M. HASSAN PANJESHAHI

Professor of Chemical Engineering | Process Integration, Clean Technology & Energy Systems
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PROFESSIONAL SUMMARY

Internationally recognized chemical engineering professor and process integration researcher with 30+ years of academic, industrial, and policy-facing experience in clean technology, resource value chains, industrial energy efficiency, climate mitigation, and sustainable energy systems. Former Professor at the University of Tehran and Adjunct Professor at the University of Calgary, with 240+ scholarly publications, approximately 100 supervised MSc/PhD theses, and extensive leadership in applied research, industrial collaboration, and energy-policy projects. Research aligns closely with Canada Impact+ priorities in clean technology and resource value chains, environment and climate resilience, industrial decarbonization, and sustainable manufacturing systems. Experienced in building interdisciplinary research programs, mentoring highly qualified personnel, and translating engineering research into practical solutions for industry, government, and society.

CORE RESEARCH ALIGNMENT

- Clean technology and resource value chains
- Environment, climate resilience, and industrial decarbonization
- Energy efficiency in oil, gas, petrochemical, utility, and power systems
- Water-energy-environment nexus
- Process integration, pinch analysis, exergy analysis, and optimization
- Sustainable energy strategy, technology needs assessment, and policy impact
- HQP training, graduate supervision, interdisciplinary collaboration, and industry partnership
- Knowledge mobilization and translation of research into industrial and societal impact

TECHNICAL AND RESEARCH EXPERTISE

Process Integration: Heat integration, heat exchanger network retrofit, total-site integration, water pinch, hydrogen pinch, exergy analysis, pinch technology.

Energy and Climate: Industrial energy efficiency, GHG reduction, sustainable energy planning, clean technology, energy auditing, climate mitigation, resource optimization.

Industrial Systems: Oil and gas processes, petrochemical complexes, natural gas networks, cooling towers, utilities, EOR/IOR, refinery systems, gas refinery systems, and energy-intensive industries.

Research Leadership: Research program development, graduate supervision, HQP training, interdisciplinary teams, international partnerships, keynote speaking, editorial leadership, academic mentorship, and knowledge mobilization.

Tools and Methods: Aspen HYSYS, process simulation, energy targeting, mathematical optimization, benchmarking, economic and environmental assessment, custom software development, and applied industrial research.

ACADEMIC AND LEADERSHIP EXPERIENCE

Professor, Chemical Engineering | University of Tehran, Iran | 1992-2026

- Led an internationally recognized research program in process integration, industrial energy efficiency, clean technology, heat exchanger network retrofit, and industrial decarbonization.

- Supervised approximately 100 MSc and PhD theses, contributing to the training of highly qualified personnel in chemical engineering, energy engineering, process integration, and sustainable industrial systems.
- Published 240+ national and international journal and conference papers in areas aligned with clean technology, resource value chains, process optimization, and climate mitigation.
- Developed applied research tools and software for heat exchanger network design, water minimization, cooling tower simulation, and wastewater treatment network design.
- Delivered undergraduate, graduate, and professional courses in process design, process control, pinch analysis, exergy analysis, cogeneration, energy management, and industrial energy auditing.
- Collaborated with industrial, governmental, and international partners to translate research into practical energy-efficiency, sustainability, and climate-response solutions.
- Advanced applied research projects with relevance to energy-intensive industries, petrochemical complexes, gas networks, refinery systems, and resource optimization.

President | Iranian Energy Experts Club | 2020-2026

- Led a professional energy network focused on sustainable energy systems, industrial energy efficiency, and expert knowledge exchange.
- Promoted collaboration among academic researchers, industry professionals, and policy stakeholders.
- Supported professional engagement and applied knowledge sharing in energy, environment, and sustainability.

Head, Energy & Environment Division | Iran Academy of Science | 2016-2026

- Led strategic research and advisory activities in energy, environment, climate mitigation, sustainable development, and technology needs assessment.
- Contributed to national and international discussions on energy transition, environmental policy, clean technology adoption, and sustainable resource systems.
- Supported knowledge mobilization between academia, government, industry, and international organizations.

Dean | Institute of Petroleum Engineering, Iran | 2015-2021

- Led academic and research programming in petroleum and energy engineering, supporting interdisciplinary training and applied research in oil, gas, and resource systems.
- Strengthened links among faculty, students, industry, and government stakeholders to advance research capacity, practical implementation, and knowledge mobilization.

Adjunct Professor, Department of Chemical & Petroleum Engineering | University of Calgary, Canada | 2005-2015

- Contributed to teaching and academic collaboration in chemical and petroleum engineering, with emphasis on process integration, energy systems, and engineering education.
- Supported Canadian academic research and training activities in energy efficiency, process systems engineering, and chemical engineering education.
- Recognized with the Outstanding Teaching Award from the University of Calgary in 2015.

Chancellor | Petroleum University of Technology, Iran | 2003-2008

- Provided executive leadership for university-level academic, research, and administrative priorities in petroleum engineering and energy-related disciplines.
- Supported institutional partnerships, faculty development, and student training aligned with energy-sector needs and applied industrial impact.

Founder and First Editor-in-Chief | Iranian Journal of Energy, Iran | 1996-2007

- Established and led an energy-focused scholarly journal to support knowledge mobilization in energy systems, energy efficiency, and sustainability.
- Oversaw editorial strategy, peer-review development, and scholarly dissemination across academic, industrial, and policy communities.

