advanced drilling engineering, enabling participants to understand the drillstring integrity under various operating load conditions. The class also covers the BHA design concepts, drillahead and drillstring dynamics. Participants will be provided on the realtime time monitoring and optimization and predictive conditions when the well is drilled. Upon completion of this course, participants will not only have deeper knowledge of the basic engineering principles used in the drillstring design but also have confidence to use them efficiently for consulting as well as solving complex problems effectively.

Course Outline:
- Basics and mechanical properties and concepts
- Wellbore friction and wellpath challenges
- Downhole tools and placement
- Torque and drag models – soft, stiff, hybrid and dynamic
- Fatigue, buckling, stress and yield limits
- BHA selection
- Basics of vibration and drillstring vibration and challenges
- Drillstring dynamics
- Tubular wear
- Failure prevention

"I have witnessed how education opens doors, and I know that when sound instruction takes place, students experience the joys of newfound knowledge and the ability to excel."
Daniel Akaka

Featured Instructor:

Robello Samuel, PhD

Dr. Robello Samuel has been a Chief Technical advisor and a senior Fellow, working with Halliburton since 1998. Dr. Samuel began his career working on rigs as a field and drilling engineer for nine years with the Oil and Natural Gas Corporation. Since then he has developed more than 34 years of experience in domestic and international oil/gas drilling operations. He is the recipient of several awards including the Gulf Coast SPE Drilling Engineering Award, SPE International Drilling Engineering Award, SPE Distinguished Membership Award and the Distinguished Lecturer award from the Society of Petroleum Engineers.

Dr. Samuel has taught on the faculty of various universities and holds an adjunct professor appointment (concurrently) for the past 16 years, at the University of Houston and 4 years at the University of Southern California, LA. He has published more than 200 technical papers, holds 67 US patents, and 40 patent pending applications. Dr. Samuel serves regularly as a keynote speaker at major conferences and corporate forums and is regarded as one of the world's most influential contributors to advancement of research and practice in drilling engineering.

Robello's unique blend of skills with broad experience as a field engineer, thinker, thought leader, innovator, researcher, educator and educationist has given him the ability to author thirteen drilling books. He holds BS and MS degrees in Mechanical Engineering, as well as MS and PhD degrees in Petroleum Engineering. Robello also received the SPE/AIME Honorary Membership award in 2021.

Courses Taught:

- Applied Drilling Engineering Optimization for Drilling Engineers
- Applied Drillstring Mechanics for Drilling Engineers
- Principles and Practices of Mud Motor

ARTIFICIAL LIFT AND PRODUCTION OPTIMIZATION SOLUTIONS

Instructor: Rajan N. Chokshi, PhD
Discipline: Engineering, Unconventional Reservoirs
Length: 5 Days
CEUs: 4.0
Availability: Public & In-House

Who Should Attend:
Production/Reservoir/Completion/ Drilling/ Facilities engineers, field operators, working in integrated project teams. Anyone interested in selection, design, analysis, optimum operation of artificial lift and related production systems. Project /asset managers interested in the effects of artificial lift on the performance of their assets.

Course Description:
Cost savings and efficiency improvement require existing and planned oil and gas production assets are optimally utilized. Most oil and gas wells require artificial lift for most of their productive life; the artificial lift systems are important part of production operations for the entire lifecycle of an asset. Careful selection, design and operation of artificial lift equipment is important for profitability. Efficient and cost-effective production workflows involve field management using digital oilfield concepts. Understanding of these production concepts are key to profitably exploit the existing assets fully.

The objective of this course is to:
- Provide awareness of production fundamentals by introducing fluid flow, flow correlations, PVT/Black Oil, IPR, VLP, nodal analysis, pressure gradient curves.
- Introduce applications of major forms of artificial lift like GL, RRL, ESP, PCP, HJP, plunger, capillary injection.
- Provide knowledge about the lift system, from downhole to surface - for GL, RRL, ESP, PCP, HJP, and Plunger.
- Discuss challenges facing lift applications.
- Explore downhole monitoring and surface measurements.
- Efficient and cost-effective production workflows involve field management using digital oilfield concepts. Understanding of these important production concepts are key to profitably exploit the existing assets to the fullest extent.

Learning Outcomes:
- Artificial lift techniques for production optimization.
- The basics and advanced concepts for each form of artificial lift systems from downhole to the surface including real-time optimization equipment and software.
- Using appropriate software tools, how lift components are designed and analyzed.
- Challenges facing lift applications.
- Artificial lift selection and life cycle
- Recent advances in real-time approaches to the production monitoring and lift management from field case studies

Course Content:
Day 1: Systems Analysis and Gas-Lift
Day 2: Reciprocating Rod Lift
Day 3: Electrical Submersible Pumping (ESP)
Day 4: PCP, Hydraulic Lift, Gas Well De-liquification
Day 5: Capillary, Plunger Lift, Digital Oil Field

Note:
This course is customizable from one to five-days in length.

ARTIFICIAL LIFT AND REAL-TIME OPTIMIZATION FOR UNCONVENTIONAL ASSETS

Instructor: Rajan N. Chokshi, PhD
Discipline: Engineering, Unconventional Reservoirs
Length: 3 Days
CEUs: 2.4
Availability: Public & In-House

Who Should Attend:
Reservoir/Completion/Drilling/Facilities/Production engineers working on shale development. Field and asset supervisors and managers interested in improving performance of their unconventional assets. Personnel interested in artificial lift and unique challenges of unconventional production.

Course Description:
Unconventional production is highly dynamic. Traditional approaches to artificial lift applications are inefficient. Artificial lift life cycle is different for unconventional wells. Production dynamics requires rethinking application of real-time downhole and surface sensing. Software tools available to analyze field data are inadequate. This course provides applicable solution paths, an overview of artificial lift and related issues applicable to unconventional and tight oil/gas wells, and production optimization, particularly real-time measurements and optimization techniques required to understand and manage the dynamic production scenarios.

Besides the basics of artificial lift and real-time measurements, the training focuses on specific production and lift challenges related to the unconventional wells. Artificial lift selection and life cycle analysis are covered. Recent advances in real-time approaches to the production monitoring and lift management are discussed using field case studies. The course closes with a group exercise to develop a problem statement and solution plans for production from unconventional assets.

Learning Outcomes:
- Why and how production differs in unconventional wells.
- Artificial lift and production optimization concepts applicable for unconventional wells
- Real-time measurements and optimization in unconventional wells.

Course Content:
Day 1:
- Pre-test
- Introduction to Artificial Lift Systems and Production Optimization
- Production Challenges specific to Shale Development
- Continuous Gas-lift
- Electrical Submersible Pumping
- Hydraulic Jet and Piston Pump

Day 2:
- Reciprocating Rod Lift
- Capillary Injection
- Plunger Lift
- Selection of artificial lift for Shale Wells
  - Variables specific to Shale Well ALS Selection
  - Strengths & weaknesses of applicable lift systems

Day 3:
- Selection of artificial lift for Shale Wells
  - Lift Life Cycle and Elimination process
  - Application case studies in oil & gas wells
- Digital oil field and production optimization
  - Real-time downhole and surface measurements
  - Role of software in visualization, analysis and surveillance
  - Application Case Studies
- Lift Selection Aspects in Shale: Group Exercise

Note: this course is customizable from one to three-days length.

BASIC PETROLEUM ENGINEERING PRACTICES

Instructor: Kirk Boatright, PhD, PE
Discipline: Engineering, Multi-Disciplinary & Intro
Length: 5 Days
CEUs: 4.0
Availability: In-House

Who Should Attend:
Entry-level technical & non-technical personnel who would like an understanding of the discipline of petroleum engineering.

Course Description:
This course is more than an introduction to petroleum engineering and is not a superficial presentation of the technology of the industry. Its purpose is to develop an understanding of the technology and its applications at an engineer's level, and the confidence, professionalism and, therefore, productivity which comes with that understanding. Participants are placed in the position of Reservoir Engineer, and "Our Reservoir" is defined, analyzed and put in production. Next, drill sites are chosen. Participants are then placed in the position of Drilling/Completion Engineer, and the drilling/completion program for "Our Well" is analyzed. Participants enter those specialized programs with a depth of understanding of that particular technology and relation to other classic and new technologies of the industry. The course focuses on the field and application approach, and includes classroom and outside exercises, fundamental engineering problems, and basic field exercises.

Learning Outcomes:
- Reservoir fluid and rock properties.
- Fundamentals of reservoir fluid flow.
- Oil and gas reservoir classification, definition, delineation and development.
- Unconventional reservoirs.
- Fundamentals of drilling, well completion, and production operations.
- Basics of casing design and primary cementing.
- Primary and enhanced recovery mechanisms.
- Surface operations.
- Terminology of exploration and production (language of the oil field).

Course Content:
- Basic petroleum geology
- Reservoir fluid properties
- Our reservoir
- Petroleum geology
- Petroleum reservoirs
- Hydrocarbon generation & occurrence
- Reservoir fluid distribution & flow characteristics
- Tight oil & gas reservoirs
- Hydrocarbon reservoir classification & definition
- Exploration technology
- Defining the hydrocarbon reservoir
- The reservoir development plan
- Drilling engineering & operations
- Well completion technology
- Production technology
- Reservoir development practices
- Hydrocarbon recovery mechanisms
- Surface processing of produced fluids

"BEST PRACTICES" FOR NEW WELL FRACS AND LEGACY WELL REFRACS NEW

Instructor: Robert 'Bob' Barba
Discipline: Engineering, Unconventional Reservoirs
Length: 2 Days (Classroom),
CEUs: 1.6
Availability: Public & In-House

Who Should Attend:
Engineers, managers, and geoscientists concerned that their reservoirs may not be completed using the best possible techniques. The course covers the latest developments in techniques to get the maximum recovery possible from new well frac and legacy well refrac programs.

Course Description:
Participants will learn a methodology that first accurately characterizes the reservoir properties to evaluate the production potential of the reservoir with a state of the art treatment. For refracs this is compared to the historic production to estimate the upside from a properly designed treatment. This enables a determination of the cause of poor production performance; as a function of a poorly designed or executed completion, or poor quality reservoir rock. If the remaining volumetric reserves are adequate, techniques are presented to effectively access these reserves with refracturing treatment(s).

Learning Outcomes:
- What should a new well or refrac produce with an optimized stimulation treatment?
- How do you avoid stranding hydrocarbons in new and existing wells?
- What are the "best practices" for executing new well fracs and refracs?
- Where have operators done refracs and what are their economics vs new wells?
- How refracs can help avoid new infill well 40% EUR losses from asymmetric fracs.
- How to avoid the need for a future refrac by getting the completion right the first time!

PLEASE NOTE: STUDENTS ARE REQUIRED TO BRING A LAPTOP WITH MICROSOFT EXCEL AND ADOBE READER INSTALLED.

Course Content:
- Discussion of the current state of the frac and refrac industry
- Review of basic log analysis techniques
- Log quality control, calibration, and normalization steps
- Recovery factor and effective frac length model data requirements
- Net pay model calibration using log, core, DFIT, well test, and production data
- Permeability, rock properties and reservoir pressure model calibration to field data
- Integration of rock properties, permeability, and reservoir pressure models
- Production decline curve analysis issues
- Recovery factor exercises for unconventional reservoirs
- Effective frac length exercises for conventional reservoirs
- Historical best practices for improving frac performance
- Review of refrac project results
- Mechanical issues with refrac design and execution
- Review of local examples and discussion

CARBON CAPTURE UTILIZATION AND STORAGE - A GEOLOGICAL PERSPECTIVE NEW

Instructor: Stephen A. Sonnenberg, PhD
Discipline: Geoscience, Engineering, Multi-Disciplinary & Intro
Length: 2 Days (Classroom), 4 Half-Day Sessions (Live Online)
CEUs: 1.6
Availability: Public, In-House, & Live Online

Who Should Attend:
Geologists, geophysicists, and engineers who are interested in geologic carbon capture utilization and storage.

Course Description:
This course will discuss carbon capture utilization and storage (CCUS) from a geologic perspective. Examples from carbon capture utilization (CCU) including enhanced oil recovery (EOR) projects will be shown. Known and proposed carbon capture storage (CCS) examples will also be covered.

Learning Outcomes:
- CCUS Options.
- Screening Criteria for CCU.
- Screening Criteria for CCS.
- Relevant Mineral Reactions to Consider.
- Monitoring of Projects.
- Induced Seismicity.

Course Content:
- Introduction and Geologic Considerations
  - Greenhouse gases
  - CCUS options
  - CO_2 phase behavior
  - Subsurface brines
  - Some mineral reactions
  - Hydrocarbon traps (key elements)
  - Induced seismicity
- CO_2 Storage in Depleted Oil and Gas Reservoirs
  - Screened for production volume, depth, proximity of anthropogenic CO_2 source
  - Reservoir size and properties
  - Trap
  - Seal
- Enhanced Oil Recovery and Enhanced Gas Recovery
  - What is it?
  - Where is it applied?
  - How does it work?
  - Examples
  - EOR in unconventionals
- Gas Storage Fields and CO_2 Options
  - Review of gas storage field types
    - Depleted oil and gas fields
    - Salt caverns, mines, etc.
    - Aquifer storage fields
  - CO_2 Options
- Enhanced Coalbed Methane (CBM) and CO_2 Storage in Deep Coal Seams
  - CBM basics
  - Enhanced CBM with CO_2
  - CO_2 options in deep un-mineable coal seams
- Enhanced Shale Gas and CO_2 Storage
  - Shale gas basics
  - CO_2 options
- CO_2 Injection in Saline Aquifers
  - Selection criteria
  - Examples
- CO_2 Fields and Options
  - Review of CO_2 fields
  - CO_2 options
- Enhanced Geothermal Options
- CO_2 and Carbonation Options
  - Geological disposal - mineralization
  - Mineral reactions
  - Examples
- Summary and Wrap-Up

CARBON CAPTURE UTILIZATION AND STORAGE - AN ENGINEERING PERSPECTIVE NEW

Instructor: Christine Ehlig-Economides, PhD and Dimitrios Hatzignatiou, PhD
Discipline: Geoscience, Engineering, Multi-Disciplinary & Intro
Length: 3 Days (Classroom), 5 Half-Day Sessions (Live Online)
CEUs: 2.4
Availability: Public, In-House, & Live Online

Who Should Attend:
Petroleum engineers and geoscientists interested or already engaged in methane and carbon dioxide (CO_2) capture from industrial and agricultural sources and from the air, CO_2 utilization for enhanced oil recovery (EOR), and CO_2 storage in depleted reservoirs and saline aquifers.

Course Description:
The primary topics of discussion during this course are (1) Methane leak avoidance and CO_2 emissions capture, (2) CO_2 EOR, (3) Blue hydrogen and CO_2 transport and storage, (4) Saline aquifer storage with Monitoring, Reporting and Verification (MRV), and (5) Economics.

Learning Outcomes:
- Estimate CO_2 storage capacity, well injectivity, a suitable Monitoring, Reporting, and Verification (MRV) plan, and storage cost in $/tonne, based on geologic models and (where applicable) reservoir production data in both clean and shaley intervals.
- Explain quantitative evidence for sustainable CO_2 storage in terms the public can understand.
- Locate information essential to storage asset evaluation from digital publications and online data.

Course Content:
- Course Rationale
  - Uses for fossil resources
  - Greenhouse gas (GHG) emission sources
  - GHG storage options
  - CO_2 capture and utilization
- Decarbonizing Oil
  - Maximized CO_2 storage in depleted oil reservoirs
  - Currently active EOR+ projects
  - Carbon neutral crude oil
- Decarbonizing Natural Gas
  - CO_2 storage in depleted gas reservoirs
  - CO_2 storage in a blue hydrogen economy
  - Hydrogen storage
- CO_2 Storage in Saline Aquifers
  - CO_2 storage in deep saline aquifers
  - Wells and CO_2 injection
  - Monitoring, Reporting, and Verification
- Economics
  - Are we making money yet?
  - Incentives
  - Value products

CASED HOLE AND PRODUCTION LOG EVALUATION

Instructor: James Smolen, PhD
Discipline: Engineering, Formation Evaluation
Length: 5 Days
CEUs: 4.0
Availability: Public & In-House

Who Should Attend:
Reservoir and production engineers and geologists, cased hole sales engineers, petrophysicists, log analysts and others involved in maximizing recovery, identifying production problems or planning workover operations.

Course Description:
This comprehensive, up-to-date course covers new and traditional wireline diagnostic techniques for cased wells and emphasizes three major factors. 1.) Evaluation of formation through casing focuses on locating oil, gas and water downhole, determining their saturations and monitoring their movement over time. 2.) Well integrity applies a variety of cement bond logging and casing inspection techniques to confirm zonal isolation and detect mechanical damage, corrosion, scale, perforations. 3.) Water identification and fluid contribution emphasizes techniques to quantify the sources of water, oil and gas production for control of the production profile or as inputs to reservoir modeling. Special consideration is given to the newest logging techniques for highly deviated and horizontal wells.

Learning Outcomes:
- Quickly recognize clean gas, oil and salt water zones on Gamma Ray and Sigma logs.
- Calculate fluid saturations from Sigma logs in both clean and shaley intervals.
- Assess cement quality, compute bond index, appreciate the shortcomings of this measurement and select a suitable bond log tool.
- Compute the well flow profile (zonal contributions) from the Spinner and Fluid ID surveys.
- Use temperature log to detect contributing zones and possible channels.

Course Content:
- Overview of cased hole logs
- Formation evaluation
- GR and CNL
- Pulsed neutron sigma and C/O logs
- Resistivity and acoustic
- Well integrity
- Conventional, directional and pad tools
- Pulse echo techniques
- Casing inspection techniques
- Fluid contribution
- Classic PLT approach
- Oxygen activation and PN techniques
- New tools for horizontal wells

Participant Testimonial:
"Great instructor! He didn't talk over our heads and explained things at a very basic and easy to understand level." – Lauren B., Well Intervention Engineer

CEMENT EVALUATION AND REPAIR WORKSHOP

Instructor: William K. Ott, PhD and James Smolen, PhD
Discipline: Engineering
Length: 2 Days
CEUs: 1.6
Availability: Public & In-House

Who Should Attend:
Drilling and completion engineers, Field supervisors, Petroleum engineers and geologists, Company executives and officials, Independent producers, Field personnel with operating & service companies, Production managers and engineers.

Course Description:
This two-day training course will focus on detection of fluid channels, voids and leaks, and their effective repair. Poor cement coverage often leads to production of undesired fluids, disposal problems, reservoir pressure decline, loss of hydrocarbon reserves and other problems. Aim to evaluate and discuss various technologies used to repair leak paths due to wellbore ages which can develop allowing fluid to migrate from the high-pressure downhole strata through leakage paths in the containment.

Numerous logging tools and techniques are available to evaluate cement issues prior to initial completion or anytime during the life of the well. Topics on the technologies that are available to repair the primary cement to the proper stage of hydraulic isolation or solve the SCP problem will be discussed at the training course. The morning of the training course is dedicated to cement evaluation and the afternoon to cement repair.

Course Content:
DAY 1: Cement Evaluation - Jim Smolen
- Cement and Isolation
- Acoustic Bond Logs - What They Measure
- Cement Bond Log (CBL) Tool Configuration and Operations
- Tool Configuration
- The Received Signal and Logs Presented
- CBL Log Presentation
- Factors Affecting Tool Performance
- Quantitative Cement Bond Log Evaluation
- Special and Non-Standard CBL Examples
- Borehole Compensated Cement Bond Logs
- Pad Type CBL, the Segmented Bond Tool (SBT)
- Bond Logs with Directional Receivers

DAY 2: Cement Repair - William K. Ott
- Squeeze Cementing
- Problem Diagnosis
- Squeeze Cementing Theory
- Squeeze Methods
- Placement Techniques
- Tools and Job Considerations
- Well Preparation
- Job Planning
- Slurry Design and Preparation
- Basic Procedures
- Applications
- Alternatives to Cement
- Specialty Products and Techniques
- Evaluating a Squeeze Cementing Job
- Reasons for Failures
- Conclusions
- Summary of Recommended Practices

DEVELOPING ROBUST PRODUCTION FORECASTS: DO'S AND DON'TS NEW

Instructor: Srini Prasad
Discipline: Engineering
Length: 1 Day (Classroom), 2 Half-Day Sessions (Live Online)
CEUs: 0.8
Availability: Public, In-House, & Live Online

Who Should Attend:
Reservoir engineers, production engineers, subsurface managers, and asset managers.

Course Description:
Developing and sustaining a production delivery track record of meeting or exceeding expectations is a critical component of ensuring that an upstream oil/gas company is properly valued by the industry and the investment community. Success depends upon creating the right production forecast (and range) and then delivering the promise. Developing robust production targets is critical for planning and making sound business decisions. This class identifies the key issues associated with setting the right production expectations and provides recommendations to improve forecast reliability.

Learning Outcomes:
- Key factors in developing a production forecast.
- How to account for uncertainties in the forecast.
- Factors impacting short-term and long-term forecasts.
- Recommendations for different field/reservoir types/production maturity.
- Checklist of Do's and Don'ts.

Course Content:
- Why is it Important?
- Production Forecasting Phases?
- Production Forecasting Approach
  - Capacity Model & Downtime
  - Estimating Reservoir and Well Potential
  - Estimating Downtime
  - Injection Issue
  - Commercial Considerations
  - Long-Term and Short-Term Forecasts
  - Common Pitfalls
- How to Account for Uncertainty
  - Types of Uncertainty
  - Uncertainty and Error
  - Train Wreck and Force Majeure
  - Uncertainty Analysis at Asset/Field & Portfolio Levels
- Quality Assurance
  - Independent "Cold Eyes" Review
  - Benchmarking
  - Audit Trail
- Recommendations for Different Field/ Reservoir Types
  - Conventional Oil Reservoirs: Greenfield and Brownfield
  - Unconventional Oil Reservoirs: Greenfield and Brownfield
  - Considerations for Gas Reservoirs

DRILLING FLUIDS

Instructor: Lee A. Richards, PhD, PE
Discipline: Engineering
Length: 3 Days (Classroom), 3 Half-Day Sessions (Live Online)
CEUs: 2.4
Availability: Public, In-House, & Live Online

Who Should Attend:
Drilling engineers and well operations personnel who would like to gain greater understanding of drilling fluids, their application and the principals behind fluid treatment.

Course Description:
This course is designed to improve understanding of drilling fluids and the theory behind fluid treatment and maintenance. Often during operations drilling engineers and well-site supervisors lack the basic understanding of how drilling fluids work and why certain treatments are administered. This often leads to the application of improper treatment regimens which can lead to increased well costs, improper hole cleaning, stuck pipe incidences, poor ROPs, and even well control situations. This course will take the mystery out of drilling fluid operations and provide a working knowledge of both oil based and water based drilling fluid maintenance and application.

Learning Outcomes:
- Understand the basic make-up of both water based and oil based fluids.
- Learn how fluids interact with drilled formations and the principals of fluid treatment to improve operational efficiency.
- Understand mud reports and the governing principals behind the numbers reported.
- Learn to recognize proper and improper treatment strategies.
- Learn to recognize potential problematic zones and formulate drilling fluid strategies to optimize drilling operations.
- Determine when to select various types of drilling fluid for specific drilling situations.
- Understand the basic principles behind solids control.
- Learn the governing aspects of hole cleaning and how drilling fluid treatment and selection can optimize cuttings transport.
- Prevent stuck pipe situations.
- Understand lost circulation and learn how to prevent and treat fluid loss events.
- Understand how drilling fluids react during well control situations and how treatment can prevent major well control events.

Course Content:
- Water based fluids
- Clay interactions in water based fluids
- Water based fluid maintenance and treatment
- Oil based fluids
- Emulsion theory
- Oil based fluid maintenance and treatment
- Drilling fluids reports and how the measured parameters effect drilling operations
- Wellbore problems associated with drilling fluids
- The importance of drilling fluids for kick prevention
- Fluid considerations for well control operations

ECONOMIC EVALUATION OF PETROLEUM OPPORTUNITIES

Instructor: Ed Savage
Discipline: Engineering
Length: 3 Days
CEUs: 2.4
Availability: In-House

Who Should Attend:
Engineers, geoscientists, planners, managers, supervisors, financial or oil & gas accounting staff plus anyone who is involved in building or evaluating economic models.

Course Description:
Proper decision making requires a thorough understanding and consistent application of economic evaluation techniques throughout an organization; failure to achieve correct and consistent economic analysis will result in less than optimum application of available capital. To achieve this, everyone involved must understand the economic analysis process: why we do it, the components involved, the calculations, and the proper application of the resulting metrics.

Participants will learn from the ground up: cash flow, discounting, metrics calculations, and proper application of those metrics.

Risk and uncertainty will be illustrated by demonstrations and exercises after which we will apply what we've learned to economic analysis. We will look at techniques of handling uncertainty in reserves, producing rates, costs, and prices.

Culmination will be a full scale evaluation model of the Eagle Ford Shale play in the US.

Learning Outcomes:
- Basic concepts and components of economic analysis.
- Discounting, why and how.
- How to calculate economic metrics and how and when to use them properly.
- Why reserves are log normally distributed.
- Concepts of risk and uncertainty and why risk is not the same as uncertainty.
- How to handle risk and uncertainty in economic evaluations.

Course Content:
- What is Economic Analysis and why do we run them?
- Components of an Economic Analysis
- Building a PSC cash flow model, undiscounted and discounted
- Metrics, definitions, calculations and appropriate usage
- Reserve distributions: the importance of log normal distributions to understanding oil and gas reserves
- Risk vs. Uncertainty
- Risk assessment
- Making decisions under risk and uncertainty
- Ranking problem incorporating risk and uncertainty
- Building a full scale evaluation model: the Eagle Ford Shale

Participant Testimonials:
"He was very knowledgeable and presented the information in an easy way to understand."

"I enjoyed the course and would recommend it to anyone interested in learning more about economics."

"Very good, energetic, and knowledgeable."

ELECTRICAL SUBMERSIBLE PUMP - DESIGN AND OPTIMIZATION USING NODAL ANALYSIS NEW

Instructor: Rajan N. Chokshi, PhD or Gabor Takacs, PhD
Discipline: Engineering
Length: 5 Days (Classroom), 10 Half-Day Sessions (Live Online)
CEUs: 4.0
Availability: Public, In-House, & Live Online

Who Should Attend:
Production, reservoir, completion, drilling and facilities engineers, analysts, operators, and anyone interested in learning about the implications of Electrical Submersible Pump (ESP) systems for their fields and reservoirs.

Course Description:
The course covers the basic design principles of one of the most common artificial lift methods, Electrical Submersible Pumping, illustrated with many classroom examples. The proper design of ESP installations is a technical and economic problem. The course starts with a short overview of fundamentals and deals with well inflow performance, hydraulics, electrics, and a basic description of NODAL Analysis principles. The basic components of the ESP system: the pump, motor, protector, electric cable, are fully described by introducing their main structural and operational features. Trainees solve examples and class problems throughout the course. Animations and videos reinforce the concepts under discussion.

Special well conditions like high viscosity fluids, free gas production, and abrasive materials require special equipment completely covered during the course. A brief discussion on ESP application in unconventional wells is included. The course covers the application of Variable Speed Drives and their advantages in producing oil wells. The special feature of this course is a discussion of digital oilfield and a brief review of machine learning applications in the operations of ESPs.

Learning Outcomes:
- Understand the basic fundamental theories and procedures related to ESP operations.
- Easily recognize the different components of the ESP system and their basic structural and operational features.
- Understand how special well conditions (high fluid viscosity, free gas production, abrasives in well fluids, unconventional developments) can be handled by properly designed ESP systems.
- Have a working knowledge of the types, the application, and the advantages of Variable Speed Drives.
- Be able to design an ESP installation and select the optimum components of the ESP system.
- Be able to use NODAL Analysis program packages to describe the operation of ESP installations.
- Have a basic understanding of the ESP system's power efficiency and system losses.
- Be able to conduct basic troubleshooting of ESP installations.
- Understand how digital oilfield tools help address ESP challenges.
- Recent advances in real-time approaches to the production monitoring and lift management.

- **Course Content:**
- Pre-test, Introduction to ESP Operations
- Well Inflow Performance, Hydraulic Fundamentals, Electrical Fundamentals
- Application of NODAL Analysis, ESP Components and Their Operational Features
- Use of ESP Equipment in Special Conditions
- Variable Speed Applications, Digital Oilfield

ENERGY TRANSITION FOR PETROLEUM PROFESSIONALS NEW

Instructor: D. Nathan Meehan, PhD, PE
Discipline: Geoscience, Engineering
Length: 3 Days (Classroom), 6 Half-Day Sessions (Live Online)
CEUs: 2.4
Availability: Public, In-House, & Live Online

Who Should Attend:
Reservoir engineers, petroleum engineers, production engineers, geologists, geophysicists, managers, independent operators, marketing personnel and anyone who needs a practical understanding of the energy transition and how it will affect future oil and gas activities and what the opportunities are to be "part of the solution."

Course Description:
This course is designed for energy professionals with an understanding of oil and gas operations and activities but not necessarily any background in climate change, energy transition, life cycle analysis or alternative fuels. The course emphasizes the role of fossil fuels in a world with increasing drivers away from such fuels. Practical approaches to minimize the carbon impact of oil and gas operations are presented.

Learning Outcomes:
- Understanding of key drivers for alternative energy and the energy transition.
- Understanding of quantitative ways to evaluate carbon intensity of oil and gas operations and ways to lower that impact.
- Understanding of key policy issues associated with the energy transition.
- Understanding of carbon capture, utilization, and storage (CCUS) and other major opportunities to profit from the energy transition.

Course Content:
- History of energy
- Drivers for the transition
  - Macroeconomics
  - Climate change
  - Goverment and policy
  - Technology and cost
  - Differing regional baselines and transition pathways
- Not all zero-carbon power comes from renewables, not all renewables are carbon-free
- Decarbonizing oil and gas
- CCUS
- Industry-specific issues
- Case studies
- The way ahead

"Education is the most powerful weapon which you can use to change the world."
Nelson Mandela

FOR SAFE DRILLING: FORMATION - FRACTURE PRESSURE INTERPRETATIONS AND ANALYSIS NEW

Instructor: Selim Shaker
Discipline: Engineering
Length: 5 Days (Classroom), 10 Half-Day Sessions (Live Online)
CEUs: 4.0
Availability: In-House & Live Online

Who Should Attend:
Drilling, completion and reservoir engineers and managers, drilling supervisors and staff, mud loggers, well log and geopressure analysts, geologists, geophysicists and technical staffs.

Course Description:
The geopressure and fracture pressure subsurface profile has great impact on drilling prognosis, challenges and the cost estimate of testing a prospect. Before drilling, pore-fracture pressure prediction is a prerequisite for a successful drilling. The size of the drilling tolerance window (DTW), especially in deepwater and high temperature, high pressure (HTHP) environments, dictates the drilling operation maneuverability, such as mud weight, casing settings and projected total depth.

Most of the pressure surge, hard kicks, blowouts and loss of circulation unexpectedly happens when the drill bit penetrates the interface between seal (e.g. shale) and reservoir (e.g. sand). A comprehensive knowledge of pressure disparity causes between shale and sand is a keystone for safe and economically feasible exploration projects. Overlooking the fortunate presence of a large oil-gas pool can further shrink the drilling tolerance window and allow unexpected drilling challenges.

Water depth, sediment maturation, and the subsurface geological structural setting dictate the size of the safe drilling tolerance window. Estimation of the safe DTW allows drilling with minimum challenges like lost circulation, kicks, excessive torque, bore-hole instability, pack off-hole, etc.

Learning Outcomes:
- Understand the causes, conceptual models and graphic representations.
- Gain the knowledge of the different prediction methods and help choose the right software for your proposed well location.
- Comprehend the importance of PP-FP profile in assigning the casing seats depth, MW and their safety limitations.
- Calibrate (in real time) the before drilling PP-FP model to ensure ECD stay in the safety margins in a stable bore-hole.
- Understand challenges involve drilling through faults, salt ridges and overhangs, salt weld, pay zones and depleted reservoirs.
- Recognize the effect of pore pressure – geomechanics interrelation on bore hole stability, caving, tight holes, etc.
- Assess drilling safety especially in Deepwater such as SWF, narrow DTW, Kicks, LOC, Dual Gradient Drilling (DGD), Managed Pressure Drilling (MPD).
- Appraise the proposed completion operation based on geopressure. compartmentalization.

Course Content:
- Pore Pressure Fundamentals
- Subsurface Pressure Profile Impact on Drilling Prognoses
- Pre-Drilling Prediction and Assessment
- While Drilling PP-FP Pertaining Analyses
- While Drilling Applications
- Post-Drilling
- Drilling Challenges in Deepwater

GAS-LIFT & DELIQUIFICATION APPLICATIONS NEW

Instructor: Rajan N. Chokshi, PhD
Discipline: Engineering, Unconventional Reservoirs
Length: 3 Days (Classroom), 8 Three-Hour Sessions OR 6 Four-Hour Sessions (Live Online)
CEUs: 2.4
Availability: Public, In-House, & Live Online

Who Should Attend:
Production, reservoir, completion, drilling, and facilities engineers, and anyone interested in learning about the implications of gas-lift systems for their fields and reservoirs.

Course Description:
Gas-lift is one of the predominant forms of artificial lift used for lifting liquids from conventional, unconventional, onshore, and offshore assets. Additionally, proper application of gas-lift to loaded-up gas wells can be one of the most effective ways of improving profitability of a gas well portfolio. Gas-lift and its various forms (intermittent lift, gas-assisted plunger lift) enable various well lift possibilities when selected and applied properly. This course is designed to give trainees a thorough understanding of gas-lift technology and related application concepts.

Learning Outcomes:
- Provide a thorough introduction about the theory of gas lift.
- Demonstrate the advantages and limitations of gas-lift systems.
- Acquaint the student with system evaluation, design, installation, operation concepts.

Course Content:
Modules 1 & 2:
- Introduction
  - Artificial Lift: The When / Why / What of Lift Mechanisms
  - Similarities and differences of gas-lift compared to other lift forms and relative market position
- Review of well performance fundamentals
  - Systems/NODAL Analysis
  - Reservoir performance: Productivity Index & Inflow Performance Relationship (IPR)
  - PVT Analysis
  - Multiphase Flow
    - Flow correlations & mechanistic models
    - Flow regimes/maps
    - Pressure gradient curves
    - Vertical Lift Performance (VLP)
- Gas-Lift
  - Types, application, advantages, limitations
  - Downhole and surface equipment
  - Gas-lift production rate and well evaluation basics - Operating Points Analysis

Modules 3 & 4:
- Gas-Lift Valve Mechanisms
  - Valve Classifications: IPO, PPO, Pilot, Dummy
  - Continuous Flow Unloading Sequence
  - Importance of True Valve Performance
- Gas-Lift Installation Designs
  - Overview of IPO design methodology
  - Valve spacing and valve sizing
  - Design and optimization

Modules 5 & 6:
- Gas well deliquification options
- Plunger lift
- Gas-lift well life cycles
- Gas-assisted plunger lift (GAPL)
- Plunger-assisted gas lift (PAGL)
- Intermittment gas-lift basics and overview of design

Modules 7 & 8:
- Injection infrastructure: compression and sizing
- Well unloading procedures and guidelines
- Gas-lift trouble-shooting and diagnostics
- Digital oilfield and ML introductions as applicable to gas-lift

GAS LIFT DESIGN AND OPTIMIZATION USING NODAL ANALYSIS NEW

Instructor: Rajan N. Chokshi, PhD or Gabor Takacs, PhD
Discipline: Engineering
Length: 5 Days (Classroom), 10 Half-Day Sessions (Live Online)
CEUs: 4.0
Availability: Public, In-House, & Live Online

Who Should Attend:
Production, reservoir, completion, drilling and facilities engineers, analysts, operators, and anyone interested in learning about the implications of gas-lift systems for their fields and reservoirs.

