

CEAS CURRICULUM VITAE – Brian Toelle, Ph.D.

DATE: September 1, 2020

NAME: Brian Toelle

CURRENT UW POSITION: Professor of Practice, Department of Petroleum Engineering

UW ADDRESS: EN4044; 307-766-6780

EDUCATION: Ph. D., Geology, University of West Virginia, 2013
M.S. Geology, Stephen F. Austin State University, 1981
B.S. Geology, Texas A & M University, 1978

EMPLOYMENT:

- Interim Department Head, Department of Petroleum Engineering, University of Wyoming, 2018 to January, 2020
- Professor of Practice, Department of Petroleum Engineering, University of Wyoming, 2017 to present
- Visiting Professor, Department of Petroleum Engineering, University of Wyoming, 2015 to 2017
- Advisor, Exploration and Geophysics, Schlumberger PetroTechnical Services (PTS), 2011 to 2015
- Subject Matter Expert for Schlumberger's Network of Excellence in Training (NExT), 2009 to 2015
- Principal Geophysicist and Manager of Geology & Geophysics for Schlumberger Data & Consulting Services, 2002 to 2011
- Lead Geophysicist, Schlumberger Holditch – Reservoir Technologies, 2001 to 2002
- Senior Geoscientist, Schlumberger GeoQuest, 1997 to 2001
- Geoscientist, Saudi Aramco, 1992 to 1997
- Geoscientist for GeoQuest Systems, Inc. , 1989 to 1992
- Geologist for Texaco USA, 1981 to 1989

HONORS AND AWARDS:

- 2014-2015 - SPE Distinguished Lecturer
- 2013 - "Performed by Schlumberger" Bronze Award
- 2011, 4th Quarter - Schlumberger DCS "Excellence in Action" Award
- 2010, 4th Quarter - Schlumberger DCS "Excellence in Action" Award
- 2001 - "Performed by Schlumberger" Silver Award
- 1993 - Saudi Aramco Exploration's Personal Achievement Award

CURRENT UW JOB DESCRIPTION

-Professor of Practice

62.5 % Teaching 27.5 % Research 10 % Service 0 % Admin 0 % Advising _____ %
Other (describe)

