Ali Mousavi, Ph.D.

US Person (Green card holder) | (808) 366-0025 | Ali.Mousavi.contact@gmail.com | LinkedIn

Profile __ portfolio website

Professional passionate to work with people.Holistic and synergetic solution-oriented view to human and engineering systems. Team player, strongly self-motivated, positive thinker with a track record of working with people, reliability, and diligence.

- +8 years of experience with a broad and diverse experience portfolio that revolves around process engineer, data analytic, and human and resource management.
- Experienced engineer and data scientist with a solid background in both analytical and hands-on experience.
- Especially in energy conversion & storage, surface sciences, data analytic, and system optimization.
- Sharp problem solving abilities. Proven track record of building systems from research to production.
- **Release-quality delivery in fast-paced stakeholder timelines**.

Technical skills

DATA ANALYTIC and STATISTICAL
SQL | Spark | Python | MATLAB | Minitab.

INDUSTRY KNOWLEDGE
Experimental Design (Factorial design,*t*-test) | Lab Management | People Management (also preparing for PMP certificate), Technoeconomial analysis (battery systems).

ENGINEERING SOFTWARE
COMSOL (chemical reaction modeling) | LabVIEW (CERTIFIED BY NI). Familiar with: FEA | CAD

MATERIAL CHARACTERIZATION
SEM (JEOL,Hitachi) (**over 2000** images and EDX scans, nominated two time in NNCI national competitions for most stunning image) | X-ray Diffraction (XRD) (Bruker) | Goniometer (Ramehart) | Glove Box | Physical vapor deposition (PVD on silicon wafer) | MaskAligner Profilometry (power spectrum analysis) | Gas chromatography (GC-TCD, FID) | ICP-MS

ELECTROCHEMISTRY
EIS (test and circuit modeling) | Cyclic voltammetry (**CV, ORR test**) | Corrosion (**Tafel analysis**, PDP & LP tests), Rotating disk (**RDE**, Levich Study), Conductivity measurement, **Battery manufacturing & testing** (coin cell, packs, and flow batteries).

Work experience

Senior Machine Learning Engineer, Enovation Analytics | Aug. 2022 – Oct. 2025

- Led **Machine Learning Operations** framework design:**CI/CD**, automated model retraining, / performance monitoring
- Developed ML models in **ERCOT ISO (electric market)** supported delivery timelines for stakeholders such as BlackRock. **Load forecasting, wind and solar** short term prediction.
- **ETL** for AI-driven real-time price forecast. Achieved **13% KPI improvement**; **35% profit increase** vs. prior baseline.
- **Built 10+ database pipelines** (ingestion, cleaning, QC, storage); **3**× gain in data access& team efficiency.
- Deployed **interactive dashboards and web applications** for non-technical stakeholders; adopted by management.
- Shipped reusable **Python modular packages** that standardized workflows and accelerated integration across teams.
- **Cloud** resource management and orchestration; reduced cloud spend and operational overhead.

Data Scientist, Center for Tire Intelligence, Intelligent Fiber Optic Systems (IFOS) | Aug. 2021 – Aug. 2022

- Real-time **anomaly detection** for an ultrasonic metal 3D printer.
- Features from telematic **1.3 MHz** accelerometer streams (time and time–frequency domains).
- Wavelet analysis + **CNNs** for a **signal classifier**; baselines included Numenta, KNN-CAD.
- Physics-informed models + ML; reduced fabrication and maintenance costs up to **42%**.

Tools: Python | MATLAB | CNN | statsmodel | Spark | Scipy | WebApps | SQL | Docker | Git | GCP/AWS | Airflow

Researcher, Advance Material and Technology Laboratory (Virginia Tech University) | Jan. 2018 – Aug. 2021

- Led design and execution of experimental programs on metallic superhydrophobic and liquid-infused surfaces, driving performance validation for industrial applications.
- **Developed** and implemented factorial and Taguchi-based **DOE** frameworks, improving manufacturing robustness and optimizing process parameters under variability.
- Authored and **delivered technical reports to the U.S. Department of Energy** (DOE), influencing funding decisions and ensuring program compliance.

Tools & Skills: Potentiostat | **Electrochemical testing & analysis** (PDP, LSV, EIS, Tafel analysis) | **Electro-deposition** | Surface modification (etching, coatings) | **Corrosion & durability testing** | DOE | Material characterization (SEM, XRD, XPS) | **Surface characterization** (Profilometry, Goniometer Contact Angle, Surface Energy, Contact Angle Hysteresis)

Research Assistant, Sustainable Energy Laboratory (ICTAS, VTech University) | Jan. 2017 – Jan. 2018

- Led crossfunctional team on designed and test of microfabricated MEMS-based impedance sensors (gold-on-silicon) using PVD, lithography, and HF etching for smart biopsy and impedance sensing applications.
- Performed electrochemical characterization of oxygen reduction reactions (ORR) using thin-film rotating disk electrode (RDE) systems to evaluate catalytic performance.
- Engineered electrospun PAN nanofiber mats and processed them into oxidized and carbonized gas diffusion layers (GDL) for fuel cell applications.
- Designed a custom gold 4-electrode measurement system on PCB for accurate **electrical conductivity** characterization of polymer nanofiber materials.

