

2023년도 제3차 해외전문교육 개요

'23. 6. 26, 재 단사무국

1. 교육 개요

- 일시/방법 : 2023. 7. 17(월)~7. 26(수)*, 09:00~13:00 (주말 제외) / 원격교육(Zoom)
 - 개 최 : 재단-포스코인터내셔널
 - 기관/강사 : PetroEdge(싱가포르) / Dr. James Willis
(강사 이력 [첨부1] 참고)
 - 주 제 : Application of Structural Geology in Seismic Interpretation
(탄성과 해석을 통한 구조지질학 적용)
 - 분야/수준 : G&G / 중급
- * 4월 개최 예정이었으나, 강사의 개인 프로젝트로 인해 7월로 변경

2. 주요 교육 내용 (상세 내용 [첨부2] 참고)

- 구조적·계층적 시스템 및 지질 구조의 다양한 유형의 형성에 있어서 구조론과 변형의 역할을 이해하는 등 실무형 접근 방식을 통해 다양한 사례 해석
- 구조 시스템과 지층 및 퇴적학적 환경의 상호 작용 이해를 통해 저류층 형성을 예측하고 지진 규모 데이터를 통합하여 전체 석유 시스템 이해도 향상

<일별 교육 커리큘럼>

구분	7.17(월)	7.18(화)	7.19(수)	7.20(목)
내 용	<ul style="list-style-type: none">• Welcome and Introduction- Pre-Training Interpretation Exercises	<ul style="list-style-type: none">• Strain Concepts<ul style="list-style-type: none">- Understanding the deformation environment- Force, Stress, and Strain/Deformation- Strain ellipse concepts• Exploration example<ul style="list-style-type: none">- Rock mechanics- Modes of failure	<ul style="list-style-type: none">• General Seismic Interpretation• General principles of seismic acquisition, processing, and interpretation• Seismic versus well resolution• 2D-3D interpretation techniques and pitfalls• Machine Learning Applications	<ul style="list-style-type: none">• Seismic Attributes for Structural Analysis<ul style="list-style-type: none">- Amplitude analysis- Dominant attributes for structural interpretation• Coherency; edge displays; derivative maps; residual analysis; curvature analysis

구분	7.21(금)	7.24(월)	7.25(화)	7.26(수)
내 容	<ul style="list-style-type: none"> • Faults - Fracturing and Faulting - Slip vs. separation and their quantification - Normal/Reverse/Strike-slip faults and associated tectonic/nontectonic environments - Displacement analysis - Subseismic fault prediction - Fault restoration - Seismic pitfalls 	<ul style="list-style-type: none"> • Folds - General fold concepts - Modes/styles of folding - Folds and associated tectonic/nontectonic environments - Closure mapping and quantification - Fold restoration • Fracture ID - Seismic anisotropy analysis - Fracture mapping - Well data integration 	<ul style="list-style-type: none"> • Borehole Seismology and Structural Interpretation - A review of borehole seismic measurements and techniques • Acoustic logs, wellbore seismic • Growth Analysis - Understanding and quantifying syndeformational growth sedimentation - Growth in extensional, compressional, and other structural regimes 	<ul style="list-style-type: none"> • Fault Seal Analysis - Understanding and quantifying aspects of fault seal • Balancing and Restoration - Balancing techniques, structural modeling, and restoration • Exercises and integrative Case Studies/Discussion

3. 교육 정원 및 대상

○ 교육정원 : 16명

○ 교육대상 : 자원개발 업계 등

- 공동 개최 기관인 포스코인터내셔널에 전체 정원(16명) 중 5명을 우선 배정하고, 자원개발 업계 직원 및 관련 학과 교수, 대학원의 박사 과정 학생 등 11명에게 선착순으로 교육 기회 제공

- 단, 1개 기관에서 다수의 인원이 신청하여 정원 초과 시, 인원 제한 가능



ABOUT YOUR EXPERT TRAINER: DR. JAMES WILLIS



Dr Willis received his B.S. and M.S. degrees in Geology from the now University of Louisiana-Lafayette in 1989 and 1990, respectively, and his Ph.D. as a National Science Foundation fellow at Baylor University, Waco, Texas, in 1993, graduating with an overall university gpa of 4.0 in 1993. From 1994-1996, he studied planetary tectonics as a NASA-funded postdoctoral fellow at Southern Methodist University. In 1996, he returned to UL-Lafayette, where he was awarded in 1997 the Hensarling-Chapman Endowed Professorship in Geology. He began independent consulting activities in 1991, and in 2001 he left academia for full-time consulting for clients ranging from one-man shops to supermajors. James has been the editor and publisher (both volunteer efforts) for the Lafayette Geological Society since 2002, and the publisher and various editorial positions for the Gulf Coast Association of Geological Societies since 2006. James has been an active researcher, receiving several million dollars in grants from federal, state, and industry sources, has presented numerous talks, and has published on a diversity of geoscience topics.

