Paramveer Sharma

633, Sindhu Hostel, IIT Madras, Adyar, Chennai, India. - 600036.

Education

- **Indian Institute of Technology, Madras** — Chennai, India
  Master of Science in Aerospace Engineering; CGPA : 8.56/10 — Jan. 2016 – 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% — July. 2010 – June 2014
  - *Project Title: Analysis and Experimental study of Hovercraft*

Research Experience

- **Research Assistant, Department of Aerospace Engineering** — Trivandrum, India
  Research Advisor: Dr. Shantanu S. Mulay, IIT, Madras — Jan 2016 – Present
  - Computation of homogenized properties of UD composites, by employing periodic boundary conditions
  - Evaluted the effective and homogenized properties of UDL RVE having voids
  - Simulation of UDL RVE of varying dimension with different fibre volume fraction was carried out to analyze the Objectivity and Uniqueness of UDL RVEs in elastic and Hardening regime
  - Local form of Lemaitre Ductile damage model was implemented, assuming ductile behavior of matrix material of composite, to assess the damage process of the interface

Key Projects

- **Molecular Dynamics Simulation of Plate with hole** — Chennai, India
  MM5015, Dr. Anand Kanjarla, Dept. of Metallurgical and Materials Engg, IIT Madras — Aug-Nov 2016
  - 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 was 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
  MM5015, Dr. Anand Kanjarla, Dept. of Metallurgical and Materials Engg, IIT Madras — Aug-Nov 2016
  - 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 laws were used to define the material behaviour of cohesive elements
  - Fracture toughness and stress-strain response after the ultimate stress (delamination onset) were obtained
- **Vectorized User FORTRAN Code for the Lemaitre Damage model** — Chennai, India
  MS Project, Dr. Shantanu S. Mulay, Dept. of Aerospace Engg, IIT Madras — Aug-Nov 2016
  - 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
- **Implementation of Integral type Non-Local Explicit Damage model** — Chennai, India
  MM5015, Dr. Anand Kanjarla, Dept. of Metallurgical and Materials Engg, IIT Madras — Aug-Nov 2016
  - 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
- **Phase field model of thermally induced solid-solid phase transitions** — Chennai, India
  MM5015, Dr. Srikanth Vedantam, Dept. of Engineering Design, IIT Madras — Aug-Nov 2016

- 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 second law of thermodynamics
- 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
  MM5015, Dr. Anand Kanjarla, Dept. of Metallurgical and Materials Engg, IIT Madras Aug-Nov 2016
  - Developed the Unique Plug-in titled **'RVE Homogenization'** using **Python**
  - The plugIn is capable to fully automate the process from model generation to complete stiffness matrix computation.
  - It takes the set of inputs such as model information and Individual Material properties which further used to computes the homogenized properties

Positions of Responsibility

- **Founder, Royal Mechanical Buzz** Chennai, India
  HTTP://ROYALMECHANICALBUZZ.COM 2012-Present
  - Developed a blog in 2012 titled 'Royal Mechanical Buzz'. It was the Open Community forum type blog. I earned $ 2100 US Doller in **Google Adsense Program** within 1.2 years through the blog. Within a small span of time, it 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
  CGBS IITM - University project funded by **Lockhead Martin** at IIT Madras 2012-2014
  - CGBS is an air transportable, remote operated cargo handling vehicle designed for the Indian Air Force's 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, 2018–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*, we won the Student Innovator Award of the Year 2017 at IATIA^2 2017 Awards Ceremony, organised by **Auto Tech Review, *Springer India***, and awarded the monetary fund for the project support
- **HTRA(Research Assistantship):** Received HTRA 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 Microstructurs, 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

Journal Paper Submission

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

Skills

- **Scientific Software's:** Abaqus/CAE (UMAT & VUMAT), Solidworks, Ansys, LAMMPS**
- **Programming:** C, Fortran, Matlab, Python (numpy, pandas, scipy, tensorflow)
- **Web/Typography:** HTML, CSS, LaTeX, Microsoft Office Suite
- **Operating Systems:** Proficient in Windows and Linux OS

Extra Curricular

- **Inter-Hostel:** Represent the Hostel during 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