Paramveer Sharma

http://pyparam.github.io

Email: paramveersharma9@gmail.com
Mob: +91-9176-202-290

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 Scholar, Department of Aerospace Engineering** — Chennai, India
  Advisor: Prof. 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 ABAQUS/Explicit VUMAT User Subroutine for the study of Softening behaviour of RVE
  - Nonlocal Formulation and Implementation of Continuum Damage Model.

Journal Publications

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

Academic Projects

- **Implementation of Integral type Non-Local Explicit Damage model** — IIT Madras
  Part of MS Project, Prof. Shantanu S. Mulay — 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** — IIT Madras
  Part of ISRO Sponsored project, Prof. Shantanu S. Mulay — 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** — IIT Madras
  ED5053, Mechanics of Materials with Microstructurs, Prof. Srikanth Vedantam — 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
- **Motion of a Ledge/Dislocation in a Nanostructured Material** — IIT Madras
  ED5053, Mechanics of Materials with Microstructurs, Prof. Srikanth Vedantam — Aug'17 – Nov'17
  - Derived the **Frenkel Kontorova model** for the motion of a ledge/dislocation in a nanostructured material
  - Periodic substrate potential were considered for model the single plane of atoms as single row with varying stiffness within the nanostructured domains
  - Obtained discretize form of kinetic relation were implemented in matlab to draw the conclusions.

- **Molecular Dynamics Simulation of Plate with hole** — IIT Madras
  MM5015, Multiscale Modelling of Materials, Prof. Anand K Kanjarla — 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 (An 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
- **Building GUI based Custom Plug-In in Abaqus/CAE Using Python** — IIT Madras
  Part of MS Project, Prof. Shantanu S. Mulay — 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 take inputs such as model information and individual material properties which further used to compute the homogenized properties
- **Delamination at Interfaces using Cohesive Zone Elements** — IIT Madras
  MM5015, Multiscale Modelling of Materials, Prof. Anand K Kanjarla — 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 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

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 — Dec'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 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 — July'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
- **GATE**: Percentile of 96 in Graduate Aptitude Test in Engineering (GATE) 2015

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
- **Short Audit Course:** Audited the course 'Machine learning' by Andrew Ng on Coursera

Relevant Skills

- **Scientific Software's:** Abaqus/CAE (UMAT & VUMAT), Solidworks, Ansys, LAMMPS
- **Programming:** C, Fortran, Matlab, Python (numpy, pandas, scipy, sympy, tensorflow, tkinter)
- **Web/Typography:** HTML, CSS, LaTeX, 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