Tools & Skills: Electrochemical testing (**RDE, ORR**) | Electrospinning | Fuel cell materials (GDL fabrication) | Thin-film characterization | MEMS fabrication (lithography, PVD, HF etching) | **Sensor prototyping** | CAD

Research Assistant, Battery and Energy Storage Research Laboratory (VTech) | Aug. 2016 – Aug. 2017

- Led **Li-ion** coin and pouch cell assembly, testing, & cycling analysis, generating performance and degradation insights.
- Executed Na–S **flow battery** R&D, including **electrode material synthesis, system setup and cycling**.
- **Performed Advanced material characterization**, environmental SEM/EDX, Raman Spectroscopy on liquid phase.
- **Designed** and standardized **air battery** test platforms, increasing experimental repeatability and data quality.
- Performed **techno-economic modeling** of flow battery systems, identifying key cost drivers for grid-scale deployment.

Tools & Skills: Battery material syntechis & testing (**Li-ion**_NMC, Na–S_Na-Oxyg) | **Cell prototyping** (electrode slurry formulation, doctor-blade coating, calendaring, dry-room assembly) | Battery system design (coin & pouch cells, flow batteries) | CAD | **Electrochemical characterization** (EIS, CV, charge/discharge cycling) | Materials characterization (SEM/EDX, Raman spectroscopy) | **Techno-economic modeling** | Data analysis (Python, MATLAB)

Lab Management (VTech) | Aug. 2016 – Aug. 2017

- Setup & operationalized an in-lab pouch cell manufacturing line, including electrode processing & assembly equipment (dies, calendaring, cutting, stacking, and ultrasonic welding systems), enabling end-to-end battery prototyping.
- Setup, operated, and maintained glovebox systems (MBraun®, Inert®). Regeneration cycles and uptime management.
- Established lab **safety protocols, SOPs, and preventive maintenance schedules** for shared battery fabrication facilities, improving reliability and operational continuity.
- Coordinated lab workflow, **procurement activities**, and supported **training** of lab members.

Technical Mentorship, Mechanical Engineering Senior Design (Virginia Tech) | Aug. 2017 – Dec. 2017

- Mentored student team developing a recreational EV, focusing on battery pack design, testing, and performance validation.
- Designed and supervised **high-current battery testing protocols** for Samsung 18650 and A123 prismatic cells under custom load profiles (up to 220 A), evaluating electro-thermal behavior under real EV-like conditions.
- Led temperature monitoring and data acquisition during charge/discharge cycling under natural and forced convection conditions to assess thermal management performance.

Research Assistant, Hawai'i Natural Energy Institute (HNEI) | Jan. 2013 – Dec. 2015

- Designed and executed full-cycle design of experiments (DOE) for plasma reactor systems used in hydrocarbon and biofuel reforming to hydrogen-rich gas, applying 2^k factorial designs, Central Composite Design (CCD), and Response Surface Methodology (RSM) for system optimization.
- Performed statistical analysis including ANOVA and t-tests to identify significant process parameters.
- Conducted parametric studies and sensitivity analysis to evaluate key operating conditions affecting system behavior.
- Analyzed gas chromatography (GC) data and developed COMSOL-based reaction simulations to model plasma-assisted reforming mechanisms and validate experimental results.

Tools & Skills: Design of Experiments (DOE: 2^k, CCD, RSM) | Statistical analysis (ANOVA, t-test) | COMSOL Multiphysics | Gas Chromatography (GC) data analysis | Parametric & sensitivity analysis | Renewable energy systems

Technical Expert/Engineer, Oil & Gas Wellhead Facilities, Energy & Sazeh Co. | Jan. 2010 – Jan. 2013

- Provided technical consulting for oil & gas wellhead facility operations, supporting engineering decisions related to energy systems and equipment selection.
- Developed and presented procurement strategies and technical justification reports for government and third-party stakeholders, aligning purchasing decisions with operational and budget constraints.
- Evaluated and optimized technical procurement workflows by analyzing part selection, vendor processes, and supply chain efficiency, improving decision-making transparency and operational effectiveness.

Education and Qualification

Ph.D., Mechanical Engineering — Virginia Tech; GPA 3.90/4.0 — Oct. 2021
Data Science Fellowship — The Data Incubator (admitted within top 2% of applicants) — Spring 2020
M.S., Mechanical Engineering — University of Hawaii at Mānoa; GPA 3.96/4.0 — Dec. 2015
B.S., Mechanical Engineering — Sharif University of Technology; GPA 3.56/4.0 — May 2012
Summer School Excellence — Chiemsee, Germany; CEA (France) / TUM (Germany) — Summer 2016
"On the future of common European energy strategy - Electro mobility & Energy conversion"

Selected Publications (Google scholar)

- S.M.Ali **Mousavi**., and R. Pitchumani. "Temperature-dependent Dynamic Fouling on Superhydrophobic and Slippery Nonwetting Copper Surfaces" **Chemical Engineering Journal** (Impact factor 13.2) Read more
- S.M.Ali **Mousavi**., and R. Pitchumani. "A Study of Corrosion on Electrodeposited Superhydrophobic Copper Surfaces." **Corrosion Science** (Impact factor 7.2) Read more
- S.M.Ali **Mousavi***, Fengchang Yang*, et.al. "Sodium-Sulfur Flow Battery for Low-Cost Electrical Storage" **Advanced Energy Materials** (Impact factor 25.3) Read more
- S.M.Ali **Mousavi**., William Piavis, and Scott Turn. "Reforming of biogas using a non-thermal, gliding-arc, plasma in reverse vortex flow and fate of hydrogen sulfide contaminants." Fuel Processing Technology (Impact factor 5.0) Read more