Past participants of James Willis's training courses in Asia include the following organizations:

- Offshore Geo-Surveys
- Petronas Carigali
- Pearl Energy (Nam Conson)
- Tately N.V.
- Petronas Carigali Kebabangan Petroleum Operating Co.
- PETRONAS Carigali (Vietnam)
- NetSeis
- Geo Solutions Consultancy TL Geohydrographics
- Carigali Hess Operation
- Eaglewood Energy (BVI)
- Mitsui Oil Exploration Coompany Newfield Sarawak
- CGG Veritas
- Pangaea Resources Pty Ltd
- Statoil Indonesia Karama AS
- PTTEP Siam Limited
- Chevron Australia
- CNOOC SES
- PTTEP Oman Company
- PVEP Overseas (Cuba Project) Sabah Shell Petroleum Company and many more!

Academic Qualifications

1991-1993 - Doctor of Philosophy degree in Geology, Baylor University, Waco, Texas.

Dissertation: Foreland deformation, 560 p. GPA: 4.0. First Baylor recipient of National Science Foundation Graduate Research Fellowship. First graduate of Baylor Geology Ph.D. program.

1990 Master of Science degree in Geology, University of Southwestern Louisiana, Lafayette, Louisiana.

Thesis: Fold-thrust development in the northern Bighorn Mountains and Bighorn basin, Wyoming, 128 p. GPA: 4.0.

1989 - Advanced Summer Field Course, Iowa State University of Science and Technology, Ames, Iowa. GPA: 4.0.

1985–1989 - Bachelor of Science degree in Geology summa cum laude, University of Southwestern Louisiana, Lafayette, Louisiana. Top ranking student of graduating class. GPA: 4.0.

1986 – Graduate of St. Martinville Senior High School (St. Martinville, Louisiana).

Work Experience

Jan. 1991–Present Independent Geoscience Consulting and Training (full-time since 2001). Currently operating as President, Willis School of Applied Geoscience (an independent consulting, research, training, and publishing firm, St. Martinville, Louisiana).

Activities include international consulting and training activities for a diversity of companies including supermajor to small independent oil and gas companies. Consulting activities range from prospect development and evaluation, field characterization and development, structural analysis and geomechanics, seismic geophysics, well log interpretation, etc. Recent research activities focused on shale distribution typing from log analysis, azimuthal log development and analysis, simultaneous prestack/poststack seismic interpretation and attribute analysis, and LWD Rv/Rh anisotropy tool development. Training activities include nearly 150 training programs for a diversity of clients worldwide, including Subsurface Mapping Techniques, Structural Geology, Fault Seal Analysis, Applied Geomechanics, Seismic Acquisition/Processing/Interpretation, AVO, Attributes, and Inversion, Applied Sequence Stratigraphy, Sandstone Reservoir Characterization, Development of Carbonate Rock Reservoirs, Development and Production Geology, Log Analysis/Petrophysics/Formation Evaluation, Advanced Log Analysis/Petrophysics/Formation Evaluation, Shaly Sand Petrophysics, Dipmeter and Image Log Analysis, Integration of Rock, Log, Test, and Seismic Data, and Basic Geology. In addition to industry training, the Willis School of Applied Geoscience provides its industry-level training to graduate students and issued its first M.S. certification (thesis option) in Applied Geoscience in the Spring 2019 semester. Contracted Publisher (2006–Present) and various volunteer Editorial capacities, including Managing Editor, for the Gulf Coast Association of Geological Societies (GCAGS Transactions, v. 56–71; GCAGS Journal, v. 1–11; GCAGS Explore & Discover, 2016–2022).

2000 – Present Adjunct Professor, Department of Geology and Geophysics, Louisiana State University, Baton Rouge. Assistance with AAPG Imperial Barrel Award team and thesis committee member.

Aug. 1996–2018 Adjunct Professor/Instructor of Geology, School of Geosciences, University of Louisiana at Lafayette (Aug. 2011–2018). Previously Hensarling Endowed Professor of Geology (Aug. 1997–Aug. 2001), Assistant Professor of Geology (Aug. 1996–Aug. 2001), Department of Geology, University of Louisiana at Lafayette.

Received multiple Category I “Distinguished” merit evaluations during earlier full-time employment. Courses included Geology and Man, Field and Laboratory Methods, Summer Field Course, Geostatistics, Computer Geology, Advanced Topics in Computer Geology, Environmental Geology, Site Assessment and Remediation, Advanced Structural Geology I, Advanced Structural Geology II, Advanced Seismology, Remote Sensing, Surveying and Remote Sensing Techniques, Log Analysis I, Log Analysis II, Seismic Acquisition and Processing, Seismic Interpretation, Advanced Seismic Interpretation, and Applied Geomechanics. Thesis committee chair for 14 completed M.S. students; thesis committee member for 12 completed M.S. students. Served as department’s System Administrator (1996–2001). Awarded initial grant leading to development of the University of Louisiana Energy Institute. Provided training and assistance to UL’s successful AAPG Imperial Barrel Award teams.



