

Tawfik Elshehabi, Ph.D., P.E.  
Assistant Professor  
Energy and Petroleum Engineering Department  
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**Biography:** *Tawfik Elshehabi, PhD, PE, is an Assistant Professor of Energy and Petroleum Engineering at the University of Wyoming, Principal Investigator of the Drilling Innovation Group, and CO-PI of the Subsurface Energy Digital Innovation Center (SEDI). A licensed Professional Engineer (PE) in Wyoming, he holds a Ph.D. in Petroleum and Natural Gas Engineering from West Virginia University. He directs the Drilling and Completions Simulation Facility. As an ABET Program Evaluator (PEV) and Accreditation Coordinator, he ensures high standards in engineering education. Committed to student success and sustainable energy solutions, his extensive publications contribute to innovative drilling practices and energy transition efforts. Dr. Elshehabi's passion for energy innovation drives his vision of helping future engineers create a better world for all of us.*

**Research Statement:** *My research optimizes drilling fluids and cement for oil and gas, geothermal, carbon storage applications, etc. I specialize in environmentally friendly fluids and cement formulations, using nanoparticles to improve performance, efficiency, and sustainability. I believe by integrating advanced laboratory characterization with machine learning and digital twin validation, my work enhances drilling automation, wellbore integrity, and sustainable energy transitions. I advocate for energy integration, where drilling remains the key enabler of subsurface resources development.*

**Research Interest:** *Drilling fluids and cementing; nanoparticle-enhanced fluids and emulsions; geothermal and HTHP drilling; AI-predictive analytics, automation, optimization, machine learning, and digital twins; VR/AR in well control and human factor; U-shaped laterals and complex trajectories; managed pressure and deepwater drilling; CO<sub>2</sub> and hydrogen storage well and cement integrity.*

### Education

Ph.D., Petroleum and Natural Gas Engineering, College of Engineering and Mineral Resources, West Virginia University, Morgantown, WV, USA (August 2017)

- Dissertation: *Hydraulics and Well Control Complications in Unconventional Shale Laterals*

M.Sc., Petroleum Engineering, College of Petroleum and Mining Engineering, Suez Canal University, Suez, Egypt (July 2008)

- Thesis: *An Integrated Model for Gas Kick Control During the Drilling of Deviated Wells*

B.Sc., Petroleum Engineering, College of Petroleum and Mining Engineering, Suez Canal University, Suez, Egypt (May 2003)

### Academic & Professional Experience

- Assistant Professor (Tenure-Track), Energy and Petroleum Engineering, University of Wyoming, Laramie, WY (January 2023–Present)
  - Job Description: Teaching (25%), Research (50%), Services (25%) [ABET Accreditation Coordinator, Director of the Drilling and Completions Simulation Facility]
- Co-Principal Investigator (Co-PI), Advanced Well Stimulation Facility, UW Science Initiative Building (SIB, 1010) (October 2024–Present)
- Co-Principal Investigator (Co-PI), Subsurface Energy and Digital Innovation Center of Excellence (SEDI), UW School of Energy Resources (July 2024–Present)
- Principal Investigator (PI), Drilling Innovation Group (DIG), University of Wyoming (January 2023–Present)

- Established and supervises the Next-Gen Drilling and Completions Fluids Lab and Advanced Eco-Cement Testing Facility.
- Associate Instructional Professor, Energy and Petroleum Engineering, University of Wyoming (August 2022–January 2023)
- Accreditation Board for Engineering and Technology (ABET), Program Evaluator (PEV), Engineering Accreditation Commission (EAC), on behalf of the Society of Petroleum Engineers (SPE) (April 2022–Present)
- Senior Academic Professional Lecturer, Petroleum Engineering, University of Wyoming (September 2020–August 2022)
- Licensed Professional Engineer (PE #18019), Wyoming State Board of Professional Engineers and Professional Land Surveyors (June 2020–Present)
- Director, Drilling and Completions Simulation Facility, College of Engineering and Physical Sciences, University of Wyoming (Summer 2019–Present)
- Accreditation Board for Engineering and Technology (ABET), Program Accreditation Coordinator, Petroleum Engineering, University of Wyoming (January 2019–Present)
- Associate Academic Professional Lecturer, Petroleum Engineering, University of Wyoming (August 2017–September 2020)
- Graduate Teaching & Research Assistant, Petroleum and Natural Gas Engineering, West Virginia University (January 2013–August 2017)
- Assistant Lecturer, Petroleum Engineering, Suez Canal University, Egypt (2008–2010)
- Demonstrator (Teaching & Research Assistant), Petroleum Engineering, Suez Canal University, Egypt (2005–2008)

