

Tawfik Elshehabi, Ph.D., P.E.

Associate Instructional Professor
Petroleum Engineering Department
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Biography

Dr. Tawfik Elshehabi, P.E., is a lifelong petroleum engineering educator and scholar. He received his Ph.D. in Petroleum and Natural Gas Engineering from West Virginia University in 2017. Dr. Elshehabi is currently an Associate Instructional Professor at the University of Wyoming. He is also a Faculty Fellow of the Honors College, Daniels Fund Ethics Initiative, and the Summer High School Institute. Dr. Elshehabi is an ABET Program Evaluator (PEV) and Accreditation Coordinator. Additionally, he directs the state-of-the-art drilling and completions simulation facility. He is a registered Professional Engineer (PE) with the State of Wyoming. Dr. Elshehabi taught numerous petroleum engineering, engineering science, and summer high school courses. He received several teaching awards and published numerous technical papers and posters in petroleum engineering and engineering education. Dr. Elshehabi is an active member and fellow of several engineering and education societies, including AADE, ASEE, ECTL, IAWCI, LAMP, NETI, NSPE, WYSPE, SPE, etc.

Education

West Virginia University, Morgantown, WV, USA. **(August 2017)**

Ph.D. in Petroleum and Natural Gas Engineering, College of Engineering and Mineral Resources

Title: *"Hydraulics and Well Control Complications in Unconventional Shale Laterals"*

Suez Canal University, Suez, Egypt. **(July 2008)**

M.Sc. in Petroleum Engineering, College of Petroleum and Mining Engineering

Title: *"An Integrated Model for Gas Kick Control during Drilling Deviated Wells"*

Suez Canal University, Suez, Egypt. **(May 2003)**

B.Sc. in Petroleum Engineering, College of Petroleum and Mining Engineering

Academic Experience

- * **(August 2022-Present)** Associate Instructional Professor, Petroleum Engineering Department, College of Engineering and Physical Sciences, University of Wyoming, Laramie, WY.
- * **(April 2022-Present)** Accreditation Board for Engineering and Technology (ABET) – Engineering Accreditation Commission (EAC) – Program Evaluator (PEV).
- * **(September 2020-August 2022)** Senior Academic Professional Lecturer, Petroleum Engineering Department, College of Engineering and Applied Science, University of Wyoming, Laramie, WY.
- * **(June 2020-Present)** Professional Engineer, The Wyoming State Board of Professional Engineers and Professional Land Surveyors.
- * **(Summer 2019-Present)** Drilling and Completions Simulation Facility Coordinator, Petroleum Engineering Department, College of Engineering and Applied Science, University of Wyoming, Laramie, WY, USA.
- * **(January 2019-Present)** Accreditation Board for Engineering and Technology (ABET) Accreditation Coordinator, Petroleum Engineering Department, College of Engineering and Applied Science, University of Wyoming, Laramie, WY, USA.

- * **(August 2017-September 2020)** Associate Academic Professional Lecturer, Petroleum Engineering Department, College of Engineering and Applied Science, University of Wyoming, Laramie, WY.
- * **(January 2013-August 2017)** Graduate Teaching/Research Assistant, Petroleum and Natural Gas Engineering Department, College of Engineering and Mineral Resources, West Virginia University, Morgantown, WV, USA.
- * **(August 2008-December 2012)** Assistant Lecturer, Petroleum Engineering Department, College of Petroleum and Mining Engineering, Suez Canal University, Suez, Egypt.
- * **(August 2005-July 2008)** Demonstrator (Teaching/Research Assistant), Petroleum Engineering Department, College of Petroleum and Mining Engineering, Suez Canal University, Suez, Egypt.

Current Job Description

- * 50% Teaching, 25% Service: ABET Accreditation Coordinator and Simulation Facility Coordinator, 25% Professional Development and Graduate Committees.

