

# Shyam Prasad V Atri

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## Education

1. Doctor of Philosophy in Mechanical Engineering: College of Engineering, North Carolina State University CGPA 3.76/4 (Fall2021-Present)
2. Master of Science in Mechanical Engineering: Viterbi School of Engineering University of Southern California 2018 CGPA 3.85/4
3. Bachelor's in mechanical engineering: P.E.S.I.T (autonomous) 2015, Visvesvaraya Technological University CGPA 9.04/10

## Experience

- 1. North Carolina State University Teaching Assistant and Research Assistant (Raleigh, NC) (August 2021- Present):**
  - Research assistant for understanding particle capture by nonwoven materials with electrostatic forces.
  - Teaching assistant for solid mechanics lab (Fall 2021, Spring 2022).
  - Have experience developing User Defined Functions (UDF) in Ansys fluent for making customised simulations
  - Have experience developing User Defined Libraries (UDL or API) in Altair EDEM for customising Discrete Elemental Method (DEM) Simulations
- 2. HUF Automotive continuous improvement Engineer (Greenville, TN) (February 2018- July 2021):**
  - Developed a mathematical model and implemented the incentive system in the assembly department which improved the efficiency of the assembly department from 70% to 94%. Extended the system for the plastics and paint department.
  - Create dashboards using Power BI and work sense IOT for displaying the OEE metric of the assembly process, which aided the replacement of the manual OEE boards. Once the Incentive system was fully implemented a much better data collection process was introduced. Converted all Power BI dashboards to Cyber Query (SQL) dashboards. Which is the business intelligence tool used in the company. Note: Cyber Query was self-thought. And I also trained few members from other departments to migrate all their dashboards into cyber query.
  - Perform time study analysis assembly of a door handle and configure the HMI to collect the scrap and downtime data.
  - Created a tool for automation of assembly capacity planning process.
  - Perform 6S audit for paint department.
  - Implemented a one-piece flow process for an assembly line by making the process lean to improve the capacity and performance of the line. This resulted in eliminating the sub-assembly process and a lot of material handling.
  - Developed an intuitive algorithm to Understand the working of Xrite and Huf custom made colour sensor. Using statistical procedures to control the tolerance for all the colours across the plant. This reduced the wrong colour shipment problem significantly in turn resulting in a reduction of non-conformance costs.
  - Develop the material flow process and allocate optimum storage to reduce material movement. By writing queries in cyberquery(SQL) using customer demand to calculate FIFO lanes required. Which aided in reducing the inventory of the company and achieving better cash flow.
  - Develop a custom software tool to capture the information from two different data sources to track the preventative maintenance done on the injection moulding tool based on shot cycles.
  - Developed a mathematical procedure to extract the machine errors accumulated for the Tesla door handle assembly line and created a live error tracking system. Currently extending this system to multiple other assembly lines.
  - Created a rule-based script in python to generate new revision part numbers to be deployed to assembly cells. Based on the part number database created from cyberquery(SQL). This eliminated a lot of manual entry errors and made revision changes smoother.
  - Working on designing new Paint Adapters for Rivian and other new projects to hold handles to be presented for paint robots.
- 3. Ansys Software Test Engineer Intern (Canonsburg, PA) (August 2017- December 2017):**
  - Test a new library named SMART for Fatigue and Fracture Analysis
  - Perform GUI testing for Ansys 19.0 release.
  - Performed system maintenance by adding -.CDB, IGES and .RPT files that were missing in the models.
- 4. Research Assistant University of Southern California Impact Laboratory (Los Angeles, CA) - Mechanical Design Engineer in Robotics and Machine Learning (August 2016-August 2017):**
  - Understood various machine learning algorithms by participating in a MOOC.
  - Created a CAD model of the robot designed assembled it and built a prototype.
  - Understood how to use the Udacity simulator created in unity for simulating the self-driving car.
  - Wrote robot control code in python that will help you to control the motion of the robot and capture the motion data of the environment.
- 5. Ontology of Heat Exchangers and application of FEA to Heat exchangers (Bengaluru, KA, IND) (October 2013- April 2015):**
  - Created an ontology of heat exchangers based on various object properties and datatype properties.
  - Wrote subroutines using finite element analysis for the analysis of heat exchangers.
  - Validated the numerical model using results from the international journal of heat exchangers.

