We practice what we teach.

SUBSURFACE CONSULTANTS & ASSOCIATES, LLC
Serving the Upstream Oil & Gas Industry Since 1988
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SCA HAS TRAINED OVER **26,000** GEOScientists AND Engineers IN OVER **50** COUNTRIES.
We are happy to present SCA’s 2020 Course Catalog. Our program offers upstream professionals of all skill levels an excellent lineup of over 60 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 “Boot Camp”)
- Principles of Mapping with Petrel®

SCA and IHRDC are working together to provide a full menu of high-quality, technologically current learning resources including in-depth, instructor-led training, competency assessment and management tools, web-based e-Learning, oil and gas management courses, virtual learning and mentoring services, and petroleum industry learning simulation games.

Be sure to also review the newly offered Live Online versions of the following courses:

- Applied Biostratigraphy in Oil and Gas Exploration and Production | William Krebs, PhD | Page 14
- Basics of the Petroleum Industry | Susan Howes, PE, PHR | Page 58
- Depositional Evolution of the Gulf of Mexico Sedimentary Basin | John Snedden, PhD | Page 16
- Drilling Fluids | Lee Richards, PhD | Page 36
- Introduction to Energy Data Science in Python | John Foster, PhD | Page 60
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- Reservoir Scale Geomechanics | Amy Fox, PhD | Page 43
- Sequence Stratigraphy Applied to Oil and Gas Exploration | Oscar Lopez-Gamundi, PhD | Page 22

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 about courses in this catalog, please contact us at training@scacompanies.com.

Cover Image: Gigi Hiu, Lampung, Sumatra, Indonesia
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. hmiller@scacompanies.com

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. matchison@scacompanies.com

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. showes@scacompanies.com

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. mnowak@scacompanies.com

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 60+ training courses SCA offers. Tim earned his Bachelor’s Degree in Marketing from Texas Lutheran University. triepe@scacompanies.com
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 26,000 petroleum industry professionals of all experience levels. We offer 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
SCA offers over 80 courses in six disciplines. Register today through 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 P3 & 77 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
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.

SCA identifies 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
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*This course is offered in Spanish

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**LEGEND:**
- ⚡ Flagship Course
- ⚡ Boot Camp Course
- 📑 Laptop Required
- NEW New Course
- 🌐 Live Online Version Available

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Office address:
10700 Richmond Ave., Ste. 325
Houston, TX 77042-4966

It 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 page 15.

**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 page 21.
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  
**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. Biostratigraphic 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.” - Kim C.  
- “Dr. Krebs taught with enthusiasm and deep knowledge of the subject matter.” - Anna E.  
- “A well put together program with the perfect balance of lecture and practice work.” - Anna E.

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**APPLIED SEISMIC INTERPRETATION**

**Instructor:** James J. Willis, PhD  
**Discipline:** Geoscience  
**Length:** 2 days  
**CEUs:** 1.6  
**Availability:** Public & In-House

**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. 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)
Featured Instructor: Sia Agah

Sia Agah 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. Sia has taught our premier class, 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.

Courses Taught:
- Applied Subsurface Geological Mapping
- Hand Contouring Workshop

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

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 representation 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)

DEPOSITIONAL EVOLUTION OF THE GULF OF MEXICO SEDIMENTARY BASIN

Who Should Attend:
This course has been designed for working geoscientists who wish to develop a thorough understanding of the Gulf of Mexico tectonostratigraphic history, supporting regional and prospect evaluation. Covers basin history and current exploration in the US and Mexico, Mesozoic and Cenozoic.

Course Description:
The Gulf of Mexico’s stratigraphic and structural history underlies and supports one of the world’s richest petroleum basins. Learn about the depositional evolution of the Gulf from rift to divergent margin. This exciting introduction to the basin includes:
• The interplay of sandstones and carbonates from Mesozoic to Cenozoic.
• Progressive depositional change from Jurassic aeolian systems to Pleistocene abyssal plain submarine fans.
• Overprint of multiple tectonostratigraphic events.
• Shifting source terrain input, from Appalachians to Quachita to Laramide, Chapas.
• Oil and gas source rock families from USA and Mexico.
• Existing and new emerging plays, dry holes and discoveries.
• Suprasalt to sub-salt, Pre-salt to Pleistocene Key basin events: Pre-salt rifting, The KPg large-scale impact, PETM, Chiapanecan orogeny.

The course is based upon the comprehensive new book by the instructor, The Gulf of Mexico Sedimentary Basin: Depositional Evolution and Petroleum Applications (Cambridge University Press, 2019). This course provides participants with a thorough, hands-on understanding of this prolific Super Basin, covering the US, Mexico and Cuba. Lectures and course notes are superbly illustrated with seismic and well log sections, and paleogeographic maps of key Cenozoic and Mesozoic intervals. Course includes eleven hours of exercises for participants to apply and test their new knowledge.

Learning Outcomes:
• Perform analysis of structurally complex stratigraphic sections from onshore to offshore Gulf of Mexico (GOM), identifying faults and likely detachment surfaces (salt bodies and welds).
• Discriminate between shelfal, slope, and deepwater reservoirs from seismic character, position on depositional profile, and paleogeographic location.
• Carry-out well log correlations at basin scale to identify key depositional fairways for deepwater systems and use log motifs to differentiate distributive fan from poorly organized slope and abyssal plain aprons.
• Review continental scale drainage maps to identify sand-prone pathways and role of key long-lived structural entities in source-to-sink reconstructions.
• Recognize major tectonic and depositional episodes in the GOM, as defined by seismic and well log anomalies.
• Identify and assess discrete intervals of organic enrichment that are required for source rocks and shale reservoir plays.
• Evaluate the quality and diversity of established, emerging, and frontier exploration plays ranging from Pre-salt to Plio-Pleistocene in both USA and Mexico.

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 will teach 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 - source rock, migration pathway, reservoir, trap and seal, as well as the linkage between these elements.
• 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 (including geologic models).
• Uncertainty and risk assessment in prospect evaluations.

“If you think education is expensive, try estimating the cost of ignorance.”
Howard Gardner
### ELEMENTS OF PETROLEUM GEOLOGY

**Instructor:** Stephen A. Sonnenberg, PhD  
**Discipline:** Geoscience, Multi-Disciplinary & Intro  
**Length:** 3 days  
**CEUs:** 2.4  
**Availability:** In-House

**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 crude, 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

### GEOSTEERING: BEST PRACTICES, PITFALLS, & APPLIED SOLUTIONS

**Instructor:** Raymond Woodward  
**Discipline:** Geoscience, Unconventional Reservoirs  
**Length:** 2 days  
**Course CEUs:** 1.6  
**Availability:** Public & In-House

**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  
- Parallax problems; MWD-LWD log curves  
- Surveys - positional uncertainty  
- Inter-Disciplinary Culture/Communications  
- Priorities of geologists/engineers/well site team; individual backgrounds  
- Resulting conflicts/inter-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

### HAND 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 grinding to generate geologically valid maps, especially when the computer-generated map is deemed geologically unreasonable or invalid.

**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.
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 processes  
• 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

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

Who Should Attend:  
Enter 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 geologic/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 and maps.  
• 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 depth.  
• 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.

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/compensation 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. Interpretation of this type 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 designed 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 Geometrics 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 decisions requires no geologic 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.

Course Description:
Interpret fluids/source rock data to add value to projects from exploration to environmental remediation in both conventional/unconventional petroleum systems worldwide.
- Fundamentals of petroleum composition/properties.
- Sampling of rocks, fluids.
- Analytical techniques to evaluate potential of source rocks, composition of petroleum fluids.
- Characterization/risking of source rocks, prediction of fluid properties in exploration prospects.
- Interpretation of data from drilled exploration wells to assess value of discovery.
- Assess reservoir compartmentalization during appraisal/development.
- Geochemical surveillance of oil & gas production.
- Locate producing intervals, allocate petroleum production.
- Identify oil sources for petroleum spills/leaks.

Please Note: Participants are required to bring their own laptops.

Learning Outcomes:
- Identify oil sources for petroleum spills/leaks.
- Identify/propose geochemical solutions.
- Design cost-effective sampling/analysis programs for source rocks, petroleum fluids.
- Construct expulsion profiles for different types of source rocks.
- Predict fluid properties, product value in exploration/product wells.
- Correlate oils to source rocks.
- Interpret origin of hydrocarbon/non-hydrocarbon natural gases.
- Integrate geochemical interpretations into holistic petroleum systems analysis.

Course Content:
- Day 2. Petroleum exploration and drilling the prospect.
- Day 3. Appraisal, development, production, environmental, and downstream projects.

Featured Instructor:
Alan Cherry

Alan Cherry is a Senior Geoscientist with over 35 years of industry experience. He has been associated with SCA since 2003 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.

Course Taught:
- Mapping Seismic Data 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 Vice President, Regions for AAPG. 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
- Mapping & Interpreting Clastic Reservoirs
- QC Techniques for Reviewing Prospects & Acquisitions
- Quality Assurance/Quality Control Skills for Subsurface Mapping (QAQC)
- Petroleum Resources and Reserves: An Overview of Recommended Geological Practices

Instructor: Alexei Milkov, PhD
Discipline: Geoscience, Unconventional Reservoirs
Length: 3 days
CEUs: 2.4
Availability: Public, In-House, & Live Online

Who Should Attend:
Geoscientists, geoscience managers working exploration, appraisal, development, production, or environmental projects.

