Shashank Sharma

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Education

Stony Brook University Stony Brook, NY
Ph.D., Mechanical (Concentration: Design and Robotics, Minor: Applied Mathematics), GPA 3.95 *Aug. 2015 – Present*
- **Relevent 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 Stony Brook, NY
Research Assistant *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. Stony Brook, NY
Product Design Intern *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 Stony Brook, NY
Design Engineer *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 Jabalpur, India
Junior Research Fellow *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.

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.

Technical Proficiency

- **Languages :** Python, Javascript, C++, MATLAB, Mathematica
- **CAD softwares :** Solidworks, Autodesk Inventor, PTC Creo, CATIA, Ansys (CFD and Mechanical), Autodesk AutoCAD, Autodesk Moldflow, FeatureCAM , MSC-Adams, ZWCAD, Altair HyperMesh, Altair 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

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