Research Experience

- **(August 2017-Present)** University of Wyoming, Laramie, WY, USA.
Drilling and well control studies: Mentoring numerous undergraduate and graduate students researching drilling and well control using the state-of-the-art drilling and well control simulation facility, also investigating nanoparticles applications in drilling fluids using experimental and simulation studies.
- **(August 2017-Present)** University of Wyoming, Laramie, WY, USA.
Active and collaborative learning studies: Investigating the impact of using active and collaborative learning pedagogies in petroleum engineering classes and K-12 outreach. Also, developing a visual and multimodal teaching philosophy, learning, and assessment models.
- **(January 2013-August 2017)** West Virginia University, Morgantown, WV, USA.
Ph.D. Dissertation in Petroleum Engineering: Studied mud hydraulics and well control complications in unconventional shale Laterals. This included the impact of inclined upward and downward lateral configurations, gas solubility in oil-based mud, and kicks while running casing or liner strings.
- **(June 2015-August 2017)** The data used as part of this research was funded through the U.S.DOE National Energy Technology, Marcellus Shale Energy and Environmental Laboratory (MSEEL) (DOE Award No.: DE-FE0024297). Worked with Dr. Ilkin Bilgesu to analyze drilling and mud hydraulics data and predict vertical and horizontal stresses using drilling and well logging data coupled with artificial intelligence techniques, such as artificial neural networks.
- **(August 2016-December 2016)** NASA RASC-AL Mars Ice Drilling Challenge: Advised the Mountaineer (MIDAS) champion-team on well design, drilling fluids, and drilling optimization and automation.
- **(January 2015-December 2016)** non-funded project: Experimental study of the impact of nanomaterials on the rheological and filtration properties of water-based drilling fluids.
- **(August 2015-June 2016)** SPE-DSATS Drillbotics International University Competition, WVU champion-team: Designed and developed software and hardware for a fully automated lab-scale drilling rig utilizing artificial intelligence. This project was sponsored by NASA-West Virginia Space Grant Consortium.
- **(August 2008-December 2012)** Suez Canal University, Suez, Egypt.
Unfinished Ph.D. Dissertation in Petroleum Engineering: Performed research on artificial intelligence application in real-time drilling optimization for the Western Desert deep wells in Egypt.
- **(January 2004-July 2008)** Suez Canal University, Suez, Egypt.
Completed Master's degree in Petroleum Engineering: Developed an integrated mathematical model for gas kick control in vertical, directional, and horizontal wells.

Petroleum Engineering Experience

- ◆ **AGIBA Petroleum Company** – Meliha field, Western Desert, Egypt (2011): worked on drilling and completion design and operations for deep wells.
- ◆ **Belayim Petroleum Company (PETROBEL)** – Abu Rudeis field, Gulf of Suez, Egypt (2005): worked on drilling, completion, and artificial lift optimization for onshore and offshore wells.
- ◆ **Western Desert Operating Petroleum Company (WEPCO)** – Alamein field, Western Desert, Egypt (2002): worked on production and artificial lift optimization for oil and gas wells.
- ◆ **Gulf of Suez Petroleum Company (GUPCO)** – Abu El-Gharadig field, Western Desert, Egypt (2001): worked on drilling, completion, and production optimization for shallow and deep wells.

Teaching Experience

- ES 2120 – Engineering Dynamics
- PETE 2050 – Fundamentals of Petroleum Engineering
- PETE 3255 – Basic Drilling Engineering
- PETE 3265 – Drilling Fluids Laboratory
- PETE 3725 – Wellbore Operations
- PETE 3900 – Undergrad Research
- PETE 4736 – Petroleum Engineering Design
- PETE 4970 – Internship in PETE
- PETE 4990 – Well Control
- PETE 5100 – Independent Study
- PETE 5255 – Advanced Drilling Engineering
- PETE 5890 – Graduate Seminar
- Wyoming’s Energy 4 You – Summer High School Institute
- HP 4151 – Engineering, Energy, and Ethics – Honors College