Associate Dean for Research Affairs | Faculty of Engineering, University of Tehran, Iran | 1994-1996

- Coordinated research affairs and supported faculty research development within the Faculty of Engineering.
- Helped strengthen research administration, interdisciplinary collaboration, and graduate research capacity.

SELECTED FUNDED, INDUSTRIAL, AND POLICY-RELEVANT PROJECTS

Clean Technology, Energy Efficiency, and Industrial Decarbonization

- Development of a conceptual-mathematical model for benchmarking energy consumption and CO2 emissions in natural gas compressor stations - Iran National Science Fund.
- Energy optimization in selected energy-intensive industries - Iran Fuel Conservation Organization.
- Energy auditing and implementation of an Energy Information Management System in Mobin Utility Plant - Mobin Petrochemical Co.
- Energy auditing of Khangiran Gas Refinery - National Iranian Gas Company.
- Energy auditing of Raazi Petrochemicals - Institute of International Energy Studies.
- Energy auditing of Abadan Petrochemicals - Institute of International Energy Studies.

Oil, Gas, Petrochemical, and Resource Value Chains

- Comprehensive study of Azadegan Oil Field for EOR and IOR - National Iranian Oil Company.
- Development of a new method for conceptual design and analysis of natural gas transmission networks - National Iranian Gas Company.
- Consultant to OIEC in development of a 25-year gas planning model for Iran.
- Design and optimization of low-temperature liquefaction and gas separation processes - National Iranian Oil Refining & Distribution Company.
- Feasibility study for application of plate and helix heat exchangers in the petroleum industry - National Iranian Oil Refining & Distribution Company.
- Energy auditing of Bandar Imam Petrochemical Complex, including 12 petrochemical plants.

Water-Energy-Environment Nexus

- Water and wastewater minimization in process industries - Ministry of Science, Research & Technology and Ministry of Energy.
- Development of a new method for process integration using combined thermal and water pinch analysis - National Iranian Oil Refining & Distribution Company.
- Optimization of cooling towers of Tehran Northern Oil Refinery for heat-loss reduction.
- Optimization of power plant efficiency using combined pinch and exergy analysis - Ministry of Energy.

Climate Policy, Sustainability, and International Development

- HCFC Phase-out Stage II, non-investment components in Iran - United Nations Environment Programme.
- Assessment of technology transfer modalities to address climate change response goals in oil, gas, and petrochemical sectors - UNDP.
- Assessment of technology transfer modalities to address climate change response goals in industry and transportation sectors - UNDP.

- Comprehensive policies for sustainable energy in Iran - Wuppertal Institute for Energy and Environment.
- Development of energy scenarios for Iran - Wuppertal Institute for Energy and Environment.
- Technology needs assessment for optimization of energy production and consumption considering national and global environmental aspects and international conventions - Iran Academy of Science.

EDUCATION

Ph.D., Chemical Engineering - Process Integration: University of Manchester Institute of Science and Technology, United Kingdom | 1991

M.Sc., Chemical Engineering - Process Integration: University of Manchester Institute of Science and Technology, United Kingdom | 1988

B.Sc., Chemical Engineering - Petroleum Refining: Sharif University of Technology, Iran | 1983

SELECTED HONOURS

- Outstanding Teaching Award, University of Calgary, Canada, 2015
- Recognized among 50 most influential Sharif University of Technology graduates for scientific and technological service to society, 2016
- Premier Researcher, 4th Iranian Energy Congress, 2003
- Moulton Gold Medal, Institution of Chemical Engineers, UK, for best paper in chemical engineering on "Retrofit of Heat Exchanger Network", 1990

PROFESSIONAL SERVICE, MEMBERSHIPS & EDITORIAL ROLES

Professional Memberships and Leadership Roles

- Member and Founder, Iran Energy Association
- Member and Founder, Iranian Energy Experts Club
- Member, Iran Academy of Science
- Member, Iranian Association of Chemical Engineers
- Member, Iranian Society of Mechanical Engineers

Editorial Board Memberships

- Editorial Board Member, Journal of Faculty of Engineering, Ferdowsi University, Iran
- Editorial Board Member, Journal of Energy Economics Study, Institute for International Energy Studies, Iran
- Editorial Board Member, Journal of Energy Management & Planning, Iran
- Editorial Board Member, Journal of Engineering Materials, Iran
- Editorial Board Member, Iranian Journal of Chemical and Petroleum Engineering, Iran
- Editorial Board Member, International Journal of Chemical Engineering, Iran

SELECTED PUBLICATIONS AND SCHOLARLY OUTPUT

- 240+ national and international journal and conference publications
- Books and book chapters in process integration, sustainable energy, energy and water integration, oil refineries, and petrochemical complexes
- Contributions to internationally recognized publications on heat exchanger network retrofit, energy efficiency, pinch analysis, exergy analysis, hydrogen networks, and industrial decarbonization

SELECTED SOFTWARE DEVELOPMENT

- PILOT: Targeting and Design of Heat Exchanger Networks
- HENOPT: Heat Exchanger Network Optimization
- TPWC: Targeting of Process Water Consumption
- CTSD: Cooling Tower Simulation and Design
- WWTND: Wastewater Treatment Network Design

TEACHING AREAS

- **Undergraduate teaching:** Chemical Process Design; Process Control; Mathematical Methods in Chemical Engineering; Numerical Computation in Engineering
- **Graduate teaching:** Pinch Analysis; Exergy Analysis; Process Integration; Cogeneration & Utility Systems
- **Professional and short courses:** Pinch Analysis for Senior Engineers; Energy Management; Energy Auditing in Industry