# Vishal S

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## Research Interests

- Phase field simulations for solidification
- High performance computing in materials science
- Multiscale modelling of materials

## Education

**Dual Degree (B. Tech + M. Tech)(2014 – present)**

Department of Metallurgical and Materials Engineering, Indian Institute of Technology Madras, Chennai
Minor: Foundations of Physics
CGPA: 9.19/10

**All India Senior School Certificate Examination (AISSCE)** (2014)

Maharishi Vidya Mandir, Hosur
Percentage : 96.8 %

**All India Secondary School Examination (AISSE)** (2012)

Maharishi Vidya Mandir, Hosur
CGPA : 10/10

## Scholastic Achievements

- Recipient of **Ministry of Steel Scholarship** by securing $\mathbf{1^{st}}$ **rank** till $6^{\text{th}}$ semester of the Dual Degree programme (2017)
- Awarded **Sri Satish Pai Prize** for the best academic performance in the $2^{\text{nd}}$ year of the Dual Degree programme (2017)
- Secured **AIR 3836** in JEE (Advanced) (2014)
- Selected for **INSPIRE fellowship** for being among the **top 1%** in AISSCE (2014)
- Received **Merit certificate** for being among the **top 0.1% of candidates** in AISSE (2012)

## Conference Presentation

- Abhik Choudhury, **Vishal S.**, Gandham Phanikumar, Shyamprasad Karagadde, Abhishek G.S., *Prediction of microstructure and cracking susceptibility during additive manufacturing: State of the art and challenges*, NMD - ATM, Goa, 11 - 14 November 2017.

## Research projects

**Indian Institute of Technology Madras**, Chennai

**Hot cracking susceptibility of Ni-based superalloys during laser based additive manufacturing**
*Advisor: Prof. Gandham Phanikumar* *Dec 2016 - Ongoing*

- Computed the **thermal profiles and weld pool geometries** using Computatonal Fluid Dynamics (CFD) technique
- Performed **phase field simulations** using in-house codes to observe the evolution of microstructure
- Formulated a multiscale approach to quantitatively determine the hot cracking susceptibility

**Study of grain growth characteristics in spark plama sintered MgO**
*Advisor: Prof. B S Murty* *June 2015 - July 2015*

- Performed ball milling, spark plasma sintering, XRD and SEM analysis of MgO
- Optimised the sintering conditions to prevent grain growth in MgO

**Indian Institute of Science**, Bangalore

**Velocity profiles in fluids using Lattice Boltzman Method (LBM)**
*Advisor: Dr. Abhik Choudhury* *Dec 2017 - Jan 2018*

- Generated the **velocity profiles in a lid driven cavity** using LBM formulation
- Implemented **Open MPI** to enable parallel processing for faster computing

## Internship

**Enhancing the hardness of 22 kt gold**
*TITAN Industries* *May 2016 - July 2016*

- Casted different alloy systems to increase the hardness without compromising purity and aesthetics
- Achieved increased hardness (two times) which significantly improved the durability.

## Technical Project

**Waterfall Graphic Print - Envisage[1] (Shaastra[2] )** *Aug 2015 - Jan 2016*

- Contributed to image processing and Arduino programming for the project
- Won the **most innovative project** award - CFI[3] awards 2016

**Augmented Reality App - Computer Vision** *Jan 2015 - Apr 2015*

- Part of a 3 member team for executed Image processing techniques
- Implemented OpenCV to get the desired results

## Computational Skills

- **Languages** : C/C++, Fortran, Python
- **Software** : MATLAB, Arduino, Thermo-Calc
- **Computer Vision** : OpenCV, ImageJ
- **Parallel Computing** : OpenMP, Open MPI.
- **Visualization** : ParaView, VESTA
- **Scientific Tools** : Origin, X'Pert HighScore

## Relevant Course Work

**Computational Materials**

- Foundations of CFD
- Atomisitc Modelling of Materials
- Computational Materials Thermodynamics
- Computational Materials Engg. Lab

**Maths and Physics**

- Differential Equations
- Mathematical Methods for Chemical Engg.
- Quantum Physics
- Probability, Statistics and Stochastic Processes

**Materials Science**

- Intro to Transport Phenomena
- Stability of Microstructures
- Solidification Phenomena
- Micromechanics
- Electronic materials, devices and fabrication

## Positions of Responsibility

**Deputy Placement Coordinator - Institute Placement Team 2015** *Aug 2015 - Jan 2016*

- Managed the logistics during the placement session for about 1200 aspirants
- Contributed to the department placement portal by uploading preparation material on a timely basis

**Coordinator - Workshops and Demonstrations, Amalgam[4] 2015** *Jan 2015 - Apr 2015*

- Initiated and organised a computational workshop on molecular dynamics simulations using LAMMPS

## Extra/Co-Curricular Activities

- Performed on stage for **Envisage[1], Shaastra[2] 2015** as a part of **Envisage Choreo Team**
- Won **Ultimate Metallurgist**, **Group Discussion** and **Process Planning** in Amalgam 2016
- **Star Volunteer** of the project "Computer literacy for all" under the **National Service Scheme[5]** for the year 2014-2015
- **Rajya Puraskar awardee**, the second highest stage of advancement of a Scout, in **Bharat Scouts and Guides[6]**

[1] India's largest student organized techno-cultural show in Shaastra
[2] ISO certified Annual Technical Fest of IIT Madras
[3] Centre For Innovation (CFI) is a forum for student innovation at IIT Madras
[4] Annual symposium conducted by the Dept. of Metallurgical and Materials Engg., IITM
[5] NSS, IIT Madras chapter under Govt. of India
[6] A voluntary, non-political, educational movement (www.bsgindia.org)