Affiliations and Associations

- ◆ A Foundation Board of Advisors Member of the International Association of Well Control Instructors (**IAWCI**) since November 2020.
- ◆ A member of **Tau Beta Pi** - Engineering Honor Society and Wyoming Alpha Chapter of Tau Beta Pi since April 2022.
- ◆ Faculty Fellow of the University of Wyoming **Daniels Fund Ethics Initiative**, starting Academic Year 2021-2022.
- ◆ Faculty Fellow of the University of Wyoming **Honors College**, starting Academic Year 2021-2022.
- ◆ Academic advisor of the American Association of Drilling Engineers (**AADE**) student chapter since August 2021.
- ◆ Member of the Advisory Board of the Petroleum Engineering program at Beirut Arab University (**BAU**) since June 2021.
- ◆ Member of the University of Wyoming Student Interaction (University-level) committee since June 2021.
- ◆ Mentor at the University of Wyoming Science Initiative, Learning Actively Mentoring Program (**LAMP**) since May 2021.
- ◆ Reviewer for the Journal of Petroleum Science and Engineering since January 2021.
- ◆ Certified Peer Reviewer for Higher Education and K-12 Online Courses from Quality Matters (**QM**), the Global Organization since December 2020.
- ◆ Member of the Wyoming Society of Professional Engineers (**WYSPE**) since November 2020.
- ◆ Member of the National Society of Professional Engineers (**NSPE**) since October 2020.
- ◆ Certified Reviewer with the Quality Matters (**QM**), the Global Organization, since August 2020.
- ◆ Professional Engineer (**PE**), the Wyoming State Board of Professional Engineers and Professional Land Surveyors since June 2020.
- ◆ Faculty Fellow of the National Effective Teaching Institute (**NETI**) since June 2020.

- ◆ Member of the University of Wyoming Leadership committee in the Howard Hughes Medical Institute (HHMI) Inclusive Excellence Initiative, Third Competition, ie3.
- ◆ Faculty Fellow of the University of Wyoming Science Initiative, Educator's Learning Community (ELC) since May 2020.
- ◆ Reviewer for the Journal of Petroleum Exploration and Production Technology (PEPT) since 2020.
- ◆ Certified instructor on **Drilling Systems** Cyber-chair DrillsIM-6000, WirelineSIM-5000, and Coiled-TubingSIM-5000 since August 2019.
- ◆ Chair of the Drilling Simulator Lab Committee since August 2019.
- ◆ Faculty Fellow of the University of Wyoming Science Initiative, Learning Actively Mentoring Program (LAMP) since May 2019.
- ◆ Member of American Society for Engineering Education (ASEE) since May 2019.
- ◆ Member of Association of American Colleges & Universities (AAC&U) since May 2019.
- ◆ Faculty Fellow of the University of Wyoming Ellbogen Center for Teaching and Learning (ECTL) since February 2018.
- ◆ Faculty fellow of UW Summer High School Institute (HSI) since 2018. Developed and delivered "Wyoming's Energy 4 You" course to high school scholars from around Wyoming.
- ◆ Member of the International Association of Drilling Contractors (IADC) since 2018.
- ◆ Member of the Drilling Simulator Lab Committee, from August 2017 to August 2019.
- ◆ Member of the Fluid Dynamics Multidisciplinary Teaching Lab Committee (College-Level) since August 2017.
- ◆ Member of the Undergraduate Curriculum Continuous Improvement Subcommittee since August 2017.
- ◆ Member of the Appeals Panel Committee since August 2017.
- ◆ Reviewer for the Journal of Natural Gas Science & Engineering (JNGSE) since 2016.
- ◆ Member of the American Association of Drilling Engineers (AADE) since 2013.
- ◆ Member of the Society of Petroleum Engineers (SPE) since 2013.

Honors and Achievements

- ✧ Accreditation Board for Engineering and Technology (ABET) **Program Evaluator** (PEV) since April 2022.
- ✧ Accreditation Board for Engineering and Technology (ABET) **Program Evaluator** Candidate (PEVC) in-training since October 2021.
- ✧ More than 100 state-of-the-art drilling simulator visits and outreach tours that welcomed more than 3,500 visitors and guests and offered hands-on experience since summer 2019.
- ✧ Awarded the UW Ellbogen Center for Teaching and Learning (ECTL), Teaching and Learning Certificate (100 Professional Development Units) in September 2021.
- ✧ Awarded the **third-best diversity** paper in the New Engineering Education (NEE) Division of the 2021 American Society for Engineering Education (ASEE) Annual Conference.
- ✧ **Leadership Development for Engineers** Specialization, Rice University, 38 Professional Development Units, awarded in July 2021.
- ✧ **Engineering Project Management** Specialization, Rice University, 38 Professional Development Units, awarded in August 2020.
- ✧ Speaker and moderator during the new UW faculty orientation day (70+ attendees) on August 19th, 2020.
- ✧ Nominated for Advisor of The Year for the International Association of Drilling Contractors (IADC) Recognized Student Organization (RSO) student chapter Spring 2020.
- ✧ Awarded the Diversity Equity & Inclusion - Silver Badge from the UW Ellbogen Center for Teaching and Learning in Spring 2020.

