
Senior Research & Development Engineer

17+ years' success leading Research & Development for high-growth organizations

Dedicated and visionary professional, with expertise in developing and deployment of new technologies, concepts, and processes within the chemical and energy sector. Recognized as a leader in identifying opportunities for efficiency, improvement, and driving development with cutting-edge technologies to achieve solutions. Skilled communicator known as being innovative, a strategic thinker, resourceful leader and team member who works with integrity and professionalism to consistently meet and exceed organizational objectives.

History of working in multiple fields including CO₂ capture, gas treating such as SO₂ scrubbing, wastewater treatment, gasification, biorefinery, mining, oil & gas, waste to energy, multiphase reactors, biofuel and bioenergy, bulk material handling, and combustion technologies.

Highlights of Expertise

- Process Development & Deployment
- Project Planning & Execution
- Organizational & Time Management
- Quality Control & Assurance
- State & Federal Compliance
- Research & Development
- Risk analysis & Mitigation
- Simulation & Modeling
- Project Specifications and Documentation
- Leadership & Team Building

CAREER EXPERIENCE

Process Engineering Advanced Research Lab.
(part of Ecole Polytechnique Montreal)

Senior research engineer (2017 to Present – Montreal, CA)

Coordinate efforts and provide direction to ensure timely completion of the projects. Held responsibility to manage development and execute activities associated with projects and research from discovery to deployment.

- ✓ (Technical lead and project manager) Responsible for executing a Research & Development (R & D) of a commercial project (client confidential) including design and operating a new sulfur recovery process from phosphogypsum with 3M ton/year capacity with over \$1B in market value.
- ✓ (Technical lead and project manager) Define and execute R&D plan for developing new concepts for energy storage (client confidential), effectively securing new business opportunities, which will result in gaining over \$500M in market value.
- ✓ (Project Manager and technical consultant) Advanced potash technology development (client: Advanced Potash Technology), developing a new process to produce fertilizer from KFS with over \$1B in market value.
- ✓ Defining and executing game-changer research programs leading to development of novel process for production of biofuels with significantly lower CAPEX and OPEX and reduced CO₂ foot print (with over \$1B in market value)

Development Engineer (2015-2017 – Montreal, CA)

Provided oversight of daily operations and led the global R&D collaborations with research centers and universities around the world, updating the technology funnel with new



Shell

inventions to secure the organization's leadership in the field. Focused on developing new CO₂ capture technologies including adsorbents and membranes

- ✓ Initiated, defined and executed R&D projects (from discovery to deployment) to secure 35% reduction in OPEX and 20% reduction in CAPEX for the CO₂ capture process.
- ✓ Led troubleshooting and plant optimization of SO₂ scrubbing technology
- ✓ Conducted game-changer research programs which led to the development of an integrated line-up with total 300 MM\$ NPV savings.
- ✓ Developed and led structured technical engagement sessions with key external stakeholders.
- ✓ Accomplished process design window extension of the current company's CO₂ capture technology to secure company's competitive position in a new market with >200 MM\$ business value
- ✓ Translated impact of R&D activities outcome to conceptual design and defined its benefits on CAPEX and OPEX reduction to maximize business opportunities
- ✓ Identified and solved process drawbacks for current clients, resulting in increasing reliability and availability of the overall process while reducing the OPEX by 30%.
- ✓ Modified and improved existing process to ensure up to date technologies and techniques are implemented
 - Coordinated with vendors, sales reps and technology providers
 - Led the activities to capture and deploy the lessons learned to improve the technology
- ✓ Initiated, structured and led the global R&D collaborations with research centers and universities around the world and updated the technology funnel with new inventions to secure the company's leadership in the field and respond to market requirements.
- ✓ Played a key role in securing R&D funding of 3.5 MM\$/year for three years.
- ✓ Initiated the research activities to unlock new market and opportunities for CO₂ utilization with >300 MM\$ business value.
- ✓ Played a key role in developing new CO₂ capture technologies such as adsorbents and membranes.



