NAZANIN MINAIAN

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PROFESSIONAL EXPERIENCE

June '18 - Current

Active Materials and Smart Living (AMSL) Laboratory

Graduate Research Assistant, University of Nevada, Las Vegas

- o Researched electroactive polymers (EAPs), focusing on ionic polymer-metal composites (IPMCs) and their use as flexible fluid flow sensors for naval and underwater applications.
- o Communicated directly with multiple vendors for acquiring and configuring substantial equipment related to the experimental setup for ONR Grant N00014-16-1-2356.
- o Modeled with CAD software and utilized additive manufacturing for experimental testing platforms.
- o Fabricated EAP actuators and sensors in a wet laboratory environment for applications in soft robotics and flow sensing.
- o Developed physics-based models using COMSOL software for fluid-structure interaction studies, and vortex shedding for a MEMS vortex flowmeter.
- o Design of experiments and data acquisition for various EAP actuators and sensors.
- o Utilized various imaging and image processing techniques; including the development of a computer vision-based software in Wolfram Mathematica for tracking sensor deflection, travel velocity, and vortex shedding.

Aug. '17;
June - July '19

Soft Mechatronics (SM) & Robotics Laboratory

Visiting Research Assistant, Korea Institute of Science and Technology (KIST), Seoul, South Korea

- o Collaborated with a multinational team in South Korea researching soft-robotics and artificial muscles at the Korea Advanced Institute of Science and Technology (NSF Grant #1545857).
- o Initially developed an IPMC powered motor under advice of Dr. Youngsu Cha at KIST
- o Fabricated and modeled a piezoelectric energy harvesting ring-type transducer comprised of a PVDF film supported by a PDMS substrate
- o Designed and assembled a testing apparatus for the energy harvester ring, along with a finger-bending model using additive manufacturing and laser cutting.

EDUCATION

Est. May '22

Ph.D.   in **Mechanical Engineering** (GPA 4.0)
University of Nevada, Las Vegas

May '18

B.S.E.   in **Mechanical Engineering** (GPA 3.91*, magna cum laude*)
Minor in Technology Commercialization
University of Nevada, Las Vegas

COURSEWORK

Advanced Thermodynamics, Finite Element Applications in Mechanical Engineering, Introduction to Composite Materials, Introduction to Fuel Cell, Transport Phenomena in Bioengineering, Imaging and Image Processing, Advanced Fluids I & II, Computational Fluid Dynamics, MEMS and Small Systems

PUBLICATIONS/PRESENTATIONS

Google Scholar: https://scholar.google.com/citations?hl=en&user=jHSonusAAAAJ

(1) **Minaian, N.**, Kim, K. J., "Continuing the investigation of the sensing response of ionic polymer-metal composites: effects of geometry and orientation," SPIE Smart Structures Conference/SPIE, Anaheim, California, #SSN02-13, May 2021 (*presentation only*).

(2) **Minaian, N.**, Olsen, Z. J., Kim, K. J., 2020, "Ionic Polymer-Metal Composite (IPMC) Artificial Muscles in Underwater Environments: Applications in Soft-robotic Sensing, Actuation, and Controls" *Bioinspired Sensing, Actuation, and Control in Underwater Soft Robotic Systems, Springer*

(3) Kim, Y., **Minaian, N.**, Kim, K. J., Cha, Y., 2019, "Spiral shape energy harvester with silicone finger bending model using PVDF," AMSM ThPS-105, P00099

(4) **Minaian, N.**, Stalbaum, T., Kim, K. J., 2019, "A feasibility study in the use of ionic polymer-metal composites in rectangular cantilever form as flow sensor devices," Proc. SPIE 10966, Electroactive Polymer Actuators and Devices (EAPAD) XXI

(5) Shen, Q., Stalbaum, T., **Minaian, N.**, Oh, I.K. and Kim, K.J., 2018. A robotic multiple-shape-memory ionic polymer–metal composite (IPMC) actuator: modeling approach. *Smart Materials and Structures*, *28*(1), p.015009.

ENGINEERING PROJECTS

Nov. '19	**Computer Vision-based Fluid-Structure Interaction Tracking Software**	Developed a user interactive notebook within Wolfram Mathematica that can track object deflection, travel velocity, and particle tracking of acquired videography related to IPMC underwater sensor data.
Nov. '19	**MEMS-based Flowmeter using an Ionic Polymer-Metal Composite Sensor**	Designed a small-scale vortex flowmeter with an interior diameter of 10 mm and implemented a 5 mm rectangular IPMC sensor to detect the frequency of vortices shedding from a bluff body. SLA printed and wired fully functional prototype. Performed COMSOL fluid-structure analysis to verify acquired experimental data.
Nov '18	**Design of Fuel Cell Powered UNLV Engineering Building**	Within MATLAB, developed a diffusion flux model using solid oxide fuel cells (SOFC) to power the Science and Engineering Building (SEB) of UNLV. The designed system was comprised of a 6.4 MW dual inverter and performed at 40% efficiency at the maximum load and 48% efficiency at the typical operational load of the building (2.6 MW).
May '18	**Laminar Flow Faucet-less Smart Sink**	Concepted, designed, and fabricated a novel faucet-less sink with multiple radially placed laminar nozzles within the sink basin to provide unobstructed hand and face washing capabilities. Focused on CAD modeling, fluid dynamic analysis, material selection, fabrication, marketing, and dissemination of results. Awarded 1st Place Interdisciplinary Engineering Design Award

TECHNICAL SKILLS

SOFTWARE	MATLAB, SolidWorks, Wolfram Mathematica, COMSOL Multiphysics, solidThinking Inspire, LabVIEW, Python 3, Adobe Photoshop
EXPERIMENTAL	Scanning Electron Microscope (TM3030), FFT Analysis, 3D printers (Formlabs Form 2, Raised N2 Plus, Lulzbot and Zortrax M200), Laser Cutter, Dynamic Mechanical Analysis (Pyris Diamond DMA), Peristaltic Pump (Masterflex L/S series)

HONORS AND AWARDS

Member of TBP Engineering Honor Society, Atkins Global Interdisciplinary Award Spring 2018, Recipient of 2016-2017 UNLV Differential Tuition Scholarship, Recipient of the Nevada Millennium Scholarship (2011-2016), Coauthor of Best Poster in the 4th International Conference on Active Materials and Soft Mechatronics (AMSM)