Ali Mirzaei, MEng, EIT

Mechanical Engineer | Experimental Systems | Testing & Validation | Prototyping
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PROFESSIONAL SUMMARY

Mechanical Engineer specializing in experimental systems, mechanical testing, and prototype development. Experienced in designing controlled experiments, integrating instrumentation, and validating system performance through structured data analysis. Combines strong analytical modeling and fabrication skills with cross-functional coordination experience.

PROFESSIONAL EXPERIENCES

Graduate Researcher, Mechanical Engineering, IBM LAB, UBC

Jan.2022 - Jan.2023

- Designed and executed experimental studies to characterize the rheological behavior of cellulose nanocrystal (CNC) suspensions under varying concentration ratios.
- Integrated a rheometer with a controlled magnetic field system to evaluate magneto-rheological response and field-dependent viscosity changes.
- Developed experimental protocols, calibrated instrumentation, and ensured repeatability and accuracy of measurements.
- Analyzed experimental data to model non-Newtonian flow behavior and identify potential biomedical applications, including injectable synovial fluid analogs.
- Validated proof-of-concept magnetically responsive fluid systems for biomedical injection applications.

Undergraduate Research Assistant, MNSL, Sharif University of Technology

Sep.2019 - Sep.2021

- Co-designed a 3D microfluidic lab-on-chip device for particle separation using laminar flow and diffusion principles to isolate smaller particles while minimizing unwanted convection effects.
- Modeled and validated experimental results using COMSOL Multiphysics simulations to correlate diffusion-driven separation efficiency with device geometry.
- Calibrated and evaluated precision syringe pumps prior to experimentation, analyzing flow stability and accuracy; documented performance findings and reported directly to product management.
- Developed controlled laminar etching processes by sandwiching etchant streams between buffer flows and tuning flow rates to achieve programmable shaping of micro-scale copper wires within microfluidic channels.
- Applied shaped copper structures as sacrificial molds to fabricate complex, cost-effective microchannel geometries for advanced microfluidic systems.

Project Coordinator, Prism Ltd and VPAC Group

Mar.2023 – Current

- Coordinated multi-disciplinary building systems (mechanical, electrical, architectural) to ensure technical integration between design documents, site conditions, and execution constraints.
- Performed detailed drawing reviews using Bluebeam to identify system-level conflicts, constructability limitations, and cross-discipline interface risks prior to installation.
- Managed technical documentation processes (RFIs, submittals, change orders) to maintain configuration control, design traceability, and structured issue resolution throughout project lifecycle.

Junior Mechanical Engineer, Internship, Aban-Sanat-Kara company *Apr. 2020 - Jul. 2020*

- Designed hydrodynamic components for a small dam project, supporting flow behavior and structural considerations.
- Developed optimization models using MATLAB and COMSOL (FEA) to evaluate environmental impact parameters.
- Prepared technical reports assessing environmental effects of dam construction.

EDUCATION

University of British Columbia, Vancouver, BC, Canada Jan. 2022 - Jan. 2023
MEng. Mechanical Engineering (GPA 88/100)

- Designed full-building HVAC system using RTS load calculation method; performed heating and cooling load analysis and selected appropriate system components.
- Modeled and simulated components of fuel cell systems, evaluating performance and system-level integration parameters.

Sharif University of Technology, Tehran, Iran Sep. 2017 - Apr. 2021
B.Sc. Mechanical Engineering (GPA: 3.84/4)

- Designed and simulated a microfluidic chip for micro-pore generation and cell detection using pressure-driven flow; utilized COMSOL, CAD, and C++ for modeling and validation.
- Modeled hydrodynamic behavior for dam and water resource systems, analyzing flow and structural considerations.
- Designed and optimized a household refrigeration system, performing thermodynamic cycle calculations and performance analysis.

TECHNICAL SKILLS

- CAD & Mechanical Design: SolidWorks, AutoCAD
- Multiphysics Simulation & Modeling: COMSOL Multiphysics
- Numerical Analysis & Programming: MATLAB, C++
- Technical Documentation & Drawing Review: Bluebeam, Procore

AWARDS

- **Ranked 431st** among more than 145000 students in the Nationwide University Entrance Exam. (2017)
- **Silver medal** at the countrywide Physics Olympiad. (2016)

PUBLICATIONS

- Bahari, A., **Mirzaei, A**. & Taghipoor, M. Cost-effective 3D H-filter fabricated by xurographic method. *Microfluid Nanofluid*, Springer Nature **26**, 70 (2022).
- **Mirzaei, A**., Asli, A., Ahmadi, H., Izadi, S., & Taghipoor, M. Fabrication and micro-designing of micro-pore with hydrodynamic focusing method. Electrophoresis, Wiley Analytical Science, Manuscript in preparation.

References Available Upon Request