### **Industry Experience**

- Drilling Supervisor, AGIBA Petroleum Company, Meliha Field, Western Desert, Egypt (2010–2012)
  - Supervised all key drilling and completion operations, ensuring efficient execution and adherence to safety and environmental regulations.
- Drilling & Wellsite Engineer, Belayim Petroleum Company (PETROBEL), Abu Rudeis Field, Gulf of Suez, Egypt (2003–2005)
  - Designed and executed drilling and completion operations for onshore and offshore wells in the Sinai Peninsula and the Gulf of Suez. Coordinated daily drilling activities, ensuring personnel safety and regulatory compliance.
- Intern, Western Desert Operating Petroleum Company (WEPCO), Alamein Field, Western Desert, Egypt (Summer 2002). Assisted in optimizing production and artificial lift strategies for oil and gas wells.
- Intern, Gulf of Suez Petroleum Company (GUPCO), Abu El-Gharadig Field, Western Desert, Egypt (Summer 2001). Contributed to drilling and completion optimization for deep gas wells.

### **Proposals, Grants, and Funds**

- U.S. DOE Office of Science (\$2M) – Predictive Understanding of THMC Processes Driven by Impure CO<sub>2</sub> Injection (PUSH-CO<sub>2</sub>) (Submitted: February 2025)
  - Key researcher, responsible for well and cement integrity modeling using CFD, machine learning, and digital twins. (DE-FOA-0003444)
- Fiscal Year 2025 Engineering Initiative One-Time Funding (Awarded: January 2025, \$45,000)
  - Funded for replacing outdated canopy ventilation exhaust with a health and safety-approved fume hood in Lab EN 4042.
- College of Engineering Initiative Seed Grant (\$25,000, Submitted: 2025)
  - Co-PI in collaboration with Computer Engineering faculty on “Risk-Free Operations Through AR/VR and Machine Learning Applications”.
- Graduate Student Supervision through Department Fund Raising (\$1M, Expected: 2025)

- Anticipated to supervise multiple graduate students, supported by \$500,000 donation + \$500,000 matching as part of Dr. Vamegh Rasouli's Top 5-in-5 initiative for drilling-focused MS/MEng scholarships.
- Engineering Initiative Funding in collaboration with the School of Energy Resources to – Eco-Cem Liquid Cement Testing Equipment (Awarded: April 2024, \$407,000)
  - Acquire advanced slurry testing equipment for next-generation cement formulations.
- Mowry Project Phase II – Drilling Fluids Stability & Shale Compatibility (Awarded: July 2023–August 2025, \$142,410)
  - Funded by the UW School of Energy Resources to investigate drilling fluid interactions with Mowry shale-bentonite layers.
- Engineering Initiative One-Time Funding – Drilling & Completion Fluids Laboratory Infrastructure (Awarded: March 2023, \$33,940)
- The John L. & Catherine Donofrio Heywood Fund (2023 Proposal, \$96,401 Requested)
  - Selected to apply for funding to develop a “Sustainable Lab for Next-Gen Eco-Friendly Fluids”.
- Daniels Fund Ethics Initiative (DFEI) Faculty Fellowships
  - 2024–25 (\$3,000) – Facilitated campus-wide ethics training in collaboration with ECTL.
  - 2023–24 (\$3,000) – Facilitated campus-wide ethics training in collaboration with ECTL.
  - 2022–23 (\$3,000) – Developed an ethical decision-making framework for engineering education.
  - 2021–22 (\$3,000) – Advanced ethics integration in engineering curricula.
- Industry & In-Kind Contributions
  - International Association of Drilling Contractors (IADC) Headquarters – One-time \$10,000 donation to the UW IADC Student Chapter (Supervised as Faculty Advisor).
  - Well Control School (WCS) – Secured \$6,250 in-kind donation for online drilling and well control training for 25 students.
- Petroleum Engineering Software Contributions – Acquired in-kind software donations, including:
  - DrillScan Software
  - Oliasoft WellDesign
  - Schlumberger Wellscan, Drillbench
  - NSI Technologies StimPlan, Barree & Associates GOHFER
  - PetroEd Online Modules, IADC Well Control Training & Certifications
- University of Wyoming Funding & Outreach
  - LAMP Grant – Science Initiative Learning Actively Mentoring Program (Awarded: 2019–2020, \$5,000) – Implemented active learning strategies in engineering education.
  - UW Libraries Open Textbook Grant (Awarded: 2018, \$5,000) – Developed an open educational resource (OER) textbook for PETE 2050 – Fundamentals of Petroleum Engineering.
  - External Outreach Fundraising (\$1,500, 2018–2022) – Secured funding for UW Summer High School Institute – “Wyoming Energy for You”.

