

## Education

### Stony Brook University

*Ph.D., Mechanical (Concentration: Design and Robotics, Minor: Applied Mathematics), GPA 3.95*

Stony Brook, NY

*Aug. 2015 – Present*

- **Relevant Coursework** : Robotics, Advanced Dynamics, Vibration and Control, Kinematic Analysis and Synthesis, Applied Stress Analysis, Product Design Optimization, Geometric Modeling, Analysis of Algorithms

## Experience

### Stony Brook University

*Research Assistant*

Stony Brook, NY

*May 2017 – Present*

- Developing a Computational Framework for Data-Driven Mechanism Design Innovation supported by \$450K NSF grant.
- Created [MotionGen](#) a web-based mechanism design framework. Uses MEAN (MongoDB, Express.js, Angular.js, Node.js) stack to create a RESTful web service based on MVC architecture. iOS and Android app created using Apache Cordova framework.
- Path synthesis of mechanisms based on Fourier descriptor fitting using Nelder-Mead and Simulated Annealing optimization.
- Mixed motion and path mechanism synthesis using optimal non-uniform DFT and Singular Value Decomposition.
- Real-time simulation of planar and spherical mechanisms with prismatic and revolute joints using Newton-Raphson optimization.
- Synthesized path tracing mechanisms with optimum transmission angle using wavelet features in a neural network.
- Developing Spatial mechanisms synthesis techniques using Homotopy methods for type and dimensional synthesis.

*Teaching Assistant*

*Aug 2016 – Apr 2017*

- Developed [SnappyXO](#), a laser-cut design-driven robotics platform which enables designing mechanisms, structures, and robots.
- Advised 250+ undergraduates in MEC101-Freshman Design Innovation and MEC 102-Engineering Computing.

### Vivonics, Inc.

*Product Design Intern*

Stony Brook, NY

*Feb 2016 – Aug 2016*

- Developed PMT Monitor, a portable medical headset which detects head trauma by measuring visually evoked potential.
- Generated concepts for a mechanism which adjusts the interpupillary distance between the lenses. Focus was on manufacturability and robustness.

### Leviathan Energy

*Design Engineer*

Stony Brook, NY

*Feb 2016 – May 2016*

- Collaborating on propeller airfoil design under Strategic Partnership for Industrial Resurgence program by SUNY.
- In charge of part design using design software such as Solidworks and Autodesk Inventor and prototyping of designed parts by FDM based 3D printing techniques.

### Indian Institute of Information Technology

*Junior Research Fellow*

Jabalpur, India

*May 2014 – May 2015*

- Led a \$70k+ research project funded by the Science and Engineering Research Board titled “Development of Additive-Subtractive Integrated Rapid Prototyping System for Improved Part Quality”.
- Designed and Fabricated a Pellet based Screw Extrusion process to enable the use of CNC machines as hybrid 3D printers.
- Developed Toolpath Planning strategies to manufacture CAD models using Hybrid Manufacturing techniques.

## Skills

- **Languages** : Proficient in Python, Javascript, C++, MATLAB, Mathematica
- **CAD softwares** : Solidworks, CATIA, PTC Pro/ENGINEER (CREO), Ansys (CFD and Mechanical), Autodesk Inventor, Autodesk AutoCAD, Autodesk Moldflow, FeatureCAM, MSC-Adams, ZWCAD, HyperMesh, OptiStruct, Materialize Magics, Materialize Mimics, CNC G-M Code, Minitab
- **Tools & Technologies** : Keras, Tensorflow, OpenCV, HTML, CSS, Canvas, Node.js, Express.js, Redis, Apache Cordova, OpenGL, Jupyter, Anaconda

## Relevant Projects

### Fracture test analysis for compact tension specimen

Feb 2017 – May 2017

- Finite element analysis of a fracture specimen to predict and validate deformations at the crack tip using Abacus.

### Conceptual Design

Aug 2015 – May 2016

- Conceptual design of an Ergonomic Nutcracker and Stone Crusher.
- Formulation of product design specification and criteria and generation of the best possible product concept.

### Quality Improvement of Aircraft Wing Assembly

Aug 2015 – Nov 2015

- Identifying and correcting the root cause for high rejection rate of final assembly using Pareto Charts, Cause and Effect Diagrams, Control Charts and Histograms.

### Mold Design and Manufacturing

May 2012 – Nov 2012

- Designed and manufactured molds for irrigation industry products for Injection Molding Process.
- Flow Analysis results were used to optimize design and a Pricing Strategy was developed for industry.

## Selected Publications

- Sharma S., Purwar A., Ge Q.J.; **A Motion Synthesis Approach to Solving Alt-Burmester Problem by Exploiting Fourier Descriptor Relationship Between Path and Orientation.**, ASME J. Mechanisms Robotics; doi:10.1115/1.4042054
- Sharma S., Purwar A., Ge Q.J.; **An Optimal Parametrization Scheme for Path Generation Using Fourier Descriptors for Four-Bar Mechanism Synthesis.**, ASME J. Computing and Information Science in Engineering; doi:10.1115/1.4041566