TEACHING – University Level

Courses Taught 392 Students for over 1300 credit hours

<u>Year</u>	<u>Semester</u>	<u>Course No./Title</u>	<u>Cr. Hrs.</u>	<u>Enrollment</u>	<u>Comments</u>
2020	Spring	PETE-4970 / Internship	3	1	
2020	Spring	PETE-3900 / Undergrad Research	3	6	
2020	Spring	PETE-4736 / Petroleum Eng Design	4	35	
2019	Fall	PETE-3900 / Undergrad Research	3	4	
2019	Fall	PETE-5400 / Tight Gas Sand/CBM	3	2	PETE Elective
2019	Fall	PETE-4400 / Tight Gas Sand/CBM	3	7	PETE Elective
2019	Fall	PETE-5980 / Dissertation Research	1	1	Zhe Chen
2019	Fall	PETE-4736 / Petroleum Eng Design	4	10	
2019	Spring	PETE-5980 / Dissertation Research	1	1	Zhe Chen
2019	Spring	PETE-4736 / Petroleum Eng Design	4	14	
2018	Fall	PETE-5980 / Dissertation Research	1	1	Zhe Chen
2018	Fall	PETE-4736 / Petroleum Eng Design	4	13	
2018	Fall	PETE-4850 / Shale Reservoir Development	3	11	
2018	Fall	PETE-5100 / Shale Reservoir Development	3	1	
2018	Summer	PETE-5980 / Dissertation Research	1	1	Zhe Chen
2018	Spring	PETE-5980 / Dissertation Research	1	1	Zhe Chen
2018	Spring	PETE-5960 / Thesis Research	1	1	Marcin Pankau
2018	Spring	PETE-4320 / Well Log Interpretation	3	67	
2018	Spring	PETE-4736 / Petroleum Eng Design	4	13	
2017	Fall	PETE-4736 / Petroleum Eng Design	4	16	
2017	Fall	PETE-3900 / Undergrad Research	3	1	Brent Kebert
2017	Fall	PETE-3900 / Undergrad Research	3	1	Dusty Taylor
2017	Fall	PETE-5960 / Thesis Research	1	1	Marcin Pankau
2017	Fall	PETE-4990 / Tight Gas Sand/CBM	3	19	PETE Elective
2017	Fall	PETE-5150 / Tight Gas Sand/CBM	3	2	PETE Elective
2017	Summer	PETE-4970 / Internship in PETE	3	1	Brent Kebert
2017	Summer	PETE-3900 / Undergrad Research	3	1	Ben Wonderly
2017	Spring	PETE-4736 / Petroleum Eng Design	4	8	
2017	Spring	PETE-5980 / Dissertation Research	1	1	Zhe Chen
2017	Spring	PETE-4990 / Shale Reservoir Development	3	19	
2017	Spring	PETE-5150 / Shale Reservoir Development	3	7	Graduate course
2017	Spring	PETE-3900 / Undergrad Research	3	1	Juan Montenegro
2017	Spring	PETE-3900 / Undergrad Research	3	1	Abdullah Alyami
2017	Spring	PETE-5960 / Thesis Research	1	1	Marcin Pankau
2016	Fall	PETE-5980 / Dissertation Research	1	1	Zhe Chen
2016	Fall	PETE-4736 / Petroleum Eng Design	4	10	
2016	Fall	PETE-5960 / Thesis Research	1	1	Marcin Pankau
2016	Fall	PETE-4990 / Tight Gas Sand/CBM	1	1	
2016	Fall	PETE-3900 / Undergrad Research	1	1	
2016	Spring	GEOL-5210 / Topics IBA	3	4	Imperial Barrel Award
2016	Spring	PETE-4970 / Internship in PETE	1	1	Douglas Nale
2016	Spring	PETE-4735 / Pete Design II	4	26	
2016	Spring	PETE-4990 / Shale Reservoir Development	3	14	
2016	Spring	PETE-5150 / Shale Reservoir Development	3	2	Graduate course
2016	Summer	PETE-4970 / Internship in PETE	3	1	Levi Arguello
2016	Summer	PETE-4990 / Shale Reservoir Development	3	23	
2016	Summer	PETE-3900 / Undergrad Research	3	1	Abdullah Alyami

2015	Fall	PETE-4735 / Pete Design I	4	41
2015	Fall	PETE-4735 / Pete Design I	4	24
2015	Fall	PETE-4735 / Pete Design I	4	5
2015	Fall	PETE-4990 / Shale Reservoir Development	3	40
2015	Fall	PETE-5150 / Shale Reservoir Development	3	7

Mentoring – Industry Level (Performed through Schlumberger’s NExT (Network of Excellence in Training))

January to February, 2013 - NExT's Shale Geophysics On-The-Job Training Program for Saudi Aramco - Denver, Colorado

January to February, 2014 - NExT's Second Shale Geophysics On-The-Job Training Program for Saudi Aramco - Denver, Colorado

Workshops – University Level

November, 2013 - "Finding and Developing Shale Reservoirs" - West Virginia University

February, 2014 - "Use of Geomechanics and Microseismic in the Evaluation of Shale Reservoirs" - West Virginia University

Teaching – Industry Level (Performed through Schlumberger’s NExT (Network of Excellence in Training))

Aug. 25 to 28, 2014 - NExT Open Enrollment Class - Shale Gas, Houston, Texas - "Shale Gas Evaluation - Finding Production Sweet Spots"

May 21 to 23, 2014 - NExT Open Enrollment Class - Houston, Texas - "Shale Oil Fundamentals"

May 12 to 16, 2014 - PTS DeepBlue 2 Class - Houston, Texas - "Basic and Advanced Geophysics"

April 7 to 9, 2014 - PTS Shale Training - Denver, Colorado - "Shale Reservoir Fundamentals"

March 31 to April 3, 2014 - NExT Class for SM Energy - Houston, Texas - "Shale Gas Evaluation - Finding Production Sweet Spots"

March 25 to 27, 2014 - NExT Open Enrollment Class - Bogota, Columbia - "Shale Oil Fundamentals"

