

Vishal Gupta

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Education

1. **Bachelor of Mechanical Engineering at Indian Institute of Technology Ropar, India**
2013-17; IIT Ropar; CPA 7.55/10
2. **Intermediate/+2 at Budha Dal Public School**
2012; Central Board of Secondary Education; Percentage 82.6
3. **Matriculation at Budha Dal Public School**
2010; Central Board of Secondary Education; CPA 9.6/10

Research

Study of Hydrogen embrittlement of Ni using Density Functional Theory (DFT) calculations.

Aug 2014-May 2017; Indian Institute of Technology Ropar.

- Computational material study of the effect of grain boundary type on hydrogen embrittlement of Ni.
- Grain boundary models were simulated using DFT code VASP. Traction Separation law derived for $\Sigma 5$ & $\Sigma 3$ grain boundaries and trap binding energy of hydrogen calculated.
- Wrote bachelor's thesis on the same in senior year. Findings show that $\Sigma 5$ has higher hydrogen trapping tendency and is more vulnerable to embrittlement than $\Sigma 3$.

Work Experience

Scientist/Engineer-SC at Indian Space Research Organisation (ISRO)

July 2017-current; Space Applications Centre (SAC), Ahmedabad, India.

- As a mechanical designer, realized microwave remote sensing payload subsystems. Responsible for facilitating the realization process from design stage through different test phases until final integration.
- As the primary indenter, arranged for the procurement of different components (tools & softwares) used across the mechanical department.
- As a member secretary of indent committee, checked the technical compliance of procured components.

Research Intern at Interdisciplinary Centre for Advanced Materials Simulation (ICAMS), Ruhr-Universität, Bochum, Germany.

May-July 2016; Supervisor: Dr. Rebecca Janisch, Leader (Mechanical properties of interfaces)

- Continued research on hydrogen embrittlement of Ni. Optimized $\Sigma 5$ symmetrical tilt grain boundary and found most stable transition state using DFT code VASP.
- Wrote shell scripts to automate the simulation process on High performance cluster (HPC).
- Obtained traction separation law for this optimized grain boundary and calculated hydrogen trap binding energy.

Research Intern at Ropar Mechanics of Materials Laboratory(RMML), IIT Ropar.

May-July 2015; Supervisor: Dr. Dhiraj K. Mahajan, Group Leader(RMML)

- Learnt ab-initio simulations in DFT code Quantum Espresso. Also, learnt molecular modelling and high performance computing.

- *Obtained traction separation law for geometric $\Sigma 5$ symmetrical tilt grain boundary with and without hydrogen. Results showed that ultimate strength decreases with hydrogen trapped at the grain boundary.*

Projects

Gaganyaan

October 2019-Feb 2021; Space Applications Centre (SAC), Ahmedabad, India.

- *Designed and realized a compact waterproof mechanical housing of Altimeter payload for Air drop test.*
- *The housing had to be as compact as possible without compromising on structural resilience.*

RISAT-2B

November 2017-March 2019; Space Applications Centre (SAC), Ahmedabad, India.

- *Designed and realized mechanically following subsystems: Receiver and Circulator Switch. Total 30 subsystems were delivered.*
- *Supervised integration of entire payload assembly on priority basis.*

Chandrayaan-2

October 2017-Feb 2018; Space Applications Centre (SAC), Ahmedabad, India.

- *Designed and realized mechanical assembly of Altimeter payload in the lander for moon mission.*
- *Designed the payload container for transportation and vibration isolation.*

R&D

- *Designed and realized a thermoelectric cooler for SSPA electronics package.*
- *Developed guidelines for thermal design of PCB and its electronics package.*

Skills

Numerical Methods: FEM (thermal/structural), Density Functional Theory (DFT), Hartree Fock

DFT Codes: Vienna Ab-Initio Simulation Package (VASP), Quantum Espresso, Gaussian

CAD: Solidworks, Autodesk Inventor, NX, Autocad

Codes: C, MATLAB, JAVA, Python, shell, bash

CAE: Abaqus, NX, Ansys, Hypermesh, COMSOL

OS: Windows, Linux

Relevant Courses

Mechanics of Materials	Finite Element Analysis	Electronic Structure Calculations
SQL for Data Science (Coursera)	Data Structures and Algorithms in JAVA (Udemy)	Energy Science & Technology
Theory of Machines	Material Characterization Techniques	Continuum Mechanics

Extra-Curricular Activities

1. Represented IIT Ropar in Basketball at the 49th Inter-IIT Sports meet 2013 at IIT Guwahati and SAC, Ahmedabad in Basketball at Inter-Centre sports meet 2017 and 2019.
2. Self-taught acoustic guitarist of five years. Played as the rhythm guitarist at many gigs throughout college and office.
3. Stood 2nd in the annual Hindi story writing competition 2019 held at SAC.
4. Volunteered for the organizing of IIT Ropar's cultural fest *Zeitgeist 2014 and 2016*. Oversaw the signing of Memorandum of Understanding (MoUs) between College, Organizing Committee and the sponsors.
5. Participated as a contributor in Scholars for Change Program 2014 of IIM Ahmedabad, contributed audio-visual educational content for underprivileged students of classes 6-8th.
6. Hobbies are reading, playing guitar and working out.