Instructor: Bob Shoup
Discipline: Geoscience
Length: 1 day
CEUs: 0.8
Availability: In-House

Who Should Attend:
Geologists, geophysicists, engineers, support staff, supervisors, managers, resources or reserves evaluators, financial analysts, investors, bankers or anyone who needs to understand the recommended geological methods to estimate resources and reserves.

Courses Taught:
- Petroleum Resources and Reserves: An Overview of Recommended Geological Practices

Instructor: Alexei Milkov, PhD
Discipline: Geoscience, Unconventional Reservoirs
Length: 3 days
CEUs: 2.4
Availability: Public, In-House, & Live Online

Who Should Attend:
Geoscientists, geoscience managers working exploration, appraisal, development, production, or environmental projects.

Instructor: Bob Shoup
Discipline: Geoscience
Length: 1 day
CEUs: 0.8
Availability: In-House

Who Should Attend:
Geologists, geophysicists, engineers, support staff, supervisors, managers, resources or reserves evaluators, financial analysts, investors, bankers or anyone who needs to understand the recommended geological methods to estimate resources and reserves.

Courses Taught:
- Petroleum Resources and Reserves: An Overview of Recommended Geological Practices

The Guidelines for Application of the Petroleum Resources Management System (PRMS) was updated in 2018 to recommend derivation of reserves estimates by either deterministic scenarios or using a probabilistic distribution. The starting point for all resources or reserves determinations is estimation of the size of the container and the volume of hydrocarbons in-place. This course covers industry recommended and accepted geoscience methods and techniques to obtain the best possible estimates of reservoir volume and in-place hydrocarbons given the uncertainties involved. The Joint Committee of Reserves Evaluators Training (JCORET) has reviewed, approved and endorsed Petroleum Resources and Reserves: An Overview of Recommended Geological Practices.

Learning Outcomes:
- Proper, geologically sound, industry sanctioned and accepted methodology for estimating reservoir volumes, and oil and gas in place.

Course Content:
- General Introduction
- Reserves vs Resources
- Mapping Surfaces: structure maps, reservoir top and base of porosity maps
- Mapping of trapping faults (geology/geophysics)
- Down-dip limits in vertically stratified reservoirs
- Net sand and net pay
- Wedge zones (water, hydrocarbon and fault)
- Thickness determinations in deviated wells and dipping beds
- Net-to-gross ratios
- Application of porosity, permeability and saturation cut-offs
- Isotherms or maps (volume determinations for bottom and edge water reservoirs)
Geoscience

Include procedures for selecting appropriate data in unconventional plays. Exercises will generate geologically valid maps of faulted those workflows. Emphasis will be placed on workflows and the geologic principles behind 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® 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.

**Course Taught:**
- Principles of Mapping with Petrel®

**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 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:** 2.4  
**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  
**CEUs:** 2.4  
**Availability:** Public & In-House

**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:** 3 days  
**CEUs:** 4.0  
**Availability:** In-House

**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, deepwater systems. Topics in the course include important/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  
**CEUs:** 4.0  
**Availability:** In-House

**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 geopressures create compartmentalization where fluids are trapped behind 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  
**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

**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, geochronological 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 fracture 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

*“Live as if you were to die tomorrow. Learn as if you were to live forever.”*  
Mahatma Gandhi
Instructor: Catalina Luneburg, PhD and James Granath, 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

Courses Taught:  
• Structural Styles in Petroleum Exploration and Production  
• Structural and Sequence Stratigraphic Field Course (Hill Country, Texas)

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” from Department of Geological and Environment Sciences, from Stanford University.

Instructor: Lansing Taylor, PhD  
Discipline: Geoscience  
Length: 4 days  
CEUs: 3.2  
Availability: Public & In-House

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 basin structures  
• Rift structures  
• Laminar 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 very 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.” - Randy B.

“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.” - 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.” - Carly M.
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 use GDE maps in 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
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 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 potential.
• 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 (an equivalent fluid column width (water to oil to gas transitions). Prevent grave and costly mistakes.
• Integrate mix 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 databases, 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. Qualitative 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
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 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.

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

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.
Avoid Dry Holes and Accurately Assess Reserves

Exercise: Would you approve these wells?

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?
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.
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
- Hand 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 exciting 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.

Testimonials from Past 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 hands-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.”
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.

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

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.
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 41

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 45

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.

Page 40

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. Both the theory and practice of applied interpretation are covered as well as practical advice, applied exercises, discussions and the study of actual logs. Specific learning outcomes include the determination of main lithologies and volumes, calculation of porosity, and detection and quantification of hydrocarbons. The accompanying manual provides a useful reference for attendees to use after the conclusion of the course.

Page 39

Drilling Fluids

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.

Page 36

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 of this course 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.

Page 45
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.

Page 43

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. Understanding of these important production concepts are a must to profitably exploit the existing assets fully.

Page 35

Applied Drilling Engineering Optimization for Drilling Engineers
This course covers 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. Algorithms are studied and optimization techniques are 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 Dr. Samuel’s book, Applied Drilling Engineering Optimization.

Page 34

Seal and Reservoir Pressures Analysis for E&P Prospect’s Risk Assessment
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, 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.

Page 44

Hydraulic Fracturing: Theory and Application
Take an in-depth look at hydraulic fracturing with this course. 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 38

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. Special consideration is given to the newest logging techniques for highly deviated and horizontal wells.

Page 36

Reservoir Scale Geomechanics
The course is focused on conveying an understanding of why an accurate geomechanical model is necessary, and how it can inform decisions made by various stakeholders within the reservoir finding and development process. A wide range of data types and analyses are discussed and prioritized. Class time is split between lectures, examples, and hands-on exercises. Learning outcomes include: relevancy of geomechanics throughout the reservoir life-cycle, knowledge of the kinds of data that can be used to build a geomechanical model, and applications of the principles of geomechanics to solve real-world problems and reduce risk.

Page 43
**Instructor:** Robello Samuel, PhD  
**Discipline:** Engineering  
**Length:** 2 days  
**CEUs:** 1.6  
**Availability:** Public & In-House

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.

**Courses Taught:**
- Applied Drilling Engineering Optimization for Drilling Engineers
- Applied Drillstring Mechanics for Drilling Engineers
- Principles and Practices of Mud Motor

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**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

**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.
<table>
<thead>
<tr>
<th>ARTIFICIAL LIFT AND PRODUCTION OPTIMIZATION SOLUTIONS</th>
<th>ARTIFICIAL LIFT AND REAL-TIME OPTIMIZATION FOR UNCONVENTIONAL ASSETS</th>
<th>BASIC PETROLEUM ENGINEERING PRACTICES</th>
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<tbody>
<tr>
<td>Instructor: Rajan N. Chokshi, PhD</td>
<td>Instructor: Rajan N. Chokshi, PhD</td>
<td>Instructor: Kirk Boatright, PhD, PE</td>
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<tr>
<td>Discipline: Engineering, Unconventional Reservoirs</td>
<td>Disciplines: Engineering, Unconventional Reservoirs</td>
<td>Discipline: Engineering, Multi-Disciplinary &amp; Intro</td>
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<td>Length: 5 days</td>
<td>Length: 3 days</td>
<td>Length: 5 days</td>
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<tr>
<td>CEUs: 4.0</td>
<td>CEUs: 2.4</td>
<td>CEUs: 4.0</td>
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<tr>
<td>Availability: Public &amp; In-House</td>
<td>Availability: Public &amp; In-House</td>
<td>Availability: In-House</td>
</tr>
</tbody>
</table>

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 to be 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-liquefication
- Day 5: Capillary, Plunger Lift, Digital Oil Field

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

### Drilling Fluids

**Instructor:** Lee A. Richards, PhD, PE  
**Discipline:** Engineering  
**Length:** 3 days  
**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
EVALUATING WELL PERFORMANCE FOR UNCONVENTIONAL AND CONVENTIONAL RESERVOIRS

Instructor: Robert ‘Bob’ Barba  
Discipline: Engineering, Unconventional Reservoirs  
Length: 3 days  
CEUs: 2.4  
Availability: In-House  

Who Should Attend:  
Engineers, managers, geoscientists concerned that reservoirs are not completed using best techniques.  

Course Description:  
This course is for engineers, geoscientists, asset managers to maximize asset value in horizontal or vertical wells in unconventional/conventional reservoirs. Learn to evaluate well performance using recovery factor technique, effective frac length technique for conventional reservoirs. When combined with characterization of mechanical properties, a determination can be made whether poor production is due to proper completion, poor reservoir rock, or both.  

Use open hole wireline logs, core data, pre-frac pump-in test data, production data to predict production performance as a function of recovery factor, effective frac length. Data is used to determine what completion practices create highest recovery factors/ longest effective frac lengths in a tight or perforation cluster. Case studies reinforce concepts. Predict EUR’s prior to frac as a function of completion options. Calibrated petrophysical model provide oil or gas in place, permeability, key rock properties.  

Participants will be able to develop well performance models specific to reservoirs. Participants are encouraged to provide local examples for discussion of model implementation, “best practices” for areas of activity.  

Learning Outcomes:  
- Maximize asset value in horizontal or vertical wells in unconventional/conventional reservoirs.  
- Learn methods that evaluates well performance using recovery factor technique for all reservoirs, effective frac length technique for conventional reservoirs.  
- Determine if poor production is a function of a poor completion, poor reservoir rock, or both.  
- Calculate inputs required to develop calibrated reservoir, mechanical properties to load directly into a 3D hydraulic fracture simulator.  
- Develop well performance models specific to reservoirs.  