## Research Supervision and Committees

### Advisor/Chair

- PhD Students
  - Abdallah Mehanna, *Energy and Petroleum Engineering* (Fall 2024 – Present)
  - Ahmed Essam Mohamed, *Energy and Petroleum Engineering* (Summer 2024 – Present)
- MEng/MS Students
  - Garrett Cox, *Energy and Petroleum Engineering* (Spring 2025 – Present)
  - Joshua Shipman, *Energy and Petroleum Engineering* (Fall 2024 – Present)
  - Owen Kuemmerle, *Energy and Petroleum Engineering* (Spring 2024 – Present)
  - Hossam Elnaggar, *Energy and Petroleum Engineering* (Fall 2023 – Spring 2024, Co-Advisor)
  - Ayat Abdulsattar Jabbar Al-Asadi, *Energy and Petroleum Engineering* (Fall 2023 – Spring 2024)
- Undergraduate Researchers
  - Undergraduate researchers in my labs, include Garrett Cox (October 2023–present), Joe Hajba (December 2023–present), Ian Molinar (February 2024–present), Isaac Sternhagen (February 2024–present), Owen

Kuemmerle (April 2024–August 2025), Tate Novodvorsky (September 2024–present), and Logan Colwell (February 2025–present).

### **Committee Member**

- **PhD Students**

- Thi Thu Trang Nguyen, Energy and Petroleum Engineering, Dr. Saraji's Group (Spring 2025 – Present)
- Ahmed Shawki, Energy and Petroleum Engineering, Dr. Saraji's Group (Spring 2025 – Present)
- Nazia Kolla, Energy and Petroleum Engineering, Dr. Rabiei's Group (Fall 2024 – Present)
- Ahmed Taman, Energy and Petroleum Engineering, Dr. Piri's Group (Spring 2024 – Present)
- Omer Abdelazim Hasabelrasool Salim, Energy and Petroleum Engineering, Dr. Piri's Group (Summer 2023 – Present)
- Alvinda Sri Hanamertani, Energy and Petroleum Engineering, Dr. Saraji's Group (Summer 2023 – Spring 2024)
- Moustafa Aly, Energy and Petroleum Engineering, Dr. Saraji's Group (Spring 2022 – Present)
- Ying Yu, Energy and Petroleum Engineering, Dr. Saraji's Group (December 2020)

- **MS Students**

- Benard Oppong, Geology & Geophysics (Spring 2024 – Present)
- Emmanuel Chibueze Obasi, Energy and Petroleum Engineering, Dr. Saraji's Group (Fall 2022 – Fall 2023)
- Christopher Walker, Energy and Petroleum Engineering, Dr. Saraji's Group (Optimization of Nanoparticle-Enhanced Water-Based Drilling Fluid, September 2021, Co-Advisor)
- Joshua Medina, Energy and Petroleum Engineering, Dr. Saraji's Group (Enhanced Oil Recovery from Carbonates, April 2021)

### **Teaching and Curriculum Development**

- **Undergraduate Courses**

- ES 1101 – First-Year Seminar
- ES 2120 – Engineering Dynamics
- PETE 2050 – Fundamentals of Petroleum Engineering
- PETE 3255 – Basic Drilling Engineering
- PETE 3265 – Drilling Fluids Laboratory
- PETE 3725 – Wellbore Operations (Well Completions)
- PETE 3900 – Undergraduate Research
- PETE 4736 – Petroleum Engineering Design
- PETE 4970/5990 – Internship in Petroleum Engineering

- **Graduate Courses**

- PETE 4990/5150 – Well Control
- PETE 5100 – Independent Study
- PETE 4255/5255 – Advanced Drilling Engineering
- PETE 5890 – Graduate Seminar
- PETE 5980 – Dissertation Research

- **Interdisciplinary and High School Courses**

- HP 4151 – Engineering, Energy, and Ethics (Honors College)
- Wyoming's Energy 4 You – Summer High School Institute
- Energy 4 You – Engineering Summer Program (ESP)

- **Independent Study Topics**

- Clay Chemistry
- Geothermal Drilling Engineering
- Drilling Automation and Optimization
- Machine Learning in Drilling
- Advanced Well Control
- Managed Pressure Drilling

### **Awards, Certifications & Recognitions**

- Promoting Intellectual Engagement in the First Year (PIE) Campus-Wide Award (April 2023)
- IADC Instructor Certificate in Drilling Operations (Supervisor Level, Surface BOP Stack) (November 2022)

