

## Education

### **Brown University - Providence, RI USA**

PhD Solid Mechanics (Computational Mechanics), Expected May 2025

GPA: 4.00/4.00

### **Brown University - Providence, RI USA**

Sc.B., Mechanical Engineering with Honors, May 2019

B.A., Applied Mathematics, May 2019

Elected to Sigma Xi

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## Research Experience

### **Mathematical Modeling of Extreme Loading Conditions (Brown University)**

Fall 2018 - Present

#### **Computational Engineering in Coupled Fluid-Solid Mechanics, Advisor: Prof. Yuri Bazilevs**

Work on development of models for solving complex loading situations involving fluid and solid mechanics. Focus on the implementation of numerical schemes to determine structure and fluid behaviour during extreme loading events. Investigation of shock capturing techniques in computation to predict the formation of hot-spots within porous media to evaluate shock-induced detonation.

Completed and presented senior honors thesis.

### **Mathematical Modeling of Mechanics (Brown University)**

Fall 2017 - Fall 2018

#### **Fluid Mechanics and Renewable Energy, Advisor: Prof. Shreyas Mandre**

Using multiphysics simulations, motivate experimentation with respect to vertical, horizontal wind turbine placement for the investigation of power-optimized array configurations. Implemented problem in COMSOL with turbulence modeling to capture wake small-scale dynamically similar problem. Developed meshing to effectively capture wake structures and evaluate turbine performance.

### **Student Researcher - Nanoscience and Nanoengineering (SDSMT)**

Spring 2012 - Spring 2016

#### **Department of Nanoengineering, South Dakota School of Mines and Technology, Advisor: Prof. Steve Smith**

Worked with a graduate student toward experimental and analytic objectives, sample imaging, mechanical drafting and prototyping of lab equipment, lab organization, and outreach tasks. In this role, learned and performed techniques relating to nanoscale material production including lithography and atomic force microscopy. Developed visualization technique for 3D data.

## Employment

### **Teaching Assistant, Dynamics and Vibration (School of Engineering, Brown University)**

Spring 2019

Provide assistance during ideation, design, implementation and testing associated with the four Design Projects required as a part of the course "Dynamics and Vibration" at Brown. Projects include design of a spring-mass launcher, dynamic modeling in Matlab, and automation of a quadcopter drone.

### **Teaching Assistant, Fluid Mechanics (School of Engineering, Brown University)**

Fall 2018

Held office hours and graded assignments for the course "Fluid Mechanics." Met with students regularly to provide clarification regarding course materials which includes hydrostatics, incompressible flows, dimensional analysis, potential flow, boundary layer analysis and 1-D shocks. Developed lesson plans to lead sessions in preparation for exams.

### **Dean of the College Tutor (Brown University)**

Fall 2016 - Fall 2018

Applied Mathematics, Mathematics and Engineering

Prepared 1-1.5 hour weekly lessons for five person groups. Designed and led weekly meetings consisting of group problem solving with clarifying and supplementing class material. Answered student questions and led exam review. Classes tutored include: "Applied Partial/Ordinary Differential Equations", "Methods of Applied Mathematics I, II".

### **Engineering Peer Mentor (School of Engineering, Brown University)**

Fall 2016 - Fall 2018

Mentored freshman student groups within the "Introduction to Engineering" course to complete labs and student projects. During weekly sessions, directed discussions and group work, enabled implementation of ideas, assisted engineering analysis of designs, and taught basic machining and woodworking safety and techniques. These techniques include introduction to the use of powered saws, drills, 3D printing, sheet metal bending, cutting, and fastening.

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## Projects and Groups

### **Brown Space Engineering - NASA CubeSat Power Team R&D Member**

Fall 2016 - Present

Currently contribute to work on the simulation, design and implementation of circuitry on-board a satellite. This team focuses on the analysis of power systems including solar panels, batteries, and sensors. Complete first-analysis on ideas put forth by the group and assess feasibility and potential directions for approach. Launched from ISS March 2018.

### **Senior Design Project - All-Electric Mid-Weight Drone "Aircraft Design", Brown University - Providence, RI USA**

Fall 2018

In a group of four, developed an all electric drone capable of carrying a 5 kg payload at 20 m/s for five hours to provide a mid-size (portable) reconnaissance and rescue drone. Overcame the hurdle associated with the low energy density associated with batteries to provide high endurance with a relatively large payload to provide the reliability of electric powerplants in a demanding environment.

### **Swearer Tutoring Enrichment in Math and Science Swearer Center - Providence, RI USA**

Spring 2016

Volunteered in a classroom at Hope High School to assist an instructor with daily classes in High School Physics. Provided instruction with demonstrations and labs. Provided in-class support for classwork.

### **FIRST Robotics Competition Team #4593 (Rapid Acceleration) Rapid City, SD USA**

Fall 2013 - Spring 2015

Worked with other High School students and mentors to design and create a robot capable of competing in a prescribed task. On this team, focused on component fabrication and assembly. Qualified and competed at the national level.

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## Publications and Presentations

1. Shende R, Shaunak. CFD for Designing Arrays of Hydrokinetic Turbines. Poster presented at: UTRA Summer Research Symposium; 2018 Aug 2-3; Providence, RI.
2. Shende R., Shaunak, Fisher, J., Smith, S. The Production of a Nanotriangle Lattice for use in Metal-Enhanced Upconversion of Light. Poster presented at: South Dakota Academy of Science annual Conference; 2014 April; Rapid City, SD. Abstract published in Conference Proceedings.
3. Shende R., Shaunak. "Analysis of Shock Capturing Techniques in Hot-Spot Formation within Shock-Sensitive Porous Media." Brown University, 2019. (Senior Thesis)

## Honors and Awards

1. Karen T. Romer Group Undergraduate Teaching and Research Award, May 2018
2. Brown School of Engineering Honors, May 2019
3. Elected to Sigma Xi

## Technical Skills

- Highly Proficient in MATLAB, Python, SolidWorks, Fusion360, COMSOL and Ansys.
  - Proficient in C and C++.
  - Effective in presenting and leading groups. Proficient in interdisciplinary communication.
  - Proficient in machining, soldering, circuit prototyping and testing.
  - Practiced in laboratory and laser technique and safety. Familiar with microscopy techniques, sample preparation, imaging, image analysis, and chemical procedures.
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