- * Awarded the Diversity Equity & Inclusion - Bronze Badge from the UW Ellbogen Center for Teaching and Learning in Fall 2019.
- * LAMP Fellow of the month [September 2019] for developing a visual model (A.S.K) for teaching and learning.
- * Awarded the 2018-2019 Don Stinson Outstanding Teacher, Department of Petroleum Engineering, University of Wyoming, May 2019.
- * Nominated for the Tau Beta Pi Outstanding Undergraduate Teaching Award, Department of Petroleum Engineering, University of Wyoming, February 2019.
- * Awarded the best active engagement session in the Rocky Mountains Section (RMS) of the American Society for Engineering Education (ASEE) Conference, May 2019.
- * Awarded the best new Recognized Student Organization (RSO) for the International Association of Drilling Contractors (IADC) student chapter.
- * Petroleum Engineering Department, Accreditation Board for Engineering and Technology (ABET) Champion since January 2019.
- * Founder and academic advisor of the fourth International Association of Drilling Contractors (IADC) student chapter in the United States at the University of Wyoming since November 2018.
- * Speaker at the faculty grant recipient panel on Thursday, October 4th, during the Open Education Symposium organized by UW libraries.
- * Awarded the University of Wyoming Libraries Open Textbook grant for the development of an open textbook for PETE 2050 Fundamentals of Petroleum Engineering in Fall 2018.
- * Wyoming State Science Fair, Engineering Energy Projects Judge, since March 2018.
- * Top of Murchison Drilling Schools (MDS) class and WELLSHARP certified in March 2018 from the International Association of Drilling Contractors (IADC) in Drilling Operations, Workover Completions Supervisor Level 4.
- * Served as a reviewer for the U.S. Department of Energy's Geothermal Technologies Office (GTO) on Efficient Drilling for Geothermal Energy (EDGE) in Summer 2018.
- * Society of Petroleum Engineers SPE-DSATS, Drillbotics International University Competition Championship of 2015-2016 (the Drilling Engineer of the West Virginia University team).
- * Outstanding Ph.D. Graduate Student based on academic and research achievements from Petroleum and Natural Gas Engineering for academic years of 2013/2014, 2014/2015, 2015/2016, and 2016/2017.
- * International Well Control Forum (IWCF) Surface BOP Stack Certificate in 2007 and Wild Well Control Fundamental Certificate in 2013.

Grants and Funds

- * Awarded the 2022 Daniels Fund Ethics Initiative (DFEI) Faculty Fellowship (\$3,000) to develop a framework for ethical decision-making in engineering education.
- * Secured an in-kind donation from Well Control School (WCS) for online drilling and well control modules for 25 students (\$250 each)
- * Secured in-kind donations for petroleum engineering software, including Schlumberger Wellscan, Drillbench, NSI Technologies StimPlan, Barree & Associates GOHFER; PetroEd online modules, and well control training and certifications.
- * Awarded the University of Wyoming Science Initiative Learning Actively Mentoring Program (LAMP) grant (\$5,000) to implement active learning in 2019-2020.
- * Raised external funds of (\$1,300) for the UW Summer High School Institute "Wyoming Energy for You," summer 2018-2021
- * Awarded the University of Wyoming Libraries Open Textbook grant (\$5,000) for the development of an open educational resources (OER) textbook for PETE 2050 Fundamentals of Petroleum Engineering in 2018.