Course Description:
Gas-lift is one of the predominant forms of artificial lift used for lifting liquids from conventional, unconventional, onshore and offshore assets. Gas-lift and its various forms (intermittent lift, gas-assisted plunger lift) allows life of well lift-possibilities when selected and applied properly. This course is designed to give trainees thorough understanding of gas-lift technology and related application concepts.

The course covers main components, application envelope, relative strengths and weaknesses of gas-lift and its different forms like intermittent lift, gas-assisted plunger lift. Trainees solve examples and class problems throughout the course. Animations and videos reinforce the concepts under discussion. A unique feature of this course is discussion on digital oil field and machine learning applications in gas-lift optimization.

Learning Outcomes:
- Understand the fundamental theories and procedures related to Gas-Lift operations.
- Easily recognize the different components of the gas-lift system and their basic structural and operational features.
- Be able to design a gas-lift installation.
- Understand how digital oilfield tools help address ESP challenges.
- Recent advances in real-time approaches to the production monitoring and lift management.

Course Content:
- Pre-test
- Introduction
  - Artificial Lift: When / Why / What of Lift - Mechanisms; Types
  - How Gas-lift is same and different from other lift forms.
  - Well Life Cycles and gas lift Applicability vis a vis other lift methods
- Well Performance: Review of Fundamentals
- Gas Lift Installation Types
  - Tubing Flow Installations
  - Casing Flow and Other Installations
- Gas Lift Valves
- Continuous Flow Gas Lifting
- NODAL Analysis of Continuous Flow Gas Lifted Wells
- Optimization of Continuous Flow Gas Lift Installations
- CASE STUDY: Optimizing the Operating Conditions in a Major Gas-Lifted Field
- Unloading Design for Continuous Flow
- Intermittent Gas-Lift Basics & Overview of Design
- Plunger Assisted Gas-Lift & Gas-Assisted Plunger Lift
- Analysis and Troubleshooting Continuous Flow Gas Lift Wells
- Gas-Lift Application in Unconventional Production
- Digital Oilfield for Production Optimization
- Post-test

HOW TO MAXIMIZE UPSTREAM EXPLOITATION VALUE (CONVENTIONAL RESERVOIRS) NEW

Instructor: Srini Prasad
Discipline: Engineering
Length: 1 Day (Classroom), Two 3.5 Hours Sessions (Live Online)
CEUs: 0.8
Availability: Public, In-House, & Live Online

Who Should Attend:
Reservoir engineers, production engineers, subsurface managers, and asset managers.

Course Description:
The primary objective of any upstream oil field development should be to make the right sanction promise and then meet/beat the promise (recoverable volume, production, cost and schedule estimates).

It is critical to select the right subsurface development, then execute/operate it in a manner to meet the above objective. The subsurface is the foundation of an upstream oil/gas company. The right reservoir rock and fluid characteristics are key to getting the best returns on your investment and sustaining the long-term health of the company. A key financial metric is the cost/barrel. In today's world, especially with the advent of digitalization, Subsurface Excellence, Innovation, Automation, Machine Learning/ Artificial Intelligence, are key to "increasing the denominator" of the financial metric.

The workshop provides examples of how to maximize the value of exploiting a conventional reservoir development (thereby also getting a more effective carbon footprint) by applying these principles of subsurface excellence, innovation, and digitalization. It identifies value enhancement levers all the way from the Appraise to the Operate stage of the development.

Course Content:
- What has Changed?
- Typical Exploitation Stages of a Conventional Reservoir Development
  - Expectations for the Appraise(A)/Select(S)/ Define(D)/Execute(E)/Operate(O) Stages
- How to Bolster Performance/Reduce Discovery-Start-Up Time
  - New Appraise, Select, (Think Agile!) and Development Stage Philosophies
  - Leverage Subsurface Excellence, Digitalization
- Do the Right Subsurface Development/Do it Right
  - Utilize Four Subsurface Excellence "Evaluation Lenses"
    - Benchmark recoverable volume per completion and recovery factor estimates
    - Robust Production/Recoverable Volume Forecasts
    - Reservoir Well Surveillance and Management to deliver the sanction promise
    - Recovery Factor Technical Limit Study: Maximize Ultimate Recovery
- How to Sustain/Enhance Well Health Leveraging Robotic Process Automation Based Well Surveillance
- How to Maximize Waterflood Recovery
  - Track/Enhance Injected Water Efficiency
  - Leverage Machine Learning: Enhance performance after acquiring enough data to train the algorithm
  - Modify rock-fluid wettability with designer cocktail
- How to Address Cultural/Organizational Issues

HYDRAULIC FRACTURING: THEORY & APPLICATION

Instructor: Jennifer Miskimins, PhD
Discipline: Engineering, Unconventional Reservoirs
Length: 3 Days (Classroom), 6 Half-Day Sessions (Live Online)
CEUs: 2.4
Availability: In-House & Live Online

Who Should Attend:
This course is intended for petroleum engineers, geologists, geophysicists, and other technical staff wanting a more in-depth understanding of hydraulic fracturing. All types of reservoir applications are discussed, but a focus is placed on the design and application in horizontal well systems. Previous knowledge of hydraulic fracturing basic concepts is helpful, but not required.

Course Description:
This course provides an in-depth look at hydraulic fracturing, first from a theoretical viewpoint, but also how this theory translates into application of the technique. The course starts with a discussion of the goals of hydraulic fracturing and the economic justifications that go along with them. From there, the reservoir characteristics such as in-situ stresses, rock mechanical properties, etc. and their impacts on hydraulic fracture behavior are covered.

Fracturing fluids and proppant types are presented, and an in-depth discussion of conductivity and the associated damage mechanisms under reservoir conditions are discussed. The impacts of such on production and reserve recovery is also highlighted. A large section of the course is dedicated to diagnostic techniques such as DFIT's, tracers, microseismic, and fiberoptics. How these techniques work, benefits and drawbacks, and potential applications are reviewed. Fracture modeling is discussed, with some model examples presented. Finally, the course concludes with a discussion of economic considerations for hydraulic fracturing design, specifically in horizontal wells.

Learning Outcomes:
- Distinguish between the different fracture lengths (created, effective, propped, hydraulic) and understand their importance in fracture design and efficiency.
- Differentiate between various fracture conductivity damage mechanisms and understand the impacts to production.
- Compare and contrast different treatment diversion options.
- Calculate in-situ stress values and understand the impacts of over- and under-pressured reservoir systems on such values.
- Distinguish between different diagnostic techniques, both indirect and direct, and determine the pros/cons of various options.

Course Content:
- What is hydraulic fracturing?
- SRV vs. enhanced permeability models
- Rock mechanics
- In situ stress
- Breakdown pressures
- Completion Types and Perforating
- Fracturing fluids
- Proppants
- Conductivity
- Diagnostics
- Hydraulic fracture modeling
- Economic optimization of treatments
- Conclusions

HYDRAULIC PUMPING NEW

Instructor: Rajan N. Chokshi, PhD
Discipline: Engineering
Length: 2 Days (Classroom), 4 Half-Day Sessions (Live Online)
CEUs: 1.6
Availability: Public, In-House, & Live Online

Who Should Attend:
Production, reservoir, completion, drilling and facilities engineers, analysts, operators, and anyone interested in learning about the implications of hydraulic lift systems for their fields and reservoirs.

Course Description:
Hydraulic lift can be applied to oil and gas wells in conventional, unconventional, onshore, and offshore assets. Hydraulic lift jet pumping and piston pumping systems are less frequently used forms of lift methods, but they work where other lift methods struggle. Hydraulic lift methods enhance the life of well lift possibilities when selected and applied correctly. Trainees receive a thorough understanding of hydraulic pumping lift technologies and related concepts. Examples and class problems are solved using SNAP software. Animations and videos reinforce the concepts under discussion. A brief review of digital oilfields application in hydraulic lift is also presented.

Learning Outcomes:
- Develop a clear understanding of hydraulic pumping lift system, how they work, and when they are used in oil and gas wells.
- Understand benefits and limitations of hydraulic lift against other lift forms during well's life cycle.
- Develop design of jet pump using SNAP software.
- Identify surface and subsurface equipment that enable hydraulic lift.
- Be aware of optimization practices for trouble-free operation.

Course Content:
- Pre-Test
- Introduction
  - Artificial Lift: When / Why / What of Lift - Mechanisms; Types
  - How Plunger Lift Differs From Other Lift Forms
  - Well Life Cycles and Hydraulic Lift Applicability Vis-à-Vis Other Lift Methods
- Introduction to Hydraulic Lift
  - Deployment and Retrieval Methods
  - Subsurface and Surface Configurations
- Basics of Nodal Analysis
- Hydraulic Jet Pumps
  - Application Envelope
  - Working Principle and Internals
  - Surface Applications
  - CASE STUDY: Unconventional Applications
  - CASE STUDY: Hybrid Lift Applications
  - Design and Analysis Using SNAP Software
- Hydraulic Piston Pumps
  - Application Envelope
  - Working Principles and Internals
- Digital Oilfield for Hydraulic Lift
- Post-test

INTRODUCTION TO DRILLING ENGINEERING

Instructor: Lee A. Richards, PhD, PE
Discipline: Engineering, Multi-Disciplinary & Intro
Length: 2 Days (Classroom), 4 Half-Day Sessions (Live Online)
CEUs: 1.6
Availability: Public, In-House, & Live Online

Who Should Attend:
Entry level drilling engineers, rig supervisors, drilling supervisors (company men), geologists, and other personnel who need to advance their knowledge into the basic theory of oil and gas well drilling and engineering.

Course Description:
This course is designed as an overview of well drilling and introduction to the principles that govern operation margins for land drilling. It is designed to give personnel who have little working knowledge of a drilling rig, insight into how the rig operates and the logistics of carrying out operations on a land rig. Further, students with a high level working knowledge of the mechanics associated with drilling operations such as senior rig personnel and field supervisors will gain an understanding of the engineering principals associated with downhole operations.

Learning Outcomes:
- Understand the basic mechanical components of a modern conventional land drilling rig and their interactions throughout the drilling process.
- Gain knowledge of basic fluids used in drilling and the mechanics principles of drilling fluid flow in drill strings and annuli.
- Understand basic selection factors for choosing drillstring components and BHA design.
- Learn how commonly encountered formations effect drilling operations.
- Understand hydrostatic pressures within the wellbore during drilling operations.
- Determine safe margins for working within both fracture and pore pressure gradients.
- Understand and identify the most prevalent hole problems encountered while drilling.
- Gain knowledge in basic bit selection and operating parameters including dull grading and wear characteristics.
- Calculate pressures throughout the wellbore in all situations encountered during drilling.
- Interpret how pressures effect successful wellbore completion.
- Introduction to basic well control as it pertains to drilling operations.

Course Content:
- Rotary drilling components and their functions
- Wellbore design and geometry
- Drillstring design and geometry
- Drill bit selection
- Drilling hydraulics
- Well control operations
- Hole problems

ENGINEERING

Featured Instructor:

Lee A. Richards, PhD

Dr. Lee Richards is an accomplished petroleum engineer who has worked for companies such as Halliburton and BP America during his career. Most recently, he serves as Assistant Professor of Petroleum Engineering for Montana Tech and simultaneously consults as an engineer for clients. Lee has co-authored a variety of publications and given various professional technical presentations over the course of his career.

Dr. Lee received a BS in Chemical Engineering from Washington State University and a PhD in Chemical Engineering from Montana State University.

Courses Taught:
- Drilling Fluids
- Introduction to Drilling Engineering
- Well Control for Drilling Engineers and Senior Rig Personnel

IN-WELL FIBER-OPTIC SENSING
NEW

Instructor: Dennis Dria, PhD
Discipline: Engineering, Geoscience
Length: 2 Days
CEUs: 1.6
Availability: Public & In-House

Who Should Attend:
Completion, drilling, production, surveillance, and reservoir engineers who need an introduction to the design and use of fiber-optic instrumented well installations, as well as geologists and geophysicists who need an understanding of the capabilities of in-well fiber-optic sensing.

Course Description:
This two-day training event introduces petroleum engineers and geoscientists to fiber-optic sensing technology that is used for well and reservoir diagnostics and surveillance. Each day may be taken individually to satisfy a particular need (technology awareness, review prior to beginning FO field projects, introduction to current preferred practices) or as a sequence to obtain a more thorough understanding (to move user through "awareness" to "knowledgeable" level).

Learning Outcomes:
- How fiber-optic sensors work.
- Where and how fiber-optic sensing can create value.
- Technical and economic factors that influence the selection and justification for installing DAS/DTS systems in specific well types.
- Completion and monitoring components needed to deliver a DAS/DTS-monitored well.
- Installation and commissioning operations.

Course Content:
In-Well Fiber-Optic Sensing: Introduction to the Technology and Applications (1 Day)
- What is Fiber-Optic Sensing (FOS): basic physics and engineering of the FOS system components: fibers, coatings, cabling, connectors optical fibers, sensor types, instrumentation.
- Why we would want to use FOS: advantages and disadvantages vs. other sensing/ monitoring technologies.
- Overview of the different applications
- Survey of FOS system deployment methods
- Data management and analysis/ interpretation
- Factors that influence FOS system selection
- High-level screening of candidate wells and justification for installing FOS

In-Well Fiber-Optic Sensing: Applications and Deployment (1 Day)
"Applications for Diagnostics and Surveillance"
- Introduction to "Life-of-Field" monitoring with Fiber-Optic Sensing (FOS)
- Using FOS for completion and stimulation diagnostics
- Life-of-field surveillance
- What FOS provides (where it works), what it misses (advantages/disadvantages vs. other monitoring tools)
- Integration (synergy) with other monitoring methods

"Deployment of Fiber-Optic Sensing Systems: Well Design and Installations"
- Fiber-optic sensing (FOS) well architectures
- FOS system – component selection and specification
- Well design modifications needed to accommodate FOS
- Installation operations
- Commissioning

MANAGING MATURE OILFIELDS WITH CAPACITANCE-RESISTANCE MODELLING

Instructor: Larry Lake, PhD and Jerry Jensen, PhD
Discipline: Geoscience, Engineering
Length: 2 Days (Classroom), 4 Three-Hour Sessions (Live Online)
CEUs: 2.4
Availability: Public, In-House, & Live Online

Who Should Attend:
Engineers and geoscientists with 2 or more years of experience in managing and/or developing mature oil fields. Students should have basic proficiency in Excel and bring their own laptop.

Course Description:
Developing and managing mature oil fields can have many challenges. Ideally, a history-matched reservoir simulation model using a comprehensive reservoir model will guide choices, such as well locations and water injection rates. Many fields, however, lack such tools and need simpler, less sophisticated methods to improve results. This is where the capacitance-resistance model (CRM) can help.

The CRM evaluates injector-producer connectivity using injector and producer flow rates and bottom hole pressures (if available). It is a simplified model capturing the effects of injection on production and does not require any geological model to operate. Results can be used to adjust injection rates, identify fluid escape, and compare with geological information. CRM results can also help reservoir simulation model development.

This course provides prospective users with the knowledge to use the CRM and apply its results to manage mature fields. Through numerous field examples, we show how the CRM can be applied and the results interpreted. Both engineers and geoscientists will see how the results can help their challenges.

Learning Outcomes:
- Introduce CRM method.
- Describe CRM versions and their advantages.
- Illustrate CRM capabilities.
- Provide case studies showing applications.

Course Content:
- CRM basics and variations (4 hours)
  - Basic flow equations
  - CRMT + exercise
  - CRMP + spreadsheet demo
  - CRMIJ
  - ICRM
- CRM uncertainty (2 hours)
  - Data sufficiency and CM number
  - CRM parameter sensitivities to noise and well interventions
  - CRM behavior
- Applications 1 (2 hours)
  - Primary recovery
  - Flow capacity curves
  - Tracers and CRM
- CRM modified versions (2 hours)
  - Segmented
  - Compensated
  - Pseudo well
- Applications 2 (4 hours)
  - Segmented
  - Oil production modelling
    - Gentil model
    - Koval model
    - Application to CO_2 flooding
- Percolation basics (2 hours)
  - Percolation - relevance to reservoir behavior
  - Non-linear behavior of connectivity
  - Geological uncertainty and effects on connectivity
- Case studies (4 hours)
  - Comparison to seismic
  - Integration with geology

NODAL ANALYSIS IN SELF-FLOWING AND ARTIFICIAL LIFT WELLS NEW

Instructor: Rajan N. Chokshi, PhD or Gabor Takacs, PhD
Discipline: Engineering
Length: 5 Days (Classroom), 10 Half-Day Sessions (Live Online)
CEUs: 4.0
Availability: Public, In-House, & Live Online

Who Should Attend:
Production, reservoir, completion, drilling and facilities engineers, analysts, operators, and anyone interested in learning about the application of NODAL analysis on well-design and operational decisions on profitability.

Course Description:
Dynamics of the oil and gas production wells require that decisions related to oil and gas producing installations be made after a thorough analysis of many inputs and many more production scenarios. NODAL™ analysis, also referred to as the production system analysis, is an important technique that offers a toolset to determine the optimum combination of wellbore and surface system parameters under varying production conditions.

This five-day course aims to provide an essential discussion of NODAL analysis for naturally flowing oil and gas wells and artificially lifted wells. Using a combination of lectures and classroom exercises, we introduce participants to the theories underlying this vital technique. Once students understand the building blocks, combinatorial scenarios are introduced and solved to help students understand the interaction of various system parameters. SNAP© software is used to demonstrate effective use of NODAL analysis.

Learning Outcomes:
- Learn the fundamentals of oil & gas production, like
  - Black oil characteristics and PVT properties importance,
  - Multi-phase fluid flow behavior and patterns, multi-phase fluid flow correlations and unified mechanistic models,
  - Reservoir behavior or the inflow performance relationship (IPR),
  - Vertical lift performance (VLP), pressure-gradient curves
- Combine above concepts leading to the NODAL analysis concepts like
  - Selection of optimum completion.
  - When will a gas or oil well not flow naturally?
- Apply NODAL analysis for artificial lift scenarios

Course Content:
- Pre-test
- Production Basics
  - The objectives, and the main challenges to achieve these objectives.
  - Why design in a piece-meal fashion, not the most effective approach?
- NODAL Analysis or Systems Analysis
- Single & Multi-Phase Flow Basics
- PVT Basics
- Inflow Performance Relationship
- Flow through Restrictions
- Nodal Analysis of Continuous Flow Gas-Lifted Wells
- Nodal Analysis of Sucker-Rod Pumped Wells
- Nodal Analysis of ESP Installations
- Post-test

NODAL ANALYSIS (PETROLEUM EXPERTS IPM SOFTWARE) NEW

Instructor: Rajan N. Chokshi, PhD
Discipline: Engineering
Length: 5 Days (Classroom), 10 Half-Day Sessions (Live Online)
CEUs: 4.0
Availability: Public, In-House, & Live Online

Who Should Attend:
Production, reservoir, completion, drilling and facilities engineers, analysts, operators, and anyone interested in learning about the application of NODAL analysis on well-design and operational decisions on profitability.

Course Description:
Dynamics of the oil and gas production wells require that decisions related to oil and gas producing installations be made after a thorough analysis of many inputs and many more production scenarios. NODAL™ analysis, also referred to as the production system analysis, is an important technique that offers a toolset to determine the optimum combination of wellbore and surface system parameters under varying production conditions.

This five-day course aims to provide an essential discussion of NODAL analysis for naturally flowing oil and gas wells and artificially lifted wells. Using a combination of lectures and classroom exercises, we introduce participants to the theories underlying this vital technique. Once students understand the building blocks, combinatorial scenarios are introduced and solved to help students understand the interaction of various system parameters.

Petroleum Experts IPM© software is used to demonstrate effective use of NODAL analysis. Clients need to provide access to Petroleum Experts Prosper© and GAP© software package(s) and their datasets. A workshop is conducted to provide hands-on exposure to how NODAL analysis is performed in the Petroleum Experts software suite and what workflow engineers can use to get maximum benefits. This requires three days of consulting work and a license for the client's software at least one month prior to the class.

Learning Outcomes:
- Learn the fundamentals of oil & gas production, like
  - Black oil characteristics and PVT properties importance,
  - Multi-phase fluid flow behavior and patterns, multi-phase fluid flow correlations and unified mechanistic models,
  - Reservoir behavior or the inflow performance relationship (IPR),
  - Vertical lift performance (VLP), pressure-gradient curves
- Combine above concepts leading to the NODAL analysis concepts like:
  - Selection of optimum completion.
  - When will a gas or oil well not flow naturally?
- Apply NODAL analysis for artificial lift scenarios

Course Content:
- Pre-test
- Production Basics
- NODAL Analysis or Systems Analysis
- Single & Multi-Phase Flow Basics
- PVT Basics
- Inflow Performance Relationship
- Flow through Restrictions
- Nodal Analysis of Continuous Flow Gas-Lifted Wells
- Nodal Analysis of Sucker-Rod Pumped Wells
- Nodal Analysis of ESP Installations
- Post-test

PLUNGER LIFT NEW

Instructor: Rajan N. Chokshi, PhD
Discipline: Engineering
Length: 2 Days (Classroom), 4 Half-Day Sessions (Live Online)
CEUs: 1.6
Availability: Public, In-House, & Live Online

Who Should Attend:
Production, reservoir, completion, drilling and facilities engineers, analysts, operators, and anyone interested in learning about the implications of plunger lift systems for their fields and reservoirs.

Course Description:
Plunger lift can be applied to gas and oil wells in conventional, unconventional, onshore, and offshore assets. It is one of the most economical artificial lift methods and allows enhancement of the life of well lift-possibilities when selected and applied correctly. Trainees receive a thorough understanding of plunger lift technology and related concepts. Examples and class problems, animations, and videos reinforce the concepts under discussion. A special feature of this course is a discussion of digital oilfields and a brief review of machine learning applications in plunger lift operations.

Learning Outcomes:
- Develop a clear understanding of what a plunger lift is, how it works, and when it gets used in oil and gas wells.
- Understand benefits and limitations of plunger lift against other lift forms during well's life cycle.
- Identify surface and subsurface equipment that enable plunger lift.
- Understand well-evaluation and plunger-lift design criteria.
- Be aware of optimization practices for trouble-free operation.
- Understand emerging areas of machine learning applicable to plunger lift.

Course Content:
- Pre-Test
- Introduction
  - Artificial Lift: When / Why / What of Lift Mechanisms; Types
  - How Plunger Lift differs from other lift forms
- Liquid Loading and Deliquiification Concepts
- Well Life Cycles and Plunger Applicability Vis-à-Vis Other Lift Methods
- Plunger Lift Advantages and Limitations
- Surface and Subsurface Equipment overview
- Continuous versus Conventional Plunger Lift
- Plunger Lift Evaluation & Design Calculations
- Plunger Lift Optimization Algorithms
- Plunger Lift Advanced Applications
  - Unconventional Well Applications
  - PAGL – Plunger Assisted Gas Lift
  - GAPL – Gas Assisted Plunger Lift
  - Staged Plunger Lift
- Digital Oilfield for Plunger Lift
- Machine Learning Applications in Plunger Lift
- Post-test

ENGINEERING

Featured Instructor:

Bob Barba

Bob has over 40 years of practical experience in the petroleum industry as an openhole wireline engineer, product development manager, petrophysicist, and completion optimization advisor focusing on integrated reservoir characterization studies, completion optimization studies, rock mechanics analysis, and horizontal well field development projects. He has extensive experience in both conventional and organic shale reservoirs.

Bob received the Regional Formation Evaluation Award from the Society of Petroleum Engineers Southwest North America region (Permian Basin) in May of 2018. He served as a Distinguished Lecturer 1995-1996 for the Society of Petroleum Engineers on the optimization of completion designs using petrophysical and reservoir engineering inputs. Bob is a recognized industry authority on refracturing rock mechanics and practices. He delivered the keynote address at a major refracturing conference for the SPE in Calgary January 2016 and has delivered over 100 presentations on the use of refracturing to enhance production in organic shale reservoirs. Bob served as an expert witness on log derived rock properties for BP through Kirkland and Ellis in the Macondo trial. He pioneered techniques to evaluate well performance using production data and routine well log data and applied the concept to over 5,000 wells to date. This significantly improved completion results in those fields.

Most recent projects involve the application of these techniques in Permian organic shale reservoirs where a solid correlation between modeled propped height and production results enables operators to forward model production results from shale reservoirs. Bob has analyzed over 3,000 organic shale wells in the Permian Basin and 400 wells in the Eagle Ford to date. He has also presented SPE 174994 at the 2015 SPE ATCE summarizing the analyses, SPE 195962 at the 2019 ATCE, and URTEC 2662 on organic shale frac and refrac optimization.

Courses Taught:
- "Best Practices" for New Well Fracs and Legacy Well Refracs
- Practical Interpretation of Open Hole Logs
- Predicting Organic Shale Well Performance

PRACTICAL INTERPRETATION OF OPEN HOLE LOGS

Instructor: Robert 'Bob' Barba
Discipline: Engineering, Formation Evaluation
Length: 5 Days (Classroom), 6 Half-Day Sessions (Live Online)
CEUs: 4.0
Availability: Public, In-House, & Live Online

Who Should Attend:
Reservoir engineers, petroleum engineers, production engineers, geologists, geophysicists, managers, independent operators, marketing personnel and anyone who needs a practical understanding of open hole log interpretation.

Course Description:
This course requires no prior knowledge of logs or log interpretation. Attendees will acquire understanding and basic interpretation techniques needed to interpret open hole well logs. Both quick-look qualitative interpretations and more rigorous quantitative interpretations are covered. The course is generic in technical scope, no specific software is used. Equations are solved by hand with a calculator. Both the theory and practice of practical, applied interpretation are covered as well as practical advice, applied exercises, discussions and the study of actual logs. The accompanying manual provides a useful reference for attendees to use after the conclusion of the course.

Learning Outcomes:
- Determination of main lithologies and volumes of each.
- Calculation of porosity.
- Detection of hydrocarbons, and quantification.
- Learn systematic log interpretation procedure & real world practicalities.
- Uses and limitations of main specialty logging tools.

Course Content:
- What is open hole well logging?
- Basic rock properties
- Well and wellbore environments
- Lithology indicators and volume of shale
- Porosity logs
- Resistivity logs
- Quick-look (qualitative) interpretation
- Quantitative interpretation: Water saturation calculations
- How to run logs
- Real world practicalities of interpretation
- Class interpretation of actual field logs

Participant Testimonials:
"Very good instructor! Very educational and very comprehensive information. I would definitely recommend him again." - Joy B.

"Excellent knowledge and great energy in presenting. He really kept us engaged!" - Kevin T.

"Bob is enthusiastic and engaging and I appreciate his honesty in presenting both advantages and shortcomings of each tool/ method." - Mark D.

PREDICTING ORGANIC SHALE WELL PERFORMANCE

Instructor: Robert 'Bob' Barba
Discipline: Engineering, Unconventional Reservoirs
Length: 2 Days (Classroom), 4 Half-Day Sessions (Live Online)
CEUs: 1.6
Availability: Public, In-House, & Live Online

Who Should Attend:
Engineers, geoscientists, asset managers who want to develop techniques for predicting well performance in organic shale reservoirs by integrating petrophysical analysis with rock properties, production data.

Course Description:
Petrophysical analysis of organic shale reservoirs is more complicated than analysis of conventional reservoirs. The presence of kerogen in organic shale reservoirs introduces a level of complexity into petrophysical analysis process for estimating hydrocarbons in place. Traditional TOC based models are complicated by presence of mobile oil with kerogen that makes volume of kerogen in rock difficult to estimate. Even with an accurate kerogen volume, physical properties are not well characterized. Most organic shale reservoirs have complex minerals that complicate a straight volumetric approach. Rock mechanics and proppant transport issues introduce complexity. The petrophysical analysis process uses Powerlog Synthetic Curve Generator which ties log/core data to estimate hydrocarbons in place. An estimate is made of producing height and a comparison is made to production data with height above proppant bank a function of rock brittleness. Operators can "forward model" landing zone performance prior to drilling a lateral. Recovery factors are a function of the frac treatment intensity and forecasts can be made for previously fracced areas with larger fracs. The flexibility of Powerlog program allows for robust models for simple "triple combo" log suites following calibration of the model to core and/or specialty log data. Participants are encouraged to provide local case studies to develop models specific to wells in the course.

PLEASE NOTE: PARTICIPANTS ARE REQUIRED TO BRING THEIR OWN LAPTOPS (WITH MICROSOFT EXCEL AND ADOBE READER INSTALLED).

Learning Outcomes:
- Develop a calibrated petrophysical model to estimate hydrocarbons in place.
- Learn techniques to integrate OIP/GIP data with rock properties and production data to estimate recovery factors as a function of frac vintage.
- Develop well performance models specific to reservoirs and export equations for application in reservoirs.

Course Content:
- Basic log analysis techniques
- Log quality control, normalization
- Calibration of Vclay, porosity, Sw to core, production data
- Net pay cutoff estimation
- Recovery factor model data requirements
- Rock properties model development
- Production decline curve analysis
- Log analysis exercises
- Case studies with calculation of OIP and comparisons to EUR
- "Best Practices" incorporating OIP and rock properties data

PRESSURE TRANSIENT TEST DESIGN AND INTERPRETATION

Instructor: Christine Ehlig-Economides, PhD
Discipline: Engineering, Formation Evaluation
Length: 5 Days (Classroom), 10 Half-Day Sessions (Live Online)
CEUs: 4.0
Availability: Public, In-House, & Live Online

Who Should Attend:
Engineers and geoscientists interested in well and reservoir evaluation from well tests and production data.

Course Description:
This 5-day course will provide a comprehensive view of pressure transient test design and interpretation. The emphasis is on understanding how well and reservoir parameters of practical interest can be quantified from well tests. Well parameters causing productivity loss include near wellbore damage and limited entry; those stimulating productivity include hydraulic fracturing and well deviation, the latter including horizontal wells. Reservoir parameters include vertical and horizontal permeability, natural fractures, and reservoir boundary characterizations. The course begins with a brief derivation of the models used for pressure transient analysis and hands on interpretation basics. The test design module describes a wide variety of test types and acquaints participants with forward simulation using commercial software providing a rich analytical model catalog. Then basic analysis is extended to include gas reservoirs and the effects of heterogeneity due to natural fractures. Next the emphasis turns to characterizing vertical and lateral reservoir limits and how the latter relates to seismic data interpretation. Then both pressure transient and production data analysis are considered for horizontal and hydraulically fractured wells. Finally, we examine multiwell and interference testing. Participants are invited to bring data for the class to consider on the last day if not before.

PLEASE NOTE: PARTICIPANTS ARE REQUIRED TO BRING THEIR OWN LAPTOPS.

Contact SCA for details on required software licenses

Learning Outcomes:
- Learn how well test models are derived and computed.
- Experience how to simulate pressure transient test behavior and how to design well tests.*
- Experience how to process, quality check, diagnose, and analyze pressure transient data.
- Understand the behavior of well and reservoir response patterns observed in well tests, what well and reservoir parameters can be quantified, and how to quantify them from pressure transient data.

Using commercial software (Ecrin suite by Kappa Engineering)

Participant Testimonials:
"The instructor was so energetic and consistently displayed her knowledge and experience in the field."

"I was impressed with this course and the enthusiasm and professionalism of the professor."

PRINCIPLES AND PRACTICES OF MUD MOTOR

Instructor: Robello Samuel, PhD
Discipline: Engineering
Length: 1 Day (Classroom), 2 Half-Day Sessions (Live Online)
CEUs: 0.8
Availability: Public, In-House, & Live Online

Who Should Attend:
Drilling engineers, well operations personnel, rig supervisors, drilling supervisors mud motor designers and manufacturers who would like to gain greater understanding of mud motor design and their applications in drilling.

Course Description:
This is a unique and focused training on positive displacement motor commonly called mud motor. Positive displacement motor commonly called Mud motor, a simple but elegant machine that has become an integral part of the BHA specially when drilling shale wells. Even though tremendous advancements have been made but the challenges remain. The one-day training on mud motors covers the concepts, performance, advancements, future designs and how to use and when to use at difficult times. The workshop covers additional talks from industry technology leaders and is targeted for engineers, mud motor experts and manufacturers. The training price includes *Positive Displacement Motor: Theory and Applications* textbook (400 pages, color) authored by Dr. Robello Samuel.

Course Outline:
- Mud Motor History
- History of Power Sections
- Product Variants
- Genesis of Profile
- Evolution and Trends
- Design Problems -- Sensitivity Analysis
- Operational Challenges
- Lab Tests and Downhole Vibration
- Repair and Maintenance
- Limits and Potential New Directions
- Mud Motor: Not a Dying Breed -- From Workhorse to Racehorse
- Mud Motor Hydraulic and Mechanical Optimization (software demo included)

"The purpose of learning is growth, and our minds, unlike our bodies, can continue growing as we continue to live."
Mortimer Adler

PRMS AND SEC RESERVES AND RESOURCES REGULATIONS

Instructor: W. John Lee, PhD
Discipline: Engineering
Length: 2 Days (Classroom), 4 Half-Day Sessions (Live Online)
Course CEUs: 1.6
Availability: Public, In-House, & Live Online

Who Should Attend:
Geologists, engineers, supervisors, managers, financial analysts, investors, bankers, or anyone who needs to understand the industry standard methods to classify and report reserves and resources.

Course Description:
This course summarizes the "Petroleum Resources Management System (PRMS) - 2018 Update" classification system. PRMS guidelines are compared to SEC reserves reporting rules which, at the option of the audience, are also covered in significant depth. The course also emphasizes guidelines for unconventional (low permeability) resources, which are under-emphasized in the original (2007) PRMS document but have received more detailed coverage in the updated *Canadian Oil & Gas Evaluation Handbook (COGEH)* in a recent section on Reserves Other Than Resources (ROTR).

Learning Outcomes:
- PRMS resources classification system.
- SEC reserves reporting guidelines (optional).
- Deterministic and probabilistic resources estimation procedures.
- PRMS-compliant procedures to unconventional resources.

Course Content:
- Logic, workflow, and methodology of resource evaluations
- Risk and uncertainty in resource assessments
- Guidelines for classification of projects and categorization of recoverable quantities
- Applying guidelines to incremental projects
- Applying guidelines to unconventional resources
- Reporting guidelines: commercial criteria, production measurement issues, resources entitlement and recognition
- Overview of volumetric and production-based resource assessment techniques including pitfalls
- Overview of probabilistic resource assessment techniques
- Comparison of PRMS to SEC reserves reporting regulations (optional)

ENGINEERING

Featured Instructor:

W. John Lee, PhD

W. John Lee is the Rob L. Adams Professor in Petroleum Engineering at Texas A&M University. John holds BS, MS and PhD degrees in chemical engineering from the Georgia Institute of Technology. He worked for ExxonMobil early in his career and specialized in integrated reservoir studies. He later joined the Petroleum Engineering faculty at Texas A&M, and became Regents Professor of Petroleum Engineering. While at A&M, he also served as a consultant with S.A. Holditch & Associates, where he specialized in reservoir engineering aspects of unconventional gas resources. He joined the University of Houston faculty in September 2011 and held the Cullen Distinguished University Chair until September 2015. He served as an Academic Engineering Fellow with the U.S. Securities & Exchange Commission (SEC) in Washington during 2007-2008, and was a principal architect of the modernized SEC rules for reporting oil and gas reserves.

