Farshid Ghezelbash, PhD

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Statement

With a vision to integrate advanced research with real-world product development, I aim to create innovative technologies and products. I have developed multiple computational models that are being used by various clinical and industrial partners, demonstrating my ability to translate research into real-world applications.

Summary

Expertise: Extensive background in mechanical engineering, computational mechanics, and biomechanics.

Innovation: Proven track record in leading cross-functional R&D projects from concept to mass production, with an emphasis on computational methods, data analysis, and user experience.

Publications & Patents: Filed one patent and published 28 journal papers (majority on computational mechanics).

Recognition: Recipient of multiple prestigious scholarships and fellowships.

Selected Experience

Biomechanical Scientist   **2022–Present**
EERS, QC, Canada

Led R&D projects focusing on the development of ergonomic auditory wearables.

Conducted finite element analysis (FEA) of designed auditory wearables for performance and comfort.

Applied machine learning and data-driven approaches to product design.

Utilized computational design and shape analysis to enhance product ergonomics and mass manufacturing.

Directed large-scale trials to assess the comfort, usability, and acoustic performance of auditory wearables.

Conducted advanced material research and mechanical characterization.

Postdoctoral Scholar   **2020–2022**
McGill University, QC, Canada

Pioneered damage and fracture characterization of intervertebral discs.

Developed finite element models to capture mechanical response of intervertebral discs and blood clots.

Explored novel mechanical properties of blood clots.

Led spine biomechanics team and supervised graduate students.

Awarded beamline time at CLS (the only synchrotron facility in Canada).

Postdoctoral Researcher   **2020–2022**
IRSST & Polytechnique Montreal, QC, Canada

Developed the first micromechanical finite element model of the human disc.

Created an advanced EMG-driven finite element model for patients with back pain.

Employed machine learning for biomechanical assessment and advanced modeling.

Conducted biomechanical experiments (electromyography & kinematics).

Wrote research grants (IRSST and NSERC).

Research Assistant   **2015–2019**
Polytechnique Montreal, QC, Canada

Developed and validated a subject-specific musculoskeletal model.

Constructed a finite element model of the intervertebral disc to capture damage and failure.

Established an analytical tool to estimate spinal loads for an industrial partner.

Collected and analyzed experimental data (whole-body kinematics & electromyography).

Wrote research grants (FRQNT).

Skills

Theoretical Skills: Computational mechanics, finite element analysis (FEA), constitutive modeling, solid mechanics, musculoskeletal modeling, machine learning, data science

Modeling & Simulation: Abaqus, COMSOL, HyperMesh, OpenSim, 3DSSPP

Programming: Python, MATLAB, Fortran, C#

Experimental Skills: Biomechanical human trials, comfort tests, motion tracking, mechanical material testing (tension, compression), microscopy, histopathology

3D Design: SolidWorks, Rhino, Grasshopper

Prototyping: 3D printing, laser cutting, micro-controllers

Collaboration: Worked with teams from embedded systems, clinicians, manufacturing, and materials science to achieve project goals

Honors and Awards

Postdoctoral fellowship, FRQNT, $90K, Canada (2023)

Postdoctoral fellowship, Mitacs Elevate, $65K, Canada (2020–2022)

Awarded beamline time at CLS (the only synchrotron facility in Canada) (2021)

Postdoctoral fellowship, Merit Scholarship, FRQNT, $9K, Canada (2020)

Doctoral scholarship, Merit Scholarship, FRQNT, $49K, Canada (2016–2018)

Ranked 4th among 24,000 candidates, National MSc Entrance Exam, Iran (2012)

Top student, Mechanical Engineering Department, K.N.T.U., Iran (2011)

Publications

Filed one patent on computational design of auditory wearables, and two design patents.

28 published papers in scientific journals.

16 presentations at scientific conferences.

Invited speaker at various workshops.

Full list of publications available on Google Scholar (citations: 585; h-index: 14).

Selected Projects

2022–2024: Created a data-driven pipeline to design ergonomic auditory wearables.

2021–2024: Developed a machine learning framework to evaluate spine biomechanics.

2021–2023: Constructed a complex finite element model of the spine with clinical applications.

More details are available on my personal website.

Education

MSc in Computer Science   **2024–Present**
Georgia Institute of Technology

PhD in Mechanical Engineering   **2015–2019**
Polytechnique Montreal, Canada

MSc in Mechanical Engineering   **2012–2014**
Sharif University of Technology, Tehran, Iran

BSc (Hons) in Mechanical Engineering   **2007–2011**
K.N.Toosi University of Technology, Tehran, Iran

References

Available upon request.