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

Course Content:  
- Review of basic log analysis techniques  
- Log quality control, calibration steps  
- Recovery factor model data requirements  
- Effective frac length model data requirements  
- Net pay model calibration using log, core, DFT, well test, production data  
- Permeability, rock properties, reservoir pressure model calibration to field data  
- Integration of rock properties, permeability, reservoir pressure models  
- Basic production decline curve analysis  
- Effective frac length exercises  
- Historical best practices for implementing effective frac length  
- Review of student provided case studies  

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

Instructor: Selim Shaker  
Discipline: Engineering, Unconventional Reservoirs  
Length: 5 days  
CEUs: 4.0  
Availability: In-House  

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.  

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-PF 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-PF Pertaining Analyses  
- While Drilling Applications  
- Post-Drilling  
- Drilling Challenges in Deepwater  

“THERE IS NO REASON TO INTRODUCE THE COMPLEXITY OFICES INTO THE EDUCATION PROCESS. STUDENTS PREPARE TO WORK IN A WIDE RANGE OF ENVIRONMENTS, NOT JUST IN A FLAT, PLANAR WORLD WHERE THE RULES ARE EASY TO UNDERSTAND.”  

“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
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

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

Instructor: Jennifer Miskimins, PhD
Discipline: Engineering, Unconventional Reservoirs
Length: 3 days
CEUs: 2.4
Availability: In-House

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 drilling 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
- Drilling string design and geometry
- Drill bit selection
- Drilling hydraulics
- Well control operations
- Hole problems

Instructor: Lee A. Richards, PhD, PE
Discipline: Engineering, Multi-Disciplinary & Intro
Length: 2 days
CEUs: 1.6
Availability: Public & In-House
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.

Recent consulting projects have integrated petrophysics with completions in organic shale reservoirs for major operators in the Wolfberry, Wolfbone, Wolfcamp, Marcellus, Utica, Cline, Eagle Ford, and Bakken. His paper (SPE 174994) “Liquids Rich Organic Shale Recovery Factor Applications” demonstrates the application of the techniques presented in the school to estimate recoveries and producing heights with various landing options and to optimize the number of stacked laterals in organic shale reservoirs. Another paper (SPE 125008) “A Novel Approach to Identifying Refracturing Candidates and Executing Refracture Treatments in Multiple Zone Reservoirs” has received considerable attention lately. He received the SPE Regional Formation Evaluation Award in 2018. Bob has a BS from the US Naval Academy and MBA from the University of Florida.

Courses Taught:
• Evaluating Well Performance for Unconventional and Conventional Reservoirs
• Practical Interpretation of Open Hole Logs
• Predicting Organic Shale Well Performance
• Refrac Candidate Selection, Execution and Performance Evaluation for Conventional and Unconventional Reservoirs

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.
**PRESSURE TRANSIENT TEST DESIGN AND INTERPRETATION**

**Instructor:** Christine Ehlig-Economides, PhD  
**Discipline:** Engineering, Formation Evaluation  
**Length:** 5 days  
**CEUs:** 4.0  
**Availability:** Public & In-House

**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 multwell 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."

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**PRINCIPLES AND PRACTICES OF MUD MOTOR NEW**

**Instructor:** Robello Samuel, PhD  
**Discipline:** Engineering  
**Length:** 1 day  
**CEUs:** 0.8  
**Availability:** Public & In-House

**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)

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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.
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
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

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)
Instructor: Robert ‘Bob’ Barba  
**Discipline:** Engineering, Unconventional Reservoirs  
**Length:** 2 days  
**CEUs:** 1.6  
**Availability:** In-House & Live Online

Who Should Attend:  
Engineers, managers, and geoscientists who want to maximize the probability of success and minimize surprises from a refrac program in unconventional or conventional reservoirs. Particular emphasis is placed on managing primary (parent) - infill (child) frac interactions within a drilling spacing unit to avoid EUR losses and to maximize the number of wellbores within the DSU. Refracs have been shown to be the most cost-effective method to maximize recovery within a DSU in both the primary and infill wells. “Best Practices” are presented to maximize productivity at the minimum cost possible from the primary and infill wells.

**Course Description:**  
Participants will learn a methodology that first accurately characterizes the reservoir properties to evaluate the effectiveness of the original hydraulic fracture treatment with production data. 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 economic techniques are presented to effectively access these reserves with refracturing treatment(s). “Best practices” presented include recovery factor analysis, perforation cluster optimization using Extreme Limited Entry constrained by critical rate, and the use of expandable tubulars to minimize refrac costs. Innovative techniques such as single perforation hole clusters are discussed to more accurately gauge cluster efficiency. Treatments are designed to both maximize productivity from “new rock” and recharge the existing fracture system to prevent infill well EUR losses.

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

**Learning Outcomes:**  
- What makes a good refrac candidate in conventional and unconventional reservoirs?  
- Is the poor performance of the candidate due to the initial frac or the reservoir?  
- What is the optimum refrac strategy for primary wells to avoid infill well EUR losses?  
- What will a refraced well produce?  
- What are the “best practices” for refracs in conventional and unconventional reservoirs?  
- What information and analyses are required to answer these questions?

**Course Description:**  
In addition to identifying the best refrac candidates, the mechanical aspects of refrac execution are emphasized to ensure that the maximum stimulated volume possible is obtained. The methodology utilizes basic openhole wireline logs, core data, pre-frac pump-in test data, and production data to predict production performance as a function of frac performance. This information can then be used to determine what refrac practices are resulting in the highest recovery factors. Diagnostic techniques such as production logs, microseismic, tracers, decline curve analysis, and post frac production analysis are discussed to supplement the performance analysis.

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Course Description:  
The course will cover the fundamentals of reservoir characterization for mudrock reservoirs. Participants will learn screening techniques to identify continuous types of 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).
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.

WE PRACTICE

on various SCA projects

as contracted by major oil and gas companies domestically and internationally.

Instructor: Shah Kabir
Discipline: Engineering, Unconventional Reservoirs
Length: 2 days
CEUs: 1.6
Availability: Public & In-House

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

Instructor: Amy D. Fox, PhD
Discipline: Engineering, Unconventional Reservoirs
Length: 2 days
CEUs: 1.6
Availability: Public, In-House & Live Online

Who Should Attend:
Geologists, geophysicists, engineers (geological, reservoir, drilling, completions), petrophysicists, asset managers. Because it is such a multi-disciplinary subject, anyone involved in planning or implementing a field development project can benefit from learning how geomechanics is relevant from exploration to abandonment.

Course Description:
Petroleum geomechanics is a unique, multi-disciplinary field that combines elements of rock mechanics, geology, geophysics and engineering. Although it has been around for several decades, addressing issues such as wellbore stability, fault seal/leakage and sand production, geomechanics started receiving increasing attention with the advent of unconventional resources, where the mechanical behavior of the reservoir is a key factor in successful development programs. The fact that there are few research groups in academia dedicated to petroleum geomechanics means there are few specialists in the field compared to other disciplines. As a result, the need for geomechanics training for non-specialists in industry is very high.

The course is focused on conveying an understanding of why an accurate geomechanical model is necessary and how it can inform decisions made by various stakeholders within an oil and gas organization. A wide range of data types and analyses are discussed and prioritized. Class time is split between lectures, examples, and hands-on exercises. If time and circumstances permit, attendees can get help looking at examples of their own data.

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

Learning Outcomes:
- Relevancy of geomechanics throughout the reservoir life-cycle.
- Kinds of data can be used to build a geomechanical model.
- Applications of the principles of geomechanics to solve real-world problems and reduce risk.
- How to be proactive instead of reactive towards geomechanical issues.

Course Content:
- Geomechanics in conventional vs. unconventional reservoir
- In-situ stress and pore pressure
- Mechanical rock properties
- Stress determination – data types, modeling approaches
- Borehole stresses and wellbore failure
- Geomechanics in hydraulic fracturing
- Natural fractures and production
- Effects of depletion and injection
Seal and Reservoir Pressures Analysis for E&P Prospect's Risk Assessment

Instructor: Selim Shaker, PhD
Discipline: Geoscience, Engineering
Length: 5 days
CEUs: 4.0
Availability: In-House

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 hydrocarbons under a competent sealed cap and/or un-breeched 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 reservoir'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
- Prospect Evaluation
- Pre drilling
- While drilling
- Post drilling

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 (Shef 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

Unconventional Resource Plays - Workshop

Instructor: Stephen A. Sonnenberg, PhD
Discipline: Geoscience, Engineering, Unconventional Reservoirs
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 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 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-sport identification). Integrate with thermal maturity and pressure data (always as a function of depth, subsue 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
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 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

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.

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.

Instructor: Leo 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.

Instructor: Leo Roodhart, PhD and Gerrit Nitters
Discipline: Engineering, Unconventional Reservoirs
Length: 5 days
CEUs: 4.0
Availability: Public & In-House

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.
As recognized authorities, SCA instructors have years of industry experience plus the knowledge and skills required to tackle today's challenges in exploring and developing unconventional resource plays.

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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Geosteering: Best Practices, Pitfalls, & Applied Solutions

This two-day course teaches participants the importance of geosteering and what defines a geosteering success, how to look critically at pre-drill geologic work-ups, and what pitfalls are inherent to geosteering techniques. Also covered is how to recognize LWD-MWD telemetry problems, how to recognize deficient LWD data, positional uncertainty, cultural issues within horizontal well teams and communication strategies, and best practices for each phase of a horizontal well. Best practices are addressed for the pre-drill phases, drilling curve, landing curve, lateral drilling, and post-drill use of results.

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Hydraulic Fracturing: Theory and Application

Take an in-depth look at hydraulic fracturing with this course. Approached from a theoretical viewpoint initially, 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.