Publications

- Elshehabi, T. A. (2022).** *Well Control Complications in Unconventional Shale Laterals*. Chapter in the *Shale Gas Production - Lessons Learned* Textbook, edited by Prof. Rouzbeh, and published by ELSEVIER in Feb. 2022, ISBN: 9780323901857.
- Elshehabi, T. A. (2021).** When We Care We Share: Empowering Students with an Innovative Visual Teaching Philosophy. Paper presented at the Original **Lilly** Conference on College Teaching, Oxford, OH. November 19-21.
- Elshehabi, T. A. (2021).** Visual Teaching Philosophy Empowering Inclusive Learning and Managing Expectations. Paper presented at the 2021 American Society for Engineering Education (**ASEE**) Virtual Annual Conference & Exposition, July 26-29.
- Elshehabi, T. A., & Heshmati, M. (2021).** Fundamentals of Petroleum Engineering. Open Education Resources OER Textbook. Laramie, Wyoming. Funded by the University of Wyoming Libraries. (Work in progress)
- Elshehabi, T. A. (2020).** When the Whole is Greater Than the Sum of Its Parts: The Power of The Team-Based Collaborative Mode of Learning. Abstract accepted in the Rocky Mountain Section (RMS) of the American Society for Engineering Education (**ASEE**). The conference was cancelled due to the global COVID-19 pandemic. May 17-19.
- Elshehabi, T. 2019.** Innovative Hands-on Teaching Tools Inspiring Upcoming Petroleum Engineers and K-12 Students. The 2019 Rocky Mountain Section (RMS) of the American Society for Engineering Education (**ASEE**), Laramie, Wyoming, USA, May 19-22.
- Elshehabi, T. and Bilgesu, I. 2017.** Marcellus Shale Toe-up Laterals: Hydraulics and Well Control Implications. Paper presented at the Society of Petroleum Engineers (**SPE**), Eastern Regional Meeting, Lexington, Kentucky, USA, 4-6 October. <https://doi.org/10.2118/187517-MS>.
- Elshehabi, T.A. 2017.** Hydraulics and Well Control Complications in Unconventional Shale Laterals. Ph.D. Dissertation, College of Engineering and Mineral Resources, West Virginia University, Morgantown, WV, USA. ProQuest # 10281277.
- Bilgesu, H., Cox, Z., **Elshehabi, T.A.**, Smith, C., Idowu, G. and Florence, F.R. **2017.** A Real-Time Interactive Drill-Off Test Utilizing Artificial Intelligence Algorithm for DSATS Drilling Automation University Competition. Paper presented at the Society of Petroleum Engineers (**SPE**), Western Regional Meeting, Bakersfield, California, USA, 23-27 April. <https://doi.org/10.2118/185730-MS>.
- Elshehabi, T. and Bilgesu, I. 2017.** Drilling Unconventional Shales with Upward or Downward Laterals: What are the Hydraulics and Well Control Consequences? Paper presented at the American Association of Drilling Engineers (**AADE**), National Technical Conference & Exhibition, Houston, Texas, April 11-12. AADE-17-NTCE-115.
- Guner, S., **Elshehabi, T.** and Bilgesu, I. **2017.** The Effects of Gas Kick Migration on Wellbore Pressure. Paper presented at the American Association of Drilling Engineers (**AADE**), National Technical Conference & Exhibition, Houston, Texas, April 11-12. AADE-17-NTCE-132.
- Elshehabi, T. and Bilgesu, I. 2016.** Well Integrity and Pressure Control in Unconventional Reservoirs: A Comparative Study of Marcellus and Utica Shales. Paper presented at the Society of Petroleum Engineers (**SPE**), Eastern Regional Meeting, Canton, Ohio, USA, 13-15 September. <http://dx.doi.org/10.2118/184056-MS>.
- Salih, A., **Elshehabi, T.** and Bilgesu, I. **2016.** Impact of Nanomaterials on the Rheological and Filtration Properties of Water-Based Drilling Fluids. Paper presented at the Society of Petroleum Engineers (**SPE**), Eastern Regional Meeting, Canton, Ohio, USA, 13-15 September. <http://dx.doi.org/10.2118/184067-MS>.
- Guner, S., **Elshehabi, T.** and Bilgesu, I. **2016.** Pressure Variations due to Migration of Gas Kick Bubbles in Deep Vertical, Deviated and Horizontal Wells. Paper presented at the Istanbul Technical University (**ITU**) Petroleum and Natural Gas Seminar and Exhibition, Istanbul, Turkey, 23-24 June.
- Elshehabi, T. and Bilgesu, I. 2016.** What are the Well Control Complications while Drilling with Casing or Liner? Paper presented at the American Association of Drilling Engineers (**AADE**), Fluids Technical Conference and Exhibition, Houston, Texas, April 12-13. AADE-16-FTCE-79.