John is the author of four textbooks published by SPE and has received numerous awards from SPE, including the Lucas Medal (the society's top technical award), the DeGolyer Distinguished Service Medal (the society's top service award) and Honorary Membership (the highest recognition awarded society members). He is a member of the U.S. National Academy of Engineering and the Russian Academy of Natural Sciences.

Courses Taught:
- PRMS and SEC Reserves and Resources Regulations
- Production Forecasting for Low Permeability Reservoirs

PRODUCTION FORECASTING FOR LOW PERMEABILITY RESERVOIRS

Instructor: W. John Lee, PhD
Discipline: Engineering, Unconventional Reservoirs
Length: 2 Days (Classroom), 4 Half-Day Sessions (Live Online)
CEUs: 1.6
Availability: Public, In-House, & Live Online

Who Should Attend:
Engineers, geologists, financial analysts, investors, bankers, or anyone who needs to understand traditional and recent methods to forecast production for low-permeability oil and gas reservoirs.

Course Description:
This course summarizes decline curve analysis (DCA), including Arps' decline models, linear flow models, and other recent decline analysis approaches. We provide background information on basic fluid flow theory, which enhances understanding of strengths and limitations of both traditional and recent decline analysis methods. Numerous short class exercises illustrating principles will be included.

PLEASE NOTE: PARTICIPANTS ARE REQUIRED TO BRING THEIR OWN LAPTOPS (WITH MS EXCEL INSTALLED)

Learning Outcomes:
- State assumptions and limitations of Arps and other decline models.
- Analyze production histories and forecast production using Arps and other decline models for low-permeability reservoirs.
- Analyze production histories and forecast production using the Fetkovich type curve.
- Outline systematic forecasting procedures combining rate-transient analysis (RTA), decline curve analysis, numerical and analytical reservoir models.

Course Content:
- Basic fluid flow fundamentals underlying DCA and RTA
- Flow regime identification
- Arps decline model
- Fetkovich and other type curves
- Alternative decline models: stretched exponential, power law, long-duration linear flow, Duong model
- Comparison of decline models
- Systematic procedure for DCA
- Overview of RTA, including systematic work flow for applications Discussion of the current state of the refrac industry

At SCA, our motto is:

"EXCELLENCE THAT RUNS DEEP"

This same commitment extends to our other upstream services, which include consulting, projects and studies, oil and gas advisory services, quality assurance, and direct hire recruiting. At all levels of our organization, we are led by years of direct, applied industry experience.

Whether for hiring decisions or strategic investments, SCA's recommendations are grounded in professional ethics, and supported by respected authorities and decision makers.

RESERVOIR CHARACTERIZATION FOR MUDROCK RESERVOIRS

Instructor: Stephen A. Sonnenberg, PhD
Discipline: Geoscience, Engineering, Unconventional Reservoirs
Length: 3 Days (Classroom), 6 Half-Day Sessions (Live Online)
CEUs: 2.4
Availability: Public, In-House, & Live Online

Who Should Attend:
Geologists, geophysicists, & engineers who are interested in exploring and developing resources in mudrock formations. The course is intended to be an overview of various successful and unsuccessful mudrock systems.

Course Description:
This course is an introduction to mudrock resource plays. A wide range of topics will be covered to familiarize the participant with the important nuances of both successful and unsuccessful mudrock plays. The petroleum system approach will be used. A key emphasis of this course will be to show the important elements and processes for continuous oil and gas accumulations. The participant will learn screening techniques (check list) which may help identify continuous types of accumulations.

Learning Outcomes:
- What exactly is a mudrock?
- Understand factors related to tight oil & gas mudrock production.
- Working model for unconventional tight petroleum systems.
- Recognize technologies available for tight reservoirs.
- Determine if a pervasive hydrocarbon exists.
- Determine the type of source rocks present and maturity.
- Use geological and geochemical reconnaissance.
- Mudstone facies.
- Reservoir characterization for mudrock reservoirs.
- Mudrock sequence stratigraphy.
- Understand the importance of mechanical stratigraphy.
- Identify matrix porosity and permeability.
- Identify reservoir drive mechanisms.
- Discuss various tools and techniques for reservoir characterization.
- Discuss structural styles associated with mudrocks (e.g., polygonal fault systems).
- Identify the presence of natural fractures.
- Discuss secondary and tertiary recovery potential in mudrock systems.
- Discuss latest drilling and completion techniques.

Course Content:
Successful mudrock plays discussed in this course include Bakken (Williston Basin), Niobrara (Rocky Mountain Region), Vaca Muerta (Neuquén Basin), Eagle Ford (Gulf Coast), Haynesville (Gulf Coast), Greenhorn (Denver Basin), Marcellus (Appalachian Basin).

RESERVOIR GEOMECHANICS I & II

NEW

Instructor: John T. Foster, PhD
Discipline: Engineering, Unconventional Reservoirs
Length: 5 Days (Classroom), 10 Half-Days (Live Online)
CEUs: 4.0
Availability: Public, In-House, & Live Online

Who Should Attend:
Geologists, petrophysicists, and engineers.

Course Description:
This course covers stress and strain analysis, conservation equations, fracture mechanics, and numerical techniques for hydraulic fracture prediction in the subsurface. There is emphasis on applications of these topics to petroleum engineering.

Learning Outcomes:
- Understand mechanisms of rock deformation and fracture.
- Understand mechanics fluid flow in fractures.
- Understand differences in assumptions in hydraulic fracture simulators.
- Be able to write a simple hydraulic fracture simulator.

Course Content:
- Stress Tensor
- Conservation Equations
- Constitutive Laws
- Rock Failure
- Programming in Python/Julia

"You can teach a student a lesson for a day but, if you can teach him to learn by creating curiosity, he will continue the learning process as long as he lives."
Clay P. Bedford

RESERVOIR MANAGEMENT OF UNCONVENTIONAL RESERVOIRS: FROM INCEPTION TO MATURITY

Instructor: Shah Kabir
Discipline: Engineering, Unconventional Reservoirs
Length: 2 Days (Classroom), 4 Half-Day Sessions (Live Online)
CEUs: 1.6
Availability: Public, In-House, & Live Online

Who Should Attend:
Reservoir and production engineers

Course Description:
This two-day workshop entails a fundamental understanding of well performance with the use of several tools, such as RTA and DCA. Application of DCA emphasizes matching the cumulative-production curve for retaining solution consistency and objectivity. Overall, suitability of these tools for reserves forecasting will be the cornerstone of this workshop. We will also introduce a promising semi-analytical DCA tool, the Series model. Although deterministic reserves estimation will be emphasized, probabilistic approaches will be outlined.

Obtaining some of the basic reservoir parameters with DFIT entails stress and reservoir properties, such as initial pressure and permeability. However, factors influencing the non-ideal DFIT behavior often present interpretation challenges. We will explore some of these issues while tackling some of the field responses. Finally, beyond the early production period, production of water can complicate the lift issue. We will discuss a simplified plunger-lift model to tackle this flow problem at hand. Tools involved include Kappa (RTA and PTA modules), and simple analytical diagnostic and analysis methods.

PLEASE NOTE: PARTICIPANTS ARE REQUIRED TO BRING THEIR OWN LAPTOPS.

Learning Outcomes:
- Explore diagnostic fracture injection testing (DFIT) and well management before production initiation.
- Forecast performance with decline-curve analysis (DCA) tools and understand their relative strengths.
- Use rate-transient analysis (RTA), when possible, to gain insights into long-term performance.
- Consider merits of reservoir simulation approach.
- Estimate reserves with a few tools in both deterministic and probabilistic frames.
- Understand the wellbore lift issue with a plunger-lift operation.
- Solution workflows for participants' specific problems.

Course Content:
- Participants discuss operational problems on pertinent topics within the workshop's scope
- Background review of each topic
- Hands-on problem-solving sessions using field data – preference: client's own data

SEAL AND RESERVOIR PRESSURES ANALYSIS FOR E&P PROSPECT'S RISK ASSESSMENT

Instructor: Selim Shaker, PhD
Discipline: Geoscience, Engineering
Length: 5 Days (Classroom), 6 Half-Day Sessions (Live Online)
CEUs: 4.0
Availability: In-House & Live Online

Who Should Attend:
Prospect generator geoscientists, geologists, geophysicists, drilling and reservoir engineers, well log analysts, managers, and support staff involved in exploration, development and drilling. This course is exceptionally helpful for explorationists that are keen on appraising prospects in-house and farm in/out.

Course Description:
The optimum trap is a reservoir capable of confining and economically delivering hydrocarbon under a competent sealed cap and / or un-breached faulted structural closure. Sealing integrity is essential for trapping, migration, and lateral and vertical distribution of hydrocarbons in a prospective reservoir. The sealing capacity also impacts reservoir flow rate and the driving mechanism of the initial natural flow and the secondary recovery process. Subsurface geopressure compartmentalization plays a critical role in determining seals, reservoirs and consequently the reserve's volume and flow duration.

This course will demonstrate to participants how to use measured pressure data from wire-line tests (MDTs, RFTs etc.) and production tests to design pressure-depth plots which reveal permeability barriers (sealed), communications, and breached reservoir (seal failure).

It will also examine how seismic velocities and well logs' petrophysical properties establish seal integrity via subsurface pressure drift. Moreover, participants will gain the fundamental knowledge of predicting pore-fracture pressure and estimate the drilling tolerance window (DTW) that leads to successful drilling prognosis of the trajectory bore-hole to the targeted reservoirs formation. Exploration risk in salt basins will be thoroughly discussed with multiple case histories.

PLEASE NOTE: PARTICIPANTS ARE REQUIRED TO BRING THEIR OWN LAPTOPS (WITH MS OFFICE SUITE INSTALLED).

Learning Outcomes:
- Understand the causes, concepts and graphic representations of vertical and horizontal compartmentalization due to reservoirs partitioned by seals.
- Comprehend pressure gradient in seals versus reservoirs and the causes of disparity between measured and predicted values.
- Recognize sealed vs. breached reservoirs.
- Calculate hydrocarbon columns in four ways vs. three way faulted closures.
- Evaluate and assess the trapping risk of a prospect before and post drilling.

Course Content:
- Subsurface Compartmentalization
- Reservoirs
- Seals
  - Cap Seals (four ways)
  - Fault Seals (faulted three ways)
  - Salt - Sediments Interface
- Prospect Evaluation
  - Pre drilling
  - While drilling
  - Post drilling

UNCONVENTIONAL RESOURCE PLAYS - WORKSHOP

Instructor: Stephen A. Sonnenberg, PhD
Discipline: Geoscience, Engineering, Unconventional Reservoirs
Length: 3 Days (Classroom), 6 Half-Day Sessions (Live Online)
CEUs: 2.4
Availability: Public, In-House, & Live Online

Who Should Attend:
Geologists, geophysicists, petrophysicists, reservoir engineers and managers who are exploring for and developing oil and gas fields in unconventional, basin-centered petroleum systems. Basic knowledge of well log evaluation is recommended.

Course Description:
This three-day workshop introduces sound evaluation techniques used in choosing and developing "unconventional resource new ventures." It combines geology, reservoir engineering, reserves evaluation, economic forecasting and the concepts of multivariate analysis to develop skills that help predict productivity in oil and gas systems. The workshop covers gas and oil plays in shale and stacked tight sands that are developed with horizontal and vertical wells, and completed and stimulated with hydraulic fracturing.

Learning Outcomes:
Attendees will be able to:
- Demonstrate knowledge of reservoir attributes (variables) pertaining to unconventional resource play viability and scale.
- Screen (evaluate) all play types. For example, what will work, what is economically feasible, what play has critical flaws, what play is basin-centered but is marginal because of its size and depth.
- Develop an idea of the viability of new venture oil/gas plays, compare them to other global plays, and develop a clear idea of reservoir/geologic mechanisms and acceptability.
- Recognize and appraise how a play will perform and forecast potential resources. Include examples of winners and losers, using actual cases. REALLY know what you are evaluating quantitatively with comparison to other global play results.
- Evaluate tight gas sands over a long vertical interval and shale gas over a finite interval developed with horizontal wells. Evaluation of plays with an inverted fluid column (water to oil to gas transitions). Prevent grave and costly mistakes.
- Integrate mixed parameters such as electric log values of porosity, resistivity, and "cross-over gas effect." Identify key reservoir "drivers" versus depth and location (sweet-spot identification). Integrate with thermal maturity and pressure data (always as a function of depth, subsea depth or depth to stratigraphy.
- Apply intuitive principles to more accurately predict oil/gas productivity in tight rocks.
- Understand the hydraulic fracture stimulation treatments employed by operators.

Course Content:
- DAY 1: Unconventional Tight Gas
- DAY 2: Unconventional Tight Oil Reservoirs
- DAY 3: Unconventional Resource Assessment

WELL CONTROL FOR DRILLING ENGINEERS AND SENIOR RIG PERSONNEL

Instructor: Lee A. Richards, PhD, PE
Discipline: Engineering
Length: 4 Days
CEUs: 3.2
Availability: Public & In-House

Who Should Attend:
Drilling engineers and senior well operations personnel who would like to gain greater understanding of well control principles that go beyond those taught in commercially offered well control courses.

Course Description:
This course is designed to break out of the formula driven well control techniques taught by many commercial well control education providers. The courses offered for well control certification often simply teach personnel to plug numbers into formulas for the answers that they seek. The courses rarely focus on the actual principles governing the equations that are commonly used in well control calculations. Attendees of this course will learn what fundamentally governs well control theory, decision making and operations. In addition, they will be able to determine theoretical pressures throughout the wellbore during well control situations in order to improve decision making in both wellbore design and during well control events.

Learning Outcomes:
- Understand the basic mechanical components of land based BOPs and associated well control equipment.
- Understand how an accumulator works and the principals of storing energy to operate BOPs in emergency situations.
- Gain knowledge in fracture pressures and pore pressures and how they related to well control situations.
- Learn how to effectively recognize kick warning signs and understand the cause associated with each kick indicator discussed.
- Understand and identify the most prevalent situations that lead to well control events.
- Understand hydrostatic pressures within the wellbore during drilling operations, both before and after taking a kick.
- Determine safe margins for working within both fracture and pore pressure gradients.
- Gain knowledge in gas migration and resultant shoe and surface pressure changes.
- Understand the principals behind controlling wellbore pressures with managed pressure drilling.
- Calculate pressures anywhere in the annulus and inside the drillstring during well control operations and understand how the results can help with decision making during emergencies.

Course Content:
- BOP components and their operation
- Accumulator theory and operation
- Formation evaluation and kick potential
- Wellbore pressure operating margins
- Kick warning signs
- Hydrostatic Pressures
- Dynamic wellbore pressures
- Boyles Law and how it relates to gas migration within the wellbore

Featured Instructor:

Leo Roodhart, PhD

Leo Roodhart's career with the oil and gas industry spans some 35 years in the areas of Production Engineering, Production Optimisation and Water Management, Strategic Innovation, Scenario Planning, and New Business Development. He worked as Senior Advisor Production Engineering for Shell International, performing audits and reviews of Shell assets worldwide. As global well stimulation expert, he designed and supervised fracturing treatments in Shell's operating units across the globe. He has written and presented numerous papers in the area of production optimization, hydraulic fracturing and acidizing, and water management.

Leo was a Distinguished Lecturer for the SPE in 2008 and served on the board of directors from 2005-2008. He then became President of the Society of Petroleum Engineers in 2009. Leo retired from Shell in 2010, having joined the company in 1980 after acquiring a PhD in Mathematics and Physics.

Featured Instructor:

Gerrit Nitters

Gerrit Nitters is a specialist in well stimulation operations with over 40 years of experience in the industry. During his career with Shell, he became Shell's global well stimulation coordinator and Principal Technical Expert on well stimulation providing active advice from his Shell Houston and Shell Rijswijk offices. After his retirement from Shell in 2006, he founded the Nitters Petroleum Consultancy Int. B.V. He is also involved in Geothermal Energy projects in the Netherlands through a liaison with IF Technology.

Gerrit authored and co-authored many SPE papers on the subject of well stimulation. He was SPE's Distinguished Lecturer on Well Stimulation in 2005. In addition, he served as committee member and chaired a number of SPE conferences and forums on well stimulation.

WELL STIMULATION WORKSHOP: PRACTICAL AND APPLIED

Instructor: Leo Roodhart, PhD and Gerrit Nitters
Discipline: Engineering, Unconventional Reservoirs
Length: 5 Days (Classroom), 10 Half-Day Sessions (Live Online)
CEUs: 4.0
Availability: Public, In-House, & Live Online

Who Should Attend:
Well completions design engineers, production, reservoir, drilling engineers; economists, asset managers, geologists. Senior technologists, those involved in development planning, economics, production operations, production chemists, well stimulation specialists.

Course Description:
In the drive towards more technically challenging completions and the development of unconventional reservoirs, not enough attention is paid to the details of inflow performance optimization. This can result in poor or less than optimum production. Asset managers, advisors and engineers involved in the planning, execution, and evaluation of well completions need to have the background in what is possible using modern well stimulation techniques and tools.

This course is designed for those involved in all aspects of inflow performance and well completion/outflow design, and has the emphasis on well stimulation. Obviously, to be able to make decisions it is important to understand the characteristics of the "drainage volume" in relation to the well paths. Candidate selection is therefore key and time will be spent discussing candidate selection strategies, how that will affect the inflow performance and consequently, the stimulation design. The course includes acidizing and fracturing design, quality control, conducting the treatment, analyzing pressures and other critical parameters, during and after the treatment.

Participants are encouraged to bring their own cases. The aim is that the time is spent both on lecturing and students working on case studies divided into teams to evaluate and design stimulation treatments.

Course concludes with a comprehensive exercise where students will:
- Select candidates from group of wells
- Make a proposal for selection of a treatment for each candidate
- Design of selected treatment
- Make a comparison with alternative treatment(s)

Students are encouraged to bring their own problem sets.

Learning Outcomes:
- Identify the best economical, method to enhance/optimize the inflow performance in the various completion configurations/ formation types.
- Understand formation damage causes/ remediation.
- Select candidates for acidizing treatments.
- Select candidates for hydraulic fracturing treatments, both propped, acid fracturing.
- Understand the design/execution of acidizing treatments.
- Understand the design/execution of hydraulic fracturing treatments.
- Understand acidizing/hydraulic fracturing simulators.
- Understand the nature, environmental impact of fluids used in production enhancement treatments to develop a disposal strategy.


Rajan N. Chokshi, PhD

Artificial Lift and Real-Time Optimization for Unconventional Assets

Unlike conventional production, unconventional production is highly dynamic. Traditional approaches to artificial lift applications are inefficient or even unsuccessful. The artificial lift life-cycle is different for unconventional wells. Production dynamics requires rethinking of the application of real-time downhole and surface sensing. This three-day course will help attendees understand and appreciate these facets while providing applicable solutions. The course gives an overview of artificial lift and related issues that are applicable to unconventional and tight oil/gas wells. Production optimization is also discussed, particularly real-time measurements and optimization techniques that are required to understand and manage dynamic production scenarios.

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Gas-Lift & Deliquification Applications

Gas-lift is one of the predominant forms of artificial lift used for lifting liquids from conventional, unconventional, onshore, and offshore assets. Additionally, proper application of gas-lift to a loaded-up gas wells can be one of the most effective way to improve profitability of a gas well portfolio. Gas-lift and its various forms (intermittent lift, gas-assisted plunger lift) allows life of well lift-possibilities when selected and applied properly. This course is designed to give trainees thorough understanding of gas-lift technology and related application concepts.

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Robert 'Bob' Barba

"Best Practices" for New Well Fracs and Legacy Well Refracs

Participants will learn a methodology that first accurately characterizes the reservoir properties to evaluate the production potential of the reservoir with a state of the art treatment. For refracs this is compared to the historic production to estimate the upside from a properly designed treatment. This enables a determination of the cause of poor production performance; as a function of a poorly designed or executed completion, or poor quality reservoir rock. If the remaining volumetric reserves are adequate, techniques are presented to effectively access these reserves with refracturing treatment(s).

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Predicting Organic Shale Well Performance

The presence of kerogen in organic shale reservoirs introduces a level of complexity into the petrophysical analysis process for estimating hydrocarbons in place. Taking this two-day course will teach participants how to develop a calibrated petrophysical model to estimate hydrocarbons in place, techniques to integrate OIP/GIP data with rock properties and production data to estimate recovery factors as a function of frac vintage, and how to develop well performance models specific to reservoirs while exporting equations for application in reservoirs.

Page 59


Jennifer Miskimins, PhD

Hydraulic Fracturing: Theory and Application

This course provides an in-depth look at hydraulic fracturing from both a theoretical viewpoint and how this theory translates into application of the technique. The course starts with a discussion of the goals of hydraulic fracturing and the economic justifications that go along with them. From there, reservoir characteristics such as in-situ stresses, rock mechanical properties, etc. and their impacts on hydraulic fracture behavior are covered. Fracturing fluids and proppant types are presented, and an in-depth discussion of conductivity and the associated damage mechanisms under reservoir conditions are discussedand fiberoptics. Finally, the course concludes with a discussion of economic considerations for hydraulic fracturing design, specifically in horizontal wells.

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Siddharth Misra, PhD

Introduction to Subsurface Machine Learning

Students of this course will acquire a working knowledge of using Python programming and open-source packages essential for data analytics and machine learning. Live demos of codes and workflows in the Jupyter Notebook environment serve as the basis for the entire course. The course will help geoscientists, geophysicists, and petroleum engineers learn python programming at a beginner to intermediate level. Various types of data are used including well logs, core data, well performance data, and production data.

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Lothar Friberg, PhD

Petroleum Systems Modeling

The course covers the concepts of what a petroleum system is comprised of and the benefits of integrating petroleum systems modeling as a discipline in an exploration workflow. In this context, participants will learn about the key parameters required to conduct a petroleum systems modeling study. Learning outcomes include defining source rock organofacies for a basin model, understanding heat sources contributing to the temperature field of a sedimentary basin and how the basin fill lithologies are affecting it, being aware of standard calibration parameters used in basin models, identifying critical input parameters for a basin model, and understanding the different modeling program approaches.

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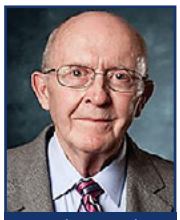
W. John Lee, PhD

Production Forecasting for Low Permeability Reservoirs

This course summarizes decline curve analysis (DCA), including Arps' decline models, linear flow models, and other recent decline analysis approaches. Background information on basic fluid flow theory is provided - this enhances understanding of strengths and limitations of both traditional and recent decline analysis methods. Analyze production histories and forecast production using Arps, other decline models for low-permeability reservoirs, and the Fetkovich type curve. Numerous short class exercises illustrating principles will be included.

Page 59


Steve Sonnenberg, PhD

Reservoir Characterization for Mudrock Reservoirs

This course provides an introduction to mudrock resource plays. A wide range of topics will be covered to familiarize the participant with the important nuances of both successful and unsuccessful mudrock plays while using the petroleum system approach. A key emphasis will be to show the important elements and processes for development of continuous oil and gas accumulations. Participants will learn screening techniques that help identify commercial accumulations.

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Unconventional Resource Plays - Workshop

Learn sound evaluation techniques used in choosing and developing unconventional resource plays with this three-day workshop. Geology, reservoir engineering, reserves evaluation, economic forecasting, and the concepts of multivariate analysis are combined to develop skills that help predict productivity in oil and gas systems. The workshop covers gas and oil plays in shale and stacked tight sands that are developed with horizontal and vertical wells.

Page 61


John T. Foster, PhD

Reservoir Geomechanics I & II

Participants of this course will study stress and strain analysis, conservation equations, and fracture mechanics. Numerical techniques for hydraulic fracture predictions in the subsurface. There is emphasis on applications to petroleum engineering. Other learning outcomes include understanding the mechanisms of rock deformation and fracture, the mechanics of fluid flow in fractures, differences in assumptions in hydraulic fracture simulators, and the ability to write a simple hydraulic fracture simulator.

Page 60


Shah Kabir

Reservoir Management of Unconventional Reservoirs: From Inception to Maturity

This workshop provides a fundamental understanding of well performance with the use of several tools such as RTA and DCA. Suitability of these tools for reserves forecasting will be the cornerstone of this workshop. Although deterministic reserves estimation is emphasized, probabilistic approaches will also be outlined. Obtaining some of the basic reservoir parameters with DFIT entails stress and reservoir properties, such as initial pressure and permeability. However, factors influencing the non-ideal DFIT behavior often present interpretation challenges. We will explore some of these issues while tackling some of the field responses. We will discuss a simplified plunger-lift model to tackle this flow problem at hand.

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Ursula Hammes, PhD

Shale Reservoir Workshop: Analyzing Organic-Rich Mudrocks from Basin to Nano-Scale

This training course can be customized to by choosing between modules of different lengths. The class utilizes lectures, core examination, and exercises to address the reservoir characterization, sedimentology, facies, sequence stratigraphy, petrophysics, fractures, and geochemistry of shale-gas/oil bearing mudrocks. This workshop focuses on rock-based interpretation of mudrocks from basin to nano-scale. Participants will learn how to use core, cuttings, geochemical, and petrophysical data to characterize mudrocks and apply mudrock depositional, sedimentological, sequence stratigraphic, geochemical and petrophysical principles to exploration areas and production assets in shale basins.

Page 60


Ruben O. Caligari

Unconventional Oil and Gas

Participants of this course will discuss characteristics of conventional oil and gas to better understand why other accumulations are considered unconventional. Various unconventional systems currently under exploitation will be presented with specific focus in tight and shale systems, with the highest potential in Argentina and other countries within the region. The complex trapping mechanism of tight and basin-centered gas will be discussed, as well as well completion techniques and results. Participants will identify and understand key factors in defining the quality of plays. Methodologies for assessing technically recoverable resources and different approaches for production forecasting will be analyzed. Horizontal drilling and multiple stage fracturing technologies will also be reviewed. Offered in Spanish.

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Leo Roodhart, PhD

Well Stimulation: Practical and Applied

In the drive towards more technically challenging completions and the development of unconventional reservoirs, not enough attention is paid to the details of inflow performance optimization. This can result in poor or less than optimum production. Asset managers, advisors, and engineers involved in the planning, execution, and evaluation of well completions need to have an understanding of possible situations using modern well stimulation techniques and tools. The course includes acidizing and fracturing design, quality control, conducting a treatment, analyzing pressures, and other critical parameters during and after treatment.

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Gerrit Nitters

ADVANCED ARTIFICIAL LIFTING WITH ESP NEW

Instructor: Rajan N. Chokshi, PhD
Discipline: Engineering, Unconventional Reservoirs
Length: 3 Days (Classroom), 4 Six-Hour Sessions OR 6 Four-Hour Sessions OR 8 Three-Hour Sessions (Live Online)
CEUs: 2.4
Availability: Public, In-House, & Live Online

Who Should Attend:
Production, reservoir, completion, drilling, and facilities engineers, and anyone interested in learning about the implications of Electrical Submersible Pumping (ESP) systems for their fields and reservoirs.

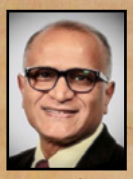
Course Description:
ESP is one of the predominant forms of artificial lift used for lifting prolific quantities of liquids from conventional, unconventional, onshore, and offshore assets. Proper application of ESP is a must in any environment to improve the profitability of an oil producing asset. ESP in its various configurations enables various well lift possibilities when selected and applied correctly. This course gives trainees a thorough understanding of ESP artificial lift technology and related application concepts.

Learning Outcomes:
- Provide a thorough introduction about the theory and application of ESP.
- Demonstrate the advantages and limitations of ESP systems.
- Acquaint the student with ESP system evaluation, design, installation, and operation concepts.

Course Content:
- Introduction
  - Artificial Lift: The When / Why / What of Lift Mechanisms
  - Similarities and differences of ESP compared to other lift forms and relative market position
- ESP Basics
  - Advantages, Limitations, and Operating Principles
  - System Components: Downhole & Surface
- ESP Installation Design
  - Basics of Nodal Analysis for ESP
    - Systems/NODAL Analysis
    - Reservoir Performance
    - Vertical lift performance
    - Total Dynamic Head (TDH)
  - Design & Optimization
    - Pump Curve
    - Affinity Laws
    - Equipment selection and sizing
    - VSD application concepts
- ESP Operations
  - Role of real-time measurements & SCADA applications
  - Challenging applications & mitigation approaches
  - Lessons from Unconventional fields
  - Importance of ESP reliability and DIFA (Dismantle Inspection Failure Analysis)
  - ESP lift lifecycle
- Advances in ESP and Emerging Applications
  - Permanent Magnet Motors
  - Wireline and coiled tubing deployed systems
  - High-temperature and high-viscosity applications
  - Ultra-high-speed applications
- Digital Oilfield and ML Applications for ESP

Featured Instructor:

Rajan Chokshi, PhD



Dr. Rajan Chokshi works as an artificial lift and production 'Optimizer' for Accutant Solutions. He has over 36 years of experience working with a national oil company, research consortia, consulting and software firms, and a service company in various roles: engineer, software developer, project manager, trainer, consultant, and senior business leader.

Rajan has worked on global projects in multiphase flow, artificial lift, production optimization, data analysis with real-time production monitoring. He has co-authored over fifteen SPE papers and holds two US patents. He has served on the SPE training and global production award committees and several technical committees for the SPE ATCE and artificial lift conferences. He has co-chaired an SPE artificial lift workshop, an SPE forum on production issues in unconventional, and an SPE multiphase flow metering workshop. He was an SPE Distinguished Lecturer twice for the 2015-2016 and 2018-2019 years. Dr. Chokshi holds a Bachelor's and Master's in chemical engineering from the Gujarat University and IIT-Kanpur, India; and a Ph.D. in Petroleum Engineering from the University of Tulsa, USA.

Courses Taught:
- Advanced Artificial Lifting with ESP
- Advanced Sucker Rod Pumping
- Artificial Lift and Production Optimization Solutions
- Artificial Lift and Real-Time Optimization for Unconventional Assets
- Electrical Submersible Pump – Design and Optimization Using Nodal Analysis
- Gas-Lift & Deliquification Applications
- Gas Lift Design and Optimization Using NODAL Analysis
- Hydraulic Pumping
- Nodal Analysis in Self-Flowing and Artificial Lift Wells
- Nodal Analysis (Petroleum Experts IPM Software)
- Plunger Lift

ARTIFICIAL LIFT AND PRODUCTION OPTIMIZATION SOLUTIONS

Instructor: Rajan N. Chokshi, PhD
Discipline: Engineering, Unconventional Reservoirs
Length: 5 Days
CEUs: 4.0
Availability: Public & In-House

Who Should Attend:
Production/Reservoir/Completion/ Drilling/ Facilities engineers, field operators, working in integrated project teams, interested in selection, design, analysis, optimum operation of artificial lift and related production systems. Project /asset managers interested in the effects of artificial lift on the performance of their assets.

Course Description:
Cost savings and efficiency improvement require existing and planned oil and gas production assets are optimally utilized. Most oil and gas wells require artificial lift for most of their productive life; the artificial lift systems are important part of production operations for the entire lifecycle of an asset. Careful selection, design and operation of artificial lift equipment is important for profitability. Efficient and cost-effective production workflows involve field management using digital oilfield concepts. Understanding of these production concepts are key to profitably exploit the existing assets fully.

The objective of this course is to:
- Provide awareness of production fundamentals by introducing fluid flow, flow correlations, PVT/Black Oil, IPR, VLP, nodal analysis, pressure gradient curves.
- Introduce applications of major forms of artificial lift like GL, RRL, ESP, PCP, HJP, plunger, capillary injection.
- Provide knowledge about the lift system, from downhole to surface - for GL, RRL, ESP, PCP, HJP, and Plunger.
- Discuss challenges facing lift applications.
- Explore downhole monitoring and surface measurements.
- Efficient and cost-effective production workflows involve field management using digital oilfield concepts. Understanding of these important production concepts are key to profitably exploit the existing assets to the fullest extent.

Learning Outcomes:
- Artificial lift techniques for production optimization.
- The basics and advanced concepts for each form of artificial lift systems from downhole to the surface including real-time optimization equipment and software.
- Using appropriate software tools, how lift components are designed and analyzed.
- Challenges facing lift applications.
- Artificial lift selection and life cycle.
- Recent advances in real-time approaches to the production monitoring and lift management from field case studies.

Course Content:
Day 1: Systems Analysis and Gas-Lift
Day 2: Reciprocating Rod Lift
Day 3: Electrical Submersible Pumping (ESP)
Day 4: PCP, Hydraulic Lift, Gas Well De-liquification
Day 5: Capillary, Plunger Lift, Digital Oil Field

Note:
This course is customizable from one to five-days in length.

ARTIFICIAL LIFT AND REAL-TIME OPTIMIZATION FOR UNCONVENTIONAL ASSETS

Instructor: Rajan N. Chokshi, PhD
Discipline: Engineering, Unconventional Reservoirs
Length: 3 Days
CEUs: 2.4
Availability: Public & In-House

Who Should Attend:
Reservoir/Completion/Drilling/Facilities/Production engineers working on shale development. Field and asset supervisors and managers interested in improving performance of their unconventional assets. Personnel interested in artificial lift and unique challenges of unconventional production.

Course Description:
Unconventional production is highly dynamic. Traditional approaches to artificial lift applications are inefficient. Artificial lift life cycle is different for unconventional wells. Production dynamics requires rethinking application of real-time downhole and surface sensing. Software tools available to analyze field data are inadequate. This course provides applicable solution paths, an overview of artificial lift and related issues applicable to unconventional and tight oil/gas wells, and production optimization, particularly real-time measurements and optimization techniques required to understand and manage the dynamic production scenarios.

Besides the basics of artificial lift and real-time measurements, the training focuses on specific production and lift challenges related to the unconventional wells. Artificial lift selection and life cycle analysis are covered. Recent advances in real-time approaches to the production monitoring and lift management are discussed using field case studies. The course closes with a group exercise to develop a problem statement and solution plans for production from unconventional assets.

Learning Outcomes:
- Why and how production differs in unconventional wells.
- Artificial lift and production optimization concepts applicable for unconventional wells
- Real-time measurements and optimization in unconventional wells.

Course Content:
Day 1:
- Pre-test
- Introduction to Artificial Lift Systems and Production Optimization
- Production Challenges specific to Shale Development
- Continuous Gas-lift
- Electrical Submersible Pumping
- Hydraulic Jet and Piston Pump

Day 2:
- Reciprocating Rod Lift
- Capillary Injection
- Plunger Lift
- Selection of artificial lift for Shale Wells
  - Variables specific to Shale Well ALS Selection
  - Strengths & weaknesses of applicable lift systems

Day 3:
- Selection of artificial lift for Shale Wells
  - Lift Life Cycle and Elimination process
  - Application case studies in oil & gas wells
- Digital oil field and production optimization
  - Real-time downhole and surface measurements
  - Role of software in visualization, analysis and surveillance
  - Application Case Studies
- Lift Selection Aspects in Shale: Group Exercise

Note: this course is customizable from one to three-days length.

"BEST PRACTICES" FOR NEW WELL FRACS AND LEGACY WELL REFRACS NEW

Instructor: Robert 'Bob' Barba
Discipline: Engineering, Unconventional Reservoirs
Length: 2 Days
CEUs: 1.6
Availability: Public & In-House

Who Should Attend:
Engineers, managers, and geoscientists concerned that their reservoirs may not be completed using the best possible techniques. The course covers the latest developments in techniques to get the maximum recovery possible from new well frac and legacy well refrac programs.