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Predicting Organic Shale Well Performance

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 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.

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Refrac Candidate Selection, Execution and Performance Evaluation for Conventional and Unconventional Reservoirs

Participants will learn a methodology that first accurately characterizes the reservoir properties to evaluate the effectiveness of the original hydraulic fracture treatment with production data. 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 economic techniques are presented to effectively access these reserves with refracturing treatment(s). “Best practices” presented include recovery factor analysis, perforation cluster optimization using Extreme Limited Entry constrained by critical rate, and the use of expandable tubulars to minimize refrac costs. Innovative techniques such as single perforation hole clusters are discussed to more accurately gauge cluster efficiency.

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Petroleum Fluids and Source Rocks in E&P Projects

Interpret fluids/source rock data to add value to projects from exploration to environmental remediation in both conventional and unconventional petroleum systems world-wide. Course participants will learn how to identify and propose geochemical solutions, design cost-effective sampling/analysis programs for source rocks and petroleum fluids, construct expulsion profiles for different types of source rocks, and predict fluid properties. Other topics covered are correlating oils to source rocks, interpreting the origin of hydrocarbon/non-hydrocarbon natural gases, and integrating geochemical interpretations into a holistic petroleum systems analysis.

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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.

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.

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.

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.

Reservoir Scale Geomechanics
The course is focused on conveying an understanding of why an accurate geomechanical model is necessary, and how it can inform decisions made by various stakeholders within the reservoir finding and development process. A wide range of data types and analyses are discussed and prioritized. Class time is split between lectures, examples, and hands-on exercises. Learning outcomes include: relevancy of geomechanics throughout the reservoir life-cycle, knowledge of the kinds of data that can be used to build a geomechanical model, and applications of the principles of geomechanics to solve real-world problems and reduce risk.

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.

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.

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.
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 to be optimally utilized. Most oil and gas wells require artificial lift for most of their productive life; the artificial lift systems are an 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 is 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, HHP, plunger, capillary injection.
- Provide knowledge about the lift system, from downhole to surface - for GL, RRL, ESP, PCP, HHP, 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-liquidification
Day 5: Capillary, Plunger Lift, Digital Oil Field

Note:
This course is customizable from one to five-days in length.
### EVALUATING WELL PERFORMANCE FOR UNCONVENTIONAL AND CONVENTIONAL RESERVOIRS

**Instructor:** Robert 'Bob' Barba  
**Discipline:** Engineering, Unconventional Reservoirs  
**Length:** 3 days  
**CEUs:** 2.4  
**Availability:** In-House

**Who Should Attend:** Engineers, managers, geoscientists concerned that reservoirs are not completed using best techniques.

**Course Description:** This course is for engineers, geoscientists, asset managers to maximize asset value in horizontal or vertical wells in unconventional/conventional reservoirs. Learn to evaluate well performance using recovery factor, effective frac length technique for conventional reservoirs. When combined with characterization of mechanical properties, a determination can be made whether poor production is due to poor completion, poor reservoir rock, or both.

Use open hole wireline logs, core data, pre-frac pump-in test data, production data to predict production performance as a function of recovery factor, effective frac length. Data is used to determine what completion practices create highest recovery factors/longest effective frac length in a wellbore perforation cluster. Case studies reinforce concepts. Predict EUR's prior to frac as a function of completion options. Calibrated petrophysical model provide oil or gas in place, permeability, key rock properties.

Participants will be able to develop well performance models specific to reservoirs. Participants are encouraged to provide local examples for discussion of model implementation, “best practices” for areas of activity.

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

**Learning Outcomes:**  
- Maximize asset value in horizontal or vertical wells in unconventional/conventional reservoirs.  
- Learn methods that evaluate well performance using recovery factor technique for all reservoirs, effective frac length technique for conventional reservoirs.  
- Determine if poor production is a function of a poor completion, poor reservoir rock, or both.  
- Calculate inputs required to develop calibrated reservoir, mechanical properties to load directly into a 3D hydraulic fracture simulator.  
- Develop well performance models specific to reservoirs.

**Course Content:**  
- Review of basic log analysis techniques  
- Log quality control, calibration steps  
- Recovery factor model data requirements  
- Effective frac length model data requirements  
- Net pay model calibration using log, core, DST, well test, production data  
- Permeability, rock properties, reservoir pressure model calibration to field data  
- Integration of rock properties, permeability, reservoir pressure models  
- Basic production decline curve analysis  
- Effective frac length exercises  
- Historical best practices for improving effective frac length  
- Review of student provided case studies

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### GEOSTEERING: BEST PRACTICES, PITFALLS, & APPLIED SOLUTIONS

**Instructor:** Raymond Woodward  
**Discipline:** Geoscience, Unconventional Reservoirs  
**Length:** 2 days  
**Course CEUs:** 1.6  
**Availability:** Public & In-House

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

**Course Description:** This course covers topics that impact geosteering efforts, including well 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, and 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 best practices play a role in 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 approaches.  
- 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:**  
- Define 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-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 software, 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

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### HYDRAULIC FRACTURING: THEORY & APPLICATION

**Instructor:** Jennifer Miskimins, PhD  
**Discipline:** Engineering, Unconventional Reservoirs  
**Length:** 3 days  
**CEUs:** 2.4  
**Availability:** Public & In-House

**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 fracturing 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 reservoirs 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 fracturing modeling  
- Economic optimization of treatments

**Conclusions**
### PETROLEUM FLUIDS AND SOURCE ROCKS IN E&P PROJECTS

**Instructor:** Alexei Milkov, PhD  
**Discipline:** Geoscience, Unconventional Reservoirs  
**Length:** 3 days  
**CEUs:** 2.4  
**Availability:** Public, In-House, & Live Online

**Who Should Attend:** Geoscientists, geoscience managers working exploration, appraisal, development, production, or environmental projects.

**Course Description:**
Interpret fluids/source rock data to add value to projects from exploration to environmental remediation in both conventional/unconventional petroleum systems worldwide.
- Fundamentals of petroleum composition/properties.
- Sampling of rocks, fluids.
- Analytical techniques to evaluate potential of source rocks, composition of petroleum fluids.
- Characterization/risking of source rocks, prediction of fluid properties in exploration prospects.
- Interpretation of data from drilled exploration wells to assess value of discovery.
- Assess reservoir compartmentalization during appraisal/development.
- Geochemical surveillance of oil & gas production.
- Locate producing intervals, allocate petroleum production.
- Identify oil sources for petroleum spills/leaks.

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

**Learning Outcomes:**
- Identify oil sources for petroleum spills/leaks.
- Identify/proposal geochemical solutions.
- Design cost-effective sampling/analysis programs for source rocks, petroleum fluids.
- Construct expulsion profiles for different types of source rocks.
- Predict fluid properties, product value in exploration/production wells.
- Correlate oils to source rocks.
- Interpret origin of hydrocarbon/non-hydrocarbon natural gases.
- Integrate geochemical interpretations into holistic petroleum systems analysis.

**Course Content:**
- Day 1. Fundamentals of petroleum geochemistry. Sampling and analytical techniques
- Day 2. Petroleum exploration and drilling the prospect
- Day 3. Appraisal, development, production, environmental, and downstream projects

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### PREDICTING ORGANIC SHALE WELL PERFORMANCE

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

**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 the 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 frac rates. 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 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.
- 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:**
- Outline systematic forecasting procedures combining rate-transient analysis (RTA), decline curve analysis, numerical and analytical reservoir models.

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

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### PRODUCTION FORECASTING FOR LOW PERMEABILITY RESERVOIRS

**Instructor:** W. John Lee, PhD  
**Discipline:** Engineering, Unconventional Reservoirs  
**Length:** 2 days  
**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 case exercises illustrating principles will be included.

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

REFRACT CANDIDATE SELECTION, EXECUTION, AND PERFORMANCE EVALUATION FOR CONVENTIONAL AND UNCONVENTIONAL RESERVOIRS

Instructor: Robert ‘Bob’ Barba
Discipline: Engineering, Unconventional Reservoirs
Length: 2 days
CEUs: 1.6
Availability: In-House & Live Online

Who Should Attend:
Engineers, managers, and geoscientists who want to maximize the probability of success and minimize surprises from a refrac program in unconventional or conventional reservoirs. Particular emphasis is placed on managing primary (parent) - infill (child) frac interactions within a drilling spacing unit to avoid EUR losses and to maximize the number of wellbores within the DSU. Refracs have been shown to be the most cost-effective method to maximize recovery within a DSU in both the primary and infill wells. “Best Practices” are presented to maximize productivity at the minimum cost possible from the primary and infill wells.

Course Description:
Participants will learn a methodology that first accurately characterizes the reservoir properties to evaluate the effectiveness of the original hydraulic fracture treatment with production data. 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 economic techniques are presented to effectively access these reserves with refracturing treatment(s). “Best practices” presented include recovery factor analysis, perforation cluster optimization using Extreme Limited Entry constrained by critical rate, and the use of expandable tubulars to minimize frac costs. Innovative techniques such as single perforation hole clusters are discussed to more accurately gauge cluster efficiency. Treatments are designed to both maximize productivity from “new rock” and recharge the existing fracture system to prevent infill well EUR losses.

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

Learning Outcomes:
• What makes a good refrac candidate in conventional and unconventional reservoirs?
• Is the poor performance of the candidate due to the initial frac or the reservoir?
• What is the optimum refrac strategy for primary wells to avoid infill well EUR losses?
• What was the refraced well produce?
• What are the “best practices” for refracs in conventional and unconventional reservoirs?
• What information and analyses are required to answer these questions?

