Ali Nikoo

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Volunteer Interests

I am eager to offer my skills and time voluntarily to support meaningful causes. I am excited to collaborate with your team in any related volunteer role, where I can contribute my expertise. I am open to acquiring new skills and knowledge as needed to excel in any volunteer capacity.

Professional Summary

A result-driven Biomedical Engineer (EIT) with a Master's in Biomechanics and hands-on experience in medical device manufacturing, specializing in prototyping, designing and engineering and with proven expertise in biomechanics, assistive device design, and computational analysis. Highly skilled in using Python, OpenSim, and Finite Element Analysis (FEA) to create predictive simulations, develop machine learning models, and optimize device performance. Experience spans the full product lifecycle, from initial research and material evaluation to Design for Manufacturability (DFM) and supplier management. A published researcher adept at translating complex data into functional improvements for end-users.

Areas of Expertise

- Product Development
- Musculoskeletal simulation
- CAD Modeling
- SolidWorks Proficiency
- Medical Imaging
- Implant Devices Design
- Problem-Solving
- Quality Assurance
- Computational modelling
- ISO 13485 & ISO 9001
- AI and Machine learning
- Finite element analysis

Technical Skills

SolidWorks (CAD), Mimics (BioCAD), Python, Abaqus (FEA), 3D Printing, 3D Bioprinting, Opensim (Moco), Research

Career Highlights

- Engineered and optimized the design of the Shockwave 360's handpiece and shock transmitter heads, significantly enhancing user ergonomics and device durability.
- Led the reverse engineering of a novel EMS suit, successfully identifying and establishing relationships with specialized textile knitting factories and material suppliers (fabrics, conductive wires), leading to a new product line's successful and efficient prototyping phase.

Professional Experience

The University of Ottawa | Ottawa, Canada
Research Assistant | Sep 2020 - Dec 2022

- Conducted research focused on prosthetic actuator design and optimization, and analyzed performance improvements in assistive devices.
- Applied biomechanics, leveraging Python and OpenSim to conduct simulations and create accurate models for prosthetic devices, improving functionality for end users.

Novinmed | Esfahan, Iran
Research and Development Specialist | Jun 2018 – Aug 2020

- Assisted in the design of various medical devices through prototyping, testing, and modelling. Created CAD models, drawings, validation plans, and protocols for the development of devices.

- Play a key role in developing, implementing, and documenting manufacturing processes for new products. Created assembly documents for 3+ individual products in less than two weeks.
- Worked with a team of 30+ engineers to construct devices such as high-power lasers and Ultrasound devices. Applied mechanical problem-solving skills to develop creative solutions for quality products.

Novinmed | Esfahan, Iran
Manufacturing Engineering Specialist | Feb 2017 – Jun 2018

- Managed supplier qualification and integration for the EMS suit project. Sourced 4 critical new suppliers for conductive fabrics and specialized wiring.
- Performed preliminary research and evaluation of novel material properties for innovative medical device applications, directly supporting the initial phases of supplier identification for projects like the EMS suit.

Projects

Lung Disease Classification using Pre-trained Deep Learning Models

- Developed a robust image classification system for lung disease diagnosis from X-ray images, leveraging multiple pre-trained deep learning models (VGG16, ResNet152V2, DenseNet201, Xception) and the Keras library.
- Implemented advanced data preprocessing, augmentation, and efficient data handling via Python generators, optimizing memory usage and scalability.

Cost Function Sensitivity in Predictive Simulations for Assistive Device Design

- Investigated the impact of various cost functions on predictive simulations for assistive device design (e.g., exoskeletons, prostheses) using OpenSim Moco.
- Analyzed the sensitivity of key design parameters (torque, power requirements) to different cost functions, aiming to improve the accuracy and reliability of simulations for human walking.

Evaluation of Stiffness-Matched NiTi Fixation Plates for Mandibular Reconstruction

- Proposed and evaluated the use of stiffness-matched, porous NiTi fixation plates as an alternative to traditional Ti-6Al-4V plates in mandibular reconstruction surgery to mitigate stress shielding.
- Utilized finite element simulations (FEA) to test mandibular models under various bite forces and healing conditions. Assessed the feasibility of selective laser melting (3D Printing) for plate fabrication.

Education

University of Ottawa | Ottawa, Ontario, Canada - Master of Engineering in Biomedical Engineering (Biomechanics) | May 2022

Certifications & Licences

- Engineer In Training | Engineers and Geoscientists BC | Issued Apr 2024 | Credential ID 255817
- Medical Equipment Technician | Iran Technical & Vocational Training Organization | Issued Apr 2019
- Develop with Python for AI and Machine Learning | LinkedIn | Issued Aug 2024

Publications

- **Be Careful What You Wish for: Cost Function Sensitivity in Predictive Simulations for Assistive Device Design.** *Symmetry*, 2022.
- **Evaluation of Useful Biomechanical Parameters On Scoliosis Using the Finite Element Method.** International Clinical Neuroscience Journal, 2019