Course Description:
Participants will learn a methodology that first accurately characterizes the reservoir properties to evaluate the production potential of the reservoir with a state of the art treatment. For refracs this is compared to the historic production to estimate the upside from a properly designed treatment. This enables a determination of the cause of poor production performance; as a function of a poorly designed or executed completion, or poor quality reservoir rock. If the remaining volumetric reserves are adequate, techniques are presented to effectively access these reserves with refracturing treatment(s).

Learning Outcomes:
- What should a new well or refrac produce with an optimized stimulation treatment?
- How do you avoid stranding hydrocarbons in new and existing wells?
- What are the "best practices" for executing new well fracs and refracs?
- Where have operators done refracs and what are their economics vs new wells?
- How refracs can help avoid new infill well 40% EUR losses from asymmetric fracs.
- How to avoid the need for a future refrac by getting the completion right the first time!

PLEASE NOTE: PARTICIPANTS ARE REQUIRED TO BRING THEIR OWN LAPTOPS WITH MS EXCEL AND ADOBE READER INSTALLED.

Course Content:
- Discussion of the current state of the frac and refrac industry
- Review of basic log analysis techniques
- Log quality control, calibration, and normalization steps
- Recovery factor and effective frac length model data requirements
- Net pay model calibration using log, core, DFIT, well test, and production data
- Permeability, rock properties and reservoir pressure model calibration to field data
- Integration of rock properties, permeability, and reservoir pressure models
- Production decline curve analysis issues
- Recovery factor exercises for unconventional reservoirs
- Effective frac length exercises for conventional reservoirs
- Historical best practices for improving frac performance
- Review of refrac project results
- Mechanical issues with refrac design and execution
- Review of local examples and discussion

GAS-LIFT & DELIQUIFICATION APPLICATIONS NEW

Instructor: Rajan N. Chokshi, PhD
Discipline: Engineering, Unconventional Reservoirs
Length: 3 Days (Classroom), 8 Three-Hour Sessions OR 6 Four-Hour Sessions (Live Online)
CEUs: 2.4
Availability: Public, In-House, & Live Online

Who Should Attend:
Production, reservoir, completion, drilling, and facilities engineers, and anyone interested in learning about the implications of gas-lift systems for their fields and reservoirs.

Course Description:
Gas-lift is one of the predominant forms of artificial lift used for lifting liquids from conventional, unconventional, onshore, and offshore assets. Additionally, proper application of gas-lift to loaded-up gas wells can be one of the most effective ways of improving profitability of a gas well portfolio. Gas-lift in its various forms (intermittent lift, gas-assisted plunger lift) enables various well lift possibilities when selected and applied properly. This course is designed to give trainees a thorough understanding of gas-lift technology and related application concepts.

Learning Outcomes:
- Provide a thorough introduction about the theory of gas lift.
- Demonstrate the advantages and limitations of gas-lift systems.
- Acquaint the student with system evaluation, design, installation, operation concepts.

Course Content:
Modules 1 & 2:
- Introduction
  - Artificial Lift: The When / Why / What of Lift Mechanisms
  - Similarities and differences of gas-lift compared to other lift forms and relative market position
- Review of well performance fundamentals
  - Systems/NODAL Analysis
  - Reservoir performance: Productivity Index & Inflow Performance Relationship (IPR)
  - PVT Analysis
  - Multiphase Flow
    - Flow correlations & mechanistic models
    - Flow regimes/maps
    - Pressure gradient curves
    - Vertical Lift Performance (VLP)
- Gas-Lift
  - Types, application, advantages, limitations
  - Downhole and surface equipment
  - Gas-lift production rate and well evaluation basics - Operating Points Analysis

Modules 3 & 4:
- Gas-Lift Valve Mechanisms
  - Valve Classifications: IPO, PPO, Pilot, Dummy
  - Continuous Flow Unloading Sequence
  - Importance of True Valve Performance
- Gas-Lift Installation Designs
  - Overview of IPO design methodology
  - Valve spacing and valve sizing
  - Design and optimization

Modules 5 & 6:
- Gas well deliquification options
- Plunger lift
- Gas-lift well life cycles
- Gas-assisted plunger lift (GAPL)
- Plunger-assisted gas lift (PAGL)
- Intermittment gas-lift basics and overview of design

Modules 7 & 8:
- Injection infrastructure: compression and sizing
- Well unloading procedures and guidelines
- Gas-lift trouble-shooting and diagnostics
- Digital oilfield and ML introductions as applicable to gas-lift

GEOSTEERING: BEST PRACTICES, PITFALLS, & APPLIED SOLUTIONS

Instructor: SCA Staff
Discipline: Geoscience, Unconventional Reservoirs
Length: 2 Days (Classroom), 4 Half-Day Sessions (Live Online)
Course CEUs: 1.6
Availability: Public, In-House, & Live Online

Who Should Attend:
Geologists, engineers, managers, and field team involved with geosteered horizontal wells.

Course Description:
This course covers topics that impact geosteering efforts, including best practices that address sources of difficulty, a review of "good outcomes", plus examples from a variety of plays. Explore four categories of potential problems, their origins, how to recognize them, and how to mitigate them. With these issues in mind, best practices for each of the following phases are covered: pre-drill phases, drilling the curve, landing the curve, drilling the lateral, and post-drill best use of results.

Learning Outcomes:
- Learn importance of geosteering and what defines a geosteering success.
- Look critically at pre-drill geologic work-up, potential impacts.
- Learn pitfalls inherent to geosteering techniques.
- Learn to recognize LWD-MWD telemetry problems, some pre-drill considerations to avoid LWD telemetry problems, mitigation options.
- Recognition of deficient LWD data, simple approaches to problems.
- Learn Positional Uncertainty
- Focus on cultural issues within horizontal well team, communication strategies.
- Learn best practices for each phase of horizontal well.

PLEASE NOTE: PARTICIPANTS ARE REQUIRED TO BRING THEIR OWN LAPTOPS.

Course Content:
- Definition of Successful Geosteering
  - Specifically, what is the main priority?
  - A realistic definition; examples of effectively steered wells
  - Geosteering: A nightmare for perfectionists
  - Terminology: Not in textbooks, but critical!
- Pre-Drill Geologic Analysis - Common Relevant Pitfalls
  - Matter of resolution plus over-dependence on technology, over-confidence in deficient data, and interpretive bias
  - Mapping styles, mistakes, impacts
  - Stratigraphic: "Layer Cake Geology"? White space in maps
  - Structural: invisible, detail-scale complexities
- Geosteering Techniques - Advantages/ Disadvantages
  - Surface logging, relying on simple measured depth data, relying on measured depth plus TVD logs, software: 3D modeling tools, KBTVD-based software, common procedural issues
- Pitfalls in Directional Data
  - Telemetry problems; MWD-LWD log curves
  - Surveys - positional uncertainty
- Inter-Disciplinary Culture/Communications
  - Priorities of geologists/engineers/well site team; individual backgrounds
  - Resulting conflicts/intra-team diplomacy; handling a difficult team member
  - Communication is critical!
- Best Practices at Each Stage, from a Practical Standpoint
  - Pre-drill phase, drilling curve, lateral drilling, post-TD: leveraging new data effectively

HYDRAULIC FRACTURING: THEORY & APPLICATION

Instructor: Jennifer Miskimins, PhD
Discipline: Engineering, Unconventional Reservoirs
Length: 3 Days (Classroom), 6 Half-Day Sessions (Live Online)
CEUs: 2.4
Availability: Public, In-House, & Live Online

Who Should Attend:
This course is intended for petroleum engineers, geologists, geophysicists, and other technical staff wanting a more in-depth understanding of hydraulic fracturing. All types of reservoir applications are discussed, but a focus is placed on the design and application in horizontal well systems. Previous knowledge of hydraulic fracturing basic concepts is helpful, but not required.

Course Description:
This course provides an in-depth look at hydraulic fracturing, first from a theoretical viewpoint, but also how this theory translates into application of the technique. The course starts with a discussion of the goals of hydraulic fracturing and the economic justifications that go along with them. From there, the reservoir characteristics such as in-situ stresses, rock mechanical properties, etc. and their impacts on hydraulic fracture behavior are covered.

Fracturing fluids and proppant types are presented, and an in-depth discussion of conductivity and the associated damage mechanisms under reservoir conditions are discussed. The impacts of such on production and reserve recovery is also highlighted. A large section of the course is dedicated to diagnostic techniques such as DFIT's, tracers, microseismic, and fiberoptics. How these techniques work, benefits and drawbacks, and potential applications are reviewed. Fracture modeling is discussed, with some model examples presented. Finally, the course concludes with a discussion of economic considerations for hydraulic fracturing design, specifically in horizontal wells.

Learning Outcomes:
- Distinguish between the different fracture lengths (created, effective, propped, hydraulic) and understand their importance in fracture design and efficiency.
- Differentiate between various fracture conductivity damage mechanisms and understand the impacts to production.
- Compare and contrast different treatment diversion options.
- Calculate in-situ stress values and understand the impacts of over- and under-pressured reservoir systems on such values.
- Distinguish between different diagnostic techniques, both indirect and direct, and determine the pros/cons of various options.

Course Content:
- What is hydraulic fracturing?
- SRV vs. enhanced permeability models
- Rock mechanics
- In situ stress
- Breakdown pressures
- Completion Types and Perforating
- Fracturing fluids
- Proppants
- Conductivity
- Diagnostics
- Hydraulic fracture modeling
- Economic optimization of treatments
- Conclusions

PETROLEUM SYSTEMS MODELING NEW

Instructor: Lothar Friberg, PhD, PMP
Discipline: Geoscience, Unconventional Reservoirs
Length: 2 Days
CEUs: 1.6
Availability: Public & In-House

Who Should Attend:
Designed for geologists, geophysicists, and engineers actively working in exploration.

Course Description:
This course covers the basic concepts of what a petroleum system is comprised of and the benefits of integrating petroleum systems modeling as a discipline in your exploration workflow. In this context participants will learn about the key parameters required to conduct a petroleum systems modeling study.

Learning Outcomes:
- Define source rock organofacies and appropriate kinetic for basin model.
- Understand heat sources contributing to the temperature field of a sedimentary basin and how the basin fill lithologies are affecting it.
- Become aware of standard calibration parameters used in basin models.
- Develop a general knowledge about the wealth of information stored in geochemical data such as maturity and facies, and how this information can be utilized in constraining and calibrating your basin model.
- Identify the critical input parameters for a basin model.
- Understand the different modeling program approaches in order to choose the most appropriate package/dimension for a given problem.
- Learn how to differentiate between strengths and weaknesses of a basin model.

Course Content:
- Introduction: Define petroleum systems
- Source rocks
  - Depositional environments & organofacies
  - Source rock analysis & kinetics
  - What is a good source rock? Examples from around the world
- Temperature
  - Heat sources
  - Conditions affecting the temperature field in a sedimentary basin
- Maturity
  - Definition of thermal maturity
  - Common thermal maturity parameters
- Fluid flow
  - Compaction
  - Pressures and fluid flow/migration
- Geochemistry
  - Analytics (GC, GCMS, Isotopes)
  - Biomarkers and their applications
  - Natural gases
  - Factors and processes affecting petroleum properties
  - Surface geochemistry
- Basin modeling
  - Purpose for modeling
  - Petroleum systems modeling workflow and data requirements
  - Modeling dimensions and techniques
  - Addressing and mitigating uncertainties (scenario testing)

PREDICTING ORGANIC SHALE WELL PERFORMANCE

Instructor: Robert 'Bob' Barba
Discipline: Engineering, Unconventional Reservoirs
Length: 2 Days (Classroom), 4 Half-Day Sessions (Live Online)
CEUs: 1.6
Availability: Public, In-House, & Live Online

Who Should Attend:
Engineers, geoscientists, asset managers who want to develop techniques for predicting well performance in organic shale reservoirs by integrating petrophysical analysis with rock properties, production data.

Course Description:
Petrophysical analysis of organic shale reservoirs is more complicated than analysis of conventional reservoirs. The presence of kerogen in organic shale reservoirs introduces a level of complexity into petrophysical analysis process for estimating hydrocarbons in place. Traditional TOC based models are complicated by presence of mobile oil with kerogen that makes volume of kerogen in rock difficult to estimate. Even with an accurate kerogen volume, physical properties are not well characterized. Most organic shale reservoirs have complex minerals that complicate a straight volumetric approach. Rock mechanics and proppant transport issues introduce complexity. The petrophysical analysis process uses Powerlog Synthetic Curve Generator which ties log/core data to estimate hydrocarbons in place. An estimate is made of producing height and a comparison is made to production data with height above proppant bank a function of rock brittleness. Operators can "forward model" landing zone performance prior to drilling a lateral. Recovery factors are a function of the frac treatment intensity and forecasts can be made for previously fracced areas with larger fracs. The flexibility of Powerlog program allows for robust models for simple "triple combo" log suites following calibration of the model to core and/or specialty log data. Participants are encouraged to provide local case studies to develop models specific to wells in the course.

PLEASE NOTE: PARTICIPANTS ARE REQUIRED TO BRING THEIR OWN LAPTOPS (WITH MICROSOFT EXCEL AND ADOBE READER INSTALLED).

Learning Outcomes:
- Develop a calibrated petrophysical model to estimate hydrocarbons in place.
- Learn techniques to integrate OIP/GIP data with rock properties and production data to estimate recovery factors as a function of frac vintage.
- Develop well performance models specific to reservoirs and export equations for application in reservoirs.

Course Content:
- Basic log analysis techniques
- Log quality control, normalization
- Calibration of Vclay, porosity, Sw to core, production data
- Net pay cutoff estimation
- Recovery factor model data requirements
- Rock properties model development
- Production decline curve analysis
- Log analysis exercises
- Case studies with calculation of OIP and comparisons to EUR
- "Best Practices" incorporating OIP and rock properties data

PRODUCTION FORECASTING FOR LOW PERMEABILITY RESERVOIRS

Instructor: W. John Lee, PhD
Discipline: Engineering, Unconventional Reservoirs
Length: 2 Days (Classroom), 4 Half-Day Sessions (Live Online)
CEUs: 1.6
Availability: Public, In-House, & Live Online

Who Should Attend:
Engineers, geologists, financial analysts, investors, bankers, or anyone who needs to understand traditional and recent methods to forecast production for low-permeability oil and gas reservoirs.

Course Description:
This course summarizes decline curve analysis (DCA), including Arps' decline models, linear flow models, and other recent decline analysis approaches. We provide background information on basic fluid flow theory, which enhances understanding of strengths and limitations of both traditional and recent decline analysis methods. Numerous short class exercises illustrating principles will be included.

PLEASE NOTE: PARTICIPANTS ARE REQUIRED TO BRING THEIR OWN LAPTOPS (WITH MS EXCEL INSTALLED)

Learning Outcomes:
- State assumptions and limitations of Arps and other decline models.
- Analyze production histories and forecast production using Arps and other decline models for low-permeability reservoirs.
- Analyze production histories and forecast production using the Fetkovich type curve.
- Outline systematic forecasting procedures combining rate-transient analysis (RTA), decline curve analysis, numerical and analytical reservoir models.

Course Content:
- Basic fluid flow fundamentals underlying DCA and RTA
- Flow regime identification
- Arps decline model
- Fetkovich and other type curves
- Alternative decline models: stretched exponential, power law, long-duration linear flow, Duong model
- Comparison of decline models
- Systematic procedure for DCA
- Overview of RTA, including systematic work flow for applications Discussion of the current state of the refrac industry

RESERVOIR CHARACTERIZATION FOR MUDROCK RESERVOIRS

Instructor: Stephen A. Sonnenberg, PhD
Discipline: Geoscience, Engineering, Unconventional Reservoirs
Length: 3 Days (Classroom), 6 Half-Day Sessions (Live Online)
CEUs: 2.4
Availability: Public, In-House, & Live Online

Who Should Attend:
Geologists, geophysicists, & engineers who are interested in exploring and developing resources in mudrock formations. The course is intended to be an overview of various successful and unsuccessful mudrock systems.

Course Description:
This course is an introduction to mudrock resource plays. A wide range of topics will be covered to familiarize the participant with the important nuances of both successful and unsuccessful mudrock plays. The petroleum system approach will be used. A key emphasis of this course will be to show the important elements and processes for continuous oil and gas accumulations. The participant will learn screening techniques (check list) which may help identify continuous types of accumulations.

Learning Outcomes:
- What exactly is a mudrock?
- Understand factors related to tight oil & gas mudrock production.
- Working model for unconventional tight petroleum systems.
- Recognize technologies available for tight reservoirs.
- Determine if a pervasive hydrocarbon exists.
- Determine the type of source rocks present and maturity.
- Use geological and geochemical reconnaissance.
- Mudstone facies.
- Reservoir characterization for mudrock reservoirs.
- Mudrock sequence stratigraphy.
- Understand the importance of mechanical stratigraphy.
- Identify matrix porosity and permeability.
- Identify reservoir drive mechanisms.
- Discuss various tools and techniques for reservoir characterization.
- Discuss structural styles associated with mudrocks (e.g., polygonal fault systems).
- Identify the presence of natural fractures.
- Discuss secondary and tertiary recovery potential in mudrock systems.
- Discuss latest drilling and completion techniques.

Course Content:
Successful mudrock plays discussed in this course include Bakken (Williston Basin), Niobrara (Rocky Mountain Region), Vaca Muerta (Neuquén Basin), Eagle Ford (Gulf Coast), Haynesville (Gulf Coast), Greenhorn (Denver Basin), Marcellus (Appalachian Basin).

RESERVOIR GEOMECHANICS I & II

NEW

Instructor: John T. Foster, PhD
Discipline: Engineering, Unconventional Reservoirs
Length: 5 Days (Classroom), 40 Hours (Live Online)
CEUs: 4.0
Availability: Public, In-House, & Live Online

Who Should Attend:
Geologists, petrophysicists, and engineers.

Course Description:
Stress and strain analysis; conservation equations, fracture mechanics. Numerical techniques for hydraulic fracture prediction in subsurface. Emphasis on applications to petroleum engineering.

Learning Outcomes:
- Understand mechanisms of rock deformation and fracture.
- Understand mechanics of fluid flow in fractures.
- Understand differences in assumptions in hydraulic fracture simulators.
- Be able to write a simple hydraulic fracture simulator.

Course Content:
- Stress Tensor
- Conservation Equations
- Constitutive Laws
- Rock Failure
- Programming in Python/Julia

"If you think education is expensive, try estimating the cost of ignorance."
Howard Gardner

RESERVOIR MANAGEMENT OF UNCONVENTIONAL RESERVOIRS: FROM INCEPTION TO MATURITY

Instructor: Shah Kabir
Discipline: Engineering, Unconventional Reservoirs
Length: 2 Days (Classroom), 4 Half-Day Sessions (Live Online)
CEUs: 1.6
Availability: Public, In-House, & Live Online

Who Should Attend:
Reservoir and production engineers.

Course Description:
This two-day workshop entails a fundamental understanding of well performance with the use of several tools, such as RTA and DCA. Application of DCA emphasizes matching the cumulative-production curve for retaining solution consistency and objectivity. Overall, suitability of these tools for reserves forecasting will be the cornerstone of this workshop. We will also introduce a promising semi-analytical DCA tool, the Series model. Although deterministic reserves estimation will be emphasized, probabilistic approaches will be outlined.

Obtaining some of the basic reservoir parameters with DFIT entails stress and reservoir properties, such as initial pressure and permeability. However, factors influencing the non-ideal DFIT behavior often present interpretation challenges. We will explore some of these issues while tackling some of the field responses. Finally, beyond the early production period, production of water can complicate the lift issue. We will discuss a simplified plunger-lift model to tackle this flow problem at hand. Tools involved include Kappa (RTA and PTA modules), and simple analytical diagnostic and analysis methods.

PLEASE NOTE: PARTICIPANTS ARE REQUIRED TO BRING THEIR OWN LAPTOPS.

Learning Outcomes:
- Explore diagnostic fracture injection testing (DFIT) and well management before production initiation.
- Forecast performance with decline-curve analysis (DCA) tools and understand their relative strengths.
- Use rate-transient analysis (RTA), when possible, to gain insights into long-term performance.
- Consider merits of reservoir simulation approach.
- Estimate reserves with a few tools in both deterministic and probabilistic frames.
- Understand the wellbore lift issue with a plunger-lift operation.
- Solution workflows for participants' specific problems.

Course Content:
- Participants discuss operational problems on pertinent topics within the workshop's scope
- Background review of each topic
- Hands-on problem-solving sessions using field data – preference: client's own data

SHALE RESERVOIR WORKSHOP: ANALYZING ORGANIC-RICH MUDROCKS FROM BASIN TO NANO-SCALE

Instructor: Ursula Hammes, PhD
Discipline: Geoscience, Unconventional Reservoirs
Length: 2, 4 or 5 Days
CEUs: 1.6, 3.2 or 4.0
Availability: In-House

Who Should Attend:
Geoscientists, reservoir engineers, and managers who desire to develop a better understanding of the geological, mechanical, and chemical character of mudrock systems and how mudrock attributes vary in the context of shale gas/oil reservoir exploitation.

Course Description:
This unique training course can be customized to your staff's skill needs by choosing between the modules below. The class will utilize lectures, core examination and exercises, to address the reservoir characterization, sedimentology, facies, sequence stratigraphy, petrophysics, fractures, and geochemistry of shale-gas/oil bearing mudrocks.

This workshop focuses on rock-based interpretation of mudrocks from basin to nano-scale. Participants will learn how to use core, cuttings, geochemical, and petrophysical data to characterize mudrocks and apply mudrock depositional, sedimentological, sequence stratigraphic, geochemical and petrophysical principles to exploration areas and production assets in shale basins. Subsurface data from a variety of oil and gas shale plays will be examined.

Client management will pre-select 2, 4 or 5 of the Modules below for their private / in-house course.

Learning Outcomes:
- Appraise the variety of shale systems from basin to nano-scale.
- Characterize mudrock facies and identify facies and sequences in cores and be able to tie those to well-log character.
- Assess and interpret geochemical data critical to understanding mudrock systems.
- Judge controls on source rock deposition, reservoir heterogeneities, and determine frackable intervals.
- Recognize and quantify the rock properties that will have an impact on completion success.
- Learn how to characterize shale reservoirs.

Course Content:
- Module 1: Approaches to understanding geology of shale-gas/oil plays
- Module 2: Stratigraphic/depositional processes in shale basins
- Module 3: Geochemical tools and geochemistry review
- Module 4: Reservoir characterization and reservoir quality of mudrocks
- Module 5: Production and well completion

OPTIONAL: 3 hour afternoon field trip to Eagle Ford/Austin Chalk outcrops in Austin.

UNCONVENTIONAL OIL AND GAS

Instructor: Ruben O. Caligari
Discipline: Unconventional Reservoirs
Length: 2 Days
CEUs: 1.6
Availability: In-House

(This course is available in Spanish)

Who Should Attend:
Technical personnel with experience in oil and gas that need to learn the nature and behavior of unconventional accumulations of oil and gas and the distinctive aspects of their development. Entry-level professionals that will work in unconventional developments and need to understand the meaning of unconventional in this context. No previous knowledge of the subject is required.

Course Description:
Development of unconventionals oil and gas has significantly shifted both industry procedures and global energy balance in 21st century. Participants of this course will discuss characteristics of conventional oil and gas to better understand why other accumulations are considered unconventional. Various unconventional systems currently under exploitation will be presented with specific focus in tight and shale systems, with the highest potential in Argentina and other countries within the region. The complex trapping mechanism of tight and basin-centered gas will be discussed, as well as well completion techniques and results.

Participants will identify and understand key factors in defining the quality of plays. Methodology for assessing technically recoverable resources will be analyzed as well as different approaches for production forecasting. Horizontal drilling and multiple stage fracturing technologies as applied in current developments will be reviewed and examples of the most prolific plays in Argentina will be presented.

Learning Outcomes:
- Understand "conventional" oil and gas and define unconventional.
- Types and historical evolution of unconventional resources.
- Characterization and examples of extra heavy oil mining, oil shales mining, and coalbed methane.
- Characterization, trapping mechanisms, development, and examples of tight gas and basin-centered gas.
- Characterization, quality factors, and examples of shale oil and gas.
- Horizontal wells and multistage fracturing.
- Understand the concept of SRV, production forecasting, and reserves assessment.
- Risk assessment and project management of unconventional developments.
- Environmental aspects of unconventional developments.

UNCONVENTIONAL RESOURCE PLAYS - WORKSHOP

Instructor: Stephen A. Sonnenberg, PhD
Discipline: Geoscience, Engineering, Unconventional Reservoirs
Length: 3 Days (Classroom), 6 Half-Day Sessions (Live Online)
CEUs: 2.4
Availability: Public, In-House, & Live Online

Who Should Attend:
Geologists, geophysicists, petrophysicists, reservoir engineers and managers who are exploring for and developing oil and gas fields in unconventional, basin-centered petroleum systems. Basic knowledge of well log evaluation is recommended.

Course Description:
This three-day workshop introduces sound evaluation techniques used in choosing and developing "unconventional resource new ventures." It combines geology, reservoir engineering, reserves evaluation, economic forecasting and the concepts of multivariate analysis to develop skills that help predict productivity in oil and gas systems. The workshop covers gas and oil plays in shale and stacked tight sands that are developed with horizontal and vertical wells, and completed and stimulated with hydraulic fracturing.

Learning Outcomes:
Attendees will be able to:
- Demonstrate knowledge of reservoir attributes (variables) pertaining to unconventional resource play viability and scale.
- Screen (evaluate) all play types. For example, what will work, what is economically feasible, what play has critical flaws, what play is basin-centered but is marginal because of its size and depth.
- Develop an idea of the viability of new venture oil/gas plays, compare them to other global plays, and develop a clear idea of reservoir/geologic mechanisms and acceptability.
- Recognize and appraise how a play will perform and forecast potential resources. Include examples of winners and losers, using actual cases. REALLY know what you are evaluating quantitatively with comparison to other global play results.
- Evaluate tight gas sands over a long vertical interval and shale gas over a finite interval developed with horizontal wells. Evaluation of plays with an inverted fluid column (water to oil to gas transitions). Prevent grave and costly mistakes.
- Integrate mixed parameters such as electric log values of porosity, resistivity, and "cross-over gas effect." Identify key reservoir "drivers" versus depth and location (sweet-spot identification). Integrate with thermal maturity and pressure data (always as a function of depth, subsea depth or depth to stratigraphy.
- Apply intuitive principles to more accurately predict oil/gas productivity in tight rocks.
- Understand the hydraulic fracture stimulation treatments employed by operators.

Course Content:
- DAY 1: Unconventional Tight Gas
- DAY 2: Unconventional Tight Oil Reservoirs
- DAY 3: Unconventional Resource Assessment

WELL STIMULATION WORKSHOP: PRACTICAL AND APPLIED

Instructor: Leo Roodhart, PhD and Gerrit Nitters
Discipline: Engineering, Unconventional Reservoirs
Length: 5 Days (Classroom), 10 Half-Day Sessions (Live Online)
CEUs: 4.0
Availability: Public, In-House, & Live Online

Who Should Attend:
Well completions design engineers, production, reservoir, drilling engineers; economists, asset managers, geologists. Senior technologists, those involved in development planning, economics, production operations, production chemists, well stimulation specialists.

Course Description:
In the drive towards more technically challenging completions and the development of unconventional reservoirs, not enough attention is paid to the details of inflow performance optimization. This can result in poor or less than optimum production. Asset managers, advisors and engineers involved in the planning, execution, and evaluation of well completions need to have the background in what is possible using modern well stimulation techniques and tools.

This course is designed for those involved in all aspects of inflow performance and well completion/outflow design, and has the emphasis on well stimulation. Obviously, to be able to make decisions it is important to understand the characteristics of the "drainage volume" in relation to the well paths. Candidate selection is therefore key and time will be spent discussing candidate selection strategies, how that will affect the inflow performance and consequently, the stimulation design. The course includes acidizing and fracturing design, quality control, conducting the treatment, analyzing pressures and other critical parameters, during and after the treatment.

Participants are encouraged to bring their own cases. The aim is that the time is spent both on lecturing and students working on case studies divided into teams to evaluate and design stimulation treatments.

Course concludes with a comprehensive exercise where students will:
- Select candidates from group of wells
- Make a proposal for selection of a treatment for each candidate
- Design of selected treatment
- Make a comparison with alternative treatment(s)

Students are encouraged to bring their own problem sets.

PLEASE NOTE: PARTICIPANTS ARE REQUIRED TO BRING THEIR OWN LAPTOPS.

Learning Outcomes:
- Identify the best economical, method to enhance/optimize the inflow performance in the various completion configurations/ formation types.
- Understand formation damage causes/ remediation.
- Select candidates for acidizing treatments.
- Select candidates for hydraulic fracturing treatments, both propped, acid fracturing.
- Understand the design/execution of acidizing treatments.
- Understand the design/execution of hydraulic fracturing treatments.
- Understand acidizing/hydraulic fracturing simulators.
- Understand the nature, environmental impact of fluids used in production enhancement treatments to develop a disposal strategy.

SCA
SUBSURFACE CONSULTANTS

OUR SERVICES

TRAINING SERVICES

Our mission at SCA is to provide a quality training experience that brings added success to our upstream oil and gas industry clients. From its founding in 1988, SCA has provided leading edge, technical training services around the world to over 27,000 petroleum industry professionals of all experience levels. We offer both in-person and live online training courses in the following categories:

- Geoscience
- Engineering
- Unconventional Reservoirs
- Formation Evaluation
- Multi-Disciplinary & Introductory
- Field Courses

CONSULTING & DIRECT HIRE SERVICES

SCA is a world leader in providing petroleum exploration, development, and production consultancy and direct hire services. Our experts have conducted consulting assignments in over 50 countries, and in virtually every major producing basin around the world. We can quickly provide consultants or direct hire support in various areas of expertise including:

- Geologists
- Geophysicists
- Geoscientists
- Petrophysicists
- Geotechnicians
- Engineering Technicians
- Petroleum Engineers
- Reservoir Engineers
- Completions Engineers
- Production Engineers
- Drilling Engineers
- Facility Engineers
- Accounting Professionals
- Land Professionals

PROJECTS & STUDIES

SCA provides teams of seasoned professionals to conduct projects and studies at your office, in remote locations around the world, or in our Houston-based Team Rooms. Examples of the type of projects SCA conducts include:

- Integrated, Multi-Disciplinary Studies (Exploration, Development, Production)
- Basin Studies
- Exploration and Development Prospect Generation and Evaluation
- Acquisition or Divestiture Evaluation
- Asset/Portfolio Evaluation
- Structural and Stratigraphic Interpretation and Mapping
- Post-drilling Evaluation and Assessments
- Structural Analysis
- Resources and Reserves Studies

QUALITY ASSURANCE

SCA provides teams of expert consultants with global experience in quality assurance to conduct reviews at the corporate strategy, play assessment, prospect portfolio, or major capital project sanctioning level. These reviews can help identify technical flaws or failures of logic (example: prospect appears reasonable but does not fit the geologic context), reduce uncertainty, mitigate risk, enhance decision quality and instill functional excellence. SCA experts can provide:

- Industry recognized expertise in specific disciplines
- Independent perspectives that may identify internal technical or strategic bias
- Experience with global analogs/best practices
- Mentoring to reinforce key skills or supplement teams on a short term or periodic basis
- Training options to upgrade internal skills

OIL & GAS ADVISORY

SCA offers Oil & Gas Advisory Services to E&P companies as well as non-industry clients considering the acquisition of or investment in producing properties, exploration, or development opportunities. Using available information, we conduct independent, unbiased 3rd party evaluations for financial institutions, private or public equity investors, family offices or ultra-high net worth individuals, asset managers, intermediaries and advisors including:

- Confirm technical validity of the opportunity
- Assess risk factors and identify risk abatement strategies
- Identify reserves/resources potential and probabilistic distributions
- Determine asset value range and upside potential

INNOVATIVE TRAINING VENUE OPTIONS

SCA offers over 95 courses in six disciplines. Register using our website at scacompanies.com or by e-mail at training@scacompanies.com. All of SCA's course materials are regularly updated to reflect the latest information and recent developments in technology. We understand the importance of producing quality training courses and the impact it has on your company's most valuable assets. We hope you will choose SCA when it comes to training your employees.

REGISTER FOR A PUBLIC COURSE:

- Gain fresh perspectives from others in the industry through classroom discussions
- Public classes take you away from the distractions of the office and allow you to focus on learning
- Tuition includes continental breakfast, lunch, afternoon snacks and beverages
- Courses are held regularly at SCA's training center in Houston, Texas, as well as international venues

ARRANGE AN IN-HOUSE COURSE:

- Save on travel and per student costs
- Conveniently select the dates that fit with your company's schedule
- Customize the content of our in-house courses to fit your work programs, incorporating your data where possible, into exercises, examples and workshops, or by simply modifying the information that is most important to your company. Additional fees may apply for course customizations

PARTICIPATE IN A LIVE ONLINE COURSE:

- SCA offers Live Online versions of select courses from our catalog (see **P6** for details)
- Cover the same content at a fraction of the in-person classroom cost
- Enjoy the conveniences of learning remotely, including saving on travel expenses
- Courses are scheduled in half-day sessions so that attendees can manage key job responsibilities concurrently

HOST A PUBLIC COURSE:

- In exchange for providing the venue and lunches, your company will receive discount pricing
- The convenience of setting the course dates to fit your company's schedule
- The cost savings of having us send our instructors to you, eliminating your company's travel costs

LUNCH & LEARNS, SEMINARS & CONFERENCES:

- SCA experts can deliver hour-long talks on a variety of technical topics well-suited for in-house lunch and learn presentations or society functions
- All talks qualify for continuing education credits

For more information about SCA's Training services, contact:

Mary Atchison, VP of Training Operations
matchison@scacompanies.com • 713.789.2444

CASED HOLE AND PRODUCTION LOG EVALUATION

Instructor: James Smolen, PhD
Discipline: Engineering, Formation Evaluation
Length: 5 Days
CEUs: 4.0
Availability: Public & In-House

Who Should Attend:
Reservoir and production engineers and geologists, cased hole sales engineers, petrophysicists, log analysts and others involved in maximizing recovery, identifying production problems or planning workover operations.

Course Description:
This comprehensive, up-to-date course covers new and traditional wireline diagnostic techniques for cased wells and emphasizes three major factors. 1.) Evaluation of formation through casing focuses on locating oil, gas and water downhole, determining their saturations and monitoring their movement over time. 2.) Well integrity applies a variety of cement bond logging and casing inspection techniques to confirm zonal isolation and detect mechanical damage, corrosion, scale, perforations. 3.) Water identification and fluid contribution emphasizes techniques to quantify the sources of water, oil and gas production for control of the production profile or as inputs to reservoir modeling. Special consideration is given to the newest logging techniques for highly deviated and horizontal wells.

Learning Outcomes:
- Quickly recognize clean gas, oil and salt water zones on Gamma Ray and Sigma logs.
- Calculate fluid saturations from Sigma logs in both clean and shaley intervals.
- Assess cement quality, compute bond index, appreciate the shortcomings of this measurement and select a suitable bond log tool.
- Compute the well flow profile (zonal contributions) from the Spinner and Fluid ID surveys.
- Use temperature log to detect contributing zones and possible channels.