- Certified Instructor – Drilling Systems DrillShip DS-6000 Drilling & Well Control Simulator (December 2021)
- Third-Best Diversity Paper Award – ASEE Annual Conference (New Engineering Education Division) (2021)
- Diversity, Equity & Inclusion (DEI) – Silver Badge, UW Ellbogen Center for Teaching & Learning (Spring 2020)
- Nominated for Advisor of the Year – IADC Recognized Student Organization (Spring 2020)
- Diversity, Equity & Inclusion (DEI) – Bronze Badge, UW Ellbogen Center for Teaching & Learning (Fall 2019)
- LAMP Fellow of the Month – Recognized for A.S.K. Visual Model for Teaching & Learning (September 2019)
- Certified Instructor – Drilling Systems Cyber-chair DrillSIM-6000, WirelineSIM-5000, Coiled-TubingSIM-5000 (August 2019)
- Don Stinson Outstanding Teacher Award – UW Department of Petroleum Engineering (May 2019)
- Best Active Engagement Session Award – ASEE Rocky Mountains Section Conference (May 2019)
- Nominated for Tau Beta Pi Outstanding Undergraduate Teaching Award (February 2019)
- UW Libraries Open Textbook Grant – PETE 2050 Fundamentals of Petroleum Engineering (\$5,000) (Fall 2018)
- Top Graduate – Murchison Drilling Schools (MDS) & WELLSHARP Certified (Supervisor Level 4, Drilling & Workover Completions, IADC) (March 2018)
- Best New Recognized Student Organization (RSO) Award – IADC Student Chapter, UW (2018–2019)
- Champion – SPE-DSATS Drillbotics International University Competition (Drilling Engineer, WVU Team) (2015–2016)
- Outstanding Ph.D. Graduate Student – WVU Petroleum & Natural Gas Engineering (2013–2017)
- Wild Well Control Fundamental Certification (2013)
- IWCF Surface BOP Stack Certification (2007)

## **Affiliations and Memberships**

### Fellowship & Mentorships

- Faculty Mentor, UW College of Business, Daniels Fund Ethics Initiative (2023–2025)
- Faculty Fellow, UW Ellbogen Center for Teaching & Learning (ECTL) – Assessment Learning Community (2022–2023)
- Faculty Fellow, UW College of Business, Daniels Fund Ethics Initiative (2021–2023)
- Faculty Fellow, John & Esther Clay Honors College (2021–2022)
- Faculty Mentor, UW Science Initiative – Learning Actively Mentoring Program (LAMP) (2021–2022)
- Faculty Fellow, National Effective Teaching Institute (NETI) (Since June 2020)
- Faculty Fellow, UW Science Initiative – Educator’s Learning Community (ELC) (2020–2021)
- Faculty Fellow, UW Science Initiative – Learning Actively Mentoring Program (LAMP) (2019–2020)
- Faculty Fellow, UW Ellbogen Center for Teaching & Learning (ECTL) (2018–2021)
- Faculty Fellow, UW Summer High School Institute (HSI) (Since 2018) – Developed and delivered Wyoming’s Energy 4 You course for high school scholars.

### Professional Memberships

- Member, Tau Beta Pi – Wyoming Alpha Chapter, Engineering Honor Society (Since April 2022)
- Advisory Board Member, Petroleum Engineering Program, Beirut Arab University (BAU) (Since June 2021)
- Member, Foundation Board of Advisors, International Association of Well Control Instructors (IAWCI) (Since November 2020)
- Member, Wyoming Society of Professional Engineers (WYSPE) (Since November 2020)
- Member, National Society of Professional Engineers (NSPE) (Since October 2020)
- Professional Engineer (PE), Wyoming State Board of Professional Engineers & Professional Land Surveyors (Since June 2020)
- Member, American Society for Engineering Education (ASEE) (Since May 2019)
- Member, Association of American Colleges & Universities (AAC&U) (Since May 2019)
- Member, International Association of Drilling Contractors (IADC) (Since 2018)



- Member, American Association of Drilling Engineers (AADE) (Since 2013)
- Member, Society of Petroleum Engineers (SPE) (Since 2013)

## **Professional Development and Services**

### Accreditation

ABET Champion, Petroleum Engineering Department, University of Wyoming (Since Jan 2019)

- Led ABET Accreditation for Petroleum Engineering BS Program – Prepared the Self-Study Report and hosted a successful accreditation visit (Nov 2021)

ABET Program Evaluator (PEV), Engineering Accreditation Commission (EAC) (Since April 2022).

Conducted onsite accreditation audits:

- Petroleum Engineering Program in Texas, Nov 19–21, 2023
- Petroleum Engineering Program in Montana, Oct 2–4, 2022
- Simulated Program Visit and Program Evaluator Candidate (PEVC) training, Oct 2021.

