Pavan Kumar Vaitheeswaran

Indian Institute of Technology Madras

Contact Information

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Research Interest

Solid and Non-linear Mechanics, Computational Mechanics & Applications in Mechanics of Materials

Education

Indian Institute of Technology Madras, Chennai **(2011–2015)**
*Bachelor of Technology (**Honours**) in Mechanical Engineering,*
Minor : Operations Research
CGPA : 9.37/10

BHPV Sen. Sec. School, Visakhapatnam **(2009–2011)**
12th Grade, Central Board for Secondary Education: 92.8%

Sir T.V.S Rao Sri Krishna Vidya Mandir, Visakhapatnam **(2009)**
10th Grade, Central Board for Secondary Education: 96.4%

Research Projects

Irradiation Effects in Silicon Carbide **(Jan 2014–Present)**
Guide: Dr. Narasimhan Swaminathan, Dept. of Mechanical Engg., IIT Madras

- Simulated an uni-axial tensile test on a diamond lattice (ZincBlende structure) of Silicon Carbide using LAMMPS, for different domain sizes and initial conditions
- Introduced concentrated point defects, such as vacancies and antisites, to mimic the effects of irradiation
- Analysed the effect on tensile strength by repeating the uni-axial tensile test simulation for the lattice with concentrated defects

Pneumatic Step Climbing Robot **(Jun–July 2012)**
Centre For Innovation, IIT Madras

- Designed and built a pneumatically actuated, manually operated robot, capable of climbing up a staircase with steps of upto 20 cm in height
- Additionally developed an autonomous robot, that can scale up a single-step with a much higher speed of operation, by implementing an Arduino micro-controller platform
- Developed three pneumatically actuated clamping mechanisms, to clamp flat and round geometries

Technical Projects

Performance Analysis of an Inlet Plenum **(May–July 2014)**
General Electric, Bangalore, India

- Performed CFD analysis for inlet plenum of centrifugal compressors, using ICEM CFD for meshing, and CFX for Pre- and Post-processing
- Analysed the CFD results to gauge the performance of the plenum, based on the parameters of flow distortion and loss coefficient
- Identified critical regions requiring improvements in design, such as redesigning the inlet guide vanes and increasing the flange angle

Quality Enhancement in Sheet Metal Slitting **(Jun–July 2012)**
Tube Products of India,TII, Chennai, India

- Reviewed literature on methods available to improve the end quality of the slitting process of sheet metal
- Selected the Roll-Slitting method for slitting of sheet metal, as the method produced burr-free rolls that improved the quality of the steel tubes produced
- Studied the steel-tube manufacturing processes – Cold Drawn Welding and Electric Resistance Welding – used in Tube Products of India

Tool Path Generation for Sheet Metal Operations **(Dec 2013–Jan 2014)**
SVP Laser Technologies Pvt. Ltd., Chennai, India

- Developed an AutoCAD plugin to nest sheet metal by Bump Nesting and Common line Nesting methods
- Created a module in VB.NET, to read a CAD drawing and generate the path required for a CNC end milling tool
- Devised an algorithm to offset a given closed polyline, containing only lines and arcs, by the specified distance

Scholastic Achievements

- Secured All India Rank **415** in IIT-JEE 2011 (among over 480,000 students)
- Awarded the Kishore Vaignyanik Prothsahan Yojana (KVPY) Fellowship 2009, by the Dept. of Science and Technology, Govt.of India
- Secured All India Rank **305** in National Science Olympiad 2008

Courses

Mechanics of Materials:
Advanced Mechanics of Solids
Introduction to Fracture Mechanics*
Computational Methods in Engg.
Variational Principles of Mechanics
Finite Element Analysis
Random Vibrations*

Other Major:
Foundations of CFD
Fluid Mechanics
Turbomachines
Air Breathing Engines
IC Engines

Minor:
Advanced Operations Research
Introduction to Game Theory

Mathematics:
Linear Algebra and Numerical Methods
Ordinary and Partial Differential Equations
Single and Multi-variable Calculus

Laboratories:
Solid and Fluid Mechanics Lab
Design, Thermal and Manufacturing Lab
Machine Drawing Practice

*Courses to be taken in Spring 2014

Skills

- *Simulation Packages:* CFX, ICEM CFD, MATLAB/Scilab, LAMMPS
- *CAD Software:* AutoCAD, SolidWorks, Creo Parametric
- *Programming Languages:* C,C++, Java, VB.NET

Extra-Curricular Activities

- Technical Affairs Secretary, Tapti hostel, IIT Madras (2013–2014)
  - Oversaw hostel technical activities, held workshops on robotics, urged students to take up hobby projects, and provided necessary resources and guidance
- Project Representative of the National Service Scheme(NSS) (2012–2013)
  - Led a team of 14 volunteers to publish books in regional languages, for distribution to poor school children, on topics such as astronomy,bird-watching and Vedic Mathematics, which are not part of school curriculum