Course Content:
- Overview of cased hole logs
- Formation evaluation
- GR and CNL
- Pulsed neutron sigma and C/O logs
- Resistivity and acoustic
- Well integrity
- Conventional, directional and pad tools
- Pulse echo techniques
- Casing inspection techniques
- Fluid contribution
- Classic PLT approach
- Oxygen activation and PN techniques
- New tools for horizontal wells

Participant Testimonial:
"Great instructor! He didn't talk over our heads and explained things at a very basic and easy to understand level." – Lauren B., Well Intervention Engineer

Featured Instructor:

Selim Shaker, PhD

Selim S. Shaker, PhD is a Consultant for Geopressure Analysis Services Inc. (G.A.S). He received a BSc, MSc and PhD in Geology from ASU, Egypt. He also received a diploma in Hydrogeology from Prague University (UNESCO). With over 35 years in the oil industry, he started his career in Egypt as a well-site, stratigrapher and structural geologist. During his 30 years of U.S. domestic service, his main function as Exploration Geologist was prospect generation in offshore Gulf of Mexico (Shelf and Deepwater), onshore TX and LA, Egypt, NW Australia, Algeria, Libya, North Sea and China.

He established G.A.S. to focus on pore-fracture pressure prediction, evaluating prospects' risk, geopressure compartmentalization, seal integrity and salt-sediments interaction on leads and prospects worldwide especially in the Gulf of Mexico. Dr. Shaker specializes in pre- and post-drilling risk assessment of a prospect.

Dr. Shaker has published over 40 papers and articles regarding the application of geopressure in exploration and drilling. He has taught several geopressure courses to the AAPG, SEG, HGS, and multiple in-house courses for domestic and international clients. He is an active member of AAPG, SEG, CSEG, AADE, EAGE, HGS and GSH.

Courses Taught:
- For Safe Drilling: Formation - Fracture Pressure Interpretations and Analysis
- Pore Pressure, Fracture Pressure, and Well-Bore Stability
- Seal and Reservoir Pressures Analysis for E&P Prospect's Risk Assessment

PORE PRESSURE, FRACTURE PRESSURE, AND WELL-BORE STABILITY

Instructor: Selim Shaker, PhD
Discipline: Formation Evaluation
Length: 3 Days (Classroom), 6 Half-Day Sessions (Live Online)
CEUs: 2.4
Availability: In-House & Live Online

Who Should Attend:
Geologists, geophysicists, drilling/reservoir engineers, well log analysts, basin-model specialists, managers, support staff involved in exploration, development, drilling.

Course Description:
This course uses basic models of geology, rock-mechanics, hydrodynamics to predict, appraise subsurface Geopressure, evaluate risk pre-/post-drilling. Participants learn to calculate, run their own pore pressure (PP) prediction/analyses, to apply a new method of calculating PP, and discuss pitfalls related to specific applications. The course explains development of subsurface geopressure compartments with depth, impact on hydrocarbon entrapments, drilling prognoses, risk assessment.

Learn to QC measured/predicted input data, to use seismic velocities, petrophysical data from offset wells to build prediction model for a wildcat proposed location. Build the foundation of establishing prediction variables, exponents for each basin. Learn calibration process of prediction model during/post drilling, and discuss mud weight, casing programs, anticipated drilling challenges, Supra salt, sub-salt models, fault seals, Strat-geopressure fairways, AVG, distribution of geological basins world-wide, impact on geopressure profiles.

Learning Outcomes:
- Understand causes, concepts, graphic representations of subsurface geopressured, hydrodynamic systems.
- Calculate pressure transgression, regression from measured wire-line/log data.
- Collection of petrophysical measurement needed for PP/fracture pressure (FP) prediction.
- Establish drilling tolerance window, safety restrictions without compromising bore-hole stability.
- Comprehend that prediction models are subject to geological setting.

Course Content:
- New approach to causes, models, definitions
- Geopressure vs. Hydrodynamics
- PP plots (PSI and PPG MWE), including pitfalls
- PP-FP direct, pertinent measurements
- Transgression, regression, P decay, centroid, hydrocarbon effect
- Models/methods used for PP prediction
- Data needed for PP prediction
- Emphasis on Effective Stress Model, Eaton's relationship
- PP predictions calibration methods
- Technique used for PP/FP prediction
- Pre-drilling: Building geological blocks
- Seismic velocity-Qualification for PP predictions
- Prediction model from seismic, offset wells
- Limitations, pitfalls
- Post-drilling: Compartmentalization, risk assessment, appraisal.
- Analysis, applications for Lead/Prospect evaluation
- Compartmentalization, seal effectiveness, retention capacity
- Transgression and regression

PRACTICAL INTERPRETATION OF OPEN HOLE LOGS

Instructor: Robert 'Bob' Barba
Discipline: Engineering, Formation Evaluation
Length: 5 Days (Classroom), 6 Half-Day Sessions (Live Online)
CEUs: 4.0
Availability: Public, In-House, & Live Online

Who Should Attend:
Reservoir engineers, petroleum engineers, production engineers, geologists, geophysicists, managers, independent operators, marketing personnel and anyone who needs a practical understanding of open hole log interpretation.

Course Description:
This course requires no prior knowledge of logs or log interpretation. Attendees will acquire understanding and basic interpretation techniques needed to interpret open hole well logs. Both quick-look qualitative interpretations and more rigorous quantitative interpretations are covered. The course is generic in technical scope, no specific software is used. Equations are solved by hand with a calculator. Both the theory and practice of practical, applied interpretation are covered as well as practical advice, applied exercises, discussions and the study of actual logs. The accompanying manual provides a useful reference for attendees to use after the conclusion of the course.

Learning Outcomes:
- Determination of main lithologies and volumes of each.
- Calculation of porosity.
- Detection of hydrocarbons, and quantification.
- Learn systematic log interpretation procedure & real world practicalities.
- Uses and limitations of main specialty logging tools.

Course Content:
- What is open hole well logging?
- Basic rock properties
- Well and wellbore environments
- Lithology indicators and volume of shale
- Porosity logs
- Resistivity logs
- Quick-look (qualitative) interpretation
- Quantitative interpretation: Water saturation calculations
- How to run logs
- Real world practicalities of interpretation
- Class interpretation of actual field logs

Participant Testimonials:
"Very good instructor! Very educational and very comprehensive information. I would definitely recommend him again." - Joy B.

"Excellent knowledge and great energy in presenting. He really kept us engaged!" - Kevin T.

"Bob is enthusiastic and engaging and I appreciate his honesty in presenting both advantages and shortcomings of each tool/ method." - Mark D.

PRESSURE TRANSIENT TEST DESIGN AND INTERPRETATION

Instructor: Christine Ehlig-Economides, PhD
Discipline: Engineering, Formation Evaluation
Length: 5 Days (Classroom), 10 Half-Day Sessions (Live Online)
CEUs: 4.0
Availability: Public, In-House, & Live Online

Who Should Attend:
Engineers and geoscientists interested in well and reservoir evaluation from well tests and production data.

Course Description:
This 5-day course will provide a comprehensive view of pressure transient test design and interpretation. The emphasis is on understanding how well and reservoir parameters of practical interest can be quantified from well tests. Well parameters causing productivity loss include near wellbore damage and limited entry; those stimulating productivity include hydraulic fracturing and well deviation, the latter including horizontal wells. Reservoir parameters include vertical and horizontal permeability, natural fractures, and reservoir boundary characterizations. The course begins with a brief derivation of the models used for pressure transient analysis and hands on interpretation basics. The test design module describes a wide variety of test types and acquaints participants with forward simulation using commercial software providing a rich analytical model catalog. Then basic analysis is extended to include gas reservoirs and the effects of heterogeneity due to natural fractures. Next the emphasis turns to characterizing vertical and lateral reservoir limits and how the latter relates to seismic data interpretation. Then both pressure transient and production data analysis are considered for horizontal and hydraulically fractured wells. Finally, we examine multiwell and interference testing. Participants are invited to bring data for the class to consider on the last day if not before.

PLEASE NOTE: PARTICIPANTS ARE REQUIRED TO BRING THEIR OWN LAPTOPS.

Contact SCA for details on required software licenses

Learning Outcomes:
- Learn how well test models are derived and computed.
- Experience how to simulate pressure transient test behavior and how to design well tests.*
- Experience how to process, quality check, diagnose, and analyze pressure transient data.
- Understand the behavior of well and reservoir response patterns observed in well tests, what well and reservoir parameters can be quantified, and how to quantify them from pressure transient data.

Using commercial software (Ecrin suite by Kappa Engineering)

Participant Testimonials:
"The instructor was so energetic and consistently displayed her knowledge and experience in the field."

"I was impressed with this course and the enthusiasm and professionalism of the professor."

VISUAL ROCK CHARACTERIZATION

Instructor: Robert Merrill, PhD
Discipline: Geoscience, Formation Evaluation
Length: 5 Days
CEUs: 4.0
Availability: In-House

Who Should Attend:
Geologists who desire to enhance ability to get more information from existing sample datasets, describe lithology from cuttings/cores for stratigraphic interpretation, facies mapping, reservoir characterization.

Course Description:
Information extracted from visual analysis of rock samples focuses on fundamentals of exploration/ development. This data is found in existing cores, cuttings during drilling at wellsite. Information is extracted from cuttings, even those chewed up by a PDC bit. Cuttings, core description brings out details of reservoir pore systems, depositional environments, facies description, supplements/enhances modern wireline logs, aids in recognizing by-passed pays. Quantitative description has progressed from thin sections to enhanced imaging techniques. There is a role for cuttings/core description in this changing environment. Grain size, framework, fossils, color/texture distinguish subtle facies changes, subsidence patterns, regional structures.

Rock description provides a tool to calibrate wireline logs to rocks for quality assurance, better interpretation, early calibration to geophysical properties. The character of matrix/accessory minerals in rock affect wireline logs, decreasing uncertainty in wireline log calculations. Shows from samples, cores exist in rock, highlighting potential pay zones.

Diagenetic changes within rock are visible in cores as well as cuttings; these changes both create/destroy porosity. The nature/amount of porosity is qualitatively described, including, not only pore types, but also pore distribution, type, amount of cement. Recognition of multiple pore types has resulted in identifying overlooked pay zones, as finest pores have higher adsorbed water percentage, larger pores will flow hydrocarbons. When dealing with unconventional reservoirs, mineralogy, hardness correlate to brittleness, fractures, microfractures are evident.
Practical applications of concepts/methods for characterizing rocks are demonstrated through exercises to reinforce key concepts. Participants are expected to independently view/describe a sequence of samples for final exercise.

Learning Outcomes:
- Understand principles of describing cuttings/ cores, including important rock properties,
- Understand criteria to differentiate cavings in a cuttings sample.
- Describe clastic rocks including shale, siltstone, sandstone, components, porosity physical characteristics.
- Describe/differentiate limestone, dolomite, evaporites, physical characteristics/ diagenesis.
- Describe a sequence of samples, generate a log from cuttings.

Course Content:
- Principles of cuttings, core examination with binocular microscope, including sample properties, wireline log response
- Sandstone, sandstone components, porosity, physical characteristics
- Siltstone/shale
- Carbonate classification, limestone, dolomite characteristics, diagenesis
- Fossils
- Evaporates, miscellaneous rock types
- Logging exercises

CLIENT SAMPLE

devon
Hilcorp
swn Southwestern Energy
OXY
SM ENERGY
Marathon Oil Corporation
eog resources
Chesapeake ENERGY
MURPHY OIL CORPORATION
Ovintiv
PIONEER NATURAL RESOURCES
MURPHY OIL CORPORATION
PETROCI
TOTAL
TATNEFT
REPSOL
EP ENERGY
Chevron
ExxonMobil
HESS
equinor
bp
bhpbilliton
Husky
Reliance Industries Limited
ADDAX PETROLEUM
SK
JAPEX
ConocoPhillips
Apache
Bapco
PEMEX
GEP GEPetrol
NATIONAL OIL COMPANY OF LIBERIA
GHANA NATIONAL PETROLEUM CORPORATION
ارامكو السعودية Saudi Aramco
KNOC KOREA NATIONAL OIL CORPORATION
JOGMEC
شركة تنمية نفط عمان Petroleum Development Oman
PETRONAS reimagining energy
PTTEP
Sonangol
PDVSA
Nigerian Petroleum Development Company Ltd (NPDC) A SUBSIDIARY OF THE NIGERIAN NATIONAL PETROLEUM CORPORATION (NNPC)

THE DANIEL J. TEARPOCK GEOSCIENCE CERTIFICATION PROGRAM

AKA "GEOSCIENCE BOOT CAMP"

Instructor: SCA Staff
Discipline: Multi-Disciplinary & Introductory
Length: 60 Days
CEUs: 23.2
Availability: Public, In-House, & Live Online

Who Should Attend:
This program is for early career engineers and geoscientists, who require a cost-effective, rapid means of learning and applying the fundamentals of geology, geophysics and engineering to become a contributing member of an exploration or development team. The Program is designed for geoscientists and engineers who have at least a Bachelor's degree from a university in geology, geophysics, or engineering, with a fundamental background in Geosciences or Petroleum Engineering.

Course Description:
This training program includes six weeks of classroom courses, followed by a six-week interpretation and mapping project. Participants learn fundamental interpretation, engineering, and mapping skills, and put those skills to the test using seismic data, well logs, and production information from a development prospect. A team of senior-level geoscientists serve as mentors to the participants and help guide their interpretation and decision-making process.

The participants apply learned skills in a real project situation. They will learn the fundamentals of material balance reserves calculations, and basic economic evaluations.

The participants will deliver an interpretation / engineering / mapping project of a producing field which includes exploration, exploitation, and development of upside potential. The participants will demonstrate their skills and gain practical experience by defending their results in a technical presentation.

The objective is to advance the skill level of the participants to make them a contributing member of an exploration or development program. The combination of in-class training, mentoring, and hands-on application through a real-world project provides the participants with well-rounded knowledge of geoscience and engineering best practices.

Course Content:
COURSE PHASE
- Basics of the Petroleum Industry
- Structural Styles in Petroleum Exploration and Production
- Structural and Sequence Stratigraphy Field Course
- Applied Seismic Interpretation
- Applied Contouring Workshop
- Practical Interpretation of Open Hole Logs
- Sequence Stratigraphy Applied to O&G Exploration
- Applied Subsurface Geological Mapping
- Mapping Seismic Data Workshop
- Basic Petroleum Engineering for Non-Engineers
- Modern Coastal Systems of Texas Field Course

PROJECT PHASE
- Phase I: Initial Exploration – Delineate Prospects – Drill Exploration Wells
- Phase II: Assess Discovery – Refine Interpretation
- Phase III-A: Field Development – Drill Development Wells
- Phase III-A: Field Development Continued
- Phase III-B: Explore for Additional Prospects
- Phase IV: Field Performance Analysis – Results of Other Exploration Prospects
- Phase V: Present Report and Project Results

BASIC PETROLEUM ENGINEERING FOR NON-ENGINEERS

Instructor: Susan Howes, PE, PHR
Discipline: Multi-Disciplinary & Introductory
Length: 2 Days (Classroom), 4 Half-Day Sessions (Live Online)
CEUs: 1.6
Availability: Public, In-House, & Live Online

Who Should Attend:
Geoscientists, geotechs, engineering techs, landmen, attorneys, financial and accounting managers, support professionals, and other non-technical personnel who require a basic understanding of petroleum engineering.

Course Description:
This two-day course describes the main aspects of petroleum engineering with the different engineering functions of the petroleum business broken down into a discussion of each discipline, with an emphasis on what a reservoir engineer does, what data is required, where it is obtained and how it affects the analysis of the reservoir. Discussions include volumetric parameters, hydrocarbon characteristics, volumetric calculations, recovery and drive mechanisms, reservoir evaluation, the difference between resources and reserves, and the basics of economic analysis (cash flow). Some basic calculations are undertaken, but complex equations and calculations are not utilized. The course is an introduction to petroleum engineering and it is not intended to develop expertise in petroleum engineering but rather to make attendees aware of what their petroleum engineer associates do and what they need to best do their jobs.

Learning Outcomes:
- Understand the various petroleum engineering functions and how geoscientists interact with each.
- Obtain a basic knowledge of the physical properties of hydrocarbons and how they affect production.
- Gain an understanding of what occurs in the reservoir in relation to drive mechanisms and resulting recovery.
- Gain an understanding of the necessity for accurate reservoir characterization in resource/reserve calculations.
- Understand the basics of how to estimate oil/gas in place more accurately with volumetric calculations.
- Obtain a basic understanding of economic evaluation through the use of cash-flow.

Course Content:
- Petroleum engineering functions
  - Drilling Engineer
  - Completions Engineer
  - Production Engineer
  - Operations Engineer
  - Facilities Engineer
  - Reservoir Engineer
- Reserves calculation methods
- Rock and fluid parameters
- Volumetric calculations
- Recovery and drives
- Performance evaluation
- Resources / reserves
- Economics
- EOR

Participant Testimonials:
"Susan was fantastic. She gave some excellent real-world examples of how the processes we learned were applicable."

"Very knowledgeable about her field."

"Great at getting through the calculations and conveying the importance of cooperation between engineers and geologists." - Joy B.

BASIC PETROLEUM ENGINEERING PRACTICES

Instructor: Kirk Boatright, PhD, PE
Discipline: Engineering, Multi-Disciplinary & Introductory
Length: 5 Days
CEUs: 4.0
Availability: In-House

Who Should Attend:
Entry-level technical & non-technical personnel who would like an understanding of the discipline of petroleum engineering.

Course Description:
This course is more than an introduction to petroleum engineering and is not a superficial presentation of the technology of the industry. Its purpose is to develop an understanding of the technology and its applications at an engineer's level, and the confidence, professionalism and, therefore, productivity which comes with that understanding. Participants are placed in the position of Reservoir Engineer, and "Our Reservoir" is defined, analyzed and put in production. Next, drill sites are chosen. Participants are then placed in the position of Drilling/Completion Engineer, and the drilling/completion program for "Our Well" is analyzed. Participants enter those specialized programs with a depth of understanding of that particular technology and relation to other classic and new technologies of the industry. The course focuses on the field and application approach, and includes classroom and outside exercises, fundamental engineering problems, and basic field exercises.

Learning Outcomes:
- Reservoir fluid and rock properties.
- Fundamentals of reservoir fluid flow.
- Oil and gas reservoir classification, definition, delineation and development.
- Unconventional reservoirs
- Fundamentals of drilling, well completion, and production operations.
- Basics of casing design and primary cementing.
- Primary and enhanced recovery mechanisms.
- Surface operations.
- Terminology of exploration and production (language of the oil field).

Course Content:
- Basic petroleum geology.
- Reservoir fluid properties
- Our reservoir
- Petroleum geology
- Petroleum reservoirs
- Hydrocarbon generation & occurrence
- Reservoir fluid distribution & flow characteristics
- Tight oil & gas reservoirs
- Hydrocarbon reservoir classification & definition
- Exploration technology
- Defining the hydrocarbon reservoir
- The reservoir development plan
- Drilling engineering & operations
- Well completion technology
- Production technology
- Reservoir development practices
- Hydrocarbon recovery mechanisms
- Surface processing of produced fluids.

BASIC PETROLEUM OPERATIONS

Instructor: Ruben O. Caligari
Discipline: Multi-Disciplinary & Introductory
Length: 2 Days (optional 3rd)
CEUs: 1.6
Availability: In-House

(This course is available in Spanish)

Who Should Attend:
Entry-level engineers and technical personnel who will work in field operations and need to understand fundamental technologies on well drilling and completion, production operations and surface facilities. Engineers, geologists and geophysicists that need a better understanding of petroleum operations to perform in multidisciplinary teams. No previous knowledge of the subject is required.

Course Description:
The course presents the basics of reservoir properties to better understand the various drilling, completion, and production technologies. Rotary drilling principles, equipment, and operations are reviewed, as well as casing and cementing procedures. Participants will acquire basic knowledge on well completion technologies, conventional and rig-less, with emphasis on hydraulic fracturing.

Fundamentals of vertical flow in wells and artificial lift methods, field fluids conditioning and surface facilities description, and environmental aspects of operations are covered. The course approach encourages participation and discussion of field examples.

Learning Outcomes:
- Properties of oil and gas reservoirs and reservoir fluids.
- Rotary system, equipment and procedures, and well control principles for drilling for oil and gas.
- Casing and cementing, well head equipment.
- Offshore drilling technologies, directional and horizontal drilling, rig-less operations.
- Well completion operations: logging, perforating, squeeze cementing.
- Matrix and fracture stimulation, conventional and unconventional systems.
- Production equipment, artificial lift principles and methods, surface facilities.

Course Content:
- Properties of reservoir rocks and fluids.
- Pressure and temperature of reservoirs.
- Drilling principles and technologies: rotary system, drilling fluids, pressure control, drilling tools.
- Vertical and directional drilling: basic offshore technologies, casing and cementing oil wells.
- Basic operations and technologies of well completion.
- Hydraulic fracturing, principles and operations, conventional and unconventional systems.
- Vertical flow in wells and artificial lift methods.
- Production operations and field conditioning of produced fluids.
- Environmental aspects of operations.

BASIC RESERVOIR ENGINEERING FOR NON-PETROLEUM ENGINEERS

Instructor: Christine Ehlig-Economides, PhD
Discipline: Multi-Disciplinary & Introductory
Length: 4 Days (Classroom), 8 Half-Day Sessions (Live Online)
CEUs: 3.2
Availability: In-House & Live Online

Who Should Attend:
Geoscientists, landmen, attorneys, financial and accounting managers, support professionals, non-reservoir engineers, and non-technical personnel who require a basic understanding of petroleum engineering.

Course Description:
This 4-day course describes the main aspects of reservoir engineering. Reservoir engineering has been defined as "the art of developing and producing oil and gas fluids in such a manner as to obtain a high economic recovery" (Moore, 1955). The module begins with a broad overview showing how reservoir engineers assess the value of the reservoir from volumetric, fluids, flow, and investment perspectives. Next is an elaboration on how much oil can be recovered from various natural reservoir drive mechanisms. Next decline curves are used to explain how investors forecast well or reservoir production. Then we explore how key well and reservoir flow properties are quantified through formation and well testing. Finally, flow simulation modeling is explained as a way to rigorously forecast primary, secondary, and even tertiary or enhanced oil production.

PLEASE NOTE: PARTICIPANTS ARE REQUIRED TO BRING THEIR OWN LAPTOPS.

Learning Outcomes:
- Learn how reservoir engineers assess the value of an asset.
- Estimate primary reserves based on production and reservoir pressure data.
- Characterize well and reservoir performance using pressure transient data.
- Use flow simulation to forecast production.
- Facilitate communication between reservoir engineers and geoscientists.

Course Content:
- Overview – Assessing the Asset [general overview of key points to be covered in the course]
- Static Reservoir Description [estimation of oil and/or gas in place mainly based on log data]
- Reservoir Drive Mechanisms [estimation of oil and/or gas in place based on production data; recovery factors from primary production with or without gas cap and/or aquifer pressure support]
- Decline Curve Analysis [empirical models used for reserves estimation]
- Reservoir Testing [single phase single well transient flow and basic pressure buildup analysis as applied to appraisal and primary development wells]
- Flow Simulation [introduction to multiphase multiwall modeling for reservoir management]

Optional Course Topics: [in place of above or for additional days]
- Secondary Recovery Processes [introduction to waterflooding and gas cycling]
- Enhanced Oil Recovery Processes [Description of recovery enhancement via CO2 injection, steam injection, surfactant injection, polymer injection]

BASICS OF THE PETROLEUM INDUSTRY

Instructor: Susan Howes, PE, PHR or Hal F. Miller
Discipline: Multi-Disciplinary & Introductory
Length: 1 Day (Classroom), 3 Three-Hour Sessions (Live Online)
CEUs: 0.8
Availability: Public, In-House, & Live Online

Who Should Attend:
Entry level geoscientists and engineers, as well as administrative assistants, clerks, lawyers, landmen, accountants, supervisors and managers. Also for participants coming to the oil industry from other backgrounds or industries.

Course Description:
A MUST course for new hires in the industry as well as non-technical personnel and support staff. Basics of the Petroleum Industry covers a wide variety of topics such as the generation and trapping of hydrocarbons, the nature of geophysics, and basic petroleum engineering practices. The key skills, terminology and tools involved in each discipline are highlighted, and all concepts are thoroughly illustrated with current examples. The course is well suited for both entry level geoscientists and engineers, and for more experienced, non-technical disciplines such as lawyers, accountants, administrative assistants and managers needing a "Prospect-to-Market" industry overview. Participants receive a practical understanding of how they fit into the overall industry workflow and some tools to help explain the oil and gas business to our non-industry friends. The diversity of participants adds greatly to the classroom interaction.

Learning Outcomes:
- Understand how oil and gas are formed, trapped, discovered and developed.
- Become familiar with the disciplines and skills involved in finding and producing oil and gas.
- Recognize the basic tools, equipment and processes used in finding, developing, producing and refining oil and gas.
- Understand the industry language and terminology that you are likely to encounter in your job.
- Understand the overall industry workflow from the prospect to the gas pump, and how your work fits into the big picture.

Course Content:
- Brief overview of the petroleum industry including global production, consumption and reserves.
- Petroleum geology including geologic age, plate tectonics, sedimentary basins hydrocarbon generation and migration, reservoir rock types and trapping mechanisms.
- Seismic data acquisition, processing, and interpretation.
- Exploration and development techniques and concepts.
- Drilling equipment and activities from rigs to drill bits, onshore and offshore.
- Well data acquisition (logs and cores) and integration to define reservoir parameters.
- Reservoir evaluation; including defining the limits and producibility of a reservoir.
- Basic risk concepts and economic evaluation.
- Field life cycle and production engineering systems, tools and concepts.
- Oil and gas transportation (midstream) and refining (downstream).

CARBON CAPTURE UTILIZATION AND STORAGE - A GEOLOGICAL PERSPECTIVE NEW

Instructor: Stephen A. Sonnenberg, PhD
Discipline: Geoscience, Engineering, Multi-Disciplinary & Intro
Length: 2 Days (Classroom), 4 Half-Day Sessions (Live Online)
CEUs: 1.6
Availability: Public, In-House, & Live Online

Who Should Attend:
Geologists, geophysicists, and engineers who are interested in geologic carbon capture utilization and storage.

Course Description:
This course will discuss carbon capture utilization and storage (CCUS) from a geologic perspective. Examples from carbon capture utilization (CCU) including enhanced oil recovery (EOR) projects will be shown. Known and proposed carbon capture storage (CCS) examples will also be covered.

Learning Outcomes:
- CCUS Options.
- Screening Criteria for CCU.
- Screening Criteria for CCS.
- Relevant Mineral Reactions to Consider.
- Monitoring of Projects.
- Induced Seismicity.

Course Content:
- Introduction and Geologic Considerations
  - Greenhouse gases
  - CCUS options
  - CO_2 phase behavior
  - Subsurface brines
  - Some mineral reactions
  - Hydrocarbon traps (key elements)
  - Induced seismicity
- CO_2 Storage in Depleted Oil and Gas Reservoirs
  - Screened for production volume, depth, proximity of anthropogenic CO_2 source
  - Reservoir size and properties
  - Trap
  - Seal
- Enhanced Oil Recovery and Enhanced Gas Recovery
  - What is it?
  - Where is it applied?
  - How does it work?
  - Examples
  - EOR in unconventionals
- Gas Storage Fields and CO_2 Options
  - Review of gas storage field types
    - Depleted oil and gas fields
    - Salt caverns, mines, etc.
    - Aquifer storage fields
  - CO_2 Options
- Enhanced Coalbed Methane (CBM) and CO_2 Storage in Deep Coal Seams
  - CBM basics
  - Enhanced CBM with CO_2
  - CO_2 options in deep un-mineable coal seams
- Enhanced Shale Gas and CO_2 Storage
  - Shale gas basics
  - CO_2 options
- CO_2 Injection in Saline Aquifers
  - Selection criteria
  - Examples
- CO_2 Fields and Options
  - Review of CO_2 fields
  - CO_2 options
- Enhanced Geothermal Options
- CO_2 and Carbonation Options
  - Geological disposal - mineralization
  - Mineral reactions
  - Examples
- Summary and Wrap-Up

CARBON CAPTURE UTILIZATION AND STORAGE - AN ENGINEERING PERSPECTIVE NEW

Instructor: Christine Ehlig-Economides, PhD and Dimitrios Hatzignatiou, PhD
Discipline: Geoscience, Engineering, Multi-Disciplinary & Intro
Length: 3 Days (Classroom), 5 Half-Day Sessions (Live Online)
CEUs: 2.4
Availability: Public, In-House, & Live Online

Who Should Attend:
Petroleum engineers and geoscientists interested or already engaged in methane and carbon dioxide (CO_2) capture from industrial and agricultural sources and from the air, CO_2 utilization for enhanced oil recovery (EOR), and CO_2 storage in depleted reservoirs and saline aquifers.

Course Description:
The primary topics of discussion during this course are (1) Methane leak avoidance and CO_2 emissions capture, (2) CO_2 EOR, (3) Blue hydrogen and CO_2 transport and storage, (4) Saline aquifer storage with Monitoring, Reporting and Verification (MRV), and (5) Economics.

Learning Outcomes:
- Estimate CO_2 storage capacity, well injectivity, a suitable Monitoring, Reporting, and Verification (MRV) plan, and storage cost in $/tonne, based on geologic models and (where applicable) reservoir production data in both clean and shaley intervals.
- Explain quantitative evidence for sustainable CO_2 storage in terms the public can understand.
- Locate information essential to storage asset evaluation from digital publications and online data.

Course Content:
- Course Rationale
  - Uses for fossil resources
  - Greenhouse gas (GHG) emission sources
  - GHG storage options
  - CO_2 capture and utilization
- Decarbonizing Oil
  - Maximized CO_2 storage in depleted oil reservoirs
  - Currently active EOR+ projects
  - Carbon neutral crude oil
- Decarbonizing Natural Gas
  - CO_2 storage in depleted gas reservoirs
  - CO_2 storage in a blue hydrogen economy
  - Hydrogen storage
- CO_2 Storage in Saline Aquifers
  - CO_2 storage in deep saline aquifers
  - Wells and CO_2 injection
  - Monitoring, Reporting, and Verification
- Economics
  - Are we making money yet?
  - Incentives
  - Value products

ELEMENTS OF PETROLEUM GEOLOGY

Instructor: Stephen A. Sonnenberg, PhD
Discipline: Geoscience, Multi-Disciplinary & Introductory
Length: 3 Days (Classroom), 6 Half-Day Sessions (Live Online)
CEUs: 2.4
Availability: In-House & Live Online

Who Should Attend:
Geologists, geophysicists, & engineers who are interested in learning about petroleum geology (the basics to advanced topics).

Course Description:
The course will use a petroleum system approach, reviewing the elements (source, reservoir, seal, and overburden rocks) and processes (generation, migration, entrapment, and preservation). We will examine: a) those basic factors that control hydrocarbon generation, migration, and accumulation; b) procedures used to discover and produce those hydrocarbons; c) data collection and interpretation techniques; d) the roles and skills required of exploration and development professionals, and e) the worldwide occurrence of hydrocarbon deposits.

This course is appropriate for those wanting a comprehensive understanding of important aspects of petroleum geology. Exercises are interspersed with lectures to emphasize learning outcomes. Enhance your professional growth in the areas of geology, geophysics and engineering related to petroleum exploration and development.

Learning Outcomes:
- The participant will become familiar with elements of petroleum geology.
- This includes petrophysics (log analysis), source rock evaluation, capillary pressure analysis, subsurface pressure analysis (including hydrodynamics), DST analysis, subsurface water analyses, and subsurface mapping and correlation techniques.

Course Content:
- Introduction & world resources
- Sedimentary basins, plate tectonics
- Petroleum systems
- Reservoir rocks, reservoir heterogeneity
- Fractured reservoirs
- Sweet spots
- Porosity and permeability
- Petroleum traps
- Formation evaluation, Pickett, Buckles, Hingle plots
- Low resistivity & low contrast pays
- Review of chemistry of petroleum
- Organic matter types in recent sediments
- Kerogen & maturation
- Lab methods, interpretation of data, biomarkers
- Composition of crudes, natural gas
- Primary & secondary migration
- Capillary pressures
- Subsurface pressures/DST analysis
- Fluid pressure compartments
- Subsurface temperatures
- Subsurface waters
- The importance of subsurface shows
- Unconventional traps
- Risk
- Resources, and reserves

INTRODUCTION TO DRILLING ENGINEERING

Instructor: Lee A. Richards, PhD, PE
Discipline: Engineering, Multi-Disciplinary & Introductory
Length: 2 Days (Classroom), 4 Half-Day Sessions (Live Online)
CEUs: 1.6
Availability: Public, In-House, & Live Online

Who Should Attend:
Entry level drilling engineers, rig supervisors, drilling supervisors (company men), geologists, and other personnel who need to advance their knowledge into the basic theory of oil and gas well drilling and engineering.

Course Description:
This course is designed as an overview of well drilling and introduction to the principles that govern operation margins for land drilling. It is designed to give personnel who have little working knowledge of a drilling rig, insight into how the rig operates and the logistics of carrying out operations on a land rig. Further, students with a high level working knowledge of the mechanics associated with drilling operations such as senior rig personnel and field supervisors will gain an understanding of the engineering principals associated with downhole operations.

Learning Outcomes:
- Understand the basic mechanical components of a modern conventional land drilling rig and their interactions throughout the drilling process.
- Gain knowledge of basic fluids used in drilling and the mechanics principles of drilling fluid flow in drill strings and annuli.
- Understand basic selection factors for choosing drillstring components and BHA design.
- Learn how commonly encountered formations effect drilling operations.
- Understand hydrostatic pressures within the wellbore during drilling operations.
- Determine safe margins for working within both fracture and pore pressure gradients.
- Understand and identify the most prevalent hole problems encountered while drilling.
- Gain knowledge in basic bit selection and operating parameters including dull grading and wear characteristics.
- Calculate pressures throughout the wellbore in all situations encountered during drilling.
- Interpret how pressures effect successful wellbore completion.
- Introduction to basic well control as it pertains to drilling operations.

Course Content:
- Rotary drilling components and their functions
- Wellbore design and geometry
- Drillstring design and geometry
- Drill bit selection
- Drilling hydraulics
- Well control operations
- Hole problems

INTRODUCTION TO SUBSURFACE MACHINE LEARNING NEW

Instructor: Siddharth Misra, PhD
Discipline: Geoscience, Engineering, Unconventional Reservoirs, Multi-Disciplinary & Introductory
Length: 2 Days (Classroom), Optional Live Online Project
CEUs: 1.6
Availability: Public, In-House, & Live Online

Who Should Attend:
Technical energy industry professionals (petroleum engineers, geoscientists) with basic Python proficiency.

Course Description:
This course will provide working knowledge on using python programming and open-source packages essential for data analytics and machine learning. The entire course is based on live demos of codes and workflows in the Jupyter Notebook environment. The course will help geoscientists, geophysicists, and petroleum engineers learn python programming at a beginner to intermediate level. The course uses various types of data: well logs, core data, well performance data, and production data.

The focus of this course is on introducing Python programing skills that are prerequisites to real-world data analysis. The course will not explore applications on large-sized field data. The group project lasting for 2 weeks at the end of the course will help the participants try out the learned concepts by modifying the shared Jupyter Notebooks. The practice session will allow deeper interaction with the instructor on problems specific to the participants.