Professional Development & Training:

- ABET Symposia: 2023 (7 PDHs, Nashville), 2021 (12 PDHs, Online), 2019 (12 PDHs, Dallas)
- Advanced Program Assessment Workshop (2023)
- Program Assessment Methods & Measures (2021)
- Basics of Program Assessment Planning (2021)

### Peer Reviews & Editorial Roles

Editorial Roles

- Editorial Board Member, Petroleum & Petrochemical Engineering Journal (PPEJ), MEDWIN Publishers (Since August 2024)
- Academic Editor, Petroleum Drilling Techniques, SINOPEC Research Institute of Petroleum Engineering (Since August 2022)

Technical Peer Reviews

- Peer Reviewer, The Ocean Energy Safety Institute (OESI)
  - 2024: *Early Kick Detection (EKD) and well control optimization.*
  - 2023: *Reduction of severity for loss of primary and secondary well control events; loss containment and early detection.*
- Peer Reviewer, U.S. Department of Energy (DOE) – Geothermal Technologies Office (GTO)
  - 2022: *MERIT Peer Review for Efficient Drilling in Geothermal Energy (EDGE).*
  - 2022: *Review for Geothermal Energy from Oil and Gas Demonstrated Engineering (GEODE).*
  - 2018: *MERIT Peer Review for Efficient Drilling in Geothermal Energy (EDGE).*
- Session Co-Chair & Peer Reviewer, “Toward Drilling Smarter Geothermal Wells,” Geothermal Rising Conference (October 2023, Reno, NV)
- Journal Peer Reviews
  - Reviewer, *Arabian Journal for Science and Engineering* (Since January 2021)
  - Reviewer, *Journal of Petroleum Science and Engineering* (Since January 2021)
  - Reviewer, *Journal of Petroleum Exploration and Production Technology (PEPT)* (Since 2020)
  - Reviewer, *Journal of Natural Gas Science & Engineering (JNGSE)* (Since 2016)
- Education & Public Outreach Reviews
  - *Certified Peer Reviewer, Quality Matters (QM) – Higher Education & K-12 Online Courses* (Since December 2020)
  - *Certified Reviewer, Quality Matters (QM) – Global Organization* (Since August 2020)
  - *Judge, Wyoming State Science Fair – Engineering Energy Projects* (Since March 2018)

### Committees

Department-Level Committees

- Petroleum Engineering Undergraduate Program Committee – Accreditation Representative (Since May 2024)
- Graduate Subcommittee for MEng/MS – Drilling-focused applications and scholarships (Since December 2024)
- Professor of Practice Search Committee, Energy & Petroleum Engineering (August–December 2024)

- Drilling Simulator Lab Committee (August 2017 – August 2019)
- Undergraduate Curriculum Continuous Improvement Subcommittee (August 2017 – December 2018)

#### College-Level Committees

- ABET Accreditation Champions, College of Engineering & Physical Sciences – Petroleum Engineering Representative (Since August 2024)
- Fluid Dynamics Multidisciplinary Teaching Lab Committee (August 2017 – August 2020)
- Appeals Panel Committee (August 2017 – August 2018)

#### University-Level Committees

- UW STEM Carnival Planning Committee (February – May 2023)
- Next Generation University Studies Program – Assessment Subcommittee (January – December 2023)
- Student Interaction Committee (Since June 2021)
- University of Wyoming Leadership Committee – HHMI Inclusive Excellence Initiative (ie3), Third Competition

#### Professional Development & Activities

- Technical Training & Certifications
  - AES Fluids Mud School, Midland, TX (June 17–20, 2024)
  - Co-instructor, Nabors IADC WellSharp Driller's Level Well Control (5 Days, 40 Hours), Laramie, WY (April 12–16, 2023)
  - Co-instructor, Nabors IADC WellSharp Supervisor Level Well Control (5 Days, 40 Hours), Laramie, WY (April 5–9, 2023)
  - Nabors IADC WellSharp Supervisor Level (Instructor training and certification) (5 Days, 40 Hours), Tyler, TX (Nov 17–21, 2022)
  - WELLSHARP Certification, IADC – Drilling Operations, Workover Completions (Supervisor Level 4), Golden, CO (March 2018)
  - International Well Control Forum (IWCF) Surface BOP Stack Certificate (2007) and Wild Well Control Fundamental Certification (2013)
- Conferences, Workshops & Industry Engagement
  - Volunteer, DOE's GEODE Consortium (Geothermal Energy from Oil & Gas) (Since January 2025)
  - Mentor, DOE's Geothermal Technology Office, 2024 Geothermal Collegiate Competition, Colorado School of Mines team.
  - Hosted Training & Drilling Fluids Lab Session – AES Fluids, Contamination & Treatment (October 24, 2024)
  - AADE Fluids Conference, Houston, TX (April 15–18, 2024) – Two research posters.
  - Machine Learning & Quantum Computing Training, Engineering Summer Program for High School Teachers (July 17–21, 2023)
  - Programming with Arduino & Raspberry Pi, Engineering Summer Program for K-12 Teachers (July 10–14, 2023)
  - Direct Air Capture in Wyoming Regional Roundtable, Center for Climate & Energy Solutions, Cheyenne, WY (May 23, 2023)
  - DOE Geothermal Technologies Office: Enhanced Geothermal Shot™ Summit (Online) (May 11, 2023)
  - Wyoming Energy Authority's Next Frontier Energy Summit (May 8–9, 2023)
  - Unconventional Geomechanics & Hydraulic Fracturing Course – ARMA & University of Wyoming (April 28, 2023)
  - Python for Data Science & Machine Learning Bootcamp (Udemy) (August 2021)
  - Leadership Development for Engineers Specialization (38 PDUs), Rice University (July 2021)
  - Engineering Project Management Specialization (38 PDUs), Rice University (August 2020)
  - IADC Drilling Engineers Committee Tech Forum – “Why We Do What We Do” (Online) (March 28, 2023)
  - Hydraulic Fracturing Training – Hosted a day-long training on unconventional shale reservoirs by Barree & Associates (March 29, 2018).
  - Directional Drilling & Surveying Short Course – Organized a two-day training by NExT (Schlumberger Company) (Spring 2018).

