

Core skills : Finite Element Analysis; Tire Modelling; Vehicle Dynamics ; Mathematical Modelling; Dynamic Mechanical Analysis (DMA); Assembly Drawings ; Tribology; Hyperelasticity; Viscoelasticity; Design of Experiments ; Control Systems; SEM; DFMEA; DFAM; GD&T; XRD; Additive Manufacturing; CNC Programming and Operation; Material Selection; Material Testing; DFMA; Machine shop; Stress Analysis; Nanomechanics; Analytical Thinking; Leadership; Product Design & Development; Total Quality Management; Optimization

Graduate Courses : Finite element in M/c Design, Solid Mechanics ,Vehicle Control, Applied Linear Systems, Polymer Viscoelasticity, Design of Exp, Rapid Prototyping, Stats in Research

Software : *Proficient in:* SolidWorks, Abaqus, ANSYS, AutoCAD, MS Office, PTC Frustum, Mathematica, MATLAB
Familiar with: Simulink, Minitab, Python , Deform 3D, Generative Design, CATIA, PTC Creo, Fusion 360, C++ , LabView, nTopology

→ Education

Present **Master of Science (M.S), Mechanical Engineering**, Virginia Polytechnic Institute and State University, Blacksburg, Virginia
Concentration: Design and FEA, Material Modelling , Vehicle Dynamics & Tire Mechanics **Expected Graduation:** Oct-Nov 2021
Honors/Awards: *Pratt Fellowship* (Academic year 2020-2021) **GPA: 3.95**

2015-19 **Bachelor of Technology (B.Tech), Mechanical Engineering**, NMIMS University, Mumbai, India
Department Valedictorian (Stood first in ME department among 240+ students) **GPA: 3.67**

→ Research Experience

Present **Graduate Research Assistant, Center for Tire Research (CentiRe)**, Virginia Tech, Blacksburg, Virginia

- Currently leading the project titled **Rubber Lifetime Performance: Coupling Effects of Dynamic Aging and Wear in SBR.**
- Performed experimental tests on a 'Dynamic Friction Tester' (DFT) to characterize wear and to study the effects of thermal (chemical) and mechanical aging (proposed) on the tire wear and life. Currently also studying effects of temperature and O₂ % on wear.
- Performed DMA and uniaxial tensile tests of aged & unaged rubber to characterize viscoelastic & hyperelastic response. Aim to the couple aging and wear damage function with the mechanical responses of rubber in the context of the CDM theory & develop a FEM.
- Creation of a UMAT subroutine after creation of a complete mathematical model to define the material properties in ABAQUS.

2018-19 **Undergraduate researcher, Experimental Investigation and Simulation of TiAl6V4 with PVD Coated inserts**, NMIMS, Mumbai, India.

- Used *TiAlN* and *AlCrN* alloy coatings on low grade carbide inserts using magnetron sputtering technique to machine TiAl6V4 titanium alloy to reduce tool wear during machining and simultaneously increase tool life and performance.
- Conducted testing on a CNC lathe and input parameters such as speed, feed, and depth of cut were varied to find the optimum output parameters viz. low cutting forces, low surface roughness and less tool wear
- Demonstrated the reduction in lead time, tool changeover time and simultaneous increase in tool life, quality & efficiency
- Performed simulations on Deform 3D software to validate the results. Focus was to improve quality and cut down costs.

→ Technical/Work Experience

Present **Tire Product Development Intern, Tire Vehicle Mechanics (TVM), The Goodyear Tire & Rubber Company**, Akron, OH

- Development of a DOE for the establishment of baseline slip and frictional energy result reproducibility and repeatability metrics on the Dynamic Footprint Machine (DFM). Identifying control factors and possible sources of variation.
- Working on the installation and programming of an existing frictional tester and run required tests by defining a GR&R plan
- Reviewing external and internal studies regarding tire/rubber wear, abrasion, and friction as well as lab friction and abrasion of tire on asphalt or concrete surfaces. Exploring novel durable test surfaces for lab abrasion testing and its analysis and testing.
- Conducting experiments on the Rotational Friction Tester (RFT), analyzing, and summarizing the data collected to calculate the static and dynamic friction coefficient for multiple test conditions. Identifying issues, modifying VBA code & cleaning up the database.

Aug-Dec '20 **Additive Manufacturing, Design, Analysis and Testing of an Additively Manufactured Rim for Passenger Car**, Virginia Tech, VA

- Worked with a team to design customized rims for passenger cars using principles of DfAM. The customer requirements we aimed to achieve were, geometry customization, lightweight, high surface finish, NVH, fatigue life, and cost effectiveness.
- For printing, a Hybrid Metal Wire Arc (HMWAAM) process was used with Aluminum 6061 T-6 as material. Modal and Static analysis was performed on the designed wheel in ABAQUS. Experiments to validate design were proposed. Cost analysis was also performed.

May-Sep '18 **Mechanical Design Intern, Nuclear Power Corporation of India Ltd**, Mumbai, India

5 months

- Worked in the Design Department wherein was assigned to develop CAD models of pressure vessels and correct any aberrations. Analyzed various components for different types of failures on ANSYS and consulted on improvements.
- Performed analytical calculations to calculate discontinuity stress in the head-shell junction of a pressure vessel used by NPCIL using ASME Section III Division-1-NC. Prepared a code and report on the same and gave a technical presentation.

2017-2018 **ATV Design and Manufacturing, MPSTME Racing Team, SAE Baja India & Enduro Student India (ESI)**

9 months

- Headed the Manufacturing department of the MPSTME Racing Team and worked in the design department to model and analyze the chassis for various failure modes. Performed failure analysis on knuckle-spindle assembly. Performed DFM and DFMEA analysis.
- Assisted in suspension designing and manufacturing to ensure better ride and handling characteristics.
- Aimed to reduce the weight of the chassis while considering ergonomics as well as rigidity of the structure A change in material selection and innovative design changes made the vehicle about 15% lighter than its predecessor.

→ Technical Papers/Projects/ Reports/ Trainings

- Cost Reduction of a Diesel Engine using DFMA method, *Product Design and Development* (case study)
- Study of Discontinuity Stresses at the Head-Shell Junction of a Pressure Vessel, *Internship* (report)
- **Finite Element** : Analysis of a 1) Race car Chassis 2) Pulpwood Loader 3) F/A-18 bulkhead
- **Linear Controls** : Designed a state-feedback control system to control position of a Hovering-Autonomous Underwater Vehicle Control: Designed a controller to improve dynamics of car during turning, braking and acceleration (projects)
- A Predictive Modeling of the Viscoelastic Response of SBR Rubber due to Aging, (Tire Society Conference, '20)