Amir Montakhab, Ph.D., P.E.

Academic Rank: Lecturer II
Discipline: Mechanical Engineering (Thermal-Fluids & Combustion)

Education

Ph.D., Mechanical and Aerospace Engineering (Computational Combustion)
Syracuse University, NY, 2022

M.Sc., Mechanical Engineering (Energy & Fluid Dynamics)
California State University, Northridge, CA, 2010

B.Sc., Mechanical Engineering (Thermo-Fluids)
Iran University of Science & Technology, 2002

Academic Experience

Prairie View A&M University – Department of Physics
Adjunct Faculty | 2025

- Instructed University Physics for undergraduate students, emphasizing problem-solving, physical intuition, and application to engineering systems.
- Designed syllabi, lectures, assignments, and examinations aligned with course learning outcomes.
- Provided individualized academic support through structured office hours.

California State University, Northridge – Department of Mechanical Engineering
Academic Workshop Facilitator | 2007–2010

- Led instructional workshops and tutoring in Thermodynamics, Fluid Mechanics, Heat Transfer, and advanced mathematics.
- Assisted faculty with course preparation, grading, and assessment of student learning outcomes.
- Supported undergraduate and graduate students through one-on-one and group instruction.

Mentorship, Advising, and Student Support

- Provided academic tutoring in college-level mathematics, physics, and chemistry.
- Supported middle- and high-school students, including AP-level coursework, in STEM subjects.
- Supervised and trained technicians, and associate engineers in design and development of new products, Finite element modeling, combustion testing, and lab safety protocols (2011–2024).

Professional and Research Experience (Industry)

Etch Materials

Technical Consultant | Sep 2025 – Dec 2025
Natural Gas Pyrolysis

- Developed CFD models using ANSYS Fluent to analyze methane heat-up mechanisms via convection and radiation.
- Implemented multi-physics models accounting for carbon aerosol formation and its impact on radiative heat transfer.

Technip Energies, Houston, TX

Research Technologist | Jan 2024 – Jul 2025
Cryogenic Decarbonization of Post-Combustion Gases

- Provided technical leadership for CFD development of a novel multiphase carbon capture technology.
- Directed modeling efforts to support scale-up from laboratory to pilot-scale systems.
- Integrated experimental observations with CFD calibration and validation.
- Applied scaling laws and fluid mechanics to translate bench-scale results to full-scale designs.

Technip Energies, Houston, TX

Principal Engineer | Nov 2022 – Jan 2024

- Led applied R&D of advanced low-NOx combustion systems for ethylene cracking furnaces.
- Integrated CFD, experimental validation, and hydrogen co-firing concepts to achieve significant emissions reduction.

Daikin Comfort Technologies, Waller, TX

Engineering Manager | Apr 2021 – Nov 2022

- Managed combustion laboratory operations supporting R&D of residential and commercial heating systems.
- Led laboratory modernization, automation, and safety improvements.

United Technologies – Carrier Corporation, Syracuse, NY

Senior Mechanical Engineer | Nov 2012 – Apr 2021

- Conducted applied research on ultra-low NOx furnace technologies from concept through production.
- Designed experimental test plans and analyzed performance and emissions data.

American Combustion Technologies – Los Angeles, CA

Mechanical Engineer | Jul 2011 – Jul 2012

- Contributed to the design and development of industrial burners and process equipment for converting organic waste to biogas and different types of synthetic fuels.
- Performed calculations to evaluate input requirements and efficiency based on CO_2 emissions and flue gas temperature data.

Publications (Peer-Reviewed)

- Montakhab, A.A., Kumgeh, B.A., *Numerical Investigation of the Effect of Inlet Turbulence Intensity on a Bluff-Body Stabilized Flame Near Blow-Off, Proceedings of ASME Turbo Expo, 2021.*

Patents

- U.S. Patent No. US-20180209643-A1, *Burner Assembly Having a Burner Enclosure for a Combustion System.*
- U.S. Patent No. US-20210088211-A1, *Inward-Fired Low NOx Premix Burner.*

Synergistic Activities (Within and Outside the Institution)

- Industry–academia collaboration on clean combustion, hydrogen-enabled firing systems, and emissions reduction technologies.
- Mentorship and supervision of engineers, technicians, and graduate-level researchers in CFD and combustion experimentation.
- Former member, ASHRAE Technical Committee 6.10 – Fuels and Combustion.
- Ph.D. Sponsorship Program Recipient – United Technologies / Carrier Corporation.

Certifications and Professional Qualifications

- Licensed Professional Engineer (P.E.), State of Texas.

Teaching Interests

- Thermodynamics
- Fluid Mechanics
- Heat Transfer
- Combustion and Energy Systems
- Computational Methods in combustion, and thermo-fluid sciences

Research Interests

- Clean and low-carbon combustion systems
- Hydrogen and alternative fuel combustion
- Pollutant formation and emissions reduction technologies
- Computational fluid dynamics (CFD) with experimental validation
- Carbon capture and decarbonization of thermal systems

Graduate Student Supervision

None to date.

Graduate Course Teaching

None to date.