- Teaching and Learning Training
  - Mentor, Daniels Fund Ethics Initiative, College of Business, UW (2023–2025)
  - Faculty Fellow, Daniels Fund Ethics Initiative, College of Business, UW (2021–2023)
  - Faculty Appreciative Inquiry Workshop, College of Engineering & Physical Sciences (November 6, 2024)
  - AAC&U Virtual Conference on General Education, Pedagogy & Assessment (2023)
  - UW Ellbogen Center for Teaching & Learning (ECTL) – Assessment Learning Community (2022–2023)
  - Mentor, Learning Actively Mentoring Program (LAMP), UW Science Initiative (Since May 2021)
  - Teaching & Learning Certificate (100 PDUs), ECTL, University of Wyoming (September 2021)
  - National Effective Teaching Institute (NETI) (June 2020)
  - Speaker & Moderator, UW Faculty Orientation (70+ attendees) (August 19, 2020)
  - Educator's Learning Community (ELC), UW Science Initiative (Since May 2020)
  - Completed UW Science Initiative, Learning Actively Mentoring Program (LAMP) Summer Camp & Year-Long Training, Sheridan, WY (Fall 2018 – Spring 2019)
- Competitive Projects
  - West Virginia University – AI & Wellbore Stress Analysis, DOE MSEEL Project (with Dr. Ilkin Bilgesu) (2015–2017)
  - NASA RASC-AL Mars Ice Drilling Challenge – WVU Team Mentor (2016)
  - SPE-DSATS Drillbotics Competition – WVU Champion Team (2015–2016)

### Outreach and Simulator Activities

- Drilling Simulator Tours & Outreach Activities– Hosted 400+ simulator visits and outreach tours, welcoming 7,500+ visitors for hands-on training since Summer 2019.
- Installation and acceptance of the DS:OTR (on the rig training) simulator, January 2025.
- IADC Well Control Training & Certification Sessions – Organized well control training with Wild Well Control in April 2018, October 2018, March 2019 and IAWCI training sessions in November 2019, March 2021, November 2021, April 2022, March 2023, November 2024.
- Facilitated MOU between UW and PetroEd & Open Petroleum Education Network for online drilling training (Since October 2024).
- Established MOU with 3T Drilling Systems for research, training, and online education in collaboration with the Department of Energy & Petroleum Engineering (Since January 2024).
- Student Industry Exposure – Led College of Engineering & Physical Sciences Career Trek (Winter 2023) to Oklahoma City & Tulsa, visiting Continental Resources, Hamm Institute, Baker Hughes, Devon Energy, and Williams Energy.
- Drilling Simulator renovation and expansion (Summer 2019) – Managed the relocation of DS:5000 to the Engineering Education & Research Building (EERB), installation and acceptance of DS:6000 (drillship), CTS:5000 (coiled tubing), WLS:5000 (wireline), DS:Educator, DS:5, and VR drilling simulators.
- STEM Outreach
  - Energy 4 U – Engineering Summer Program (ESP) (Summers 2022, 2023, 2024).
  - Wyoming's Energy for You – UW Honors & High School Summer Institute (Summers 2018, 2019, 2021).

