

AMANI CAMPBELL

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EDUCATION

Boston University

Ph.D., Mechanical Engineering

Boston, MA

Expected May 2026

Worcester Polytechnic Institute (WPI)

M.S., Mechanical Engineering

Worcester, MA

May 2020

B.S., Mechanical Engineering

May 2020

RESEARCH EXPERIENCE

MOSS Lab, Boston University

Sep 2022 - Present

Graduate Researcher

DARPA BRACE: Bio-inspired Restoration of Aged Concrete Edifices

- Lead a team of student researchers to design an adhesive-free, fiber-confined aggregate backfill for rapid deployment and improved stiffness with minimal deflection using high-performance fibers for airfield damage repair.
- Design tabletop Instron uniaxial compression tests (modified ASTM C39) on fiber-confined granular columns and analyze the data to observe the mechanical response before 'failure' and characterize the material properties of the 'metamaterial' under extreme loads.
- Developed a MATLAB and Python pipeline to analyze stress-strain behavior and inform mathematical constitutive models to accurately describe the experimental data.
- Liaise with Battelle and use MATLAB to analyze bioeffector adhesion data to characterize mechanical response to identify a biocompatible adhesive that improves stiffness.

Self-knotting and Entanglement of Curly Rods

- Investigated the knotting behavior of rods with intrinsic curvature by designing an experiment where the rods were vertically suspended and vibrated at different frequencies and amplitudes to understand how the geometrical shape influences the statistics and dynamics of self-knotting.
- Fabricated elastic rods with a prescribed curvature by casting silicone rubber in flexible polyvinyl chloride tubing, which were wound around objects of various diameters to precisely control curvature.
- Imaged the dynamics using high-resolution and high-speed cameras and developed a Python image analysis pipeline to track knot formation and movement.

INDUSTRY EXPERIENCE

Suffolk Construction, Boston, MA

Sep 2020 – Aug 2022

Assistant MEP Project Manager

Jul 2022 - Aug 2022

- Prepared detailed scope narratives for trade contractor bidding on the [350 Summer Street project](#).
- Led Building Information Modeling (BIM) for Mechanical, Electrical, and Plumbing (MEP) coordination using Autodesk BIM 360, and Revit, to resolve clashes and plan reroutes for HVAC ducts and risers, plumbing, and electrical and telecommunications conduit before field installation.
- Reviewed and annotated engineering drawings in Bluebeam and managed construction documents in Procore, to ensure code-compliance, and on-time approval.

Project Engineer

Sep 2020 - Jul 2022

- Coordinated on-site MEP work under the Superintendent on [South Station Air Rights Tower](#), issuing Bluebeam markups to resolve trade conflicts before installation.
- Managed construction documents for the [400 Summer Street project](#) in Procore, to maintain cost and scope for on-time approvals.
- Developed the MEP logistics plan for ventilation installation above active commuter rail tracks, securing approvals and enabling work with no service interruptions.
- Piloted emerging construction technology with Suffolk Technologies, providing feedback to inform rollout decisions.

SKILLS

- **Laboratory Equipment:** Instron, Magnetron Sputtering, SEM, Lightweight Deflectometer, Oscilloscope, Digital Multimeter, DAQ Machine, Signal Generator, FDM 3D Printing Machine, Laser Cutting Machine
- **Software:** MATLAB, COMSOL Multiphysics, Python, ImageJ, SolidWorks, LabVIEW, NX, ANSYS (Structural, Maxwell, Acoustics), Arduino, AutoCAD, Autodesk BIM 360, Revit, Bluebeam, Procore

TEACHING

Graduate Teaching Fellow, Boston University

2023 - 2025

- ENG ME 310 Instrumentation (Instructors: Brian Walsh, Caleb Farny) *Spring 2025*
 - Led lab sessions for 30+ students, guiding their circuit design, experimental setup, data acquisition, and safety/troubleshooting needs.
 - Supervised and guided student teams on how to operate DAQ boards and interface with LabView, and other core instrumentation tools, such as oscilloscopes, DMMs, and signal generators.
- ENG ME 306 Introduction to Material Science (Instructor: James Chapman) *Fall 2023 - Spring 2024*
 - Conducted diffusion, and optics lab sessions for 30+ students.
 - Instructed weekly discussion sections for homework review and exam preparation.

LEADERSHIP & OUTREACH

Leadership

Resident Advisor, WPI

Aug 2017 - May 2020

Admissions Associate, WPI

Aug 2018 - May 2020

Vice President, National Society of Black Engineers, WPI

May 2018 - Sep 2018

Vice President, Black Student Union, WPI

Aug 2017 - Jan 2018

Outreach

Boston University's Upward Bound Math & Science Program (UBMS) Summer Session

Jul 2025

The UBMS program provides high school students with year-round programming to deepen their academic and social skills and prepare them for college-level STEM paths.

- Designed experiments that use everyday objects to provide a hands-on understanding of fundamental mechanical principles such as buckling, instabilities, granular packing, and material characterization.
- Trained students on lab equipment to perform their experiments and guided their design process to build granular and kirigami grippers and load-bearing elastogranular columns.
- Judged students' final capstone presentations.

ACHIEVEMENTS

Distinguished Mechanical Engineering Fellowship Recipient, Boston University Fall 2022

Dean's List Recipient, WPI Spring 2017, Fall 2017, Fall 2018, Spring 2019, Spring 2020