Course Description:
In addition to identifying the best refrac candidates, the mechanical aspects of refrac execution are emphasized to ensure that the maximum stimulated volume possible is obtained. The methodology utilizes basic openhole wireline logs, core data, pre-frac pump-in test data, and production data to predict production performance as a function of frac performance. This information can then be used to determine what refrac practices are resulting in the highest recovery factors. Diagnostic techniques such as production logs, microseismic, tracers, decline curve analysis, and post-frac production analysis are discussed to supplement the performance analysis.

RESERVOIR CHARACTERIZATION FOR MUDROCK RESERVOIRS

Instructor: Stephen A. Sonnenberg, PhD
Discipline: Geoscience, Engineering, Unconventional Reservoirs
Length: 3 days
CEUs: 2.4
Availability: Public & In-House

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 (Neuquen Basin), Eagle Ford (Gulf Coast), Haynesville (Gulf Coast), Greenhorn (Denver Basin), Marcellus (Appalachian Basin).
### Reservoir Management of Unconventional Reservoirs: From Inception to Maturity

**Instructor:** Shah Kabir  
**Discipline:** Engineering, Unconventional Reservoirs  
**Length:** 2 days  
**CEUs:** 1.6  
**Availability:** Public & In-House

**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

### Reservoir Scale Geomechanics

**Instructor:** Amy D. Fox, PhD  
**Discipline:** Engineering, Unconventional Reservoirs  
**Length:** 2 days  
**CEUs:** 1.6  
**Availability:** Public, In-House, & Live Online

**Who Should Attend:** Geologists, geophysicists, engineers (geological, reservoir, drilling, completions), petrophysicists, asset managers. Because it is such a multi-disciplinary subject, anyone involved in planning or implementing a field development project can benefit from learning how geomechanics is relevant from exploration to abandonment.

**Course Description:** Petroleum geomechanics is a unique, multi-disciplinary field that combines elements of rock mechanics, geology, geophysics and engineering. Although it has been around for several decades, addressing issues such as wellbore stability, fault seal/sealage and sand production, geomechanics started receiving increasing attention with the advent of unconventional resources, where the mechanical behavior of the reservoir is a key factor in successful development programs. The fact that there are few research groups in academia dedicated to petroleum geomechanics means there are few specialists in the field compared to other disciplines. As a result, the need for geomechanics training for non-specialists in industry is very high.

The course is focused on conveying an understanding of why an accurate geo-mechanical model is necessary and how it can inform decisions made by various stakeholders within an oil and gas organization. A wide range of data types and analyses are discussed and prioritized. Class time is split between lectures, examples, and hands-on exercises. If time and circumstances permit, attendees can get help looking at examples of their own data.

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

**Learning Outcomes:**
- Relevantly of geomechanics throughout the reservoir life-cycle.
- Kinds of data can be used to build a geomechanical model.
- Applications of the principles of geomechanics to solve real-world problems and reduce risk.
- How to be proactive instead of reactive towards geomechanical issues.

**Course Content:**
- Geomechanics in conventional vs. unconventional reservoir
- In-situ stress and pore pressure
- Mechanical rock properties
- Stress determination – data types, modeling approaches
- Borehole stresses and wellbore failure
- Geomechanics in hydraulic fracturing
- Natural fractures and production
- Effects of depletion and injection

### 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 crackable 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
NEW

Instructor: Ruben O. Calgari
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 unconventional 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
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 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
CEUs: 4.0
Availability: Public & In-House

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 type.
- 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 simulations.
- Understand the nature, environmental impact of fluids used in production enhancement treatments to develop a disposal strategy.
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 inspection techniques to confirm zonal isolation and detect mechanical damage, corrosion, scale, perforations. 2.) Water identification and fluid contribution emphasizes techniques to quantify the sources of water, oil and gas production 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-gas pressure fairways, AVG, distribution of geological basins world-wide, impact on geopressure profiles.

Learning Outcomes:
• Understand causes, concepts, graphic representations of subsurface geopresurred, 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 PGP 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 models
• Seismic velocity-Qualification for PP predictions
• Prediction model from seismic, offset wells
• Limitations, pitfalls
• Post-drilling: Compartmentalization, risk assessment, appraisal.
• Application, analyses for Lead/Prospect evaluation
• Compartamentalization, seal effectiveness, retention capacity
• Transgression and regression

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.
• Calculations 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
CEUs: 4.0
Availability: Public & In-House

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 multwell 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 cuttings 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
• Evaporites, miscellaneous rock types
• Logging exercises

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.
Together SCA and IHRDC offer the oil and gas industry a broad spectrum of high-quality training content and effective blended learning delivery options that can be customized to fit the needs of our clients. We have agreed to initiate cross-marketing and selling of our respective products and services and, where appropriate, deliver joint services for the benefit of our international oil and gas industry clients.

IHRDC is a Boston-based company that strives to accelerate workforce development through customized solutions to fit client needs. Founded by President David A.T. Donohue, JD, PhD in 1969, they also have offices in Houston, London, Amsterdam, Abu Dhabi, Kuala Lumpur, and Lagos. IHRDC has set a worldwide standard of excellence through their e-Learning and Knowledge Solutions, Competency Management, and Instructional Programs.

**IHRDC’s e-Learning and Knowledge Solutions** provide employees with innovative learning resources that offer accelerated, low cost, effective, and on-demand learning devoted to all functional areas of the international oil and gas industry.

- IPIMS - Over 1,000 courses in all areas of Upstream Technology
- Petroleum Online - 13 courses encompassing the complete oil and gas value chain
- Operations & Maintenance - Over 300 courses covering plant operations and maintenance
- Business Essentials - Over 100 MBA-level courses

**IHRDC’s Competency Management** offers industry-leading competency and compliance products and services that lead to a fully competent workforce.

- Competency Management Service - Competency models, assessments, individual development plans
- CMS Online - The industry’s leading competency reporting and compliance system
- Library of Competency Models - Best-in-class resources guarantee successful outcomes

**IHRDC’s Instructional Programs** offer outstanding programs that teach management and petroleum business essentials using challenging business games.

- Boston Public Offerings - eleven outstanding O&G management certificate programs offered annually
- International Workshops - Athens, Houston, London, and Rio De Janeiro
- Private In-House Programs - Design and deliver in-house programs that meet clients’ specific needs
- Downstream Oil Programs - Effective training in the commercial aspects of the oil industry in Houston, London and Cambridge UK, and Dubai

For inquiries regarding IHRDC’s services, please contact us on our website.
THE DANIEL J. TEARPOCK GEOSCIENCE CERTIFICATION PROGRAM

AKA “GEOSCIENCE BOOT CAMP”

Instructor: SCA Staff
Discipline: Multi-Disciplinary & Intro
Length: 10 days
CEUs: 23.2
Availability: Public & In-House

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 / 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
  - Hand 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 – Define 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

Instructor: Susan Howes, PE, PHR
Discipline: Multi-Disciplinary & Intro
Length: 2 days
CEUs: 1.6
Availability: Public & In-House

Who Should Attend:
Geoscientists, geotechnical engineers, geologists, 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.

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; it 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

**NEW**

<table>
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<tr>
<th>Instructor: Ruben O. Caligari</th>
<th>Discipline: Multi-Disciplinary &amp; Intro</th>
<th>Length: 2 days (optional 3rd)</th>
<th>CEUs: 1.6</th>
<th>Availability: In-House</th>
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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 provides 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

<table>
<thead>
<tr>
<th>Instructor: Christine Ehlig-Economides, PhD</th>
<th>Discipline: Multi-Disciplinary &amp; Intro</th>
<th>Length: 4 days</th>
<th>CEUs: 3.2</th>
<th>Availability: In-House</th>
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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 multivariable 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

<table>
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<tr>
<th>Instructor: Susan Howes, PE, PHR or Hal F. Miller</th>
<th>Discipline: Multi-Disciplinary &amp; Intro</th>
<th>Length: 1 day</th>
<th>CEUs: 0.8</th>
<th>Availability: Public, In-House, &amp; Live Online</th>
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Who Should Attend:
Enter 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).

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**Elements of Petroleum Geology**

Instructor: Stephen A. Sonnenberg, PhD  
Discipline: Geoscience, Multi-Disciplinary & Intro  
Length: 3 days  
CEUs: 2.4  
Availability: In-House

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 & Intro  
Length: 2 days  
CEUs: 1.6  
Availability: Public & In-House

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

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**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.
Course Description:
This three-day workshop focuses on the application of programming, visualizations, and data science solutions to energy industry data. Dr. Foster believes that Python will be a key tool in the future of data analytics and data science (as it already is) and, as such, this workshop is geared towards teaching students how to leverage the Python data science ecosystem (Numpy, Pandas, Matplotlib, and Jupyter, etc). This course is designed to be highly interactive. Participants will be coding Python classes and functions, dashboards, and effective visualizations using all free open-source tools. By the end of the workshop, students will have practical experience designing tools that will optimize workflows in addition to a firm understanding of how the Python data science ecosystem can be applied to energy industry data. As a deliverable, students will have created a dynamic dashboard using the knowledge and expertise in new tools gained over the course. Major course concepts will be covered in one-hour bundles, with 15 minutes of lecture, 15 minutes of live demonstration, and 30 minutes of interactive coding, coaching, and troubleshooting.

Learning Outcomes:
• Primary Goal: Build an Autotype User Interface (eg Dashboard) using open source tools and oil and gas data.
• Python 3 and select Python Packages. - Numpy/SciPy/Pandas/Scikit-Learn/PyViz
• Basics of energy machine learning.
• Jupyter Project.
• Git/GitHub.
• Virtual environments.