January to February, 2014 - NExT OJT - Denver, Colorado - "Saudi Aramco OJT Shale Geophysics"

December 15 - 18, 2013 - NExT Open Enrollment Class - Algiers, Algeria - "Shale Gas Evaluation - Finding Production Sweet Spots"

November 26 - 28, 2013 - NExT open enrollment Class - Calgary, Canada - "Shale Oil Fundamentals"

November 8, 2013 - Half day workshop on Shale Reservoirs for West Virginia University

October 21 - 28, 2013 - Open enrollment class for NeXT - Denver, USA - "Shale Gas Evaluation - Finding Production Sweet Spots"

October 8 - 10, 2013 - NExT Class for Devon - Calgary, Canada - "Shale Oil Fundamentals"

August 12 - 16, 2013 - NExT Class - Aachen, Germany - "Structural Geology"

July 22 - 25, 2013 - Open enrollment class for NeXT - Pau, France - "Shale Gas Evaluation - Finding Production Sweet Spots"

June 10 - 14, 2013 - Open enrollment class for NeXT - Kuala Lumpur, Malaysia - "Shale Gas Evaluation - Finding Production Sweet Spots"

October 30 - November 2, 2012 - SIS Build It 2 Class - Houston, Texas - "Advanced Geophysical Methods"

October 1 - 4, 2012 - NeXT Class for Newfield - Houston, Texas - "Shale Gas Evaluation - Finding Production Sweet Spots"

September 10 - 14, 2012 - SIS Build It 2 Class - Abu Dhabi, UAE - "Advanced Geophysical Methods"

July 10 - 14, 2012 - SIS Build It 2 Class - Houston, Texas - "Advanced Geophysical Methods"

June 19 - 22, 2012 - NExT Open Enrollment Class - Pau, France - "Shale Gas Evaluation - Finding Production Sweet Spots"

May 28 - June 3, 2012 - NExT Class for Saudi Aramco - Dhahran, Saudi Arabia - "Introduction to Shale Reservoirs – Geology and Geophysics"

May 21 - 24, 2012 - SIS's Build-It 2 course - Abu Dhabi, UAE - "Advanced Geophysical Methods"

May 7 - 11, 2012 - NExT Open Enrollment Class - Mexico City, Mexico - "Shale Gas Evaluation - Finding Production Sweet Spots"

April 30 - May 4, 2012 - NExT Class for TPAO - Ankara, Turkey - "Shale Gas Evaluation - Finding Production Sweet Spots"

April 24 - 26, 2012 - NExT Open Enrollment Class - Calgary, Canada - "Shale Gas Evaluation - Finding Production Sweet Spots"

March 20 - 23, 2012 - SIS's Build-It 2 course - Abingdon, UK - "Advanced Geophysical Methods"

February 6 - 9, 2012 - NExT Open Enrollment Class - Houston, Texas - "Shale Gas Evaluation - Finding Production Sweet Spots"

January 30 - February 2, 2012 - NExT Open Enrollment Class - Cape Town, South Africa - "Shale Gas Evaluation - Finding Production Sweet Spots"

January 23 - 26, 2012 - SIS's Build-It 2 course - Abu Dhabi, UAE - "Advanced Geophysical Methods"

December 3 - 7, 2011 - NExT Class for Saudi Aramco - Dhahran, Saudi Arabia - "Unconventional Reservoirs"

November 14 - 17, 2011 - SIS's Build-It 2 course - Abingdon, UK - "Advanced Geophysical Methods"

October 3 - 6, 2011 - NExT Open Enrollment Class - Buenos Aires, Argentina - "Shale Gas Evaluation - Finding Production Sweet Spots"

September 19 - 22, 2011 - NExT Open Enrollment Class - Houston, Texas - "Shale Gas Evaluation - Finding Production Sweet Spots"

September 12 - 16, 2011 - SIS's Build-It 2 course - Abingdon, UK - "Advanced Geophysical Methods"

April 17 - 22, 2011 - SIS's Build-It 2 course - Houston, Texas - "Advanced Geophysical Methods"

