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## Statement

Mechanical engineer with a focus on integrating advanced research into practical applications. I specialize in developing computational models that have been successfully applied in various clinical and industrial settings, showcasing my strength in translating cutting-edge research into impactful, real-world solutions.

## Summary

* **Expertise:** Mechanical engineering, computational mechanics, biomechanics
* **Innovation-Driven:** Proven track record of leading R&D projects from concept to production, with emphasis on computational methods, FEA, and data-driven design
* **Patents & Publications:** One patent filed, 28 journal papers published in mechanical and computational mechanics domains

## Selected Experience

* **Mechanical/Biomechanical scientist (*EERS*, QC, Canada)** 2022-present
* 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 for mass manufacturing
* Directed large-scale trials to assess the comfort, usability and acoustic performance of auditory wearables
* Conducted advanced material research and mechanical characterization
* **Researcher (*McGill University*, QC, Canada)** 2020-2022
* 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)
* **Researcher (*IRSST & Polytechnique Montreal*, QC, Canada)** 2020-2022
* Developed the first micromechanical finite element model of 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 (*Polytechnique Montreal*, QC, Canada)** 2015-2019
* 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 (whole body kinematics & electromyography)
* Wrote research grants (FRQNT)

## Skills

* **Theoretical & Computational:** FEA, computational mechanics, solid mechanics, constitutive modeling, data science
* **Modeling & Simulation Software:** Abaqus, COMSOL, HyperMesh, OpenSim
* **Programming:** Python, MATLAB, Fortran, C#
* **Experimental Techniques:** Biomechanical trials, mechanical material testing, motion tracking
* **3D Design & Prototyping:** SolidWorks, Rhino, Grasshopper, 3D printing, laser cutting
* **Collaboration:** Extensive experience with cross-functional teams (e.g., embedded systems, clinicians, manufacturing)

## Selected Projects

* Created a data-driven pipeline to design ergonomic auditory wearables 2022-2024
* Developed a machine learning framework to evaluate spine biomechanics 2021-2024
* Constructed a complex finite element model of the spine with clinical applications 2021-2023
* More details are available on my [website](https://sites.google.com/view/farshidghezelbash/projects?authuser=0)

## Education

* **PhD** in Mechanical Engineering, Polytechnique Montreal, Canada 2015-2019
* **MSc** in Georgia Tech, Computer Science 2024-present
* **MSc** in Mechanical Engineering, Sharif University of Technology, Tehran, Iran 2012-2014
* **BSc (Hons)** in Mechanical Engineering, K.N.T.U., Tehran, Iran 2007-2011

## References

Available upon request