Course Content:
• Describe the skills necessary to be an effective data scientist
• Benefits of using open source software for data analysis and machine learning
• Benefits of reproducibility, code prototyping, data exploration; review basic version control commands, and interact with Github’s cloud source file storage.
• Review Python syntax, flow control, data structures, and object-oriented programming concepts.
• Introduction of the following concepts: - Intake API for loading datasets; contiguous data structures for array computing; routines for scientific computing and statistics - Accessing and manipulating labeled, indexed data; uilding high-quality data visualizations; creating web-based interactive visualizations.

Who Should Attend:
Technical energy industry professionals (petroleum engineers, geoscientists) with basic Python proficiency.

Learning Outcomes:
• What Big Data really means and how to effectively prepare data for deep dives with advanced analytic techniques and ensure that any drawn conclusions are trustworthy and reliable.
• To glean insights and make predictions from your data, using techniques such as outlier detection, data debiasing and imputation, feature engineering, anomaly detection, supervised and unsupervised learning, spatiotemporal modeling, and uncertainty modeling.
• To understand the assumptions and limits of data precision, scale and coverage, spatial interpolation, multivariate models, analytics and uncertainty models, given that predictions are only as strong as your process.
• What Big Data really means and how to apply robust machine learning tools to real Energy data problems (Dask, Torch, TensorFlow etc)

PLEASE NOTE: PARTICIPANTS ARE REQUIRED TO BRING THEIR OWN LAPTOPS. COURSE MATERIALS WILL CONSIST OF WEB-HOSTED LECTURE MATERIALS, INSTRUCTOR LED DEMONSTRATIONS, AND PROGRAMMING EXAMPLES. EVERYTHING WILL BE DELIVERED VIA A CLOUD-BASED JUPYTER LAB SESSION.

Course Description:
This two-day workshop focuses on the advanced application of data analytics, geostatistics, and machine learning to energy industry data. The course is a critical step in laying the foundation necessary for thinking statistically and identifying the key signals from the noise that is data.

Specifically, this workshop will teach participants:
• To effectively prepare data for deep dives with advanced analytic techniques and ensure that any drawn conclusions are trustworthy and reliable.
• To glean insights and make predictions from your data, using techniques such as outlier detection, data debiasing and imputation, feature engineering, anomaly detection, supervised and unsupervised learning, spatiotemporal modeling, and uncertainty modeling.
• To understand the assumptions and limits of data precision, scale and coverage, spatial interpolation, multivariate models, analytics and uncertainty models, given that predictions are only as strong as your process.
• What Big Data really means and how to apply robust machine learning tools to real Energy data problems (Dask, Torch, TensorFlow etc)

PLEASE NOTE: PARTICIPANTS ARE REQUIRED TO BRING THEIR OWN LAPTOPS. COURSE MATERIALS WILL CONSIST OF WEB-HOSTED LECTURE MATERIALS, INSTRUCTOR LED DEMONSTRATIONS, AND PROGRAMMING EXAMPLES. EVERYTHING WILL BE DELIVERED VIA A CLOUD-BASED JUPYTER LAB SESSION.
INTRODUCTION TO RISK AND UNCERTAINTY MANAGEMENT

Instructor: Susan Howes, PE, PHR
Discipline: Multi-Disciplinary & Intro
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

“'A wise man can learn more from a foolish question than a fool can learn from a wise answer.’ ”

Bruce Lee

PETROLEUM ENGINEERING FUNDAMENTALS

Instructor: Ruben O. Caligari
Discipline: Multi-Disciplinary & Intro
Length: 3 days (optional 3rd)
CEUs: 1.6
Availability: In-House
(This course is available in Spanish)

Who Should Attend:
Enter-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

PROJECT MANAGEMENT PROFESSIONAL EXAM PREP COURSE

Instructor: Jill Almaguer, PE, PMP
Discipline: Multi-Disciplinary & Intro
Length: 4 days
CEUs: 3.2
Availability: Public & In-House

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.
Field Courses

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

Field Course Taught:
- The Book Cliffs, Utah: A Case Study in Coastal Sequence Stratigraphy

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)

“In train people well enough so they can leave; treat them well enough so they don’t want to.”
— Richard Branson
THAT RUNS DEEP”

recommendations are grounded in professional ethics, and supported
by respected authorities and decision makers.

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.

“An organization’s ability to learn, and translate that learning into action rapidly, is the ultimate competitive advantage.”
Jack Welch

- Oriental, 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-beded 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

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
- 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-beded 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

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

Field Courses
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 interconnectedness.

Course Description:
This field trip in the area around Casper, Wyoming examines shear and extension fractures and fractured material. The emphasis will be on fractures 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 lithostratigraphic basins. 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 formations, 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 use 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 Electured 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, 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.

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.
Who Should Attend:
This course is relevant to all subsurface geoscientists and engineers who wish to broaden their knowledge of sandy turbidite systems. 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 area
- 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 Scaffreils
- 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.
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, less the non-refundable registration fee of US $150.00, will be reimbursed provided the cancellation is received in our office at least 30 days prior to the first day of class. For cancellations received less than 30 days in advance, the full tuition fee is due.

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 full 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.

Serving the Upstream Oil & Gas Industry Since 1988
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.
INSTRUCTOR BIOGRAPHIES

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 UMO/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 Subsurface Geophysical Mapping (p 15)
- Hand Contouring Workshop (p 17)

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 at 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 RF 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 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 61)

ROBERT BARBA
Bob spent 10 years with Schlumberger as an openhole field engineer, sales engineer, and product development manager. While at Schlumberger he was the North American product champion for the “FracHite” and “Quantifrac” products that integrated wireline, testing, and pumping inputs to optimize hydraulic fracture treatments. Since then he has spent 24 years consulting to over 250 companies on petrophysics and completion optimization.

He served as a SPE Distinguished Lecturer on integrating petrophysics with the hydraulic fracture treatment optimization process. He has implemented this integration process in a wide variety of reservoirs in North America, conducting numerous field studies for operators evaluating the effective frac length and recovery factors in over 4000 wells and providing “best practices” recommendations based on the study results (SPE 90483). He has been responsible for the petrophysical analysis of over 50 major fields worldwide as part of integrated reservoir characterization studies identifying remaining mobile hydrocarbons. He has authored 36 technical papers on the integration of petrophysics with completion designs, horizontal wells, and reservoir characterization projects.

Recent major consulting projects have integrated petrophysics with completions in organic shale reservoirs for major operators in the, Wovolta, Wolfbone, Wolfcamp, Marcellus, Utica, Cline, Eagle Ford, and Bakken.

His latest paper (SPE 174994) “Liquids Rich Organic Shale Recovery Factor Applications” (to be presented at the 2015 ATCE) demonstrates the application of the techniques presented in the school to estimate recoveries and production with various landing options and optimize the number of stacked laterals in organic shale reservoirs.

Another recent paper (SPE 125008) “A Novel Approach to Identifying Refracturing Candidates and Executing Refracture Treatments in Multiple Zone Reservoirs” has received considerable attention lately with the resurgence of refracs in the current pricing environment. He received the SPE Regional Formation Evaluation Award in 2018. Bob has a BS from the US Naval Academy and MBA from the University of Florida. He is also a member of the SPE, SPWLA, and the AAPG.

Courses taught:
- Evaluating Well Performance for Unconventional and Conventional Reservoirs (p 37, 49)
- Practical Interpretation of Open Hole Logs (p 39, 54)
- Predicting Organic Shale Well Performance (p 39, 50)
- Refrac Candidate Selection, Execution, & Performance Evaluation for Conventional and Unconventional Reservoirs (p 42, 51)

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 57)

JIM BRENNKE
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 projects at ExxonMobil. 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 Argentina 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 LAC: 2005-2011. Mr. Caligari was named as a Distinguished Member of SPE in 2020.

Courses taught (offered in Spanish):
- Basic Petroleum Operations (p 58)
- Petroleum Engineering Fundamentals (p 61)
- Unconventional Oil and Gas (p 53)
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, geophysical 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 28, 57)

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, and 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, Uplift - 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 18)

RAJAN N. CHOKSHI, PhD

Dr. Chokshi works as an artificial lift and production “Optimizer” for Accuant Solutions, a consulting firm out of Houston, TX. He has over 30 years of work experience in petroleum and software industries. He has worked at ONGC of India, The University of Tulsa artificial lift projects, CEALC and ConnectShip (consulting and software firms) and Weatherford (a global service company) in a variety of roles from petroleum engineer, research engineer, software developer, project manager, trainer, senior consultant, and a senior business leader. He has worked on many petroleum and software projects globally in the areas of multi-phase flow, artificial lift, production optimization, well performance improvement and real-time production monitoring.

Dr. Chokshi has taught many courses and conducted workshops for practicing professionals around the globe in public and private forums. He has led the development of a semester-long curriculum and taught for senior-level university students in artificial lift and production optimization at Texas Tech and Missouri S&T universities. Dr. Chokshi is an SPE Distinguished Lecturer (2015-2016 and 2018-2019) and he serves on the SPE global committees for training and for the production awards. He has co-chaired an SPE artificial lift workshop. He received a B.E., Chemical Engineering from The Gujarati University, a M. Tech, Chemical Engineering from IIT in Kanpur India, and his Ph.D. in Petroleum Engineering from The University of Tulsa.

Courses taught:
- Artificial Lift and Production Optimization Solutions (p 35, 48)
- Artificial Lift and Real-Time Optimization for Unconventional Assets (p 35, 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. Alviga Lisenbee and Dr. James Fox. He received his Master of Science in geology from the New Mexico Institute of Mining and Technology in 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.