November 8 - 13, 2010 - SIS's Build-It 2 course - Abingdon, UK - "Advanced Geophysical Methods"

October 3 - 8, 2010 - SIS's Build-It 2 course - Kuala Lumpur, Malaysia - "Advanced Geophysical Methods"

September 27 - October 1, 2010 - DCS's DeepBlue 2 course - Houston, Texas - "Basic Geophysical Methods"

May 4 - 10, 2010 - SIS's Build-It 2 course - Buenos Aires, Argentina - "Advanced Geophysical Methods"

March 22 - 26, 2010 - SIS's Build-It 2 course - Abu Dubai, UAE - "Advanced Geophysical Methods"

March 8 - 11, 2010 - DCS's DeepBlue 2 course - Houston, Texas - "Seismic Exploration Course".

SERVICE

Professional Service:

- 34 years in the oil and gas industry primarily focused on hydrocarbon exploration and shale reservoir development.
- Inventor of FractureMap: "Method and system and program storage device for analyzing compressional 2D seismic data to identify zones of open natural fractures within rock formations", Patent # US6941228B2

University Service:

- Inventor of V-ClearAir: "Systems and Methods for Providing Filtered Airflow to Airline Passengers", Patent Application #63/059,016
- Inventor of NitroTube: "Methodology integrating multiple technologies from various industries for fighting forest and wildfires in a more efficient and cost-effective manner.", Patent Application #62/639,551
- Inventor of FlareNitro: "Apparatus and Methods for Natural Gas Capture and Management.", Patent Application #62/949,814

College Service:

- Interim Department Head for Petroleum Engineering Department (2018 to 2020)

Department Service:

- Undergraduate Curriculum Committee Chairman (AY 2016 to 2017 and current)

STUDENT ADVISING/GRADUATE SUPERVISION

List all undergraduate, graduate, postdoctoral students, and research associates who you have supervised during the last five years.

None. As a Professor of practice I am not allowed to be the Chairman of any graduate committees. I, therefore, am not responsible for the actual supervision of any graduate students.

I have, however, worked with two graduate student on my research. These are;

Marcin Pankau, who obtained his M.S. in Petroleum Engineering in May, 2018

Zhe Chen, who is currently working on his Ph.D. in Petroleum Engineering.

Undergraduate Students *(list the # of advisees each year)*

- AY 2015 to 2016, 20 undergraduates students.
- AY 2016 to 2017, 12 undergraduates students.
- AY 2017 to 2018, 12 undergraduates students.
- AY 2018 to 2019, Mentoring students who desire it.

Graduate Students Completed *(list name, degree attained, MS Plan)*

Marcin Pankau – Received M.S. degree in May, 2018

Graduate students Current *(list name and degree pursued)*

Zhe Chen, Ph.D in Petroleum Engineering

PUBLISHED & SUBMITTED WORKS

Books/Textbooks/Monographs/Chapters in Books

- 2018 - Geological Society of America Special Paper 531, Chapter 8 - "Porosity characterization in a Silurian reef, northern Michigan Basin, using azimuthal seismic data and potential impacts for enhanced oil recovery".

Referred Journal Articles

- August, 2015 - Interpretation, Vol. 3, No. 3, "Rank exploration of selected European shale plays".
- April 19 - 23, 2008 - SPE Improved Oil Recovery Symposium held in Tulsa, Oklahoma, U.S.A. - "EOR Potential of the Michigan Silurian Reefs Using CO₂" - SPE 113843-PP
- October 18, 2007 - SPE Eastern Regional - "Pseudo-3D Seismic Use for Development of First US Offshore Gas Storage Facility" - SPE 111224-PP
- October 19, 2007 - SPE Eastern Regional - "CO₂ EOR From a North Michigan Silurian Reef" - SPE-111223-PP
- May, 2002 - Joint SPE/AAPG conference in Anchorage, Alaska - "Rapid Seismic Screening and Probabilistic Economic Methodologies for Prioritization of Targets" - SPE Paper 76741