## Skills

- 1 Programming languages: Python, Java, MATLAB, C/C++, Excel VBA, Cyberquery (SQL)  
<https://github.com/shyam1992atri?tab=repositories>

- 2 Mechanical Software's: Solid Works, Cosmos Works, Abaqus, Catia, Solid Edge, Ansys, MAPDL, Workbench, Space Claim, Fluent (UDF), Altair EDEM (API).
- 3 Object Oriented Modelling and Design, UML, Finite Element Analysis (Linear and Non-Linear), Structural Dynamics, Material Selection, Vehicle Dynamics, Control Systems, Linear Algebra, GD&T, Working with Arduino and Raspberry pi, Design of Experiments (Minitab), Microsoft Office, Power BI. ( [https://sites.google.com/a/usc.edu/shyamprasadv\\_atri\\_portfolio/](https://sites.google.com/a/usc.edu/shyamprasadv_atri_portfolio/) )

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## Projects

- 1 **Non-Linear Finite Element Analysis Project (January 2017-May 2017):** Implemented Total Lagrange method and Radial Return algorithm using MATLAB for a column problem and plate problem using 20 noded brick elements.
- 2 **Design of Experiments (January 2017-May 2017):** Wrote a script in python for automatic data procurement and finding the optimum setting using response surface study, gradient descent algorithm, and other optimization methods.
- 3 **Analysis of pipe intersection model using 8 noded 3-dimension shell elements (August 2016- December 2016):** Programmed a subroutine in MATLAB for a pipe intersection problem using 3D shell element and validated the program for different test cases of a journal by Bathe et al. and the results were compared with the solution obtained from Abaqus.
- 4 **Structural Dynamics (August 2016- December 2016):** Developed mathematical models, performed symbolic computations, implemented central difference method and power iteration method using MATLAB for deriving the solutions of dynamic motion of structures. This analysis was extended to study the motion in Tuned Mass Damper system and studied Structural Control.
- 5 **Design of Library resource management System (January 2016-May 2016):** A library resource management system was conceptually designed and implemented in Java using object-oriented design and methodology.
- 6 **Design of Centrifugal Governor (January 2016-May 2016):** A centrifugal governor is designed in Solid Works and analyzed in Cosmos works for the given loading conditions and geometric constraints. ( <https://grabcad.com/shyam.prasad.v.atri-1/projects> )
- 7 **Table Top Robot (August 2013-December 2013):** Table Top Robot was designed and built using infrared sensors, motor actuators, an Arduino microcontroller. The primary objective of this bot was to measure the distance of the bot from the table and always remain on top of the table without falling off.
- 8 **Inverted Pendulum (August 2013-December 2013):** Rotary Inverted Pendulum was designed and built using a potentiometer as an angle sensor, a motor as an actuator, and Arduino to control its motion. The primary objective was to stay vertical without falling off. Here PID controller was implemented to achieve the given task.
- 9 **Go to Goal and follow the Robot (January 2014-May 2014):** A go-to goal robot was simulated in python and built using wheel encoders and ultrasonic sensors, motors as actuators, and Arduino Microcontroller. The same robot was extended to perform the task of following the master robot where Kalman Filter was used.
- 10 **Vehicle Dynamics (August 2014- December 2014):** Studied a quarter car model and various vehicle performance characteristics.
- 11 **SAE Aero design West 2014 (April 2013-April 2014):** Lead the Structural Analysis division of Team Aeolus (Official Aero design Team of PESIT) for finite element analysis. A regular class RC aircraft was designed and fabricated for the given dimension constraints. The structure designed was subjected to practical loading conditions. Used Ansys to analyze and to generate an optimum structure for the aircraft. ( <https://grabcad.com/shyam.prasad.v.atri-1/projects> )
- 12 **"Finite element simulation of fracture initiation and crack propagation in bulk metallic glasses"- Final semester project (January 2015- May 2015):** I worked as a team leader for my final year project. Here we analyzed crack propagation in Vitreloy-1 (BMG) using Abaqus Software. ( <https://www.simscale.com/users/satri/> )
- 13 **Data Analysis and Machine Learning (May 2017- August 2017):** Understood data analysis procedures and implementation of various machine learning algorithms using NumPy, pandas, matplotlib, and tensor flow libraries of python by participating in a MOOC.

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## Achievements / Publications

1. Secured 9th Place All over the world in SAE Aero design west (2014) held at Fort Worth Texas USA.
2. First place in Jed-I Tabletop robot challenge and Inverted Pendulum Challenge (2013).
3. First Place in Icarus Idea presentation competition on VTOL Aircraft in QUARK fest at BITS Goa (2013).
4. Innovation Award in RC aircraft design and Fabrication Workshop organized by AEROTRIX at NHCE Bangalore (2012).
5. Developed *Huf Tennessee Incentive system* which attracted a feature article on *Huf Spiegel* for January 2019.
6. Published an article in Powder technology journal titled "Microscale modelling of electret filters using disordered 2-D domains"
7. Co authored a publication in Aerosol Science and Technology Journal for an article titled "Macroscale modeling of electrostatically charged facemasks" ( <https://scholar.google.com/citations?user=Tucqd7cAAAAJ&hl=en> )
8. Contributed to a publication in Langmuir Journal for an article titled "Importance of Dipole Orientation in Electrostatic Aerosol Filtration"
9. Presented my research work as a speaker in RISE-2023 conference "Macroscale simulation of N95 Respirators"
10. Won the poster competition of Mechanical and Aerospace Engineering symposium of NCSU for academic year 2022-23,2023-24

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## Extra

1. Apart from work I enjoy Hiking, Camping, River Float and Cooking.
2. I started learning to play the piano after I moved to Tennessee.