Courses taught:
- Effects of Mechanical Stratigraphy and Structure on Naturally Fractured Reservoirs (Central Wyoming) (p 64)

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 62)
- Deepwater Systems, Ainsa Basin, Spanish Pyrenees: Application to Hydrocarbon Prospectivity and Unconventional Plays (p 63)
- High-Continuity Sandy Turidilate System: Application to Hydrocarbon Prospectivity (p 65)

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 chairmain 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 58)
- Pressure Transient Test Design and Implementation (p 40, 55)
JOHN T. FOSTER, PhD, PE

Dr. Foster is Chief Technology Officer and Co-Founder at dayhum. 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 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 of earthquakes to geomechanically-conscious computer-aided design. Research interests include new approaches to the experimental measurement of soil properties, development of advanced numerical techniques for robust structure prediction in geomechanics, geomechanics, impact mechanics, fracture mechanics, and anomalous transport processes. Additionally, he has interest in fundamental theoretical advancements of the peridynamic theory of solids and 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:
- Introduction to Energy Data Science in Python (p 60)

AMY FOX, PhD

Amy Fox earned an undergraduate degree in Geology from the University of New Hampshire and a Masters and PhD in Geophysics from Stanford University. She started her consulting career in 1998 with GeoMechanics International (GMI) in Palo Alto, California. Between 2004 and 2007 she earned her doctorate, completing a thesis entitled “Characterization and Modeling of In Situ Stress Heterogeneity”. Immediately afterwards, GMI asked her to create a training program and career progression for their technical staff of 50+ people globally. Baker Hughes bought GMI in 2008, and in 2009 Amy moved into a corporate training and development role. In 2011 she returned to operations and moved to Canada. Amy has authored and co-authored several articles for industry publications and enjoys giving lectures at luncheons and conferences. Extremely dedicated to the geomechanics field, her every effort is an attempt to promote the understanding and application of the geomechanics discipline.

Course taught:
- Reservoir Scale Geomechanics (p 43, 52)

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 23, 30)

LAURIE GREEN, MSc, PG

Laurie has extensive international and domestic experience as a geophysical interpreter, geomodeler, and project manager on a wide range of 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 20, 26)

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 PhD 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. 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 22, 52)

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. Prior to SPE, Susan served as a Gulf Coast North Sea 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 57)
- Basics of the Petroleum Industry (p 58)
- Introduction to Risk and Uncertainty Management (p 61)
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. He was co-author of the world’s first commercially available software for building high resolution cross-sections. He was also awarded the Douglas Medal, highest scientific award of the Canadian Society of Petroleum Geologists, for “…contributions to the understanding of fault and thrust belts and, in particular, the Mount 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 64)

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. He 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 43, 55)

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 16)

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 where he has served on the faculty since 1977. 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. In 1975-75, he was chief reservoir engineer for Exxon’s Houston District. 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 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 41)  
- Production Forecasting for Low Permeability Reservoirs (p 41, 50)

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 a Master of Science degree from the University of the South of France. 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, Missouri Western 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 62)

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 served as a member of the board of directors of SPE, an SPE Distinguished Member in 1987. Dr. Lopez-Gamundi instructs a five-day course for SCA entitled “Carbonate Sedimentology and Sequence Stratigraphy”. The objective of this 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 15)  
- Sequence Stratigraphy Applied to Oil & Gas Exploration (p 22)

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 received 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 prior to joining the University of Texas at Austin in 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 Multwell 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 Leverson (twice) and Jules Braunstein awards. He has worked closely with the oil and gas industry on problems involving reservoir dimensions and in situ permeability, gained extensive hands-on experience with open hole 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.

Courses taught:
- Effects of Mechanical Stratigraphy and Structure on Naturally Fractured Reservoirs (Central Wyoming) (p 64)

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 sale of 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, HC reserve estimates, 3D framework building, and fracture prediction analyses. Luneburg 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 23)

ROBERT MERRILL, PhD

Dr. Merrill has over 30 years of industry experience. He has explored a variety of basins, including extensional 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, HC reserve estimates, 3D framework building, and fracture prediction analyses. Luneburg 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:
- Hydraulic Fracturing: Theory & Application (p 38, 49)

GERRIT NITTERS

Gerrit is a specialist in well stimulation operations with 40 years of experience in 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 Rhurgas, GDF Suez, NAM, Aurelian Oil, CEP VNG Norway, JKK 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 recently 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 in The Netherlands.

Course taught:
- Well Stimulation Workshop: Practical and Applied (p 45, 53)

ALEXEI MILKOV, PhD

Dr. Alexei V. Milkov is Full Professor and Director of Potential Gas Agency at Colorado School of Mines and a consultant to the oil and gas industry. After receiving his PhD from Texas A&M University, Dr. Milkov worked for BP, Sasol and Murphy Oil, explored for conventional and unconventional oil and gas in over 30 basins on six continents, and participated in the discovery of over 4 billion BOE of petroleum resources. He has deep expertise in oil and gas geochemistry, petroleum systems modeling, exploration risk analysis, resource assessments and portfolio management. Dr. Milkov has around 150 publications (including 47 peer-reviewed articles). He received several industry awards including the J.C. “Cam” Sproule Memorial Award from the American Association of Petroleum Geologists (AAPG) for the best contribution to petroleum geology and the Pieter Schenck Award from the European Association of Organic Geochemists (EAOG) for a major contribution to organic geochemistry.

Course taught:
- Petroleum Fluids and Source Rocks in E&P Projects (p 19, 50)

HAL F. MILLER

Mr. Hal F. 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 Willamette College in Oregon, his MBA and his M.S. in Geology from the University of Colorado in 1979.

Course taught:
- Basics of the Petroleum Industry (p 58)

JENNIFER L. MISKIMINS, PhD

Dr. Jennifer L. Miskimins is an Associate Professor and the Interim Department Head in the Petroleum Engineering Department at the Colorado School of Mines. 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 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.

Course taught:
- Structural Geology & Tectonics as Applied to Upstream Problems (p 23)

ROBERT MERRILL, PhD

Dr. Merrill has over 30 years of industry experience. He has explored a variety of basins, including extensional 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, HC reserve estimates, 3D framework building, and fracture prediction analyses. Luneburg 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:
- Visual Rock Characterization (p 24, 55)
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 36)

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 modeling, sedimentology 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 63)
- High-Continuity Sandy Turbidite System: Application to Hydrocarbon Prospectivity (p 65)

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), Ernest Harwood McGinness 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 18)
- The Practice of Seismic Stratigraphy in Deepwater Settings (p 24)

MICHAEL PYRZCZ, PhD

Dr. Pyrzc recently accepted the role of Associate Professor in the Department of Petroleum and Geosystems Engineering at the University of Texas at Austin, with an assignment in the Bureau of Economic Geology, Jackson School of Geosciences. Michael teaches and supervises research on subsurface data analytics, geostatistics, and machine learning. In addition, Michael accepted the role of Principal Investigator for the College of Natural Sciences, the University of Texas at Austin, freshman research initiative in energy data analytics and teaches widely in the energy industry. Before joining the University of Texas at Austin, Michael conducted and lead research on reservoir data analytics and modeling for 13 years with Chevron’s Energy Technology Company. He became one of the most influential subject matter experts, advising and mentoring on workflow development and best practice.

Michael has written over 45 peer-reviewed publications, a Python package and a textbook on spatial data analytics with Oxford University Press. He is currently an associate editor with Computers and Geosciences, and on the editorial board member for Mathematical Geosciences. Dr. Pyrzc is an AAPG 2020 Distinguished Lecturer on the topic of “Data Analytics and Machine Learning for Energy Geoscience and Engineering.”

Course taught:
- Introduction to Subsurface Machine Learning (p 60)

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 enterprise-wide engineer for clients. Lee has 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 36)
- Introduction to Drilling Engineering (p 38, 59)
- Well Control for Drilling Engineers and Senior Rig Personnel (p 45)

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 worldwide 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. He 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 45, 53)

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 and gas 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.

Courses taught:
- Applied Drilling Engineering Optimization for Drilling Engineers (p 34)
- Applied Drilling Mechanics for Drilling Engineers (p 34)
- Principles and Practices of Mud Motor (p 46)

ED SAVAGE

Ed Savage has over 40 years experience in the evaluation of oil and gas properties, he has held a number of significant positions and has been an industry leader in reservoir design, economics and reserve potential, including the systematic and rigorous application of risk and uncertainty principles. He 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 37)

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 Ph Din 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 major economic potential fields both in the Onshore and offshore areas. He retired from Phillips in 1984 and founded G.A.S. to focus on commercial exploration and training. He has done graduate work in Petroleum Engineering and Statistics. He 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. Shaker 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 36)
- Cement Evaluation and Repair Workshop (p 36)

JOHN W. SNEDDEN, PhD

Dr. John W. Snedden is the Director of the Gulf Basin Depositional Synthesis research project at the Institute for Geophysics, The University of Texas at Austin. A former ExxonMobil petroleum geologist with PhD, MS, and BA degrees from US universities, he accumulated more than 25 years of global experience in international exploration, production and development projects. He has used sequence and seismic stratigraphy to solve problems in 20 different basins including U.S. Gulf Coast, West Texas Midland Basin, North Sea, Mid-Norway, Barents Sea, Papua New Guinea, Arkoma Basin, Niger Delta, Sarawak (Malaysia), Mahakam Delta (Indonesia), US Atlantic Shelf, Northwest Shelf, Australia, Pannonian Basin (Hungary), South Caspian Sea (Azerbaijan, Turkmenistan), China, Norwegian Sea, Gulf of Mexico shelf and shelf edge, North East Caspian Basin (Kazakhstan), Lower Saxony and Ruhr - Muensterland Basins, Germany (unconventional, CBM, Shale Gas, Light Tight Oil), and the deep-water Gulf of Mexico. Dr. Snedden’s strengths include sequence and seismic stratigraphy, sedimentology, reservoir characterization, reservoir connectivity analysis, unconventional resource stratigraphy, and training of technical professionals. He has published over 30 technical papers and given multiple invited and award-winning presentations. He continues teaching external short courses through AAPG and SEPM, and served as technical program chair for both national and international conventions.

