Samira Lotfi

Chemical Engineer, PhD.
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Dr. Samira Lotfi has over fifteen years of experience in clean energy research, thermochemical conversion, and process innovation. At the National Research Council Canada, she has led numerous multidisciplinary projects advancing technologies in hydrochar and hydrogen production, CO_2 utilization, and waste-to-energy systems, while supervising graduate students. Her work integrates AI and data-driven methods to optimize processes and develop catalysts that enable sustainable industrial solutions, supported by a strong commitment to laboratory safety. Dr. Lotfi combines scientific excellence with practical engineering expertise to drive innovation and progress in the clean-tech sector.

SUMMARY OF QUALIFICATIONS

- Accomplished Chemical Engineer with over 15 years of experience driving innovation in clean energy, thermochemical conversion, catalysis, and process modeling.
- Proven leadership in multidisciplinary R&D projects on hydrogen production, CO_2 conversion, biomass valorization, and waste-to-energy technologies.
- Skilled in applying AI and machine learning to optimize chemical processes and catalyst design.
- Experienced Project Manager with expertise in strategic planning, budgeting, stakeholder engagement, and team supervision.
- Strong foundation in reactor development, kinetic modeling, and advanced analytical techniques (GC-MS, HPLC, TGA, BET, XRD).
- Dedicated to laboratory safety, hazard prevention, and regulatory compliance.
- Effective communicator with experience teaching, mentoring, and presenting at scientific conferences.

EDUCATION

PhD., Chemical Engineering
École Polytechnique de Montréal, QC, Canada | 2011–2015
Thesis: Conversion of lignin and black liquor to aromatics and carboxylic acids

M.Sc., Renewable Energy Engineering
Material & Energy Research Center, Tehran, Iran | 2007–2009
Thesis: Production of biodiesel from micro-algae

B.Sc., Chemical Engineering (Gas Industry)
Ferdowsi University of Mashhad, Iran | 2002–2006
Project: Modeling and simulation of PBDE reaction and transport in air, water, and soil

PROFESSIONAL EXPERIENCE

Research Officer – Clean Energy Innovations
National Research Council Canada (NRC) | 2016–Present

- **Project Manager & Lead Researcher**
  - Directed R&D projects on:
    - Syngas to ethanol conversion using machine learning
    - Hydrothermal conversion of waste to hydrogen and carbon
    - CO_2 conversion to syngas and methanol
    - Thermochemical conversion of plastics
    - Adsorptive denitrogenation of crude oil
    - Gas cleaning and quality testing of agricultural pellets
  - Managed project planning, budgeting, reporting, and cross-sector collaborations.
  - Delivered scalable solutions for sustainable chemical processes and energy systems.

- **Collaborative Research Projects**
  - Hydrothermal liquefaction (HTL) of biomass and waste
  - Adsorbent development for nitrogen and sulfur removal in biocrude
  - Catalytic conversion of HTL aqueous phase
  - Chemical process design for contaminant removal and wastewater treatment

HPP Facilitator – Hazard Prevention Program
Clean Energy Innovations Research Centre, NRC | 2016–Present

- Designed and implemented safety programs across research laboratories.
- Conducted compliance reviews and validated project safety documentation.

- **Research Assistant – Lignin & Black Liquor Conversion**

École Polytechnique de Montréal | 2011–2015

- Developed fluidized-bed reactor systems for lignin conversion.
- Synthesized and characterized catalysts (BET, PSD, XRD, SEM-EDS).
- Built kinetic models for process optimization and scale-up.
- Supervised multiple graduate researchers and coordinated experimental campaigns.

- **Laboratory Supervisor – Unit Operations**

École Polytechnique de Montréal | 2011–2014

- Oversaw laboratory operations, equipment maintenance, and safety compliance.

ACADEMIC EXPERIENCE

Teaching Assistant – Catalysis & Applied Kinetics
École Polytechnique de Montréal | 2015

- Delivered lab sessions, prepared materials, and evaluated graduate students.

Project Manager (Academic Research)
École Polytechnique de Montréal, 2012–2015

- Partial oxidation of methane to syngas.

Project Collaborator
École Polytechnique de Montréal, 2012–2015

- Gas-phase oxidation of diols to methacrylic acid over heteropolyacid catalysts.

AWARDS and Certificates

- Contributions to the RO/RCO community Award, PIPSC (2024)
- Lean Six Sigma Green Belt certificate, McGill university (2024)
- Best Presentation Award, McGill–Polytechnique Research Day (2015)
- 1st Prize, Dragons' Den Competition, 3rd FIBRE Network Conference (2015)

TECHNICAL SKILLS

- **Software:** MS Office, LaTeX
- **Simulation:** MATLAB, ProSim, HYSYS, Aspen
- **Modeling & Statistics:** Python, SigmaPlot, Minitab
- **Analytical Techniques:** GC-MS, HPLC, TGA, BET, XRD, PSD, SEM-EDX, microscopy
- **Process Expertise:** Gasification, HTL, wastewater treatment modeling, kinetic modeling

LANGUAGES

- English • French • Farsi

COMMUNITY & VOLUNTEER ACTIVITIES

- COSH committee member (2017-2024)
- Co-chair of CEI Early Career Employee committee
- Guest Editor of the Special Issue "Biomass and Waste as Feedstocks for Biofuel Production in Energies
- Poster Judge, 13th International Congress on Biofuels & Bioenergy, Ottawa (2018)
- Volunteer Judge, Canada-Wide Science Fair, Ottawa (2018)
- Educational and financial support for three high-school students
- Co-organizer, 8th Chemical Engineering Conference, Mashhad (2002)
- Co-organizer, FIBRE Network Meetings, Canada (2012, 2014)

CONTRIBUTIONS

- Over 30 peers-reviewed journal publications, two patents, and 20 international oral presentations or posters (Samira Lotfi - Google Scholar).