Learning Outcomes:
- Assemble open-source coding and scripting workflows in Python to solve basic data science problems related to subsurface data.
- Apply numpy, pandas, matplotlib, seaborn and sklearn packages on subsurface data.
- Solve supervised regression problems using ElasticNet, random forest, nearest neighbor, and LASSO regressors.
- Solve supervised classification problems using nearest neighbor, random forest, and support vector classifiers.
- Solve unsupervised clustering problems using k-means and mean shift techniques.
- Apply anomaly detection and data preprocessing.
- Apply neural network and boosting methods.
- Learn about time-series forecasting, clustering, and spatial data analytics through two-week project.

Course Content:
- Using numpy on large arrays, using pandas on large tabular data
- Using numpy and pandas on well data for preprocessing and exploratory analysis
- Using matplotlib and seaborn on well production data for visualization
- Using sklearn for regression and classification
- Feature selection, dimensionality reduction, and feature ranking
- Using sklearn for clustering and outlier detection
- Uncertainty quantification for regressors and classifiers
- Advanced regressors and classifiers: neural network and boosting
- Optional Two-Week Project: Client can select 2 of the following 3 projects according to the needs of the participants:
  - Production Forecasting
  - Shale Image Analysis
  - Clustering the Cross-Well Seismic Traces

INTRODUCTION TO RISK AND UNCERTAINTY MANAGEMENT

Instructor: Susan Howes, PE, PHR
Discipline: Multi-Disciplinary & Introductory
Length: 2 Days
CEUs: 1.6
Availability: In-House

Who Should Attend:
Geologists, geophysicists, petrophysicists, reservoir engineers, drilling engineers, production engineers, completion engineers, facility engineers, HSE professionals, technical managers.

Course Description:
This course is for members of multi-disciplinary project teams who need to identify key technical, mechanical, geological and commercial risks, and develop mitigation plans to address these risks. Members of multi-disciplinary technical teams will learn to plan how to resolve key uncertainties associated with their responsibilities for managing exploration portfolios, building regional exploitation strategies, managing capital projects and maintaining robust asset development plans.

Learning Outcomes:
- Understand the differences between risk and uncertainty.
- Learn how to identify and address various types of risk, including technical, mechanical, geological and commercial.
- Be able to add value with the appropriate level of uncertainty resolution and risk mitigation.
- Improved cross-disciplinary communication between team members, their managers, and field personnel.
- Enhanced decision quality.

Course Content:
- Introduction of key concepts for risk and uncertainty management
- Decision quality principles
  - Developing a Relevant Frame
  - Generating Creative and Doable Alternatives
  - Using Relevant and Reliable Information
  - Assessing the Consequences of Choosing Different Alternatives
  - Applying Logical Analysis
  - Committing to Action
- Characterize uncertainties and develop uncertainty resolution plans
- Analyze risks and develop risk mitigation strategies
- Practice the systematic methodology through application with relevant case studies

PETROLEUM ENGINEERING FUNDAMENTALS

Instructor: Ruben O. Caligari
Discipline: Multi-Disciplinary & Introductory
Length: 2 Days (With Optional 3rd)
CEUs: 1.6
Availability: In-House

(This course is available in Spanish)

Who Should Attend:
Entry-level technical and non-technical personnel who need an understanding of petroleum engineering principles, methods and technologies. No previous knowledge of the subject is required.

Course Description:
The concept of petroleum systems, the basic properties that control storage and flow of the fluids in the reservoir, and the relevant technologies of exploration and production of oil and gas are presented in the course.

Participants will acquire basic knowledge on driving mechanisms, recovery factors, best practices in reservoir management, reserves definitions and the characteristics of unconventional oil and gas developments. Principles and operational aspects of drilling and completion are analyzed with emphasis in directional drilling and hydraulic fracturing. Artificial lift methods, field fluids conditioning and surface facilities, and environmental aspects of operations are included. The course approach encourages participation and discussion of field examples.

Learning Outcomes:
- Energy matrix, the role of hydrocarbons and future scenarios.
- Petroleum systems and petroleum geology.
- Petroleum reservoirs: properties, energy, pressure and fluids phases behavior.
- Unconventional oil and gas.
- Drilling and completion principles and procedures.
- Production operations and production fluids conditioning.
- Engineering and industry terminology.

Course Content:
- Global and local context of the industry
- Petroleum systems and elements of petroleum geology
- Principles and technologies of petroleum exploration
- Properties of reservoir rocks and fluids
- Types and examples of unconventional oil and gas systems
- Drilling principles and technologies
- Well completion, basic operations, hydraulic fracturing
- Artificial lift methods
- Production operations and field conditioning of produced fluids

"A wise man can learn more from a foolish question than a fool can learn from a wise answer."
Bruce Lee

Featured Instructor:

Jill B. Almaguer, PE, MBA, PMP

Jill Almaguer is a certified Project Management Professional (PMP) and Registered Professional Engineer in Texas. She provides leadership and project management to coordinate suppliers to deliver contract requirements on time and on budget while meeting or exceeding customer expectations for quality results.

While working at HP for 20 years, she led a number of technical project teams implementing a broad range of projects from $10 million of medical electronics for the new Brooke Army Medical Center built in San Antonio to nationwide high-speed telecommunications network monitoring systems. She also led software application engineering team for implementation of semi-conductor design software and was director of development for an RFID asset tracking system. At HP, she taught quality process improvement methods to over 600 employees in the southern US as part of the Voice of the Customer project implementation.

Almaguer also provided project management and consulting services to clients such as BP Gulf of Mexico division for a major ERP conversion project. She has presented at numerous national and regional conferences for Society of Women Engineers and Project Management Institute.

Jill has a BS in Bioengineering and an MBA and currently serves on the board of the Federation of Houston Professional Women, and Texas A&M University Biomedical Engineering Industry advisory board. She is current chairman of the Biomedical Engineering Society Houston Industry Chapter and past president of Association of IT Professionals in Houston.

Course Taught:
- Project Management Professional Exam Prep Course

PROJECT MANAGEMENT PROFESSIONAL EXAM PREP COURSE

Instructor: Jill Almaguer, PE, PMP
Discipline: Multi-Disciplinary & Introductory
Length: 4 Days (Classroom), 8 Half-Day Sessions (Live Online)
CEUs: 3.2
Availability: Public, In-House, & Live Online

Who Should Attend:
Any professional who participates in project related work as a stakeholder including project sponsor, project team member or project manager. Anyone who needs the formal education in project management to apply for the Project Management Professional certification exam.

Course Description:
This course is based on *A Guide to the Project Management Body of Knowledge (PMBOK Guide)*, published by the Project Management Institute (PMI), as a recognized standard for the project management profession. The knowledge provided in this course includes recognized best practices of project management practitioners who contributed to the standard development. The course covers key concepts in the project management field along with the processes, inputs, and outputs that are considered good practices on most projects, as well as tools and techniques used in managing projects throughout the project management life cycle. In addition, the course defines key terms and identifies external environmental and internal organizational factors that surround or influence project success.

Learning Outcomes:
- How to define project deliverables in scope and effectively manage project throughout life cycle to prevent scope creep.
- Calculation concepts and formulas to answer various types of earned value computational questions.
- Risk management and response planning to minimize impact to project.
- Stakeholder identification and analysis including managing expectations.
- Key Procurement terms, concepts and calculations including risk profiles of different types of contracts, and point of total assumption.
- Five process groups and ten knowledge areas defined in PMBOK 5th edition.
- Examples of business applications of each of the 47 project management processes.
- Meet the 35 hour PMI education requirement to apply for the PMP certification exam.

Course Content:
- Course aligned to current year's PMI Exam
- 4 Days of intense Classroom training provided by our highly qualified certified PMP trainers
- 35 Contact Hours Certificate will be given to all registrants
- Hardcopy of PMBOK5 – Accredited and approved course material
- 3 months Online Exam Simulator for exam preparation
- End-of-Chapter Quizzes & Simulation Exams
- Industry Case studies

Participant Testimonials:
"Really enjoyed this class. Jill was patient and attentive to questions. She utilized real life examples to make the material practical and relevant. She made the material enjoyable and engaged the entire class." - Reisha B.

"Jill maintained good rapport with all of the students. She had a good sense of humor while staying on topic in a professional manner. Handled questions and comments from the group with ease." - Cathy J.

BASIN-FLOOR FAN SYSTEMS (SOUTH CENTRAL PYRENEES, SPAIN)

Instructor: Steve Cossey, PhD
Discipline: Field Courses
Length: 5 Days
CEUs: 4.0
Availability: In-House

Who Should Attend:
Geologists, geophysicists, members of deepwater study teams (engineers, team leaders and project managers), as well as mid-level to upper-level managers needing to learn more about deep-marine systems, architecture, elements, reservoir properties and their explanation and production characteristics.

Course Description:
This field course is designed for explorationists, non-geoscience members of a synergistic team and managers interested in developing an understanding of deep-marine foreland basin-floor fan systems. From seismic-scale to bed-scale, the architecture, elements and reservoir characteristics of well-exposed deep-marine channelized fan systems are studied in the South Pyrenean foreland basin which is associated with synsedimentary tectonics.

The importance of seafloor topography in controlling fan sedimentation, as well as the evaluation and significance of sediment-slide/debris flow fan system complexity is studied. In evaluating deep-marine processes, environments and systems, you will learn how to consider their application to hydrocarbon exploration and production.

Course Content:
- Deep-marine processes, environments and systems
- Seismic-scale to bed-scale exposure
- Architecture, elements and reservoir characteristics of well-exposed deep-marine fan systems
- Relationship between tectonics and sedimentation
- Overview of Ainsa Drilling Project: results and applicability
- Application of deep-marine models to hydrocarbon exploration and production
- Overview of South Pyrenean foreland: basin tectonics, structure and stratigraphy
- Evaluation of thin-bedded turbidites as potential reservoir intervals
- Production from thin-bedded turbidites
- Sheet vs. lobe deposits
- Confinement of turbidite systems
- Twelve different locations visited

"An organization's ability to learn, and translate that learning into action rapidly, is the ultimate competitive advantage."
Jack Welch

FIELD COURSES

BIG BEND FIELD COURSE

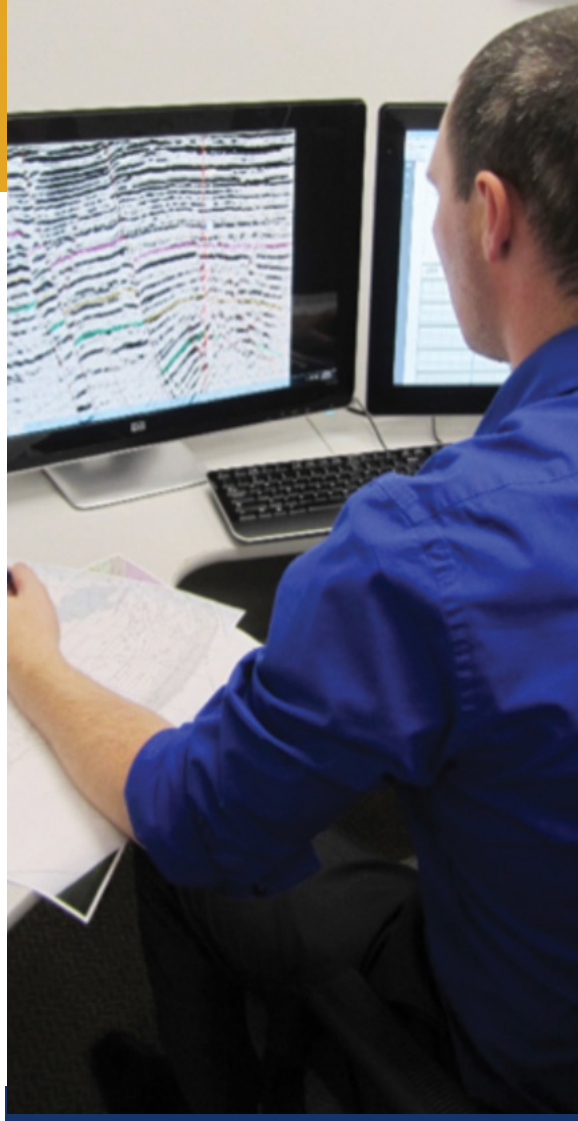
Instructor: Eric D. Carlson, PG
Discipline: Field Courses
Length: 2 Days
CEUs: 1.6
Availability: In-House

Who Should Attend:
Engineers, landmen, managers, and salesmen will take away mental images from outcrops that will help them to understand Oilpatch geology. For geoscientists, walking in and around seismic line-sized outcrops and canyons will spur new ideas and constrain existing models.

Course Description:
Big Bend is unique. It is the only place in North America where all the major types of oilfield trapping mechanisms are easily identified. Four types of mountain-building, and deposition of sandstone and carbonates are the results of continental drift and heat flow in the Earth's crust. Engineers, Landmen, Managers, and Salesmen will take away mental images from outcrops that will help them to understand Oilpatch geology. For Geoscientists, walking in and around seismic line-sized outcrops and canyons will spur new ideas and constrain existing models.

Students will receive three guidebooks and two large maps, and an orientation webinar before the trip. The tectonics and history of the park will be discussed. Each of the two days in the park will feature five hours of contact with the rocks. Outcrops are near the road. At outcrops, analogues to conventional and unconventional reservoirs will be noted. Structural analogues include the US Gulf Coast, the Oklahoma STACK Play, the Permian Basin, foreland basins of the Rockies, the Cantarell Complex, and the North Sea. Stratigraphic analogues are Gulf Coast turbidites, Cretaceous foreland sandstones, Morrow Sands, swamps, Gulf Coast Edwards and Austin Chalk plays, and giant reservoirs in the Persian Gulf. In four 1.5-mile roundtrip hikes, the trip will visit all major ecosystems of Big Bend National Park: Riverine, Desert Floor, Scrub Forest, and Chisos Rim. Nine other roadside stops will complete the course. Participants will begin each day from accommodations north of the park and return after dark. The field course size is limited to 25 attendees.

Learning Outcomes:
- Normal faults, reverse faults, and strike-slip faults will be observed at a distance and close-up, to discern major and subtle details which affect hydrocarbon trapping and well placement.
- Three types of fluvial sand bars, caused by differing bed loads and stream gradients, will be observed to help imagine their thicknesses and lateral geometries underground as reservoirs. Fossil riverbeds having scour surfaces and near-vertical walls will be seen in cross-section.
- Deepwater chert (novaculite) hogbacks and adjacent fractured black shale will be studied for their prospectivity. Flash flood channels will be compared to turbidites and submarine canyons in outcrop.
- Massive-bedded and thin-bedded limestone and marl will be examined for factors influencing horizontal and vertical permeability and fracture density. Subsurface conventional and unconventional reservoir analogues will be discussed.
- Outcrops of shale that were deposited in deep marine, shelf margin, and subaerial environments will be diagnosed by their color, plasticity, silt content, and hydrocarbon-generating/preserving abilities. Dinosaur localities will be noted. Subsurface reservoir analogues will be discussed.



WE PRACTICE WHAT WE TEACH

SCA's instructors are experts in their fields and still actively engaged in their areas of specialization. Many of our instructors have served as consultants on various SCA projects as contracted by major oil and gas companies domestically and internationally.

CARBONATE RESERVOIRS OF THE PERMIAN BASIN NW SHELF NEW

Instructor: Lansing Taylor, PhD
Discipline: Field Courses
Length: 4 Days
CEUs: 3.2
Availability: Public & In-House

Who Should Attend:
This course is intended for geologists exploring and developing carbonate reservoirs in the Permian Basin. Interested geophysicists and reservoir engineers will also benefit. A master's degree in geology or equivalent experience is required.

Course Description:
This four-day field course explores stratigraphic and structural controls on the occurrence of reservoirs in Paleozoic carbonate rocks on the NW Shelf of the Permian Basin. Primary reservoirs are associated with depositional facies like shoals, reefs, channels, fans, and mounds. Secondary reservoirs are produced by diagenetic process, karst, and natural fractures. The distribution of both primary and secondary features are controlled by location in the basin, which in turn depends on both sea level and the structural form of the basin.

Each day of the course has a theme related to the distribution and formation of reservoirs. Day 1 is about climate and sea level and the stacking of facies. Day 2 is about tectonics and deformation and process that localize facies and create secondary reservoirs. Day 3 is the detailed Wolfcamp through Guadalupe sequence stratigraphy. This is the outcrop section time-equivalent to the key subsurface reservoir section. It's not the same facies but it is the same ocean and correlations into the subsurface are robust. Day 4 is the famous Permian Reef Geology Trail at Guadalupe Mountains National Park. Obviously, that day is all about reefs. Over the four days of the course, we will walk the entire stratigraphic section sequentially from basement through top Permian.

Learning Outcomes:
- Walk the entire Paleozoic stratigraphic section of the NW Shelf.
- View strata in outcrop that are time-equivalent to key producing intervals in the subsurface.
- Identify major sequence boundaries in Wolfcamp through Guadalupe section.
- Recognize primary and secondary carbonate reservoir types in outcrop.
- Understand key differences between greenhouse and icehouse stratigraphy.
- Understand fundamental principles of tectono-stratigraphy.
- Understand the tectonic evolution and timing of the Permian Basin.
- Identify the characteristic patterns of natural fractures present in outcrop.

Course Description:
- Day 1: Cambrian through Carboniferous Reservoirs: Greenhouse vs. Icehouse
- Day 2: Tectono-Stratigraphy, La Luz Anticline: Analog to the Central Basin Platform
- Day 3: Sequence Stratigraphy of the Permian Section, Wolfcamp to Bell Canyon
- Day 4: Permian Reef Geology Trail

DEEPWATER DEPOSITS FIELD COURSE (ARKANSAS – OKLAHOMA)

Instructor: Lesli J Wood, PhD
Discipline: Field Courses
Length: 3 Days
CEUs: 2.4
Availability: In-House

Who Should Attend:
Exploration and development geologists, engineers, geophysicists and managers desiring hands-on turbidite experience.

Course Description:
This field course examines the various turbidite elements in an up-dip to down-dip depositional profile of Jackfork Group strata across the Morrowan Ouachita Basin of Arkansas. The three-day trip visits outcrops of submarine slope canyon fill, submarine slope and basin channel fill, basin floor sheet sandstones and rare leveed-channel complexes. Outcrops are seen in remarkable dam and quarry exposures. In one area, a 3-D geologic model has been completed and this outcrop has undergone reservoir simulation using the Eclipse™ modeling software. At each outcrop, measured stratigraphic sections, outcrop gamma ray logs and (in some cases) ground-penetrating radar examples are provided, which tie outcrop observations to analog subsurface reservoir features. Unique depositional features and inferred processes are discussed. The Jackfork Group is widely considered to be an outcrop analog to many deepwater (turbidite) reservoirs worldwide.

Course Content:
- Examination and discussion of various rock types of Pennsylvanian Jackfork Group
- Up-dip canyon fill, Big Rock Quarry, Arkansas
- Slope channel-fill, Pinnacle Mountain State Park, Arkansas
- Sheet- and channel-fill sandstones and leveed channel facies in various outcrops and quarries, DeGray Lake State
- Park/Hollywood area, Arkansas 3-D geologic model for simulation
- Channel-fill sandstones, Murfreesboro, Arkansas
- Sheet and channel-fill sandstones, eastern Oklahoma as related to the Jackfork gas play
- Origin of anomalous porous and permeable zones

"Train people well enough so they can leave; treat them well enough so they don't want to."
Richard Branson

DEEPWATER SYSTEMS, AINSA BASIN, SPANISH PYRENEES: APPLICATION TO HYDROCARBON PROSPECTIVITY AND UNCONVENTIONAL PLAYS

Instructor: Kevin Pickering, PhD and Steve Cossey, PhD
Discipline: Field Courses
Length: 5 Days
CEUs: 4.0
Availability: Public & In-House

Who Should Attend:
Geologists, geophysicists, members of unconventional reservoirs study teams (engineers, team leaders and project managers), as well as mid-level to upper-level managers needing to learn more about petroleum systems, architecture, elements, reservoir properties and their explanation and production characteristics.

Learning Outcomes:
- Improve knowledge and understanding of deepwater depositional processes.
- Learn necessary terminology so that engineers and geologists can communicate effectively.
- Learn appreciation for reservoir and architectural element scale, dimensions and connectivity.
- Understand deep water architectural element variability away from the wellbore.
- Relate features that are observed in core to 3D features in the subsurface.

Course Description:
- Day 1: Barcelona
- Day 2: Barcelona to Ainsa
  - Orientation, introduction to Ainsa Basin (middle Eocene deep-marine sediments) and its tectonic context within the Pyrenean orogen
- Day 3: Ainsa Basin - Submarine channel
  - Dos Rios - UCL Core Laboratory to view Well Ainsa 6 core drilled behind the Ainsa Quarry face
  - Viewpoint of seismic-scale submarine channel outcrops from across Rio Cinca (Ainsa II Fan)
  - Ainsa Quarry - look at spectacular outcrops with a large range of sedimentary facies and depositional architecture
  - Forcaz Stream, Ainsa II sandbody (fan) and associated thin-bedded deposits
- Day 4: Ainsa Basin - submarine channel and related deposits
  - Morillo and Guaso sandbodies (fans)
  - Arro channelized sandy fan along the road from Arro to Los Molinos
  - Charo Canyon (feeder system for Arro Fan)
  - Formigales shelf-margin deposits
  - Gerbe II sandy fan deposits at Gerbe (axial-channel to channel-margin deposits)
- Day 5: Jaca Basin - submarine lobes and related deposits
  - Broto waterfall outcrops in submarine lobe and deposits
  - Megaturbidites (Cotefablo) and basin-floor deposits
  - Fanlo lobe and related deposits
- Day 6: Ainsa Basin - deep-marine systems
  - Rio Sieste, Morillo System MTDs and sandy fan lateral-accretion packages (LAPs)
  - Mass transport deposits (MTDs) and channelized sandstones, Morillo I sandy fan
- Day 7: Ainsa to Barcelona

Participant Testimonial:
"By far one of the best courses I've taken. Well planned, thought-through, with very knowledgeable instructors. This course has changed the way I approach interpretations. It will also help when communicating with drilling and completions engineers on reservoir performance and possible heterogeneity not captured on logs and seismic data."

EFFECTS OF MECHANICAL STRATIGRAPHY AND STRUCTURE ON NATURALLY FRACTURED RESERVOIRS (CENTRAL WYOMING)

Instructor: John C. Lorenz, PhD and Scott P. Cooper, MS
Discipline: Field Courses
Length: 4 Days
CEUs: 3.2
Availability: In-House

Who Should Attend:
Geologists and engineers who need to characterize and understand fracture systems and their effects on reservoir permeability, who need to be able to differentiate between natural and induced fractures in cores, and who would like to be able to predict the effects of lithology on fracturing. Geoscientists who want to gain an understanding of fracture permeability as it is controlled by the in situ stress system, and of the interaction of natural fractures with hydraulic stimulation fractures, as well as the important differences between extension and shear fractures in controlling individual fracture permeability and fracture network interconnectivity.

Course Description:
This field trip in the area around Casper, Wyoming examines shear and extension fractures and fractures that are and those that are not related to folding on basement-cored, Laramide anticlines. The trip includes access to the heart of the Alcova Anticline and Freemont Canyon via a pontoon-boat excursion, for a comparison between highly fractured strata on the anticline to less fractured equivalent strata found off structure. Fold-related fractures can also be examined at Emigrant Gap, at Teapot Dome, and the Salt Creek and Beer Mug anticlines. Excellent outcrops of the Mancos, Frontier and Mowry shales in the Alcova Lake area allow characterizations and comparisons of the significantly different fractures in these two lithologically and mechanically dissimilar shales. Fractures in the Madison and Alcova carbonates and the Tensleep sandstones and dolomites will provide a background for discussion of fractures related to structure and mechanical stratigraphy. Fractures in the Niobrara limestones can also be examined east of Casper. Outcrop fractures in the Casper area will be observed in granites, carbonates, sandstones and shales. Fractures related to faulting, and the relationship between basement fractures faults and the fractures in overlying sedimentary strata will be a focus. Included in the two-day associated lecture is a 65-piece teaching collection of natural and induced fractures in core that students will work with during class exercises.

Learning Outcomes:
- The student will obtain insights into fracture mechanics and the origins of fractures, and uses those concepts in a very applied sense to instill an understanding of natural fractures and their potential effects on reservoirs.
- Attendees will learn to differentiate fractures by type and the effects of these different fracture types on reservoir permeability, and what fracture types to expect in different structural domains and reservoirs, through discussion on the outcrop.
- Attendees will obtain an understanding of the interactions between natural fractures, in situ stresses, and stimulation fractures.
- Students will come away from the course with an appreciation of the wide range of structures that fall under the basket term "fracture", and an understanding that different fracture types do not have the same effect on hydrocarbon reservoirs.

Featured Instructor:

John C. Lorenz, PhD

Dr. Lorenz earned a BA from Oberlin College, an MSc from the University of South Carolina, and a PhD from Princeton in geoscience. He worked in the USGS and for Sandia National Labs. Dr. Lorenz has been a consultant since 2007, specializing in fractured reservoir characterization and effects. He served as the Elected Editor (2001-2004) and President (2009-2010) of the AAPG where he supported the advancement of the geosciences and their applications to hydrocarbon-related problems.

His published papers on natural and induced fractures in reservoirs range geographically from the Lisburne Limestone in Alaska to the Spraberry Formation in Texas and have been awarded the AAPG Levorsen and Jules Braunstein awards. He worked closely with the industry on problems involving reservoir dimensions and in situ permeability, graining extensive hands-on experience with core analysis and fieldwork. He has led field trips, presented core workshops, and taught short courses for the industry-oriented geological community in numerous places around the world.

Featured Instructor:

Scott P. Cooper, M.S.

Scott has worked in outcrop and subsurface fracture studies, CO2 sequestration, and security related issues. He received a B.S. from South Dakota School of Mines and a MS in geology from the New Mexico Tech.

Scott was a Senior Member of the Technical Staff at Sandia National Laboratories, a Department of Energy Research Laboratory, working on projects related to outcrop and subsurface fracture studies with applications to reservoir characterization, production and CO2 sequestration. Since that time, he has had fun working in partnership with Dr. John Lorenz at FractureStudies LLC on naturally fractured reservoir issues around the world. Detailed descriptions of projects, published papers, short courses, and links to open-file reports and papers are available at www.fracturestudies.com.

FOLDS, FAULTS, AND HYDROCARBONS IN THE SOUTHERN CANADIAN CORDILLERA

Instructor: Peter Jones, PhD
Discipline: Field Courses
Length: 4 Days
CEUs: 3.2
Availability: In-House

Who Should Attend:
Geologists, geophysicists and geoscience managers working compressional tectonic settings.

Course Description:
This field trip is aimed at demonstrating the value of thinking in three-dimensions and understanding structural principles and practices applicable to deformed terrains on-and off-shore. The course covers fault and fold terminology, geometry and mechanics, evolving interpretational styles and application to interpretations of seismic profiles. Lectures are punctuated with examples, involving construction and evaluation of geological cross-sections. A comprehensive sourcebook and workshop exercises are provided.

Starting from Calgary, the field trip traverses the foothills and Rockies to the Rocky Mountain Trench, the western limit of successful oil and coal exploration and eastern limit of exposed metamorphic and intruded Paleozoic and Proterozoic rocks.

Our route goes from Calgary through the foothills into the eastern Rockies, crossing three major thrust-faulted gas fields whose surface expressions are exposed in Tertiary to Cambrian sedimentary rocks. The route follows parallel mountain valleys across passes with a maximum elevation of 7,000 feet, crossing the continental divide and the Lewis thrust sheet, whose regional aspect as well as its complex internal structure are both exposed. The route crosses the huge Flathead normal fault, entry into the Jurassic Fernie coal basin. The trip turns around at the Rocky Mountain Trench, the 1500-km long fault-bounded valley that extends from Alaska to Montana, and marks the western limit of the Rocky Mountains.

The return eastward takes in structures by-passed on the outward leg, traverses abandoned underground mining areas and concealed active open-pit mines with a famous historical landslide/mining disaster as well as regional-scale landslides. The route turns northward following the Triangle zone northward and back to Calgary via the Turner Valley oilfield, first major oil and gas field in Canada, still producing from horizontal wells.

Course Content:
- Introduction: thick- and thin-skinned structures, plate tectonics
- Thrust faults: traditional, listric, folded, and blind
- Fault kinematics, duplex reservoir structures
- Wedge tectonics and detachments
- Normal faults: traditional, listric, folded, and blind
- Gravity tectonics
- Basement-involved structures
- Strike-slip faults
- Relationships between fold and faults
- Diapiric structures in salt, clay, and coal
- Real and spurious unconformities
- Inversion tectonics
- Unrecognized hydrocarbon traps
- Geologic maps and cross-sections.
- Analogue models of geologic structures.
- Basic seismic interpretation

HIGH-CONTINUITY SANDY TURBIDITE SYSTEM: APPLICATION TO HYDROCARBON PROSPECTIVITY (FRANCE) NEW

Instructor: Kevin Pickering, PhD and Steve Cossey, PhD
Discipline: Field Courses
Length: 6 Days
CEUs: 4.8
Availability: Public & In-House

Who Should Attend:
This course is relevant to all subsurface geoscientists and engineers who wish to broaden their knowledge of sandy turbidite (deepwater) systems and deep marine clastic plays. Participants will achieve a broad working knowledge of these systems as applied to hydrocarbon prospectivity.

Course Description:
- -Arrive in Nice, France
- Day 1: Orientation, St. Antonin aree
  - Stop 1 - St. Antonin
- Day 2: Coulomp Valley near Annot
  - Stop 2a - Coulomp Valley Overview
  - Stop 2b - Coulomp Valley - St. Benolt Fault Zone
  - Stop 2c - Coulomp Valley - Braux onlap
  - Stop 3 - Annot town, Les Scaffarels
- Day 3: Montagne de Chalufy
  - Stop 4 - Chalufy Mountain
  - Stop 5 - Annot road section
- Day 4: Peira Cava area
  - Stop 6a - Peira Cava overlook
  - Stop 6b - Peira Cava log A.
  - Stop 6c - Peira Cava log B
- Day 5: Contes area
  - Stop 6d - Base log A
  - Stop 6e - Shepherd's farmhouse
  - Stop 7 - Barre des Alpes

Learning Outcomes:
- Seismic-scale to individual bed-scale appreciation of the architecture and elements of a well-exposed deep-marine high-continuity sandy system which accumulated mainly in a pre-existing and topographically-complex sub-basins associated with some syn-sedimentary tectonics.
- Relationship between tectonics and sedimentation.
- Onlap relationships associated with sandy turbidite systems. Onlaps are important in turbidite reservoirs as they may provide either stratigraphic seals or leakage. The field course involves an evaluation of field examples of onlaps. Hydrocarbon analogs and prospectivity.
- To consider applicability of depositional model/s for the Paleogene of Southern France to areas of hydrocarbon exploration and production. The Paleogene provides direct analogs for the complex slope basins of the Gulf of Mexico.
- Process sedimentology. Training course in deep-marine processes, including the issue of turbidites versus debrites, structureless ("massive") sands.

MODERN COASTAL SYSTEMS OF TEXAS FIELD COURSE (GALVESTON, TEXAS)

Instructor: Julia Smith Wellner, PhD
Discipline: Field Courses
Length: 1 Day
CEUs: 0.8
Availability: Public & In-House

Who Should Attend:
Exploration and development geologists, engineers, geophysicists and managers desiring hands-on clastic depositional systems experience.

Course Description:
Sea level has fluctuated across the Texas continental shelf and coastline throughout time. What does this mean for the rivers and coastal deposits of Texas? The processes shaping our rivers and beaches essentially were the same in the past as they are today, but where we find the deposits from ancient bays and beaches and rivers has changed. Other geologic processes, such as sediment movement, also influence the deposits.

This intensive 1-day field course examines the processes that influence deposition and change in these different environments and then map older deposits carefully to reconstruct the geologic history of the Texas coast. Participants will understand the distribution of the deposits and the processes that formed and changed them helps petroleum industry geologists better predict where oil and gas may form, move, and be found along the Texas coast and in the Gulf of Mexico.

Course Content:
- Stop #1 Brazos River
- Stop #2 New Brazos Delta and Beaches
- Stop #3 Old Brazos River Delta at Surfside Beach
- Stop #4 San Luis Pass
- Stop #5 Galveston Island Beach
- Stop #6 Galveston Island Sea Wall End

Participant Testimonial:
"The instructor was very knowledgeable and effective at communicating the course material."

STRUCTURAL AND SEQUENCE STRATIGRAPHIC FIELD COURSE (HILL COUNTRY, TEXAS)

Instructor: Lansing Taylor, PhD
Discipline: Field Courses
Length: 2 Days
CEUs: 1.6
Availability: Public & In-House

Who Should Attend:
Geologists, geophysicists, engineers, managers, and technicians who wish to develop a better understanding of rock formations (structure and stratigraphy) and how they relate to the everyday work in exploration, development, and production.

Course Description:
This field training course focuses on upper Cretaceous carbonates exposed on the Llano uplift. These formations are productive for oil and gas in the subsurface. Subsurface accumulations are discussed on analog outcrops of the actual reservoirs where participants can directly observe how depositional and structural features interact to create hydrocarbon reservoirs.

The trip begins near San Antonio where the Glen Rose, Edwards, and Austin Chalk formations are dissected by the Balcones Fault system providing several excellent fault exposures. The course then moves towards Johnson City and the central portion of the Llano uplift. Several stops illustrate a major unconformity between the Pennsylvanian and the lower Cretaceous and discussion shifts to depositional systems and sequence stratigraphy. The field component concludes with stops near Austin looking at fracture systems and their dependence on lithology in the upper Cretaceous.

During the field trip, the instructor discusses the petroleum systems of Texas, the deposition and stratigraphy of Pennsylvanian and Cretaceous sediments, and the characterization of faults and fractures in the carbonate rocks. Participants are encouraged to think about what outcrop-scale features look like in the subsurface data such as seismic or well logs, and to think about how such information can be used to infer reservoir behavior across a wide range of scales.

STRUCTURAL STYLES AND TECTONO-STRATIGRAPHY FOR THE MID-CONTINENT NEW

Instructor: Lansing Taylor, PhD
Discipline: Field Courses
Length: 4 Days
CEUs: 3.2
Availability: Public & In-House

Who Should Attend:
This course is intended for geologists, geophysicists, and reservoir engineers exploring and developing hydrocarbons in the mid-continent region including the Arkoma, Anadarko, Fort Worth and Permian Basins. The course aims to highlight connections between tectonics, structure, sedimentation, and stratigraphy. As such, broad familiarity with common geologic concepts is expected.

Course Description:
The mid-continent region includes the Arkoma, Anadarko, and Fort Worth Basins. While the Permian Basin is often discussed as its own province, it is contemporaneous with the other mid-continent basins, shares many structural and stratigraphic similarities, and is discussed in this course as part of the mid-continent system. The region has a complex structural history with compelling evidence of extension, strike slip, both thin- and thick-skinned contraction, as well as gravitational collapse. Karst and fractures are common across the region. Conveniently, all of these structural styles are exposed in southern Oklahoma and parts of the adjacent prairie in Texas. In places, the stratigraphy is well exposed and the entire Paleozoic section can be observed in outcrop. While facies and formations vary with large distance, the fundamental tectonic evolution of this field area and the impact of deformation on contemporaneous sedimentation here is representative of what happens across this multi-state area.

This course aims to provide a coherent overview of the structure and stratigraphy of this multi-basin region. We will view in outcrop the entire stratigraphic section from basement through Pennsylvanian. We will see in outcrop examples of all major structural styles except for salt tectonics. We will be able to document the timing of basin formation and the associated response of the sedimentary system to active deformation. We will view conventional carbonate and clastic reservoir rocks as well as the Woodford unconventional reservoir.