- Elshehabi, T.** and Bilgesu, I. **2015**. Impact of Drilling with Oil Based Mud on Well Control in Horizontal Shale Gas Wells. Paper presented at the Society of Petroleum Engineers (**SPE**), Eastern Regional Meeting, Morgantown, West Virginia, USA, 13-15 October. <http://dx.doi.org/10.2118/177294-MS>.
- Elshehabi, T.** and Bilgesu, I. **2015**. Well Control Operations for Horizontally Drilled Wells and its Complications. Paper presented at the Istanbul Technical University (**ITU**), Petroleum and Natural Gas Seminar and Exhibition, Istanbul, Turkey, 18-19 June.
- Elshehabi, T.A.** **2012**. Development of an Advanced Drilling Simulator for Drilling Optimization in Western Desert, Egypt. *uncompleted* Ph.D. Dissertation, College of Petroleum and Mining Engineering, Suez Canal University, Suez, Egypt.
- Elshehabi, T.A.** **2008**. An Integrated Model for Gas Kick Control during Drilling Deviated Wells. M.Sc. Thesis, College of Petroleum and Mining Engineering, Suez Canal University, Suez, Egypt.
- Elshehabi, T.A.,** Elgibaly, A.A. and Farahat, M.S. **2007**. *Development of an Integrated Model for Gas Kicks Control During Drilling of Horizontal Wells*. Journal of Petroleum and Mining Engineering, JPME 10: 91-107.

Posters and Presentations

- Elshehabi, T. A. (2020)**. Visual Teaching Philosophy: An Emerging Tool for Inclusive Classrooms. Poster accepted in the Rocky Mountain Section (RMS) of the American Society for Engineering Education (ASEE). Golden, Colorado. The conference was cancelled due to the global COVID-19 pandemic. May 17-19.
- Elshehabi, T. A. (2020)**. Teaching is Effective When It's Active and Collaborative, T.E.A.M – Together, Everyone Achieves More. Final poster presented in UW Learning Actively Mentoring Program (**LAMP**). Laramie, Wyoming. May-2.
- Elshehabi, T. A., & Gardner, M. (2019)** Integration of 3D Printing Technology and Virtual Reality With the Drilling Simulator. PokeBot V1.01 - Student Innovation Center. Engineering Education & Research Building (EERB). September-27.
- Elshehabi, T. 2019**. Wyoming Energy's for You, Active Engagement Session. The 2019 Rocky Mountain Section (RMS) of the American Society for Engineering Education (**ASEE**), Laramie, Wyoming, USA, 19-22 May.
- Elshehabi, T.,** Cox, Z., Smith, C., Idowu, G. and Bilgesu, I. **2016**. DSATS Drilling Automation University Competition Winning Team Design and Test Results. Presented at the Drilling Systems Automation Technical Section (DSATS) Symposium, Society of Petroleum Engineers (**SPE**), Annual Technical Conference and Exhibition (ATCE), Dubai World Trade Centre, Dubai, UAE, 25 September.
- Elshehabi, T. 2017**. Horizontal Well Kicks and Blowout Control: What we Know and what we Need to Know? Poster presented at the American Association of Drilling Engineers (**AADE**), National Technical Conference & Exhibition, Houston, Texas, April 11-12.
- Elshehabi, T. 2016**. Impact of Gas Solubility on Well Control Operations while Drilling with Casing/Liner using OBM. Poster presented at the American Association of Drilling Engineers (**AADE**), Fluids Technical Conference and Exhibition, Houston, Texas, April 12-13.
- Elshehabi, T. 2015**. Investigation of Well Control Procedures for Casing Drilling in Horizontal Wells. Poster presented at the American Association of Drilling Engineers (**AADE**), National Technical Conference & Exhibition, San Antonio, TX, 8-9 April.