### Student Organizations

- Academic Advisor, Tau Beta Pi – Wyoming Alpha Chapter (Since August 2022)
- Academic Advisor, American Association of Drilling Engineers (AADE) Student Chapter (Since August 2021)
- Founder & Academic Advisor, International Association of Drilling Contractors (IADC) Student Chapter – Established the fourth IADC student chapter in the U.S. at the University of Wyoming (Since November 2018)
- Industry Field Trips
  - 2024 – Fulcrum Energy, NOV Casper (Fall); True Drilling (Spring), 2023 – True Drilling (Fall); Ensign Energy (Spring), 2022 – Ensign Energy (Fall, Spring), 2021 – Ensign Energy (Fall), 2020 – KLX Energy, Ensign Energy (Spring), 2019 – Weatherford, KLX Energy, Patterson-UTI (Spring); Ensign Energy, KLX Energy (Fall), 2018 – Noble Energy, Halliburton, KLX Energy, USA Trucking (Spring); Anadarko, Precision Drilling Rig (Summer); KLX Energy (Fall).



## Publications

### Peer-Reviewed Journal Manuscripts

- Elshehabi, T.** (2025). *Nanosilica Dispersion in Water-Based Mud: Balancing Sonication and Mixing Energy for Optimized Particle Dynamics and Fluid Performance*, *Geoenergy Science and Engineering Journal*. PETROL39424 (review in progress)
- Elshehabi, T., Alfehaid, M.** (2025). *Sustainable Geothermal Energy: A Review of Challenges and Opportunities in Deep Wells and Shallow Heat Pumps for Transitioning Professionals*. *Energies*, 18, 811. <https://www.mdpi.com/1996-1073/18/4/811>.
- Alasadi, A., Elshehabi, T.** (2024) *Advancing Geothermal Energy: Integrating Mechanical Specific Energy with Bit Wear and Circulation Effects for High-Temperature Drilling*. SSRN Scholarly Paper <http://dx.doi.org/10.2139/ssrn.4735650>.
- Medina, J. A., Obasi, E. C., Elshehabi, T., Saraji, S.** (2023.) *Wettability alternation and interface tension modification for enhanced oil recovery in oil-wet carbonates: A comparative study of different surfactants*, *Geoenergy Science and Engineering Journal*. ISSN 2949-8910, <https://doi.org/10.1016/j.geoen.2023.211637>.
- Elshehabi, T.A., Elgibaly, A.A., 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.

### Books & Book Chapters

- Elshehabi, T., & Alfehaid, M.** (2025). *Geothermal Well Drilling: Engineering, Automation, and Feasibility on Mars*. (Book Chapter). In *Hydrothermal Processes in the Solar System* book, by Editors- Kenneth Sims, Everett Shock, Donald DePaolo. AGU Publisher. (Work in Progress).
- Elshehabi, T. A.** (2022). *Well Control Complications in Unconventional Shale Laterals*. (Book Chapter). In *Shale Gas Production - Lessons Learned* Textbook, edited by Rouzbeh, and published by ELSEVIER in Feb. 2022, ISBN: 9780323901857.
- Elshehabi, T. A., & Heshmati, M.** (2021). *Fundamentals of Petroleum Engineering*. Open Education Resources (OER) Textbook for PETE 2050 Fundamentals of Petroleum Engineering course material. Funded by the University of Wyoming Libraries, Laramie, WY.

### Conference Proceedings

- Elshehabi, T. & 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>.
- Bilgesu, H., Cox, Z., Elshehabi, T.A., Smith, C., Idowu, G. & 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. & 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. & 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. & 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. & 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. & 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. & 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. & 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. & 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.

#### Theses & Dissertations

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.

Elshehabi, T.A. (2012). *Development of an Advanced Drilling Simulator for Drilling Optimization in Western Desert, Egypt*. Ph.D. Dissertation (Not Completed), 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.

#### Engineering Education Publications

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 American Society for Engineering Education (ASEE) Virtual Annual Conference & Exposition, July 26–29.

Elshehabi, T.A. (2019). Innovative Hands-on Teaching Tools Inspiring Upcoming Petroleum Engineers and K-12 Students. Paper presented at the Rocky Mountain Section (RMS) of the American Society for Engineering Education (ASEE) Conference, Laramie, WY, May 19–22.

#### Posters and Presentations

- Elshehabi, T. A. (2024). Mowry Project Workshop: Drilling Fluids Stability and Compatibility with Mowry Shale-Bentonite Layers. School of Energy Resources, University of Wyoming, October 18.
- Elshehabi, T. A. (2024). Wyoming's Energy Future Panel 2: Unconventional Petroleum Systems. UW School of Energy Resources and Wold Foundation, Laramie, WY, September 12.
- Elshehabi, T. A. (2024). Mowry Phase Project: Drilling Fluids Stability and Compatibility with Mowry Shale-Bentonite Layers. School of Energy Resources, University of Wyoming, April 22.

