

BHARAT KATHPALIA

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EDUCATION

GEORGIA INSTITUTE OF TECHNOLOGY

Master of Science in Mechanical Engineering --- GPA 3.60
Research Field: Dynamics of Piezoelectric Energy Harvesting Systems

Atlanta, GA
Expected: December 2018

GEORGIA INSTITUTE OF TECHNOLOGY

Bachelor of Science in Mechanical Engineering --- GPA 3.69
Concentration in Thermal, Fluid and Energy Systems
Member of Pi Tau Sigma (Fall 2014)

Atlanta, GA
May 2016

PROFESSIONAL EXPERIENCE

TESLA, INC.

Manufacturing Engineering Intern, Model 3 Battery Module, Gigafactory 1

Sparks, NV
January 2018 - August 2018

- Improved material dispense station reliability to 90% through modifications to equipment and creating a detailed system check protocol
- Reduced cycle time of station by 50% by optimizing process flow and controls
- Reduced mean time to recovery through extensive redesign and trialing of dispense equipment
- Validated and commissioned new material batching and dispense equipment to increase production rates
- Fine-tuned material properties and dispense paths to meet safety, cost and time requirements

ATAS - Energy and Sustainability Lab, GEORGIA TECH RESEARCH INSTITUTE

Graduate Research Assistant, Advisors: Dr. Ilan Stern

Atlanta, GA
May 2016 - Present

- Responsible for the piezoelectric triggering mechanisms in multiple flooring-based projects
- Prototyped and tested multiple iterations of mechanical and electronic systems
- Optimized solar charging configurations for outdoor flooring tile project
- Performed structural and material analysis of tile designs for selection of final materials
- Identified necessary tools and materials to carry out different builds and installations

SIEMENS ENERGY, INC.

Production Engineering Co-Op, Generator Components Plant

Fort Payne, AL
May 2014 - May 2015

- Documented the Copper Wire Extrusion Project to create a standard operating procedure
- Saved 25% time in QC process using VBA macros to run Leica T-Scan equipment
- Developed the CAM code for Rotor Coil End Arc Manufacturing
- Reduced downtime by 11% in Vacuum Pressure Impregnation and Quality Testing areas
- Designed custom tooling to make processes easier for the operators on each shift

ACADEMIC RESEARCH EXPERIENCE

Smart Structures and Dynamical Systems Laboratory, GEORGIA INSTITUTE OF TECHNOLOGY

Graduate Student, Advisor: Dr. Alper Erturk

Atlanta, GA
May 2016 - Present

- Investigated applications of Piezoelectric Materials for Human Scale Energy Harvesting
- Characterized different off-the-shelf piezoelectric actuators
- Studied acceleration and forces exerted by different parts of the human body
- Designed and optimized system architectures for floor-based energy harvesting

Energy Storage and Conversion Laboratory, GEORGIA INSTITUTE OF TECHNOLOGY

Undergraduate Research Assistant, Advisors: Dr. Seung Woo Lee and Dr. Reza Kaviani

Atlanta, GA
January 2014 - August 2015

- Worked on projects to develop energy storage devices with higher energy density
- Assisted in research involving carbon nanotubes to be used as electrodes in batteries
- Created carbon nanotube electrodes for use in lithium ion batteries and super capacitors
- Assembled Tiron-Pb Redox Flow Batteries to perform tests and analysis
- Researched and proposed Organic-Inorganic Aqueous Flow Batteries for future projects

PROJECTS

Graduate Mechatronics, GEORGIA INSTITUTE OF TECHNOLOGY

Atlanta, GA

Individual Project, Light Following Autonomous Vehicle

February 2017 - May 2017

- Designed components and assembly of vehicle using SolidWorks
- Programmed microcontroller to autonomously determine direction and drive vehicle
- Designed and built custom circuit board with motor driver and encoder counter
- Implemented control algorithm to ensure vehicle drove in a straight line

Georgia Tech Solar Racing, GEORGIA INSTITUTE OF TECHNOLOGY

Atlanta, GA

Metals Fabrication Lead, Mechanical Team

August 2015 - May 2016

- Directed assembly of mechanical components to deliver a rolling chassis
- Organized CNC machining of suspension parts and carbon-fiber layups for aerobody
- Conducted training activities for 40 new members of the mechanical team

