

## Education

- **Indian Institute of Technology, Madras** Chennai, India  
Master of Science in Aerospace Engineering; CGPA : 8.56/10 Jan'16 – Present
  - *Thesis Title: Multiscale Modelling of Damage in UD Composites*
- **Uttar Pradesh Technical University, Lucknow** Lucknow, India  
B.Tech in Mechanical Engineering; Percentage: 77.58% Jul'10 – Jun'14
  - *Project Title: Analysis and Experimental study of Hovercraft*

## Research Experience

- **Research Assistant, Department of Aerospace Engineering** Chennai, India  
*Research Advisor: Dr. Shantanu S. Mulay, IIT, Madras* Jan'16 – Present
  - Computational homogenization of UDL RVE of different Fibre-Volume fractions.
  - Determination of existence of RVE in Elastic, Hardening and Softening regime
  - Micromechanical Analysis of effect of the Fibre-Volume fraction on fracture toughness of composite.
  - Development of VUMAT Abaqus/explicit User Subroutine for the study of Softening behaviour of RVE
  - Nonlocal formulation and implementation of continuum damage model.

## Journal Paper Submission

- **Paramveer Sharma, Shantanu S. Mulay (2018), Damage Modelling of Unidirectional Laminated Composite, *Mechanics of Advanced Materials and Structures*, (paper under review)**

## Academic Projects

- **Implementation of Integral type Non-Local Explicit Damage model** Chennai, India  
*Advisor: Dr. Shantanu S. Mulay, Dept. of Aerospace Engg, IIT Madras* May'18 – June'18
  - Unique Method has been developed for the implementation of Non-local damage in **Abaqus/Explicit(VUMAT)**, Since there is no in-built process for non-local implementation in Abaqus®
  - Softening behaviour of matrix was simulated, using this Non-Local damage model, and results obtained were free from the any pathological mesh sensitivity
- **Vectorized User Fortran Code for the Lemaitre Damage model** Chennai, India  
*Advisor: Dr. Shantanu S. Mulay, Dept. of Aerospace Engg, IIT Madras* Nov'17 – Jan'18
  - A fast, single equation based stress integration algorithm, for the Lemaitre ductile damage model, has been executed in Abaqus User Fortran code VUMAT.
  - Results obtained from the above implementation were used for RVE determination, in the softening phase, using **Failure zone averaging scheme**
- **Phase field model of thermally induced solid-solid phase transitions** Chennai, India  
*Advisor: Dr. Srikanth Vedantam, Dept. of Engineering Design, IIT Madras* Aug'17 – Nov'17
  - Developed the 1-D phase field model for the material undergoes thermally induced solid-solid phase transitions between two distinct phases, using the **Fried-Gurtin approach**.
  - Derived the constitutive equations which were consistent with the Clausius-Duhem Inequality
  - Specialized the governing equations for modeling the **effect of inter-facial resistance** during phase transitions
- **Building GUI based Custom Plug-In in Abaqus/CAE Using Python** Chennai, India  
*Advisor: Dr. Shantanu S. Mulay, Dept. of Aerospace Engg, IIT Madras* Jun'17– Jul'17
  - Developed the Unique Plug-in titled '**RVE Homogenization**' using **Python**
  - Plug-In is capable to **Fully automate** the process from Model Database(MDB) creation to Output Database (ODB) generation and then complete stiffness matrix computation.

- It takes inputs such as model information and individual material properties which further used to compute the homogenized properties

- **Molecular Dynamics Simulation of Plate with hole** Chennai, India  
*Advisor: Dr. Anand Kanjarla, Dept. of Metallurgical and Materials Engg, IIT Madras* Aug'16 – Nov'16
  - Molecular Dynamics simulation of Ni FCC Crystal was carried out to study the stress/strain distribution in front of propagating crack, using **LAMMPS (A Open Source Molecular Dynamics Code)**
  - Shrink wrapped (Non-Periodic) and Periodic type BCs were used to Ni FCC box containing small central crack.
  - Minimization of energy was done by **Conjugate gradient algorithm** and using NVE ensemble the system iteratively brought to desired temperature. Pair potential used for the system was Ni99.eam.alloy
- **Delamination at interfaces using Cohesive Zone Elements** Chennai, India  
*Advisor: Dr. Anand Kanjarla, Dept. of Metallurgical and Materials Engg, IIT Madras* Aug'16 – Nov'16
  - The Delamination at interface of double cantilever model of bi-material was modelled by placing the layer of cohesive elements of negligible thickness
  - Max stress based **Traction-Separation law** were used to define the material behaviour of cohesive elements
  - Fracture toughness and stress-strain response after the ultimate stress (delamination onset) were obtained

