

Alan Nguyen Pham

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Mechanical engineering PhD researcher developing morphing surfaces and reconfigurable robots.
Focus: compliant mechanisms, physical interaction, and simpler fabrication and assembly.

EDUCATION

Worcester Polytechnic Institute | PhD student, Mechanical Engineering | Dec 2027 (expected) | GPA: 3.95

California State University, Long Beach | MS, Mechanical Engineering, 2022

California State University, Maritime Academy | BS, Mechanical Engineering, 2019

RESEARCH AND ENGINEERING EXPERIENCE

Graduate Researcher | WPI

Aug 2023 - Present

- Designed single-material printed modules integrating pneumatic actuators and compliant linkages; reconfigured them into morphing surfaces, continuum arms, crawlers, and rolling rings.
- Built an 8 x 8-module display with 150 mm domes, traveling waves, and ball manipulation. Measured force scaling, loading work, and hysteresis; tested 100 manual cycles across independent specimens.
- Investigating mechanisms that translate shared position/size inputs into shape-display motion, and connected surfaces that form and retain domes, flat tops, and curling waves with minimal assembly.

Graduate Research Intern | NASA L'SPACE NPWEE

Aug 2025 - May 2026

- Contributed mechanical design and prototyping to Project SELENE through NASA L'SPACE NPWEE.
- Collaborated with a multidisciplinary team on robotics for extreme and remote environments.
- Member of the SELENE team, which secured \$10,000 in project funding.

Graduate Research Intern | Sandia National Laboratories

Jun 2025 - Aug 2025

- Co-developed analytical, MATLAB multibody, and finite-element models of the nonlinear dynamics of an electromechanical ratcheting mechanism under haversine shock and sinusoidal vibration.
- Isolated spring, pin-pawl, and pawl-gear interactions to study contact, friction, and component response.
- Varied solver iterations (1-100), mesh density, and processor count to investigate numerical behavior and mesh lock-up; presented recommendations for finite-element modeling of the full mechanism.

Mechanical Engineer | NLS Lighting

Apr 2022 - Jul 2023

- Improved luminaire designs through thermal/IP testing, static FEA, fabrication, and assembly.
- Prepared fabrication/assembly drawings, bills of materials, change orders, and installation instructions.
- Collaborated with Washington, DC stakeholders on an LED retrofit kit for a multi-million-dollar lighting project, developing a solution targeting upgrades to more than 75,000 existing street and alley lights.

SELECTED RESEARCH OUTPUT

A monolithic cellular architecture for topology-programmable soft robotics.

Pham, A. N., Rao, P. M., and Onal, C. D. Manuscript submitted to Science, October 2026.

Bahr, B., Pham, A., Winston, S., et al. Quantifying the effect of non-physical parameters on the nonlinear dynamics of an electromechanical ratcheting mechanism. Sandia NOMAD presentation, 2025.

TECHNICAL SKILLS

Design and fabrication: SolidWorks, Onshape, PTC Creo; PLA/PETG/TPU 3D printing; laser cutting.

Modeling and analysis: MATLAB, Simscape Multibody, Abaqus, Sierra/SolidMechanics, CUBIT, ParaView.

Experiments: Force-displacement testing, hysteresis, RealSense depth imaging, video tracking.

AI-assisted research: ChatGPT/Codex for CAD iteration, video analysis, and research figures.

NSF NRT FORW-RD Fellowship, 2024 | First Place, WPI Intercollegiate Soft Robotics Competition, 2024.