Proceedings/Transactions

- December 11 - 13, 2018 - AAPG/EAGE Shale Gas Evolution Symposium, Bahrain - "3-D Petroleum Systems Model of the Bighorn Basin, Wyoming".
- June, 2016 - 78th EAGE Conference & Exhibition 2016, Vienna, Austria - "Developing a Naturally Fractured Reservoir for Underground Gas Storage".
- December 10, 2013 - European Association of Geoscientists and Engineers, Second EAGE Workshop on Naturally Fractured Reservoirs - Muscat, Oman - "Subtle Structure Detection Using Spectral Decomposition for Fracture Mapping"
- September 17, 2007 - American Association of Petroleum Geologists (AAPG) Eastern Regional - "CO₂ Sequestration Potential of the North Michigan Silurian Reef Trend". This paper received the "2007 Eastern Section Division of Environmental Geosciences Award for Best Paper" award at the 2008 regional AAPG meeting in Pittsburgh
- September 25, 2007 - Society of Exploration Geophysicists - "Interpretation of Parallel 2D Seismic as a Pseudo-3D for Reservoir Characterization of a Proposed Offshore Gas Storage Field Conversion"
- March 21, 2006 - Berkeley CO₂SC Symposium - "Use of Instantaneous Frequency to Map Porosity in a Silurian Age Reef in Northern Michigan Basin in Preparation for CO₂ Injection"
- June, 2001 - American Association of Petroleum Geologists (AAPG) annual convention - "Complex Structural Mapping without 3D Seismic Data" Poster Session.
- June, 2001 - American Association of Petroleum Geologists (AAPG) annual convention - "Workflow Frameworks as a Foundation for Change" Poster Session.

Other (e.g. lab texts, book reviews, technical reports, in-house reports)

- West Virginia University Ph.D. dissertation - "Use of 3D Seismic Azimuthal Iso-Frequency Volumes for the Detection and Characterization of High Porosity/Permeability Zones in Carbonate Reservoirs"
- Summer, 2012 - Oilfield Review - "Seismic Detection of Subtle Fractures "
- Autumn, 2011 - Oilfield Review - "Shale Gas Revolution"

- May 27, 2009 - Schlumberger DCS USL Reservoir Symposium - "Rapid Response Wellbore Placement at Steckman Ridge UGS Field"
- October 23, 2008 - Eureka UGS SIG Webinar - "Use of 3D Seismic in the Development of Gas Storage Fields - A Case Study: Steckman Ridge Field"
- May 14, 2008 - Eureka Gas Shale SIG Webinar - "Marcellus Shale: Key Geologic Considerations"
- May 6, 2008 - Schlumberger DCS USL Reservoir Symposium - "Exploration Services - Fracture Detection for Woodford Shale Exploration in Okfuskee County, Oklahoma"
- February 5, 2008 - West Virginia IOGA - "ShaleMAP & FractureMAP: Understanding Shale Reservoir Heterogeneity"
- June 20, 2007 - Eureka Gas Shale SIG Webinar - "Fractures in shales"
- April 18, 2007 - SIS Forum - "FractureMAP - Seismic-Based Natural Fracture Detection Case Studies".
- September 15, 2001 - Alaska Oil & Gas Reporter - "Unique problem, a unique approach"
- September, 2001 - Leading Edge - "E & P Knowledge Management Systems and their support of the G & G process".
- July, 2001 - The American Oil & Gas Reporter - "Knowledge Sharing Systems Create Long-Term Capabilities".
- May 2001 - World Oil - "Managing Knowledge as a Company Asset".
- March 5, 2001 - The Oil and Gas Journal - "Geological Problem - Geophysical Tool: An Alternate Workflow".
- February 2001 - World Oil - "Managing Knowledge as a Company Asset".
- January 25, 2001 - The Oil and Gas Executive Report "Knowledge Management - Key to Enhanced Productivity".
- May, 2000 - Australian Petroleum Production and Exploration Association's Journal 2000 - "A Method For Conducting A 'Complete Process' Workflow Analysis".
- July, 1999 - The American Oil & Gas Reporter - "Visualization Unravels Complex Field".
- Summer, 1995 - Saudi Aramco Journal of Technology - "Integrated Reservoir Characterization Process Model: a planning and scheduling tool for E&P"