As a senior research scientist, he leads the University of Texas at Austin research project focused upon Gulf of Mexico Cenozoic and Mesozoic depositional systems in the US and Mexico, which is currently supported by 25 oil and gas exploration companies. John is lead author of the new book The Gulf of Mexico Sedimentary Basin: Depositional Evolution and Petroleum Applications published by Cambridge University Press, with William Galloway, co-author.

Course taught:
- Depositional Evolution of the Gulf of Mexico Sedimentary Basin (p 16)

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:
- Elements of Petroleum Geology (p 17, 59)
- Reservoir Characterization for Mudrock Reservoirs (p 21, 42, 51)
- Unconventional Resource Plays - Workshop (p 24, 44, 53)

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 36)
- Concrete Evaluation and Repair Workshop (p 36)
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 exploratory experience includes Alaska, North Africa, Middle East, and SE Asia, Lans performed both technical and management roles with Talisman Energy and Anadarko Petroleum. His most recent experience with Talisman includes structural evaluation, putting in-house training, implementing new technology, interfacing with academic research and structural consortia, petroleum system analysis, and risk assessment from basin to wellbore scale.

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:
- Structural and Sequence Stratigraphic Field Course (Hill Country, TX) (p 65)
- Structural Styles in Petroleum Exploration and Production (p 23)

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 65)

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. He’s 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—as an independent consultant and trainer for Baker Hughes for the last few years, it’s been particularly exciting to see just how far the reality of LWD technology has since advanced.

Course taught:
- Applied Seismic Interpretation (p 14)

LESLIE WOOD, PhD
Dr. Wood joined the faculty at Colorado School of Mines in January 2015 as a Professor and the Robert Weyer 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. She also served as a member of the Ultra-Deepwater Advisory Committee for the U.S. Secretary of the Department of Energy and sits on the RPSEA Board of Directors and the RPSEA GEC02 advisory board. Dr. Wood has published widely on the nature of modern and ancient deep- to shallow-water systems around the world and has won numerous best paper and poster awards.

Courses taught:
- Deepwater Deposits Field Course (Arkansas - Oklahoma) (p 63)
- Reservoir Characterization of Clastic (Sandstone) Reservoirs (p 21)

RAYMOND WOODWARD
Raymond received his geology degree from Baylor University in 1979 and then worked for various independent petroleum E&P companies in exploration, exploitation, and supervisory roles. He joined Sonat Exploration in 1994 and spent 4.5 years in Sonat’s Austin Chalk Business Unit during the earlier years of the broad-scale application of horizontal drilling. That setting provided immense experience in the early and still-developing areas of horizontal geology, stratigraphic geosteering, and horizontal drilling. He became an independent geologist-consultant in 1999 and encountered the substantial demand for experienced geologic consultation pertaining to horizontal wells. BHL Consulting, Inc was incorporated in 2000. By 2004, Woodward had designed and brought to fruition BORESIGHT Geosteering Software, initially only for BHL’s consulting functions. Consulting clients’ demand for fully functional geosteering software led to the spin-off of BHL BORESIGHT, Inc, BHL’s software sister company, with Woodward as president of both companies.

BHL Consulting now includes 15 consulting geologists which have collectively steered over 25 million feet of horizontal hole in the US Lower 48, Canada, and Morocco, in 14 different basins, and most significant horizontal plays. Woodward has made geosteering overview presentations for various geologic societies, expanded in-house training programs for client operating companies, and AAPG-related short courses on multiple occasions, receiving the 2015 Best Paper award from the AAPG Division of Professional Affairs for “The Three P’s of Geosteering: Principals, Practices, and Pitfalls”.

Course taught:
- Geosteering: Best Practices, Pitfalls, & Applied Solutions (p 17, 49)

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  Jill B. Almaguer, PE, MBA, PMP

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  Robert ‘Bob’ Barba

- **Artificial Lift Challenges in Unconventional Reservoirs**
  Rajan N. Chokshi, PhD

- **Modern Challenges for Pressure and Rate Transient Analysis**
  Christine Ehlig-Economides, PhD

- **Energy Data Science in Python: Introduction to Pandas**
  John T. Foster, PhD

- **Can Geomechanics Improve Your Drilling and Completions? Spoiler Alert - Yes!**
  Amy Fox, PhD

- **Mapping Faulted Surfaces with Petrel®**
  Mapping Horizontal Wells with Petrel®
  Laurie Green, MSc, PG

- **Mudrock Sedimentology in Unconventional Shale Reservoirs: Suspension Setting, Gravity Flow, or Current Transport**
  Ursula Hammes, PhD

- **Gain Insights Into Long-Term Performance Using Various DCA Tools**
  Shah Kabir

- **Kinetic Sequence Stratigraphy: Its Application to Exploration Evolution of Isolated Carbonate Buildups**
  Oscar Lopez-Gamundi, PhD

- **Well Stimulation: What, Why & How**
  Leo Roodhart, PhD & Gerrit Nitters

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  Mohan Kelkar, PhD

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  W. John Lee, PhD

- **Expression of Sequence Stratigraphy in Outcrop, The Book Cliffs, Utah**
  William Little, PhD

- **Kinetic Sequence Stratigraphy: Its Application to Exploration Evolution of Isolated Carbonate Buildups**
  Oscar Lopez-Gamundi, PhD

- **The Importance of Natural-Fracture Type in Controlling Reservoir Permeability**
  John C. Lorenz, PhD & Scott P. Cooper, MS

- **Visual Cuttings & Core Description to Characterize Reservoir & Non-Reservoir Rock**
  Robert Merrill, PhD

- **What is Your Fracture Conductivity Anyways? Damage Mechanisms and Other Concerns**
  Jennifer L. Miskimins, PhD

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- **Determining Organic Shale EURs Refrac Candidate Selection Refrac Candidate Selection**
  Robert Barba

- **Why is My Mud Bill So High? How to Minimize Costs Associated with a Healthy OBM System**
  Lee Richards, PhD
Reservoir Scale Geomechanics  
Instructor: Amy Fox, PhD  
Date: July 6-8, 2020  
Length: 3 Half-Day Sessions (12.0 Total Hours)

Introduction to Subsurface Machine Learning  
Instructor: Michael J. Pyrcz, PhD  
Date: July 21-24, 2020  
Length: 4 Half-Day Sessions (16.0 Total Hours)

Introduction to Energy Data Science in Python  
Instructor: John T. Foster, PhD  
Date: August 10-14, 2020  
Length: 5 Half-Day Sessions (20.0 Total Hours)

Basics of the Petroleum Industry  
Instructor: Susan Howes, PE, PHR  
Date: August 26-28, 2020  
Length: 3 Three-Hour Sessions (9.0 Total Hours)

Sequence Stratigraphy Applied to O&G Exploration  
Instructor: Oscar Lopez-Gamundi, PhD  
Date: September 8-10, 2020  
Length: 3 Half-Day Sessions (12.0 Total Hours)

PRMS and SEC Reserves and Resources Regulations  
Instructor: W. John Lee, PhD  
Date: October 5-8, 2020  
Length: 4 Half-Day Sessions (16.0 Total Hours)

Production Forecasting For Low Permeability Reservoirs  
Instructor: W. John Lee, PhD  
Date: October 26-29, 2020  
Length: 4 Half-Day Sessions (16.0 Total Hours)

Refrac Candidate Selection, Execution and Performance Evaluation for Conventional and Unconventional Reservoirs  
Instructor: Robert 'Bob' Barba  
Date: July 13-15, 2020  
Length: 3 Half-Day Sessions (12.0 Total Hours)

Practical Interpretation of Open Hole Logs  
Instructor: Robert 'Bob' Barba  
Date: July 27-29 & August 3-5, 2020  
Length: 6 Half-Day Sessions (24.0 Total Hours)

Drilling Fluids  
Instructor: Lee A. Richards, PhD  
Date: August 17, 19, & 21, 2020  
Length: 3 Half-Day Sessions (12.0 Total Hours)

Applied Biostratigraphy in Oil and Gas Exploration and Production  
Instructor: William Krebs, PhD  
Date: August 31 - September 4, 2020  
Length: 5 Half-Day Sessions (20.0 Total Hours)

Petroleum Fluids and Source Rock in E&P Projects  
Instructor: Alexei Milkov, PhD  
Date: September 21-23 & 28-30, 2020  
Length: 6 Half-Day Sessions (24.0 Total Hours)

Pore Pressure, Fracture Pressure And Well-Bore Stability  
Instructor: Selim Shaker, PhD  
Date: November 2-4 & 9-11, 2020  
Length: 6 Half-Day Sessions (24.0 Total Hours)

Depositional Evolution of the Gulf of Mexico Sedimentary Basin  
Instructor: John W. Snedden, PhD  
Date: November 16-20 & Nov. 30 - Dec. 4, 2020  
Length: 10 Two-Hour Sessions (20.0 Total Hours)