## Positions of Responsibility

- **Founder, Royal Mechanical Buzz** Chennai, India  
**A Mechanical Engg. Students Community Blog** Jul'12 – Present
  - Developed a blog in 2012 titled Royal Mechanical Buzz. It was the Open Community forum type blog. I earned \$ 2100 US Dollar in **Google AdSense Program** within 1.2 years through the blog. Within a small span of time, it has reached 1000 Online Subscribers.
  - Currently, it has 2078 Email Subscriptions and around 100 G+ Followers. The aim was for solving general Problem and conducting the live Online test, involving Mechanical Engg. domain
- **Team Member, CGBS IIT Madras** Chennai, India  
**Center For Innovation (CFI), IIT Madras** Jan'16 – Jun'18
  - **Cargo Ground Build-up System (CGBS)**, a University Project funded by **Lockhead Martin**
  - CGBS is an air transportable, remote operated cargo handling vehicle designed for the Indian Air Forces Hercules C-130 aircraft to enable offloading of the cargo at remote locations
  - Handle the various tasks such as Structural Components Design, validation of results, Axle design parameter identification etc. The main task was the design of a full-fledged chassis of vehicle with the minimum weight that can cable to sustain cargo weight, subject to various static and dynamic load.
- **Co-Ordinator, Placement** Chennai, India  
**Placement Team 2018** Aug'18 – Present
  - Coordinated with students and companies to organize and manage campus placements at IIT Madras for December 2018
  - Helped in organizing the tests and interviews smoothly before and during placement season in 2018 – 19

## Scholastic Achievements

- **Student Innovator of the Year 2017:** As a Part of CGBS IIT Madras, The team has won the Student Innovator Award of the Year 2017 at IATIA 2017 Awards Ceremony, organized by **Auto Tech Review, Springer India**, and awarded the monetary fund for the project support
- **HTRA:** Received HTRA (Research Assistantship) for the entire duration of M.S. Degree
- **Second Topper:** Achieved the 2nd Position in the institute, during Undergraduate programme

## Course Work

- **Key Courses:** Continuum Damage Mechanics, Multiscale Modelling of Materials, Engineering Plasticity, Mechanics of Materials with Microstructures, Elasticity, Continuum Mechanics, Composite Structures, Mechanics of Damage Tolerance, Aerospace Structures

- **Short term Course:** GIAN Course on 'Mechanics of Fracture', conducted by Prof. Krishnaswamy Ravichandar, University of Texas at Austin, USA and Dr. K. Ramesh, IIT Madras
- **Short Audit Course:** Audited the course 'Machine learning' by Andrew Ng on Coursera

## Skills

- **Scientific Software's:** Abaqus/CAE (UMAT & VUMAT), Solidworks, Ansys, LAMMPS
- **Programming:** C, Fortran, Matlab, Python (numpy, pandas, scipy, sympy, tensorflow)
- **Web/Typography:** HTML, CSS, L<sup>A</sup>T<sub>E</sub>X, Microsoft Office Suite
- **Operating Systems:** Proficient in Windows and Linux OS

## Extra Curricular

- **Inter-Hostel:** Represented the Hostel in Inter Hostel Tennis Tournament 2017
- **International Day of Yoga:** Attended and Participated in International Day of Yoga, an event organised by Dean of Students, IIT Madras
- **TensorFlow Workshop:** Attended the Workshop on "TensorFlow", An open source machine learning framework, organised by Research Affairs Council, IIT Madras