- Elshehabi, T. A. (2022) Engineering, Ethics, and Energy mock classroom experience. University of Wyoming - Honors Program Showcase Friday. Drilling and Completions Simulation Facility. Laramie, Wyoming. Nov-11.
- Elshehabi, T. A. (2022) Daniels Fund Ethics Initiative in Engineering Education. Daniels Fund Consortium Summit - Faculty Fellow Presentation. Accepted the invitation from the University of Wyoming College of Business. Denver, Colorado. November 4-5.
- Elshehabi, T. A. (2022) Teaching Engineering Ethics: The Why, How, and What? Ellbogen Center for Teaching & Learning (ECTL) - Teaching & Learning Academy. Laramie, Wyoming. October-21.
- Elshehabi, T. A. (2022) The Role of Simulation in College Education. University of Wyoming –Global Engagement Office. Drilling and Completions Simulation Facility. Laramie, Wyoming. August-25.
- Elshehabi, T. A. (2022) Saddle Up Create and Explore Session. University of Wyoming – College of Engineering and Applied Science. Drilling and Completions Simulation Facility. Laramie, Wyoming. August-18.
- Elshehabi, T. A. (2022) Educating Future Engineers. Independent Educational Consultants (IEC). University of Wyoming – Admissions Office. Drilling and Completions Simulation Facility. Laramie, Wyoming. June-17.
- Elshehabi, T. A. (2022) The Role of Simulation in College Education. EducationUSA advisors. University of Wyoming – Global Engagement Office. Drilling and Completions Simulation Facility. Laramie, Wyoming. June-7.
- Elshehabi, T. A. (2022) Daniels Fund Faculty Fellows Year-End Presentation. University of Wyoming College of Business. Laramie, Wyoming. May-6.
- Elshehabi, T. A. (2022) Engineering, Ethics, and Energy – Discovery Day mock classroom experience. University of Wyoming – College of Engineering and Applied Science. Drilling and Completions Simulation Facility. Laramie, Wyoming. April-2.
- Elshehabi, T. A. (2022) Engineering, Ethics, and Energy – Showcase Saturday mock classroom experience. University of Wyoming – College of Engineering and Applied Science. Drilling and Completions Simulation Facility. Laramie, Wyoming. February-12.
- Elshehabi, T. A. (2021) Science Initiative Learning Actively Mentoring Program (LAMP) - Teaching Philosophy Workshop. Ellbogen Center for Teaching and Learning (ECTL). November-13.
- Elshehabi, T. A. (2021) Engineering, Ethics, and Energy mock classroom experience. University of Wyoming - Honors Program Impact Weekend. Drilling and Completions Simulation Facility. Laramie, Wyoming. October-9.
- Elshehabi, T. A. (2021) Science Initiative Learning Actively Mentoring Program (LAMP) - Coffee and Curriculum. When We Care, We Share: Empowering Students with an Innovative Visual Teaching Philosophy. via Zoom. October-1.
- Elshehabi, T. A. (2021) Program Educational Objectives in Preparation for ABET On-Site Visit. ABET-Engineering Accreditation Commission (EAC). Industry Advisory Board Meeting. Petroleum Engineering Department. Laramie, Wyoming. April-29.
- Elshehabi, T. A. (2020) Petroleum Engineering Department Spotlight. University of Wyoming – College of Engineering and Applied Science. Drilling and Completions Simulation Facility. Laramie, Wyoming. September-17.
- Elshehabi, T. A. (2020). The University of Wyoming, Ellbogen Center for Teaching and Learning, New Faculty Orientation Panel. via Zoom. August-19.
- Elshehabi, T. A. (2020) The Role of Simulation in College Education. High School Counselors. Drilling and Completions Simulation Facility. Laramie, Wyoming. September-18.
- Elshehabi, T. A. (2020) Student Outcomes Assessment – AY 20/21 in Preparation for ABET On-Site Visit. ABET-Engineering Accreditation Commission (EAC). Industry Advisory Board Meeting. Petroleum Engineering Department. Laramie, Wyoming. Sep-8.

- 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. (2020) Rubrics for Assessment of Student Learning Outcomes. ABET-Engineering Accreditation Commission (EAC). Petroleum Engineering Department. Laramie, Wyoming. March-10.
- Elshehabi, T. A., & Gardner, M. (2019) Integration of 3D Printing Technology and Virtual Reality with the Drilling Simulator. PokeBot V1.01 - Student Innovation Center. Drilling and Completions Simulation Facility. 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), Drilling and Completions Simulation Facility. Laramie, Wyoming, USA, 19-22 May.
- Elshehabi, T. 2018. Teaching Tools for Large Classes. Petroleum Engineering Department, Faculty Development, Laramie, Wyoming, USA, Fall.
- Elshehabi, T. 2018. Well Control: What we Know and What We Need to Know? Petroleum Engineering Graduate Seminar and Undergraduate Senior Design, Laramie, Wyoming, USA, Spring.
- 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., 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. 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.