Company Registration No. 200710561C

Sept. 1994–Aug. 1996 National Aeronautics and Space Administration–funded Postdoctoral Research Fellow, Department of Geological Sciences, Southern Methodist University, Dallas, Texas.

Primary activities involved comparative planetary geology and geophysics research. Highlights included recognition of conjugate strike-slip fractures on a body other than Earth, and work on mega-boudinage and crustal plateau development.

Jan. 1994–Aug. 1994 National Science Foundation–funded Postdoctoral Research Fellow, Department of Geology, Baylor University, Waco, Texas.

Activities included plate margin research in United States, New Zealand, and Iceland.

Jan. 1991–Dec. 1993 National Science Foundation Graduate Research Fellow and Laboratory Instructor, Department of Geology, Baylor University, Waco, Texas.

In addition to Ph.D. research, conducted labs for Structural Geology, Techniques of Structural Interpretation, and Regional Tectonics, and various field trips. First NSF Graduate Research Fellowship awarded to a Baylor University student and first Ph.D. graduate of the Baylor Department of Geology.

Aug. 1988–Dec. 1990 Laboratory Instructor (Structural Geology, Field and Laboratory Methods, Mineralogy, Geochemistry, Petrology, and various field trips), Department of Geology, University of Southwestern Louisiana, Lafayette, Louisiana.

Taught Structural Geology Lab as an undergraduate student, and later several lab courses (Structural Geology, Field and Laboratory Methods, Mineralogy, Geochemistry, and Petrology) and various field trips as a graduate student.

Aug. 1987–Dec. 1990 Research Assistant/Associate, Department of Geology, University of Southwestern Louisiana, Lafayette, Louisiana.

Worked with various faculty members on several field and laboratory projects, including research in volcanology, mineralogy, sedimentology, and geochemistry.

첨부2

강의 계획서(교육기관 제공)



Company Registration No. 2007100410

Virtual Led Training Course Outline

Day	Topic	Activity/Methodology	Time
1	<ul style="list-style-type: none"> • Welcome and Introduction <ul style="list-style-type: none"> ○ Pre-Training Interpretation Exercises 	<ul style="list-style-type: none"> • Exercises and case studies • Interactive Lecture 	9.00 am – 10:30 am
BREAK 1			
1	Pre-Training Interpretation Exercises	<ul style="list-style-type: none"> • Exercises and case studies • Interactive Lecture 	10.45 am – 11:45 am
BREAK 2			
1	Pre-Training Interpretation Exercises	<ul style="list-style-type: none"> • Exercises and case studies • Interactive Lecture 	12:00 pm – 1.00 pm
END OF DAY 1			

Day 2

Day	Topic	Activity/Methodology	Time
2	<ul style="list-style-type: none"> • Strain Concepts <ul style="list-style-type: none"> ○ Understanding the deformation environment 	<ul style="list-style-type: none"> • Exercises and case studies • Interactive Lecture 	9.00 am – 10:30 am
BREAK 1			
2	<ul style="list-style-type: none"> ○ Force, Stress, and Strain/Deformation ○ Strain ellipse concepts <ul style="list-style-type: none"> • Exploration example 	<ul style="list-style-type: none"> • Exercises and case studies • Interactive Lecture 	10.45 am – 11:45 am
BREAK 2			
2	<ul style="list-style-type: none"> ○ Rock mechanics ○ Modes of failure 	<ul style="list-style-type: none"> • Exercises and case studies • Interactive Lecture 	12:00 pm – 1.00 pm
END OF DAY 2			

Day 3

Day	Topic	Activity/Methodology	Time
3	<ul style="list-style-type: none"> General Seismic Interpretation General principles of seismic acquisition, processing, and interpretation 	<ul style="list-style-type: none"> Exercises and case studies Interactive Lecture 	9:00 am – 10:30 am
BREAK 1			
3	<ul style="list-style-type: none"> Seismic versus well resolution 2D interpretation techniques and pitfalls 	<ul style="list-style-type: none"> Exercises and case studies Interactive Lecture 	10:45 am – 11:45 am
BREAK 2			
3	<ul style="list-style-type: none"> 3D interpretation techniques and pitfalls Machine Learning and Artificial Intelligence Applications 	<ul style="list-style-type: none"> Exercises and case studies Interactive Lecture 	12:00 pm – 1:00 pm
END OF DAY 3			