Learning Outcomes:
- Introduction to the major tectonic elements of the mid-continent region.
- Introduction to the Paleozoic stratigraphy of the mid-continent region.
- View conventional reservoir rock in carbonate and clastic units.
- View unconventional reservoirs in mudstone and fractured basement.
- Receive a comprehensive overview of major structural styles including extension, contraction, inversion, strike slip, and gravity-sliding; and see examples of each in outcrop.

Course Description:
- Day 1: Wichita Wildlife Refuge: Basement and its Discontinuities
- Day 2: Arbuckle Mountains: Inversion of the Paleozoic Carbonate Platform
- Day 3: Ouachita Mountains: Fluvial Response to The Allegheny Orogeny
- Day 4: Palo Pinto Hills: Growth Faulting on the Pennsylvanian Shore

FIELD COURSES

Featured Instructor:

William Little, PhD

William Little, PhD has extensive experience teaching university courses in sedimentary geology and geological mapping. He also has over 15 years conducting geological mapping. He received a Doctorate in geology from the University of Colorado-Boulder and MS and BS degrees in geology from Brigham Young University.

Dr. Little has held various roles in academia, including as a professor at Brigham Young University – Idaho, the University of Missouri – Rolla, Drury University, Moberly Area Community College, and Front Range Community College. At BYU – Idaho, he teaches sedimentology and stratigraphy with heavy emphases on recognition of ancient depositional systems and sequence stratigraphy, along with geomorphology. He is also the field camp director. He previously taught graduate courses in advanced geological mapping at UM – Rolla and worked as a mapping geologist for the Missouri Geological Survey.

Field Course Taught:
- The Book Cliffs, Utah: A Case Study in Coastal Sequence Stratigraphy

THE BOOK CLIFFS, UTAH: A CASE STUDY IN COASTAL SEQUENCE STRATIGRAPHY

Instructor: William Little, PhD
Discipline: Field Courses
Length: 5 Days
CEUs: 4.0
Availability: In-House

Who Should Attend:
This course is designed for petroleum geologists, geophysicists, and engineers who have a basic understanding of depositional systems and stratigraphic principles but desire a stronger working knowledge of sequence stratigraphy, based on a hands-on field experience.

Course Description:
The Book Cliffs of Utah have become the premier locality globally for field teaching of sequence stratigraphy. Continuous, well-exposed and easily-accessible outcrops make it possible to analyze facies relationships of stratigraphic sequences in great detail, both in terms of lateral variation (systems tracts) and vertical stacking patterns (parasequences). Most significant clastic depositional systems are represented, including meandering, braided, and anastomosed fluvial; fluvially and wave-dominated deltas; transgressive and regressive shorefaces, tidally-dominated estuaries, and deepwater mudstones. This makes the Book Cliffs an excellent classroom to study the interrelationship between eustatic and tectonic development of accommodation space and subsequent filling by clastic sediment.

The Book Cliffs region is often cited as an analog for subsurface exploration, particularly in foreland basins, and sequence stratigraphy has become one of the leading methods for correlating and mapping depositional packages, leading to significant discoveries of petroleum in fields that had been abandoned, as well as new discoveries. To that end, this course is directly applicable to the exploration, characterization, simulation, and development of petroleum reservoirs. Specifically, this course gives participants an opportunity to view sequence stratigraphic features directly in outcrop, giving a better perspective when making similar interpretations based on cores, logs, and seismic sections. This course would be particularly valuable to geologists who have had limited exposure to real rock bodies.

The course runs five days, with a format consisting of early morning instructional sessions at the hotel, followed by further instruction and completion of exercises in the field, and ending with post-dinner summary sessions at the hotel.

Course Content:
- Day 1: General principles and concepts of sequence stratigraphy; introduction to the stratigraphy and setting of the Book Cliffs (Price River Canyon)
- Day 2: Concept of a systems tract; relationship between facies, facies associations, and depositional environments/ systems – including river-dominated deltas, progradational beaches, and barrier islands (Gentile Wash and Spring Canyon)
- Day 3: Concept, identification, and significance of parasequences and stacking patterns; incised valley fill tidally-influenced estuarine) deposits (Coal Creek, Soldier, and Woodside Canyons)
- Day 4: Reservoir-scale down-dip facies changes; facies mapping (architectural analysis) of a complete sequence (Battleship Butte to Thompson Canyon)
- Day 5: Core analysis (Utah Geological Survey – Salt Lake City)

INSTRUCTOR BIOGRAPHIES

SCA's training instructors are top experts in their respective fields and eager to share their knowledge. They are an integral part of the superior SCA training experience.

SIAMAK AGAH

Sia Agah is a petroleum geologist and an Associate with SCA in Houston. He holds a M.A. in Petroleum Geology from the University of London. Sia was with the National Iranian Oil Co. (NIOC) in Tehran for 13 years working as a geologist, a wellsite geologist, a senior geologist, and a geological advisor until he joined Conoco in 1979. With Conoco he worked as a Senior Geologist, Chief Geologist, Exploration Manager, and New Ventures Vice President until 1997. He worked respectively in Houston, Tunisia, Angola, and the UAE (Dubai). After early retirement in 1997, Sia moved to UMC/Ocean Energy to set up and manage their South Asia - Middle East Exploration Department while managing seven exploration blocks in Pakistan, Bangladesh, and Yemen. Sia has an extensive knowledge of the petroleum geology of the Middle East, South Asia, North Africa, and Offshore West Africa, and Brazil.

Courses taught:
- *Applied Contouring Workshop* (**p 14**)
- *Applied Subsurface Geological Mapping* (**p 15**)

JILL B. ALMAGUER, PE, MBA, PMP

Jill Almaguer is a certified Project Management Professional (PMP) and Registered Professional Engineer in Texas. She provides leadership and project management to coordinate suppliers to deliver contract requirements on time and on budget while meeting or exceeding customer expectations for quality results.

While working at HP for 20 years, she led a number of technical project teams implementing a broad range of projects from $10 million of medical electronics for the new Brooke Army Medical Center built in San Antonio to nationwide high-speed telecommunications network monitoring systems. She also led software application engineering team for implementation of semi-conductor design software and was director of development for an RFID asset tracking system. At HP, she taught quality process improvement methods to over 600 employees in the southern US as part of the Voice of the Customer project implementation. Almaguer also provided project management and consulting services to clients such as BP Gulf of Mexico division for a major ERP conversion project. She has presented at numerous national and regional conferences for Society of Women Engineers and Project Management Institute.

Jill has a BS in Bioengineering and an MBA and currently serves on the board of the Federation of Houston Professional Women, and Texas A&M University Biomedical Engineering Industry advisory board. She is current chairman of the Biomedical Engineering Society Houston Industry Chapter and past president of Association of IT Professionals in Houston.

Course taught:
- *Project Management Professional Exam Prep Course* (**p 71**)

ROBERT BARBA

Bob has over 40 years of practical experience in the petroleum industry as an openhole wireline engineer, product development manager, petrophysicist, and completion optimization advisor focusing on integrated reservoir characterization studies, completion optimization studies, rock mechanics analysis, and horizontal well field development projects. He has extensive experience in both conventional and organic shale reservoirs.

Bob received the Regional Formation Evaluation Award from the Society of Petroleum Engineers Southwest North America region (Permian Basin) in May of 2018. He served as a Distinguished Lecturer 1995-1996 for the Society of Petroleum Engineers on the optimization of completion designs using petrophysical and reservoir engineering inputs. Bob is a recognized industry authority on refracturing rock mechanics and practices. He delivered the keynote address at a major refracturing conference for the SPE in Calgary January 2016 and has delivered over 100 presentations on the use of refracturing to enhance production in organic shale reservoirs. Bob served as an expert witness on log derived rock properties for BP through Kirkland and Ellis in the Macondo trial. He pioneered techniques to evaluate well performance using production data and routine well log data and applied the concept to over 5,000 wells to date. This significantly improved completion results in those fields.

Most recent projects involve the application of these techniques in Permian organic shale reservoirs where a solid correlation between modeled propped height and production results enables operators to forward model production results from shale reservoirs. Bob has analyzed over 3,000 organic shale wells in the Permian Basin and 400 wells in the Eagle Ford to date. He has also presented SPE 174994 at the 2015 SPE ATCE summarizing the analyses, SPE 195962 at the 2019 ATCE, and URTEC 2662 on organic shale frac and refrac optimization.

Courses taught:
- *"Best Practices" for New Well Fracs and Legacy Well Refracs* (**p 40**, **57**)
- *Practical Interpretation of Open Hole Logs* (**p 48**, **65**)
- *Predicting Organic Shale Well Performance* (**p 49**, **59**)

KIRK E. BOATRIGHT, PhD, PE

Dr. Boatright is President and CEO of Engineering Consultants International and Training. Formerly, Dr. Boatright was a drilling research engineer with Exxon, petroleum engineer with Amoco, roustabout with Cities Service (OXY), and Dean of the College of Arts and Sciences at Northeastern Oklahoma State University. He is also an engineering and training consultant for various major world oil and service companies. Over 13,000 people have participated in Dr. Boatright's training courses.

Dr. Boatright has extensive experience in drilling, completion, reservoir engineering, production, fluid flow, and offshore operations. Kirk is a Registered Professional Engineer. He holds a B.S. in Mechanical Engineering (Petroleum) from Oklahoma State University, an M.S. in Mechanical Engineering from Oklahoma State University, and a Ph.D. in Engineering Science (Mechanical and Civil Engineering) from the University of Arkansas.

Course taught:
- *Basic Petroleum Engineering Practices* (**p 67**)

JIM BRENNEKE

James (Jim) Brenneke graduated from Augustana College with a BA in Geology and an MS in Geology from the University of Illinois. He joined Shell Oil Company (US) and worked for various Shell subsidiaries in research, international exploration and domestic exploration and production. He then joined Subsurface Consultants and Associates, LLC (SCA) as a consulting geoscientist. In addition to consulting, he assumed various management roles with SCA including Technical Manager, Vice President of Geology & Engineering and Treasurer. He then joined BP's deepwater Gulf of Mexico (GoM) Production organization.

Jim has an extensive range of experience. He has worked in the onshore and offshore U.S. and in numerous foreign countries. He has contributed to numerous exploration discoveries, field extensions and development wells in his 40 years in the industry. He has published on deep sea carbonates and on assessing fault traps. Jim teaches our Applied Subsurface Geological Mapping course.

Course taught:
- *Applied Subsurface Geological Mapping* (**p 15**)

RUBEN CALIGARI

Rubén Caligari has more than 35 years of experience in engineering and operations in E&P. His most recent corporate position was Sr. Technical Advisor in unconventional resources with Petrobras Argentina E&P. During his career, he led multidisciplinary teams in project evaluations, field developing, and mature fields revitalizations in Argentina and several Latin American countries. He has been active in unconventional resources projects in Argentina. Retired from activities, he is currently professor of Petroleum Engineering at Instituto Tecnologico de Buenos Aires, teaching courses on energy in other universities in Argentina, and participating in Industry and Government initiatives on Education on Energy.Ruben is author and director of the online course on Petroleum Engineering Basics presented by Instituto Argentino del Petroleo y del Gas. He has been an active SPE member, serving as officer in different positions including President Patagonia Section, President Argentine Petroleum Section and Regional Director for LA&C, 2008-2011. Mr. Caligari was named as a Distinguished Member of SPE in 2020.

Courses taught (offered in Spanish):
- *Basic Petroleum Operations* (**p 68**)
- *Petroleum Engineering Fundamentals* (**p 71**)
- *Unconventional Oil and Gas* (**p 61**)

ERIC D. CARLSON, PG

Eric worked with Marathon Oil Company, CDS Oil and Gas Group plc, and LCS Production Company, and has consulted for several Independents and PEMEX. He has an 82% drilling success record, including a 97% success rate during 2015 – 2020. Eric has worked in 12 offshore and onshore US Basins, including more than 5 years in the offshore Gulf of Mexico and 4 basins in Latin America.

He is a subtle pay specialist who has helped reverse production declines in the Permian Basin, the Gulf of Mexico, and onshore Mexico. He has helped develop conventional reservoirs with infill drilling, waterfloods, tertiary recovery programs and horizontal drilling. Eric's experience includes preparing reserve EUR's & lease valuations in tite sands & unconventional shale plays (Permian Basin, Hardeman Basin, San Juan Basin, and Latin America). He has done unconventional exploration in Latin America and the US. Eric's Wellsite Supervision experience includes more than 25 offshore logging jobs and 200 Permian Basin logging jobs (12 wireline companies, 15 mudlogging companies). He has performed more than 600 e-log evaluations in unconventional zones and several thousand pay counts in conventional reservoirs. Eric earned a BA/Honors in Geoscience (1982) from Cornell University. He is a licensed geologist in the State of Texas: License Number 5258. He is a member of the AAPG and other professional associations.

Course taught:
- *Big Bend Field Course* (**p 72**)

GARY CHAPMAN

Gary has been associated with SCA since 2007. He is an oil and gas geoscience professional with wide-ranging expertise in international and domestic exploration and development projects. His strengths are in international and domestic exploration and exploitation, primarily focused on petroleum resource evaluations of new business opportunities and unconventional resources. He has a B.S and M.S. of Petroleum Geology from the University of Arkansas.

Mr. Chapman is experienced with play and basin studies, geochemical interpretation and drilling operations. He conducts exploration and development evaluations to define new business ventures and opportunities, supervises exploration and development projects and asset evaluations and ensures the achievement of company objectives by following projects from inception to completion. He has visited and conducted exploration activities in ~30 countries and emirates.

Course taught:
- *The Daniel J. Tearpock Geoscience Certification Program* (**p 32**, **67**)

ALAN CHERRY

Alan Cherry is a Senior Geoscientist with over 34 years of industry experience. He has been associated with SCA since 2005 as one of the company's principal geoscience consultants. His integrated skill set includes 2D and 3D geophysical interpretation, exploration play analysis and prospect generation, field development, reservoir engineering, formation evaluation, economic assessment, reserves evaluation, drilling, completion, and production operations. He is highly proficient in the use of multiple geologic and seismic interpretation tools. His areas of expertise include Offshore GOM, Texas Gulf Coast, South Louisiana, East Texas, Permian, Uinta - Piceance, Williston, North Slope, Cook Inlet, and onshore California. Internationally he has worked projects in Ukraine, Russia, Indonesia, North Sea, Senegal, Nigeria, Gabon, Tanzania, Morocco, Somalia, Iran, Qatar, Thailand, South China Sea, Ecuador, Venezuela, Argentina, and Colombia.

Alan received his BS in Geology at State University of New York and did his graduate studies at the University of Houston and Wright State University. He is a Licensed Professional Geologist in Texas and a Certified Professional Geologist in Indiana.

Course taught:
- *Mapping Seismic Data Workshop* (**p 21**)
- *Well Tie Workshop* (**p 27**)

RAJAN N. CHOKSHI, PhD

Dr. Rajan Chokshi works as an artificial lift and production 'Optimizer' for Accutant Solutions. He has over 36 years of experience working with a national oil company, research consortia, consulting and software firms, and a service company in various roles: engineer, software developer, project manager, trainer, consultant, and senior business leader.

Rajan has worked on global projects in multiphase flow, artificial lift, production optimization, data analysis with real-time production monitoring. He has co-authored over fifteen SPE papers and holds two US patents. He has served on the SPE training and global production award committees and several technical committees for the SPE ATCE and artificial lift conferences. He has co-chaired an SPE artificial lift workshop, an SPE forum on production issues in unconventional, and an SPE multiphase flow metering workshop. He was an SPE Distinguished Lecturer twice for the 2015-2016 and 2018-2019 years. Dr. Chokshi holds a Bachelor's and Master's in chemical engineering from the Gujarat University and IIT-Kanpur, India; and a Ph.D. in Petroleum Engineering from the University of Tulsa, USA.

Courses taught:
- *Advanced Artificial Lifting with ESP* (**p 38**, **56**)
- *Advanced Sucker Rod Pumping* (**p 38**)
- *Artificial Lift and Production Optimization Solutions* (**p 39**, **56**)
- *Artificial Lift and Real-Time Optimization for Unconventional Assets* (**p 40**, **57**)
- *Electrical Submersible Pump – Design and Optimization Using Nodal Analysis* (**p 43**)
- *Gas-Lift & Deliquification Applications* (**p 44**, **57**)
- *Gas Lift Design and Optimization Using NODAL Analysis* (**p 44**)
- *Hydraulic Pumping* (**p 45**)
- *Nodal Analysis in Self-Flowing and Artificial Lift Wells* (**p 47**)
- *Nodal Analysis (Petroleum Experts IPM Software)* (**p 47**)
- *Plunger Lift* (**p 48**)

SCOTT P. COOPER, MS

Scott has spent the last 19 years working projects related to outcrop and subsurface fracture studies, CO2 sequestration, and security related issues. He received a B.S. in geology from the South Dakota School of Mines in 1997 under Dr. Alvis Lisenbee and Dr. James Fox. He received his Master of Science in geology from the New Mexico Institute of Mining and Technology (2000) working with graduate research and academic advisors Dr. Laurel Goodwin and Dr. John Lorenz; the thesis topic was fracture characterization and modeling of Teapot Dome a basement-cored anticline in central Wyoming.

Scott was a Senior Member of the Technical Staff at Sandia National Laboratories, a Department of Energy Research Laboratory, working on projects related to outcrop and subsurface fracture studies with applications to reservoir characterization, production and CO2 sequestration. Since that time, he has had fun working in partnership with Dr. John Lorenz at FractureStudies LLC on naturally fractured reservoir issues around the world. Detailed descriptions of projects, published papers, short courses, and links to open-file reports and papers are available at www.fracturestudies.com.

Course taught:
- *Effects of Mechanical Stratigraphy and Structure on Naturally Fractured Reservoirs (Central Wyoming)* (**p 74**)

STEVE COSSEY, PhD

Dr. Cossey has over 30 years of global E & P experience with a specialty and expertise in deepwater clastics. He has explored in frontier areas of the United States as well as China, Dubai, East Africa, Guyana, Indonesia, Malaysia, Mexico, Morocco, Spain and Tunisia. Steve has also worked on numerous Gulf of Mexico lease sales, prospects, developments and farm-ins. In 1990, he helped start a deepwater research program at BP Research in Sunbury, UK. Many E&P companies use his deepwater field, reservoir and outcrop databases and attend his classroom and field seminars.

Dr. Cossey is skilled in interpreting deepwater sequences and creating sequence stratigraphic and depositional models from core, well and seismic data. He has worked with over 100 companies that are exploring the deepwater globally and is fairly fluent in Spanish and French. Steve earned his Ph.D. in Geology from the University of South Carolina, Columbia.

Courses taught:
- *Basin-Floor Fan Systems (South-Central Pyrenees, Spain)* (**p 72**)
- *Deepwater Systems, Ainsa Basin, Spanish Pyrenees: Application to Hydrocarbon Prospectivity and Unconventional Plays* (**p 73**)
- *High-Continuity Sandy Turbidite System: Application to Hydrocarbon Prospectivity (SE France)* (**p 75**)

DENNIS DRIA, PhD

Dr. Dennis Dria has over 40 years of experience in the oil & gas industry, including 9 years with the Standard Oil Company and 21 years with Shell, in a combination of upstream and downstream oil and gas R&D and E&P operating division positions. At the time he left Shell in 2010, he was a Staff Research Engineer working in the areas of fiber-optic technology development, fiber-optic data management and integration and technology implementation for well and reservoir monitoring. Prior to this he was Engineering Advisor for Shell's Global Implementation Team for Reservoir Surveillance Technologies during which he identified appropriate in-well monitoring technologies for Shell "top 70" global development projects, resulting in field surveillance

plans for more than 20 major E&P projects. He also was Shell's Global Subject Matter Expert (SME) for Production Logging and Permanent Sensing and SME for Mud Logging, and had formation evaluation and well logging (open-hole and cased-hole) assignments that included planning, vendor selection, operations, interpretation and field studies. Dr. Dria received a BS in Physics and Mathematics from Ashland University and a PhD in Petroleum Engineering from the University of Texas at Austin.

Course taught:
- *In-Well Fiber-Optic Sensing* (**p 46**)

CHRISTINE EHLIG-ECONOMIDES, PhD

Dr. Ehlig-Economides is currently professor of petroleum engineering at the University of Houston & the Hugh Roy and Lillian Cranz Cullen Distinguished University Chair. Dr. Ehlig-Economides worked for Schlumberger for 20 years in a truly global capacity. She has published more than 60 papers and has authored 2 patents, and has lectured or consulted in more than 30 countries. Dr. Ehlig-Economides is internationally recognized for expertise in reservoir engineering, pressure transient analysis, integrated reservoir characterization, complex well design, and production enhancement.

Professional service includes: Executive Editor of the Society of Petroleum Engineers Formation Evaluation journal 1995-96; SPE Distinguished Lecture 1997-98; and numerous posts as chairman or member of SPE committees and task forces. She was the Program Chairperson for the 2006 SPE Annual Technical Conference and Exhibition. In 2018, she was selected as an SPE Honorary Member. She is a member of the National Academy of Engineering, recipient of the John Franklin Carll Award, The Anthony F Lucas Medal, and the Lester C Uren Award, and on NRC Board on Energy and Environmental Systems (BEES).

Christine received a BA degree in Math-Science from Rice, an MS degree in Chemical Engineering from the University of Kansas, and a PhD degree in Petroleum Engineering from Stanford University.

Courses taught:
- *Basic Reservoir Engineering for Non-Petroleum Engineers* (**p 68**)
- *Carbon Capture Utilization and Storage - An Engineering Perspective* (**p 16**, **41**, **69**)
- *Pressure Transient Test Design and Implementation* (**p 49**, **65**)

JOHN T. FOSTER, PhD, PE

Dr. Foster is Chief Technology Officer and Co-Founder at daytum. He currently is also an Associate professor in the Hildebrand Department of Petroleum and Geosystems Engineering, the Department of Aerospace Engineering and Engineering Mechanics, and a core faculty member at the Oden Institute for Computational Engineering and Sciences at The University of Texas at Austin. Before joining UT-Austin, Dr. Foster was previously a faculty member in Mechanical Engineering at UTSA and was a Senior Member of the Technical Staff at Sandia National Laboratories where he worked for 7 years. He has been involved in many projects ranging from full scale projectile penetration field tests to laboratory experiments using Kolsky bars to modeling and simulation efforts using some of the world's largest computers. Research interests are in experimental and computational mechanics and multi-scale modeling with applications to geomechanics, impact mechanics, fracture mechanics, and anomalous transport processes. Additionally, he has interest in fundamental theoretical advancement of the peridynamic theory of solid mechanics. His teaching interests are in all areas of theoretical and computational mechanics. Dr. Foster received his BS and MS in Mechanical Engineering from Texas Tech University and his PhD in Aerospace Engineering from Purdue University. He is also a registered Professional Engineer in the State of Texas.

Course taught:
- *Reservoir Geomechanics I & II* (**p 51**, **60**)

LOTHAR FRIBERG, PhD, PMP

Dr. Friberg is an accomplished senior geoscientist with over 15 years of experience in exploration and subsurface assessments. Wide-ranging international geological expertise reaches from basinwide analysis to individual prospect generation in a variety of structural and sedimentary settings including salt basins. He is a leading contributor in developing exploration concepts which resulted in three new country entries for Chevron (Kurdistan, Liberia, Sierra Leone). Lothar has experience in seismic interpretation (regional/prospect scale) and prospect maturation to optimize fully integrated risk and resource estimations. Lothar is a recognized expert in petroleum system analysis with extensive subsurface modeling (PetroMod and Trinity) and geochemistry experience. He is highly proficient in building earth models, implementing geological concepts, and integrating interdisciplinary data. He has provided specialized studies with a focus on hydrocarbon charge assessment (source rock identification, maturation, fluid flow, HC-phase prediction).

Course taught:
- *Petroleum Systems Modeling* (**p 22**, **58**)

JAMES W. GRANATH, PhD

Dr. James W. Granath is a consulting structural geologist based in Denver, Colorado, who has worked in academia as well as minerals and petroleum exploration. Since 1976 he has taught at SUNY Stony Brook and spent 18 years in Conoco in research, international exploration, and new ventures. In 1999 he opened a consulting practice focused on structural geology and tectonics as applied to exploration problems, interrupted only by brief periods with Forest Oil and Midland Valley Exploration in Denver. He is a member of AAPG, AGU, GSA, and RMAG, and a certified petroleum geologist. He is the author of numerous research papers and co-edited several multi-author compendia.

His expertise lies in seismic interpretation and integration with structural analysis, fracture analysis, regional synthesis, and prospect and play evaluation. Current research interests include intraplate block faulted terrains, both extensional and compressional, regional tectonics of Africa, and the Kurdistan thrust belt. He holds his PhD from Monash University in Australia, and a BS and MS from of University of Illinois at Champaign-Urbana. Jim is currently on the Graduate Faculty at the University of Alabama, Tuscaloosa.

Course taught:
- *Structural Geology & Tectonics as Applied to Upstream Problems* (**p 25**, **34**)

LAURIE GREEN, MSc, PG

Laurie has extensive international and domestic experience as a geophysical interpreter, geomodeler, and project manager in conventional and unconventional assets for both E&P and service companies. She has broad expertise in computer-based mapping and modeling systems as an interpreter, programmer, and technical training. She has performed integrated field studies for global clients using different software systems and understands how computer-generated maps can be used and misused in real-world projects.

Laurie's career started in the early 1980's with Conoco in the Permian Basin, developing prospects in the Ouachita Overthrust, Midland Basin and Northwest Shelf of New Mexico. After roles as a geophysicist and computer programmer, she joined a Houston-based international consultancy where she developed expertise in geological modeling for field development projects in the Middle East, Mexico, South America, and Africa. Laurie worked as an expat in Russia and Malaysia with Halliburton before returning to Houston with Hess Corporation where she held roles as a technical professional and manager before retiring in January of 2018. Laurie received her BS in Geological Sciences from Cornell University and her MSc from the University of California at Santa Cruz. She is a registered Professional Geoscientist in the state of Texas.

Course taught:
- *Principles of Mapping with Petrel©* (**p 22**, **29**)

URSULA HAMMES, PhD

Dr. Ursula Hammes is an adjunct professor in the Department of Geological Sciences at The University of Texas at Austin teaching and assessing various shale oil/gas systems. Dr. Hammes has 20+ years of experience in the O&G industry and academia in Europe and USA in positions ranging from exploration, development, research and management. She has provided advanced consulting in shale-gas/oil systems and has taught industry short courses and in-house training courses for oil companies. Dr. Hammes obtained her Diploma at the University of Erlangen, Germany, and her Ph.D. at the University of Colorado at Boulder. Her graduate studies specialized in carbonate depositional environments, sequence stratigraphy, carbonate diagenesis, and rock-water interactions. Her background ranges from exploration, exploitation and business development for Anadarko Petroleum, consulting for Marathon Oil, Statoil, and various other independent oil/gas companies, conducting research in Texas and the Gulf of Mexico..

Dr. Hammes served as president of the Gulf Coast Section of SEPM (GCSSEPM), currently assists as associate editor for the AAPG Bulletin, and has been chair of many AAPG conventions and sessions. She serves as shale liquids and gas committee chair for EMD. Her research interests range from mudrock analyses to clastic and carbonate sequence stratigraphy and sedimentology. She has published extensively in recognized sedimentologic

and petroleum industry professional journals. She is an expert in mudrock/shale analyses from basin to nanoscale sequence stratigraphy of carbonates and siliciclastics a. She teaches core workshops and short courses in mudrock analyses and carbonate sequence stratigraphy and sedimentology.

Courses taught:
- *Shale Reservoir Core Workshop: Sedimentologic and Stratigraphic Assessment of Organic-Rich Mudrocks*
- *Shale Reservoir Workshop: Analyzing Organic-Rich Mudrocks from Basin to Nano-Scale* (**p 25**, **60**)

DIMITRIOS HATZIGNATIOU, PhD

Dimitrios G. Hatzignatiou, PhD is Professor in Petroleum Engineering at University of Houston. He holds a PhD degree in petroleum engineering from the University of Tulsa, and has over 30 years of combined academic and industry experience having taught at four universities, worked in various technical and management positions with a major service company, and consulted with the oil & gas and energy industries. He joined the Petroleum Engineering faculty at University of Houston in 2016 after serving for twelve years as Chief Technical Director and Center of Oil Recovery (COREC) Professor in Norway.

He has developed and managed several applied and research projects related to Carbon Capture Utilization and Storage (CCUS) and Carbon Capture and Storage (CCS) both in Europe and USA. He was a European Association of Engineers and Geoscientists (EAGE) CCS lecturer, and served as chairman of the 2015 EAGE International Workshop on CCS. He was a board member of the European Network of Excellence on the Geological Storage of CO2 (CO2GeoNet), and Norway representative on the European Network for Research in Geo-Energy (ENeRG). Dr. Hatzignatiou has organized and served on several SPE Technical Committees, is an Associate Editor of the SPE Reservoir Engineering journals, and is serving as reviewer in numerous scientific journals. He is a Chartered Engineer (CEng) and a European Engineer (EURING).

Course taught:
- *Carbon Capture Utilization and Storage - An Engineering Perspective* (**p 16**, **41**, **69**)

SUSAN HOWES, PE, PHR

Susan Howes joined SCA in 2016 as Vice President of Engineering. In 1982, Susan began her career with Anadarko as an Engineer in Denver, Colorado. Through the years she held a variety of engineering positions of increasing responsibility. In 2007, she joined Chevron as Horizons Program Manager and afterwards moved into their Reservoir Management function providing functional leadership that resulted in improved production and reserve trends.

As the Vice President of Engineering for SCA, Susan is responsible for maintaining the highest technical quality standards for SCA's recruitment, consultancy and training services. Additionally, she participates in the direction, administration, and coordination of SCA's operations, manages technical projects, and serves as the company's primary liaison to the engineering community through her continued involvement in the SPE and other organizations.

Susan has coauthored several papers and articles on the topics of uncertainty management, risk management, and talent management for SPE conferences and publications. She is past chair of the SPE Soft Skills Committee, previously served as SPE Regional Director for Gulf Coast North America, is a recipient of the SPE DeGolyer Distinguished Service Medal and is an SPE Honorary Member. Howes holds a BS degree in Petroleum Engineering from the University of Texas.

Courses taught:
- *Basic Petroleum Engineering for Non-Engineers* (**p 67**)
- *Basics of the Petroleum Industry* (**p 68**)
- *Introduction to Risk and Uncertainty Management* (**p 70**)

JERRY JENSEN, PhD

Dr. Jensen is a part-time research engineer at the Bureau of Economic Geology, University of Texas at Austin. From 2007 to 2018, he held the Schulich Chair in Geostatistics at the University of Calgary's Department of Chemical and Petroleum Engineering. Prior to 2007, Jerry held faculty positions at Texas A&M (1998-2007) and Heriot-Watt (1985-1997) Universities and worked as a field engineer for Services Techniques Schlumberger (1973-1977) and Gearhart Industries (1977-1983). Jensen has taught industry short courses on geomechanics, well log interpretation, geological statistics, reservoir characterization, and petrophysics.

Jensen received a BSc in electrical engineering from the U. of Birmingham (UK) in 1973 and a PhD degree in petroleum engineering from the U. of Texas at Austin in 1986. He is author or co-author of over 100 publications, including the books "Statistics for Petroleum Engineers and Geoscientists" (2000, Elsevier) and "Applied Reservoir Engineering and Characterization (2014, Gulf). He has research and teaching interests in inter-well connectivity, petrophysical analysis of unconventional reservoirs, and strategic sampling for reservoir analysis and modeling. Jerry was an SPE distinguished lecturer in 2011-2012 on the topic of inter-well connectivity.

Course taught:
- *Managing Mature Oilfields with Capacitance-Resistance Modelling* (**p 20**, **47**)

PETER B. JONES, PhD

Peter Jones obtained his Doctor of Science degree in Geology and Geophysics from Colorado School of Mines, U. S. A., with a thesis in the southern Canadian Rockies. Since then he worked on projects and field studies in the Americas, Arctic Alaska and Canada, Africa, Europe Asia and Southeast Asia as an oil company geologist, academic, and international consultant.

Dr. Jones was co-author of the world's first commercially available software for constructing balanced cross-sections. In 1997 he was awarded the Douglas Medal, highest scientific award of the Canadian Society of Petroleum Geologists, for "…contributions to the understanding of fold and thrust belts in general, in particular the Canadian Rocky Mountains". He was elected to the Russian Academy of Natural Sciences in 1998 for his contributions to the structural geology of the Soviet Union. He has published some 40 papers on the structural geology of many countries in various journals.

Course taught:
- *Folds, Faults, and Hydrocarbons in the Southern Canadian Cordillera: Short Course and Field Trip (Calgary)* (**p 74**)

SHAH KABIR

Shah Kabir is an adjunct faculty member at the University of Houston and is the proprietor of CS Kabir Consulting. He has 40 years of experience in the oil and gas industry, with stints at Dome, Arco, Schlumberger, Chevron, and Hess. He has published more than 140 papers and two books, and contributed to SPE Transient Well Testing. He was an SPE Distinguished Lecturer in 2006–2007 and has been involved in several SPE peer-reviewed journals, serving as an associate editor of SPE Production and Operations, an associate editor and technical editor of SPE Reservoir Evaluation and Engineering, and a technical editor of SPE Journal. He chaired three SPE Forum Series from 2010 to 2012 and is an editor of the SPE textbook Pressure Transient Testing. Kabir received the SPE Reservoir Description and Dynamics Award in 2010, an SPE Distinguished Membership Award in 2008, and is an SPE Honorary Member.

Shah holds a bachelor's degree and a master's degree in chemical engineering from the Bangladesh University of Engineering and Technology at Dhaka, and a master's degree in chemical engineering with petroleum engineering specialization from the University of Calgary.

Course taught:
- *Reservoir Management of Unconventional Reservoirs: From Inception to Maturity* (**p 52**, **60**)

JOHN KEASBERRY

John has over 40 years of experience as a geoscientist and training consultant for national, major, and independent oil and gas companies around the world. He has developed and taught both lecture and field courses in Geology and other subsurface disciplines in major universities as well as international corporations. He specializes in exploration strategies, seismic interpretation, asset evaluation, data management, analysis and interpretation. Mr. Keasberry has managed projects and evaluated opportunities in the UK, the Netherlands, Norway and the North Sea, Ecuador, North America, and Africa. A citizen of the Netherlands, he is a graduate of the University of Leiden, and holds a master's degree in both Geology and Geophysics.

Course taught:
- *Deepwater Operations Geology and the Technology to Acquire & Evaluate Data During Operations* (**p 17**)

WILLIAM N. KREBS, PhD

William N. Krebs graduated with a B.S. in Geology from the University of California at Los Angeles and received his Ph.D. in Geology from the University of California at Davis. He is currently a geoscience consultant who specializes in the use of biostratigraphic data for well and regional correlations, paleoenvironmental analysis, depositional and basin modeling, and for sequence stratigraphy and chronostratigraphy. He has over 30 years of experience in the petroleum industry as a technical worker, manager, mentor, and instructor for Amoco Production Co., the Energy and Geoscience Institute (EGI) of the University of Utah, and for Petronas Carigali (Kuala Lumpur, Malaysia). He has field work experience in North and South America, Africa, and Asia, and has led field trips and taught seminars in the US and Egypt. He has also written and published numerous technical papers on the application of microfossils to stratigraphic research.