PRESENTED PAPERS/SYMPOSIA/INVITED LECTURES/PROFESSIONAL MEETINGS/WORKSHOPS

(Not included in Section 2)

- November 4-5, 2009 - Independent Oil & Gas Association of New York's annual convention - "Geological Considerations for Gas Shale Plays"
- September 24, 2009 - West Virginia University - Geologic Colloquium - "CO2 Sequestration & EOR Potential of the N. Michigan Basin Silurian Reef Trend"
- April 16, 2009 - University of Pittsburgh - "CO2 Sequestration & EOR Potential of the N. Michigan Basin Silurian Reef Trend".
- February 23, 2009 - Geophysical Society of Oklahoma City - "3-D Seismic Evidence for Early Paleozoic Pannotian Breakup Features in Central Oklahoma"
- November 5, 2008 - Wright State University - "Exploration Geophysics"
- November, 2008 - Society of Exploration Geophysicists Annual Convention - "Pannotian Breakup (Iapetan Opening) Features in Central Oklahoma"
- November 5, 2007 - Wright State University - "Basin Modeling as a Hydrocarbon Exploration Tool"
- May, 2007 - Petroleum Technology Transfer Council, Appalachian Region - "Geophysics for Shale Reservoirs"
- March 29, 2007 - American Gas Association - "Use of Seismic for Reservoir Characterization and Planning of Gas Storage Fields"

- February, 2007 - Wright State University - "CO2 Sequestration Potential of the North Michigan Silurian Reef Trend"
- February 28, 2005 - Houston Geological Society - North American Exploration Dinner - Houston, Texas - "The Appalachian Basin Trenton - Black River Play"
- October, 2004 - Society of Exploration Geophysicists Annual Convention - Denver, Colorado - "2-D Variance and Blended Attribute Analysis of Deep Structures in Lincoln, Co., West Virginia"
- October, 2004 - Joint Association of Petroleum Geologists - Society of Petroleum Engineers Regional Conference - Columbus, Ohio - "Improved Interpretation of Deep Structures in Southern West Virginia through 2-D Variance and Blended Attribute Analysis"
- October 28, 2003 - Appalachian Geological Society - "An Overview of Basic and Advanced Seismic Exploration Methods In The Appalachian Basin "
- October 2, 2003 - Petroleum Technology Transfer Council, Appalachian Region - "E & P Enhanced Knowledge Management Systems"
- March, 2003 - Joint Pittsburgh Association of Petroleum Geologists - Appalachian Geological Society Meeting - Morgantown, West Virginia - "Advanced Seismic Evaluation and Visualization Methods"
- February 2003 - Pittsburgh Society of Petroleum Engineers Meeting - Pittsburgh, Pennsylvania - "Advanced Seismic Evaluation and Visualization Methods"
- December, 2002 - Joint Canadian Exploration Geophysical Society and Ontario Exploration & Geoscience Symposium - Toronto, Ontario - "Blended Seismic Attributes and Volume Visualization"
- December, 2002 - Canadian Exploration Geophysical Society conference in Toronto, Canada - "Blended Seismic Attributes and Volume Visualization".

CONTRACTS & GRANTS

Funded Projects (please list all PIs and their percent effort on the project)

- US Department of Energy Grant (DE-FC26-04NT15425): "Application of Time-Lapse Seismic Monitoring for the Control and Optimization of CO2 Enhanced Oil Recovery Operations", PI- Brian Toelle, CO-PI – Larry Pekot, \$2M

Pending Projects

- US Department of Energy Solicitation: (DE-FOA-0001990): "Quantification of the key parameters for maximum resource recovery from unconventional reservoirs via advanced seismic, rock-physics, and machine-learning", PI - Subhashis Mallick, Department of Geology & Geophysics, CO-PIs - Dario Grana, Vladimir Alvarado, Brian Toelle, John Kaszuba, Kimberly Lau, \$1.4M

OTHER ACTIVITIES/ACCOMPLISHMENTS

Generally supporting the Tier 1 initiative within the CEAS, supporting national and international enrollment at UW. Work with government and industry to support the University of Wyoming.