Day 4

Day	Topic	Activity/Methodology	Time
4	<ul style="list-style-type: none"> Seismic Attributes for Structural Analysis 	<ul style="list-style-type: none"> Exercises and case studies Interactive Lecture 	9:00 am – 10:30 am
BREAK 1			
4	<ul style="list-style-type: none"> Amplitude analysis 	<ul style="list-style-type: none"> Exercises and case studies Interactive Lecture 	10:45 am – 11:45 am
BREAK 2			
4	<ul style="list-style-type: none"> Dominant attributes for structural interpretation <ul style="list-style-type: none"> Coherency; edge displays; derivative maps; residual analysis; curvature analysis 	<ul style="list-style-type: none"> Exercises and case studies Interactive Lecture 	12:00 pm – 1:00 pm
END OF DAY 4			

Day 5

Day	Topic	Activity/Methodology	Time
5	<ul style="list-style-type: none"> • Faults <ul style="list-style-type: none"> ○ Fracturing and Faulting ○ Slip vs. separation and their quantification ○ Normal faults and associated tectonic/nontectonic environments 	<ul style="list-style-type: none"> • Exercises and case studies • Interactive Lecture 	9.00 am – 10:30 am
BREAK 1			
5	<ul style="list-style-type: none"> ○ Reverse faults and associated tectonic/nontectonic environments ○ Strike-slip faults and associated tectonic/nontectonic environments 	<ul style="list-style-type: none"> • Exercises and case studies • Interactive Lecture 	10.45 am – 11:45 am
BREAK 2			
5	<ul style="list-style-type: none"> ○ Displacement analysis ○ Subseismic fault prediction ○ Fault restoration ○ Seismic pitfalls 	<ul style="list-style-type: none"> • Exercises and case studies • Interactive Lecture 	12:00 pm – 1.00 pm
END OF DAY 5			

Day 6

Day	Topic	Activity/Methodology	Time
6	<ul style="list-style-type: none"> • Folds <ul style="list-style-type: none"> ○ General fold concepts ○ Modes/styles of folding ○ Folds and associated tectonic/nontectonic environments 	<ul style="list-style-type: none"> • Exercises and case studies • Interactive Lecture 	9.00 am – 10:30 am
BREAK 1			
6	<ul style="list-style-type: none"> ○ Closure mapping and quantification ○ Fold restoration 	<ul style="list-style-type: none"> • Exercises and case studies • Interactive Lecture 	10.45 am – 11:45 am
BREAK 2			
6	<ul style="list-style-type: none"> • Fracture ID <ul style="list-style-type: none"> ○ Seismic anisotropy analysis ○ Fracture mapping ○ Well data integration 	<ul style="list-style-type: none"> • Exercises and case studies • Interactive Lecture 	12:00 pm – 1.00 pm
END OF DAY 6			

Day 7

Day	Topic	Activity/Methodology	Time
7	<ul style="list-style-type: none"> • Borehole Seismology and Structural Interpretation <ul style="list-style-type: none"> ○ A review of borehole seismic measurements and techniques <ul style="list-style-type: none"> • Acoustic logs, wellbore seismic (e.g., VSP, cross-well, seismic MWD, bit-noise seismic) 	<ul style="list-style-type: none"> • Exercises and case studies • Interactive Lecture 	9:00 am – 10:30 am
BREAK 1			
7	<ul style="list-style-type: none"> • Growth Analysis <ul style="list-style-type: none"> ○ Understanding and quantifying syndeformational growth sedimentation ○ Growth in extensional, compressional, and other structural regimes 	<ul style="list-style-type: none"> • Exercises and case studies • Interactive Lecture 	10:45 am – 11:45 am
BREAK 2			
7	<ul style="list-style-type: none"> • Growth Analysis <ul style="list-style-type: none"> ○ Growth in extensional, compressional, and other structural regimes 	<ul style="list-style-type: none"> • Exercises and case studies • Interactive Lecture 	12:00 pm – 1:00 pm
END OF DAY 7			

Day 8

Day	Topic	Activity/Methodology	Time
8	<ul style="list-style-type: none"> • Fault Seal Analysis <ul style="list-style-type: none"> ○ Understanding and quantifying aspects of fault seal 	<ul style="list-style-type: none"> • Exercises and case studies • Interactive Lecture 	9:00 am – 10:30 am
BREAK 1			
8	<ul style="list-style-type: none"> • Balancing and Restoration <ul style="list-style-type: none"> ○ Balancing techniques, structural modeling, and restoration 	<ul style="list-style-type: none"> • Exercises and case studies • Interactive Lecture 	10:45 am – 11:45 am
BREAK 2			
8	Exercises and Integrative Case Studies/Discussion	<ul style="list-style-type: none"> • Exercises and case studies • Interactive Lecture 	12:00 pm – 1:00 pm
END OF DAY 8			