Course taught:
- *Applied Biostratigraphy in Oil and Gas Exploration and Production* (**p 14**)

LARRY W. LAKE, PhD

Dr. Larry W. Lake is a professor in the Department of Petroleum and Geosystems Engineering at The University of Texas at Austin where he holds the Shahid and Sharon Ullah Chair. He holds B.S.E and Ph.D. degrees in Chemical Engineering from Arizona State University and Rice University, respectively. Dr. Lake is the author or co-author of more than 100 technical papers, four textbooks and the editor of three bound volumes. He has served on the Board of Directors for the Society of Petroleum Engineers (SPE), won the 1996 Anthony F. Lucas Gold Medal of the AIME, the Degoyer Distinguished Service Award in 2002, and has been a member of the National Academy of Engineers since 1997. He won the SPE/DOE IOR Pioneer Award in 2000.

Course taught:
- *Managing Mature Oilfields with Capacitance-Resistance Modelling* (**p 20**, **47**)

W. JOHN LEE, PhD

Dr. Lee is known throughout the world as a leader in petroleum reservoir engineering. Author of two textbooks published by SPE on Well Testing and Gas Reservoir Engineering, Dr. Lee holds the L.F. Peterson Chair in Petroleum Engineering at Texas A&M University. After receiving BChE, MS, and PhD degrees from Georgia Tech, Dr. Lee worked for the reservoir studies division of Exxon Production Research Company from 1962 to 1968. Later he joined and eventually headed Exxon Company, US's major fields study group where he supervised integrated field studies of Exxon's largest domestic reservoirs. He joined S.A. Holditch & Associates, Inc. in 1980 and retired as a vice president in 1999. Dr. Lee is a past member of the Board of Directors of SPE, an SPE Honorary Member, has been a Distinguished Lecturer, has received the Distinguished Faculty Achievement Award, and is a Continuing Education Lecturer. He received the John Franklin Carll Award in 1995, the Distinguished Service Award in 1992, and the Reservoir Engineering Award in 1986. He was named a Distinguished Member in 1987. Dr. Lee was also elected to the National Academy of Engineering in 1993 and to Georgia Tech's first class of its Academy of Distinguished Engineering Alumni in 1994.

Courses taught:
- *PRMS and SEC Reserves and Resources Regulations* (**p 50**)
- *Production Forecasting for Low Permeability Reservoirs* (**p 50**, **59**)

WILLIAM LITTLE, PhD

Dr. Little has over 15 years of experience teaching university courses in sedimentary geology and geological mapping and 16 years conducting geological mapping. He received a Doctorate in geology from the University of Colorado-Boulder and M.S. and B.S. degrees in geology from Brigham Young University. Dr. Little has held various roles in academia, currently as a professor at Brigham Young University – Idaho and previously at the University of Missouri – Rolla, Drury University, Moberly Area Community College, and Front Range Community College. At BYU – Idaho, he teaches sedimentology and stratigraphy with heavy emphases on recognition of ancient depositional systems and sequence stratigraphy, along with geomorphology and is the field camp director. He previously taught graduate courses in advanced geological mapping at UM – Rolla and worked as a mapping geologist for the Missouri Geological Survey.

Course taught:
- *The Book Cliffs, Utah: A Case Study in Coastal Sequence Stratigraphy* (**p 76**)

OSCAR LOPEZ-GAMUNDI, PhD

Dr. Oscar Lopez-Gamundi has close to 30 years of worldwide experience in pathfinding, play trend definition, prospect generation and execution. He has extensive expertise in onshore and offshore exploration in areas including Latin America, Gulf of Mexico, and Africa. He served on a part-time basis as an Assistant Professor in Sedimentology at the University of Buenos Aires where he had previously received both his Bachelor's degree equivalent and PhD in Geology. The bulk of his career was then spent holding various high-level positions with Texaco, Chevron, and Hess. He has instructed various industry courses, given convention presentations, and has more than 100 publications on sedimentology, basin analysis, and oil and gas exploration. He is also fluent in English, Spanish, and Portuguese.

Drawing from his wide-ranging experience in the industry and academia, Dr. Lopez-Gamundi instructs a five-day course for SCA entitled "Carbonate Sedimentology and Sequence Stratigraphy". The objective of the course is to provide course participants with the tools and methodologies to effectively predict the pressure and quality of reservoir, source rock and seal.

Courses taught:
- *Carbonate Sedimentology and Sequence Stratigraphy* (**p 17**)
- *Sequence Stratigraphy Applied to Oil & Gas Exploration* (**p 25**)

JOHN C. LORENZ, PhD

Dr. Lorenz earned an undergraduate BA with a double major in geology and in anthropology from Oberlin College in 1972. After serving in the Peace Corps, Morocco, he earned his MSc with a thesis on a Moroccan Triassic rift basin at the University of South Carolina (1975). He then went on to receive his PhD while studying the Nubian Sandstone in Libya and Cretaceous strata in Montana at Princeton University (1981). Lorenz has worked for the US Geological Survey in Louisiana and New Mexico, and for Sandia National Laboratories where he was the geologist for the tight-gas Multiwell Experiment in the Piceance basin. Lorenz has been a consultant, specializing in fractured reservoir characterization and effects, since 2007.

Lorenz served as the Elected Editor (2001-2004) and President (2009-2010) of the American Association of Petroleum Geologists. His published papers and presentations have been awarded the AAPG Levorsen (twice) and Jules Braunstein awards. John is the recipient of AAPG's Sidney Powers Memorial Award in 2022. He has worked closely with the oil and gas industry on problems involving reservoir dimensions and in situ permeability, gaining extensive hands-on experience with core analysis and fieldwork. He has led field trips, presented core workshops, and taught short courses for the industry-oriented geological community in numerous places around the world.

Course taught:
- *Effects of Mechanical Stratigraphy and Structure on Naturally Fractured Reservoirs (Central Wyoming)* (**p 74**)

CATALINA LUNEBURG, PhD

Catalina Luneburg is the owner and director of TerraEx Group LLC, a customized consulting and training service for the energy industry focused on structural geology/tectonics. Dr. Luneburg was a Product Manager and Senior Scientist at Landmark/Halliburton beforehand, developing geomodelling workflows as well as managing and designing software applications (such as LithoTect and DecisionSpace). She has also held positions with GeoLogic Systems and Midland Valley, focusing on structural restorations and modeling. Prior to that, she spent many years in academic teaching and research.

Luneburg is a recognized expert in the validation of a variety of basins and petroleum systems worldwide. applying best practices and innovative structural modeling and restoration techniques. Her areas of expertise include geologic interpretation and validation, Structural Geology modeling, cross section balancing and 2D/3D time-step restorations as well as HC reserve estimates, 3D framework building and fracture prediction analyses. She holds a doctorate in Natural Sciences from the Swiss Federal Institute of Technology in Zurich, Switzerland, and a Master's and Bachelor's in Geology/Paleontology from the Ludwig-Maximilian University in Munich, Germany. She has published extensively in her field including several books.

Course taught:
- *Structural Geology & Tectonics as Applied to Upstream Problems* (**p 25**)

D. NATHAN MEEHAN, PhD, PE

Dr. D. Nathan Meehan is President of CMG Petroleum Consulting, an energy advisory firm founded in 2001 and Senior Technology Advisor for Petro.ai, a leading oilfield data analytics firm where he advises on energy transition issues. He was formerly President of Gaffney, Cline & Associates, and a senior executive at Baker Hughes, Occidental Petroleum and Union Pacific Resources. He served as the 2016 President of the Society of Petroleum Engineers.

Dr. Meehan holds a BSc in Physics from the Georgia Institute of Technology, an MSc in Petroleum Engineering from the University of Oklahoma, and a PhD in Petroleum Engineering from Stanford University. He is an SPE Honorary Member and the recipient of the World Oil Lifetime Achievement Award and Petroleum Economist magazine's Legacy Award. He served as Chairman of the Board of the CMG Reservoir Simulation Foundation and twice as a Director of the Computer Modelling Group, Ltd., as Director of Vanyoganeft Oil Company, as Director of Pinnacle Technologies, Inc., as a Director of the Society of Petroleum Engineers and as a Director of JOA Oil & Gas BV. Nathan also serves on the boards of the University of Oklahoma Board of Visitors for the Mewbourne College of Earth and Energy, the University of Texas and Saint Frances University petroleum engineering departments and the Georgia Institute of Technology College of Sciences. He is an appointed member of the Interstate Oil & Gas Compact Commission, has served on the National Petroleum Council and is a widely published author.

Nathan was named to the National Academy of Engineering in recognition of technical and business innovation in the application of horizontal well technology for oil and gas production. Dr. Meehan is a licensed professional engineer in four states.

Course taught:
- *Energy Transition for Petroleum Professionals* (p 18, 43)

ROBERT MERRILL, PhD

Dr. Merrill has over 30 years of industry experience. He has explored a variety of basins, including extensional basins, fold and thrust belts and foreland basins both from a regional context as well as prospect generation. Geographic areas outside North America in which he has both exploration and acquisition experience include Argentina, Brazil, Colombia, Thailand, Malaysia, Indonesia, Russia, Kazakhstan, Azerbaijan, the North Sea, and Central Europe. Robert has experience generating and evaluating prospects in both conventional and unconventional clastic reservoirs, including fractured reservoirs, tight gas sands, and carbonates. He has taught in-house courses on a range of subjects including structural geology, basin analysis and plate tectonics, and geology for engineers.

Dr. Merrill has served as Secretary and President of the American Institute of Professional Geologists and is active in AAPG. He has also published papers on risk analysis, deep and overpressured gas in the Green River Basin, and origin and migration of oils in Wyoming/Utah/Idaho Overthrust belt. He is a Fellow of the Geological Society of America, a Chartered Geologist with the Geological Society and has served on committees for the American Geological Institute. Dr. Merrill has his Ph.D. and M.S. from Arizona State University and his B.A. in Geology from Colby College.

Course taught:
- *Visual Rock Characterization* (p 27, 65)

HAL F. MILLER

Mr. Hal Miller, President of Subsurface Consultants & Associates, LLC, is responsible for the administration and coordination of SCA's global operations and for guiding the company's strategic direction. Prior to joining SCA in 2004 as Vice President of Operations, Hal spent a total of 26 years working at Conoco and ConocoPhillips. During that time he held a variety of positions including operations, exploration, and human resource management at the business unit level, and corporate level skills management for the geoscience and reservoir engineering disciplines.

Hal received his undergraduate degree in 1974 from Williams College in Massachusetts and his M.S. in Geology from the University of Colorado in 1979.

Course taught:
- *Basics of the Petroleum Industry* (p 68)

JENNIFER L. MISKIMINS, PhD

Dr. Jennifer L. Miskimins serves as the Department Head of the Petroleum Engineering Department at the Colorado School of Mines and holds the F.H. Mick Merelli/Cimarex Energy Distinguished Department Head Chair. Dr. Miskimins holds BS, MS, and PhD degrees in Petroleum Engineering and has over 25 years of experience in the petroleum industry. She has work experience with Marathon Oil Company in a variety of locations as a production engineer and supervisor. Dr. Miskimins started teaching at CSM in 2002 and was a full-time professor until 2013 when she returned to the industry. She continued to hold a part-time appointment at CSM, advising research and graduate students, while working for Barree & Associates. In 2016, she returned full-time to the university.

Jennifer specializes in well completions, stimulation, hydraulic fracturing, and associated production issues. She is the founder and current Director of the Fracturing, Acidizing, Stimulation Technology (FAST) Consortium and also co-directs the Center for Earth Materials, Mechanics, and Characterization (CEMMC). Her research interests focus on the optimization of stimulation treatments and the importance of such on associated recovery efficiencies. Dr. Miskimins is currently the Completions Technical Director on the SPE International Board of Directors. She was an SPE Distinguished Lecturer in 2010-2011 and 2013-2014 on hydraulic fracturing in unconventional reservoirs. She was also awarded the 2022 Distinguished Achievement Award for Petroleum Engineering Faculty by the Society of Petroleum Engineers (SPE).

Course taught:
- *Hydraulic Fracturing: Theory & Application* (p 45, 58)

SIDDHARTH MISRA, PhD

Prof. Siddharth Misra is an Associate Professor in Harold Vance Department of Petroleum Engineering with a joint appointment in the Department of Geology and Geophysics at Texas A&M University. He is a researcher and educator in the field of subsurface monitoring for the exploration and production of subsurface earth resources. He authored two books: "Machine Learning for Subsurface Characterization" and "Electromagnetic Data Interpretation for Subsurface Characterization".

His journey in oil and gas industry started with Halliburton in 2007. In 2018, Dr. Misra was recognized as the U.S. Department of Energy Early Career Awardee. For his technical contributions to geophysics and subsurface engineering, he has received several international awards, such as SEG J. Clarence Karcher Award, SPWLA Young Technical Professional Award, SPE Gulf Coast Formation Evaluation Award, and EAGE Arie Van Weelden Award. Dr. Misra holds a Bachelor of Technology in electrical engineering from the Indian Institute of Technology Bombay and a Ph.D. in petroleum and geosystems engineering from the University of Texas at Austin.

Course taught:
- *Introduction to Subsurface Machine Learning* (p 70)

GERRIT NITTERS

Gerrit is a specialist in well stimulation operations with 40 years of experience the oil industry. During his career at Shell, he became Shell's global well stimulation coordinator and Principal Technical Expert on well stimulation providing active advice from his Shell Houston and Shell Rijswijk offices. After his retirement from Shell in 2006 he founded the Nitters Petroleum Consultancy Int. B.V. Activities over the last ten years range from lecturing to detailed support (including on-site) on acid and fracturing treatments for a range of oil companies such as Maersk, RWE DEA, EoN Ruhrgas, GDF Suez, NAM, Aurelian Oil, CEP, VNG Norway, JKX and ExxonMobil. He is currently also involved in Geothermal Energy projects in the Netherlands through a liaison with IF Technology.

Gerrit authored and co-authored many SPE papers on the subject of well stimulation. He was SPE's Distinguished Lecturer on Well Stimulation in 2005. In addition he served as committee member and chaired a number of SPE conferences and forums on well stimulation. He also wrote technical guidelines for stimulation of geothermal wells in cooperation with IF Technology for a project of the Dutch Ministry of Economic Affairs. He has a B.Sc. in Chemical Technology from Minerva Academy.

Course taught:
- *Well Stimulation Workshop: Practical and Applied* (p 53, 61)

WILLIAM K. 'BILL' OTT, PE

William K. "Bill" Ott is an independent, international petroleum consultant based in both Houston and Singapore. An SPE Distinguished Lecturer 2007–08, he has conducted technical petroleum industry courses worldwide and written numerous technical papers relating to well completion and workover operations. This includes co-authoring the popular *World Oil Modern Sandface Completion Practices Handbook* and *World Oil Downhole Remediation for Mature Oil & Gas Fields*. Mr. Ott has a B.S. in Chemical Engineering from the University of Missouri and is a registered professional engineer in Texas.

Course taught:
- *Cement Evaluation and Repair Workshop* (**p 42**)

KEVIN PICKERING, PhD

With more than 25 years of experience, Kevin has conducted research in the Gulf of Mexico, offshore Japan, Arctic Norway, northern Russia, Newfoundland, Quebec, NE Scotland, southern Britain, SE France, Spanish Pyrenees, SE Spain, Tibet, Japan, Kyrgyzstan, Uzbekistan, California, and New Zealand. Kevin's research interests are many and varied, with more than 130 research papers, five authored/co-authored books and five edited books, that include the following topics: Earth surface processes (particularly all aspects of deep-marine sedimentology, stratigraphy and tectonics), surface processes on Venus, global environmental issues, stratigraphy, tectonics and sedimentation, sediment geochemistry and clay mineralogy, particularly relating to deep-marine environments.

Courses taught:
- *Deepwater Systems, Ainsa Basin, Spanish Pyrenees: Application to Hydrocarbon Prospectivity and Unconventional Plays* (**p 73**)
- *High-Continuity Sandy Turbidite System: Application to Hydrocarbon Prospectivity (SE France)* (**p 75**)

SRINI PRASAD

Srini Prasad is a Petroleum Reservoir Engineering Consultant with extensive Worldwide Upstream Oil & Gas Industry experience with Hess, BP, and Occidental Petroleum. His experience spans exploitation of multiple basins and reservoir/fluid types: unconventional shale and conventional sandstone/chalk reservoirs; light oil, heavy oil and gas reservoirs; Bakken, Deepwater Gulf of Mexico, Guyana, Angola, Malaysia, Kuwait, Alaska, Peru, California, Norway, Denmark, Russia, Canada, Libya; and various phases of an asset life cycle including exploration, appraisal, sanction, development, start-up, production, pipelining, recovery enhancement and divestiture.

He has held a variety of technical, subsurface, commercial, asset and functional leadership positions over his career. He was most recently the Chief Reservoir Engineer at Hess. Srini obtained his M.S in Chemical Engineering from the University of Houston where he was awarded a Research Fellowship. He received his B.Tech. in Chemical Engineering from the Indian Institute of Technology in Kanpur, India and graduated with a First Division with Distinction.

Courses taught:
- *Developing Robust Production Forecasts: Do's and Don'ts* (**p 42**)
- *How to Maximize Upstream Exploitation Value (Conventional Reservoirs)* (**p 45**)

BRADFORD E. PRATHER

Mr. Prather graduated from the University of Kansas in 1979 with a BSc in geology. Following graduation, he moved to the University of New Orleans to pursue a Master's degree in Earth Sciences. Prather joined the Onshore Division of Shell Oil Company in New Orleans in 1981 as a summer intern and became a full time Exploration Geologist in 1982. Brad has experience in the Smackover and Norphlet plays of onshore Mississippi, Alabama and Florida; the US Atlantic margin and shelf provinces of Louisiana and Texas; and deepwater GOM. He led Shell's Turbidites Research Team until 2008, and then returned to exploration as a Geological Advisor. He eventually became Regional Chief Exploration Geoscientist in 2009.

Upon retirement from Shell in 2014, he joined the University of Kansas as an Adjunct Professor where he teaches courses focused on seismic stratigraphy, petroleum systems, and sedimentology. He serves on both the SEPM and AAPG Research committees and is a referee for many scientific journals. Prather is the recipient of Robert R. Berg Award for Outstanding Research (2009), Erasmus Haworth Most Distinguished Alumni Honors in Geology (2006), AAPG Distinguished Lecturer (2000-2001), Jules Braunstein Best Poster Award (2000), J. C. "CAM" Sproule Memorial Best Paper Awards (1993 and 1994) and W. A. Tarr Leadership Award (1979).

Courses taught:
- *Integrated Deepwater Depositional and Petroleum Systems* (**p 20**)
- *The Practice of Seismic Stratigraphy in Deepwater Settings* (**p 26**)

LEE A. RICHARDS, PhD, PE

Lee A. Richards, PhD, PE is an accomplished petroleum engineer who has worked for companies such as Halliburton and BP. Most recently, he serves as Assistant Professor of Petroleum Engineering for Montana Tech and simultaneously consults as an engineer for clients. Lee has co-authored a variety of publications and given various professional technical presentations over the course of his career. Dr. Richards received a BS in Chemical Engineering from Washington State University and a PhD in Chemical Engineering from Montana State University.

Courses taught:
- *Drilling Fluids* (**p 42**)
- *Introduction to Drilling Engineering* (**p 46**, **70**)
- *Well Control for Drilling Engineers and Senior Rig Personnel* (**p 53**)

LEO ROODHART, PhD

Dr. Roodhart's career with the oil and gas industry spans some 35 years in the areas of Production Engineering, Production Optimisation and Water Management, Strategic Innovation, Scenario Planning, and New Business Development. He was distinguished lecturer for the SPE in 2008, served on the board of directors of SPE from 2005-2008, and became President of the Society of Petroleum Engineers (SPE) in 2009. He has served as committee member or chairman of a number of SPE conferences workshops and forums on well stimulation and water management. Leo worked as Sr. Advisor of Production Engineering for Shell International, performing audits and reviews of Shell assets worldwide. As a global well stimulation expert, he designed and supervised fracturing treatments in Shell's operating units across the globe.

Leo has written and presented numerous papers in the area of production optimization, hydraulic fracturing and acidizing, and water management. His last position was head of Group GameChanger, Shell's corporate strategic innovation program that identifies and sponsors the development of new breakthrough technologies in the context of the various technology futures for the oil industry. Leo retired from Shell in 2010, having joined the company in 1980 after acquiring a PhD in Mathematics and Physics.

Course taught:
- *Well Stimulation Workshop: Practical and Applied* (**p 53**, **61**)

JONATHAN R. ROTZIEN, PhD

Jon Rotzien is President of Basin Dynamics and Adjunct Professor at University of Houston. He specializes in reservoir presence and quality forecasting in conventional and unconventional drilling programs. Prior to his present posts, he served BP and other supermajor and independent operators in a variety of basins and petroleum reservoir technical training programs.

As a business owner and scientist, Rotzien has participated in oil and gas exploratory to development drilling, mapping expeditions, technical competency training and consulting and has served as lead geologist in about one-third of those ventures. He is currently serving as Chair of the Houston Explorers Club. Rotzien received a Ph.D. in Geological Sciences from Stanford University and a B.A. degree in Geology from Colorado College.

Course taught:
- *Applied Deep-Water Sedimentology & Stratigraphy* (**p 14**)

ROBELLO SAMUEL, PhD

Dr. Samuel has been a Chief Technical advisor and a senior Fellow working with Halliburton since 1998. He began his career working on rigs as a field and drilling engineer for nine years with the Oil and Natural Gas Corporation. Since then he has developed more than 34 years of experience in domestic and international oil/gas drilling operations. He is the recipient of several awards including the Gulf Coast SPE Drilling Engineering Award, SPE International Drilling Engineering Award, SPE Distinguished Membership Award, and the Distinguished Lecturer award from the SPE.

Dr. Samuel has taught on the faculty of various universities, has published more than 200 technical papers, holds 67 US patents, and 40 patent pending applications. He serves regularly as a keynote speaker at major conferences and corporate forums and is regarded as one of the world's most influential contributors to advancement of research and practice in drilling engineering. Dr. Samuel has also authored thirteen drilling books. He holds BS and MS degrees in Mechanical Engineering, as well as MS and PhD degrees in Petroleum Engineering. Robello also received the SPE/AIME Honorary Membership award in 2021.

Courses taught:
- *Applied Drilling Engineering Optimization for Drilling Engineers* (**p 38**)
- *Applied Drillstring Mechanics for Drilling Engineers* (**p 39**)
- *Principles and Practices of Mud Motor* (**p 49**)

ED SAVAGE

Ed Savage has over 40 years experience in the evaluation of oil and gas properties, prospects and basins for economic and reserve potential, including the systematic and rigorous application of risk and uncertainty principles. Has worked as a logging engineer, petrophysicist, reservoir engineer and economist. Most of his career has been in the identification, evaluation and recommendation of investment opportunities to management for acquisitions, dispositions, trades, farm-ins or farm-outs, and for development.
Areas of special interests are the application of statistical techniques to reservoir engineering and economics analysis and the development of consistent evaluation techniques to ensure optimum selection of exploration and production acquisition and drilling opportunities. Special studies have included basin and trend analysis, competitor analysis, company-wide reserves standards and the techniques for measuring the effectiveness of capital employed in exploration and production. Mr. Savage has a B.S. in Mathematics and has done graduate work in Petroleum Engineering and Statistics.

Course taught:
- *Economic Evaluation of Petroleum Opportunities* (**p 43**)

SELIM S. SHAKER, PhD

Selim S. Shaker directs and consults for Geopressure Analysis Services Inc. He received a BSc in Applied Geology and an MSc and PhDin Geology from ASU, Egypt. He also received a diploma in Hydrogeology from Prague University (UNESCO). With over 30 years in the oil industry, he started his career in Egypt as a well-site stratigrapher and structural geologist. During his 20 years of domestic service with Phillips Petroleum, his primary duties as an exploration geologist were prospect generation in offshore Gulf of Mexico and onshore coastal areas. He discovered/developed several fields and evaluated several exploration projects in NW Australia, Libya, Algeria, the North Sea and China.

After retiring from Phillips in 2000, Dr. Shaker established G.A.S. to focus on evaluating the implication of geopressure compartmentalization, seal integrity and salt interaction on leads and prospects on the Shelf and Deep Water of the Gulf of Mexico. Pre- and post-drilling risk assessment of a prospect is his specialty. Dr. Shaker is the Co-Chair of the AAPG Deep Water Workshop. He is an active member of AAPG, SEG, HGS, GSH, and American Association of Drilling Engineers (AADE). He has published over 40 papers and articles regarding pore pressure predictions and the impact of geological settings on subsurface geopressure profile and risk assessments.

Courses taught:
- *For Safe Drilling: Formation - Fracture Pressure Interpretations and Analysis* (**p 44**)
- *Pore Pressure, Fracture Pressure, and Well-Bore Stability* (**p 64**)
- *Seal and Reservoir Pressures Analysis for E&P Prospect's Risk Assessments* (**p 24**, **52**)

ROBERT 'BOB' SHOUP

Bob is a Board Certified Petroleum Geologist and a Louisiana Registered Geoscientist with over 35 years of experience in basin analysis, regional studies, new play generation, prospect evaluation, field studies and development planning, and project management. Bob has a MS in Geology from the University of Oklahoma and began his career at Shell Oil in 1980. Beginning in 1999, Bob worked for four years with private oil companies before becoming an independent consultant and trainer in 2003. He consults in the Asia Pacific region as well as the U.S. Gulf of Mexico. Over the course of his career Bob has discovered or helped to discover over 100 MMBOE, and has a commercial exploration success rate of 46%. Bob is a recognized expert in clastic depositional environments, rift basins, and in syndepositional structural systems. He is an active contributor in the professional community.

Bob is SCA's Chief Geologist, the current Vice President, Regions for AAPG, a past President of AAPG's Division of Professional Affairs (DPA), and past Secretary-Editor of the AAPG House of Delegates. He has served on numerous AAPG Committees and was Chairman of AAPG's Mentor, Membership and Student Chapter Committees. He is a recipient of AAPG's and the DPA's Distinguished Service Award and was granted Honorary Life Membership in the DPA. He currently serves as an ethics lecturer for the DPA, He is a past President of Bangkok's Chapter of the South East Asia Petroleum Exploration Society and is a lifetime member of the South East Asia Petroleum Exploration Society, the Indonesian Petroleum Association and the Malaysian Geological Society.

Courses taught:
- *Applied Subsurface Geological Mapping* (**p 15**)
- *Effective Petroleum Systems Analysis* (**p 18**)
- *Geology-Based Topical Contouring Workshops* (**p 19**)
- *Mapping & Interpreting Clastic Reservoirs* (**p 21**)
- *Project Management for Exploration and Development Projects* (**p 23**)
- *Quality Assurance/Quality Control Skills for Subsurface Mapping (QAQC)* (**p 23**)
- *QC Techniques for Reviewing Prospects and Acquisitions* (**p 23**)

JAMES J. SMOLEN, PhD

James J. Smolen, PhD has over forty years experience in cased hole well logging, applications, related research, and training. He began in the oil industry (1970) with Schlumberger and since 1980 has been an officer and director of Petroleum Computing, Inc., and an international consultant and trainer of cased hole logging. Dr. Smolen has numerous publications to his credit, including the 1996 PennWell text, *Cased Hole and Production Log Evaluation*. He was a Distinguished Lecturer for both the SPE and the SPWLA. Dr. Smolen holds a B.S. from Northwestern University and M.S. and Ph.D. degrees from the University of California, Berkeley.

Courses taught:
- *Cased Hole and Production Log Evaluation* (**p 41**)
- *Cement Evaluation and Repair Workshop* (**p 42**)

STEPHEN A. SONNENBERG, PhD

Dr. Sonnenberg is a professor and holds the Charles Boettcher Distinguished Chair in Petroleum Geology at the Colorado School of Mines. He has 25 plus years of experience and specializes in unconventional reservoirs, sequence stratigraphy, tectonic influence on sedimentation, and petroleum geology. Sonnenberg received BS and MS degrees in geology from Texas A&M University and a PhD degree in geology from the Colorado School of Mines. Steve has served as President of several organizations including the American Association of Petroleum Geologists, Rocky Mountain Association of Geologists, and Colorado Scientific Society. He also served on the Colorado Oil and Gas Conservation Commission from 1997-2003 and was the Chair of the Commission from 1999-2003. He is the recipient of the Young Alumnus Award, Outstanding Alumnus Award, and Mines Medal from the Colorado School of Mines, Distinguished Achievement Medal from Texas A&M University, distinguished service awards from AAPG and RMAG, and honorary membership awards from AAPG, RMAG and the Colorado Scientific Society. In 2013, he was awarded the Halbouty Medal from AAPG.

Courses taught:
- *Carbon Capture Utilization and Storage - A Geological Perspective* (**p 16**, **41**, **69**)
- *Elements of Petroleum Geology* (**p 18**, **69**)
- *Reservoir Characterization for Mudrock Reservoirs* (**p 24**, **51**, **59**)
- *Unconventional Resource Plays - Workshop* (**p 27**, **52**, **61**)

GABOR TAKACS, PhD

Dr. Gabor Takacs is a professor-emeritus at the Petroleum Engineering Department at the University of Miskolc, Hungary where he held the position of Department Head from 1995 till 2012. He holds MS and PhD degrees in Petroleum Engineering and a doctorate from the Hungarian Academy of Sciences. Between 2007-2010 he was acting Director of the Petroleum Engineering program at The Petroleum Institute in Abu Dhabi, UAE; and taught at Texas Tech University, USA in 1988/89.

He has more than 35 years of teaching and consulting experience in the production engineering field. In 1995/96 he was selected SPE Distinguished Lecturer, was Outstanding Technical Editor for the SPE journal "Production and Facilities" 1992-2003; chaired the Artificial Lift TIG (Technical Interest Group) of SPE in 1997-2003. He is the author of several books on artificial lift technology; "Modern Sucker-Rod Pumping"

(1993), "Sucker-Rod Pumping Manual" (2002), "Gas Lift Manual" (2005), all published by PennWell Books, USA. His books "Electrical Submersible Pumps Manual" (2009) and "Sucker-Rod Pumping Handbook" (2015) were published by Elsevier, USA. Dr. Takacs has more than 100 technical papers to his credit. He taught various short courses for many oil companies in Libya, Mexico, Argentina, Indonesia, UAE, Romania, Malaysia, Peru, Oman, India, Egypt, Qatar, and Austria; and is a well-known consultant and instructor on production engineering and artificial lift topics.

Courses taught:
- *Advanced Sucker Rod Pumping* (**p 38**)
- *Electrical Submersible Pump – Design and Optimization Using Nodal Analysis* (**p 43**)
- *Gas Lift Design and Optimization Using NODAL Analysis* (**p 44**)
- *Nodal Analysis in Self-Flowing and Artificial Lift Wells* (**p 47**)

W. LANSING TAYLOR, PhD

Dr. W. Lansing Taylor is an accomplished structural geologist with extensive industry and field experience specializing in structural geology, fractured reservoirs, geomechanics and field geology. He joined SCA as an instructor in 2008. His *Structural Styles in Petroleum E&P* short course and the accompanying *Structural & Sequence Stratigraphy Field Course (Hill Country, TX)* are consistently highly rated among our students. His development and EOR experience includes Hugoton, Golden Trend, Permian Basin, Ozona, and the Austin Chalk, while his exploration experience includes Alaska, North Africa, Middle East, and SE Asia. Lans performed both technical and management roles with Talisman Energy and Anadarko Petroleum. Dr. Taylor received his B.A. in mathematics and geology at Skidmore College, receiving department honors of Suma Cum Laude. He received his PhD in Quantitative Structural Geology, "Fluid flow and chemical alteration in fractured sandstone", Department of Geological and Environment Sciences from Stanford University.

Courses taught:
- *Carbonate Reservoirs of the Permian Basin NW Shelf* (**p 73**)
- *Structural and Sequence Stratigraphic Field Course (Hill Country, TX)* (**p 75**)
- *Structural Styles and Tectono-Stratigraphy for the Mid-Continent* (**p 76**)
- *Structural Styles in Petroleum Exploration and Production* (**p 26**)

JULIA S. WELLNER, PhD

Dr. Wellner is a marine geologist at the University of Houston. Julia received her bachelor's degree from Bryn Mawr College, her Master's degree from the University of Alabama, and her Ph.D. from Rice University in 2001. Following her graduation from Rice, she worked for five years as a post-doctoral fellow and lecturer in the Department of Earth Science there. She is now Research Assistant Professor in the Department of Earth and Atmospheric Sciences and Co-Director of the Geoscience Learning Center at the University of Houston. Her primary research interest is in Antarctic glacial history and marine geology and she has completed six field seasons offshore Antarctica on the icebreaker RV/IB Nathaniel Palmer. She also works in the Gulf of Mexico and Texas coast on projects related to coastal change and sediment budgets.

Course taught:
- *Modern Coastal Systems of Texas Field Course (Galveston, TX)* (**p 75**)

JAMES J. WILLIS, PhD

Dr. Willis received his B.S. and M.S. degrees from the now University of Louisiana in 1989 and 1990, respectively, and his Ph.D. as a National Science Foundation fellow at Baylor University in 1993. From 1994-1996, he studied Planetary Geology as a NASA-funded postdoctoral fellow at Southern Methodist University. In 1996, he returned to UL, where he was awarded in 1997 the Hensarling-Chapman Endowed Professorship in Geology. In 2001, he left academia for industry consulting and teaching. He's been the Editor and Publisher for the Lafayette Geological Society since 2002, and the Co-Editor/Managing Editor and Publisher for the Gulf Coast Association of Geological Societies since 2006. James has received many grants and contracts, presented numerous talks, and published various papers on a diversity of geoscience topics. As an undergraduate, he developed a 4D quantitative well bore guidance theory, including the concept of positive versus negative thickness (sign indicating direction of drilling section), that predated availability of key real-time data.

Courses taught:
- *Applied Seismic Interpretation* (**p 15**)
- *AVO Inversion and Attributes: Principles and Applications* (**p 16**)
- *Foundation of Petrophysics* (**p 19**)

LESLI WOOD, PhD

Dr. Wood joined the faculty at Colorado School of Mines in January 2015 as a Professor and the Robert Weimer Endowed Chair in Sedimentary and Petroleum Geology, where she is director of the Sedimentary Analogs Database and Research Program (SAnD). Prior to joining CSM, Dr. Wood held positions at the University of Texas at Austin, Amoco Production Company and Arco. She received her doctorate in 1992 from Colorado State University following her MS work at the University of Arkansas. She specializes in quantitative seismic geomorphology of clastic basins, structural and sedimentary system interactions, submarine mass failures, petroleum geology, mobile shales and geomorphology of Mars. She has served as SEPM Society for Sedimentary Geology national Secretary-Treasurer, the GCSSEPM President and is active in the Geological Society of America, the American Association of Petroleum Geologists and the Geological Society of Trinidad and Tobago.

In 2022, Lesli was elected as an honorary member to The Society of Sedimentary Geology (SEPM). She was also named the 2022 winner of the Robert R. Berg Outstanding Research Award from the American Association of Petroleum Geologists.

Courses taught:
- *Deepwater Deposits Field Course (Arkansas - Oklahoma)* (**p 73**)
- *Reservoir Characterization of Clastic (Sandstone) Reservoirs* (**p 24**)

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Organic Shale Refracs

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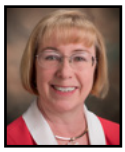

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