AMEC-FOSTER-
Wheeler

Senior Process Engineer, (2014 – 2015 - Dubai, UAE)

Held responsibilities that included the supervision and management of all engineering processes related to projects undertaken by the FEED contractor on behalf of the project owner with a project value of \$2B.

- ✓ Supervised and managed all process engineering related works undertaken and by the FEED contractor (on behalf of the project owner).
- ✓ Ensured that the FEED package is of sufficient maturity and quality to progress into the EPC (next phase of engineering) maintaining overall costs within projections.
- ✓ Led the scope change activities to minimize the risk of the technology requirement drawbacks
- ✓ Oversaw HAZID, ENVID, and HAZOP and approved related reports.
- ✓ Reviewed technical documents such as: PFD, UFD, MSD, P&ID, Control narrative, Basic Engineering Design Data, Process Basis of Design, FEED Statement of Requirements, Operating temperature and pressure philosophy, Isolation philosophy, Sparing Philosophy, Start-up Shutdown Philosophy, Black Start Philosophy, line sizing philosophy, equipment datasheet, etc.
- ✓ Reviewed licensors technologies (technical data and reports) and ensured technical details properly recognized by different disciplines among PMC team.



Accordant Energy

Senior Process Engineer (2012-2014 – VT, USA)

Developed research programs to advance re-engineered fuel technology from discovery to demonstration and executed unique one of a kind commercial demonstration of re-engineered fuel co-combustion at a 125 MW coal-fired power plant. Developed and implemented advanced analytical lab to support company's research and development activities.

- ✓ Developed and executed a research program to advance Re-Engineered fuel technology from discovery to demonstration

- ✓ Organized and executed first of a kind commercial demonstration of Re-engineered fuel co-combustion at a 125 MW coal-fired power plant
- ✓ Established one-of-a-kind, advanced analytical lab to support company's research and development activities
- ✓ Generated technical directions and guidelines for process and product developments.
- ✓ Assigned, coordinated and reviewed the technical work of the R&D department and project teams
- ✓ Ensured the optimal application of technology and engineering resources to meet product and process development objectives
- ✓ Directed staff of senior group members and directors to acquire necessary resources and plan to meet scheduled commitments.
- ✓ Planned and developed the department's operating and capital budgets and manage expenses to conform to the budget.



Research and Development Engineer (2003-2012 – Montreal, CA)

Oversaw daily activities and supported the R&D department and project teams, which included assignment of projects, coordination of projects, reviewed all technical work, and generated guidelines for process and product developments

- ✓ Reviewed academic literature, patents, technical documents, and develop proposals for research and development projects.
- ✓ Led R&D projects, set appropriate project goals with R&D project teams to meet technical needs.
- ✓ Coordinated and executed laboratory experiments for the generation and communication of reliable, well-documented data
- ✓ Managed project team to deliver project within agreed schedule and budget
- ✓ Obtained and analyzed data for process improvement and scale-up.
- ✓ Developed and evaluated PFD, UFD and P&ID and other technical documents for different chemical, petrochemical. Bio-refinery, mining, pharmaceutical and food processes.
- ✓ Provided high-level CAPEX and OPEX cost estimate.
- ✓ Coached and mentored junior engineers.
- ✓ Simulated different processes using ASPEN and HYSYS.

PADENA SEMIROM, **Process Engineer (2000-2003 - Tehran, Iran)**

Part of Multidisciplinary engineering team and

- ✓ Developed Basic Engineering Design Packages, and Front-End Engineering Design documents,

Education & Credentials

Ph.D. in Chemical Engineering | Ecole Polytechnique, Montreal, Canada, 2010

Master of Science in Chemical Engineering | Tehran University, Tehran, Iran, 2003

Bachelor Degree in Chemical Engineering | Iran University of Science and Technology, Tehran, Iran, 2000