Lead Designer, Suspension Design Group

January 2014 - August 2015

- Led the team designing the suspension, brakes and steering systems of SR2
- Redesigned suspension to accommodate for Michelin racing tires and Marand Motors

Energy Systems Design and Analysis, GEORGIA INSTITUTE OF TECHNOLOGY

Atlanta, GA

Team Lead, Compressed Air Energy Storage Power Plant

August 2015 - December 2015

- Led team to design a compressed air energy storage power plant
- Performed detailed thermodynamic analysis on required systems within the plant
- Performed economic analysis on the different systems to determine the plant profitability

LEADERSHIP

MARTIAN ADVANCED RENEWABLE SYSTEMS - Vertically Integrated Project

Atlanta, GA

Graduate Teaching Assistant

January 2017 - Present

- Supervised multiple interdisciplinary undergraduate teams for project quality and completion
- Lectured on technical writing and experimental design to prepare students for publication

GEORGIA TECH SOLAR RACING

Atlanta, GA

Team Lead, Business and Sponsorship Team

January 2016 - August 2016

- Managed a \$100,000 budget for the build phase of the next solar car (SR2)
- Led donation and sponsorship procurement efforts for the organization
- Secured donations worth over \$100,000 from multiple corporations

PI TAU SIGMA, NU CHAPTER

Atlanta, GA

Corporate Relations Chair

January 2015 - May 2015

- Interfaced with 10-12 companies to organize information sessions and raise funds
- Organized information sessions to expose members to opportunities in industry

MECHANICAL ENGINEERING AMBASSADORS

Atlanta, GA

President

August 2013 - August 2016

- Created weekly tour schedule and trained new tour guides
- Provided weekly tours of Mechanical Engineering facilities to groups of 2-15 visitors

SKILLS

Instrumentation: Lathes, Mills, Drill Presses, Band Saws, Vibrometer, Multimeter, Microcontrollers, Caliper, Micrometer, CNC Mills and Lathes, CNC and Hand Router, Waterjet, Laser Cutter, 3D Printing

Mechanical : Modal Analysis, Vibrational Analysis of Dynamic Systems, Vibrations Analysis of Continuous Systems, Transient Heat Transfer Analysis, Heat Flux Analysis, Analysis of Renewable Energy Systems, Energy Systems Design and Analysis, Fluid Dynamics, Nanoscale Heat Transfer

Manufacturing: Material Selection, Process Selection, Lean Manufacturing, Rapid Prototyping, Design for Manufacturability and Assembly (DFM/DFA), Concurrent Engineering, Cost Benefit Analysis, 3D Printing, GD&T

Software: SolidWorks, AutoCAD, Inventor, COMSOL, Python, R, MATLAB, LabView, Signal Express, C++, Engineering Equation Solver, HOMER, Siemens NX, HSMWorks CAM Suite, GibbsCAM, Excel, Windows, Linux, Mac OSX

Computer Aided Engineering: 2D & 3D Modeling and Assemblies, Isometric and Orthographic Hand Sketching, Computer-Generated Design Documentation, Finite Element Analysis (FEA), Computational Fluid Mechanics (CFD)

Languages: English, Hindi, German

PUBLICATIONS AND CONFERENCE PROCEEDINGS

1. Kathpalia, B., Tan, D., Stern, I., and Erturk, A., 2018, “[An Experimentally Validated Model for Geometrically Nonlinear Plucking-based Frequency-up Conversion in Energy Harvesting](#),” *Smart Materials and Structures*, **27**, 015024 (9pp)
2. Kathpalia, B., Tan, D., Stern, I., and Erturk, A., 2017, “[Modeling and Characterization of a Curved Piezoelectric Energy Harvester for Smart Paver Tiles](#),” Proceedings of the 7th International Conference on Sustainable Energy Information Technology, Madeira, Portugal, 16-19 May 2017.
3. Kathpalia, B., Stern, I., and Erturk, A., 2017, “[Evaluation of Human-Scale Motion Energy Harvesting for Wearable Electronics](#),” Proceedings of the 24th SPIE Annual International Symposium on Smart Structures and Materials & Nondestructive Evaluation and Health Monitoring, Portland, OR, 25-29 March 2017.