

# Abhishek Shandilya | Curriculum Vitae

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## Research Interests

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- Computational Materials Science
- High Performance Parallel Computing
- Software Development
- Energy Materials
- Computational Fluid Dynamics
- Additive Manufacturing

## Education

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**Indian Institute of Technology Madras**

**Chennai, India**

*B.Tech & M.Tech, 8.10/10*

*2012–2017*

Metallurgical and Materials Engineering

**Master's Thesis:** Phase Field Modelling of Mushy Zone Flow using Lattice Boltzmann method

Advisor: Prof. Gandham Phanikumar

## Conference

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**Poster:** Abhishek Shandilya, P Gerald Tennyson and Mahesh Mynam; *Modelling and Simulation of Dendritic Morphology in Solidification of Undercooled Melt using Phase-Field and Lattice-Boltzmann Method*; NMD-ATM 2015, Coimbatore organised by Indian Institute of Metals

## Research Projects

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**Master's Thesis: Phase Field Modelling of Mushy Zone Flow using Lattice Boltzmann Method**

Advisor: Prof. G Phanikumar

*Ongoing*

- Solving phase-field and momentum equations using lattice-Boltzmann method to simulate shrinkage and effect of forced convection on dendritic patterns during solidification
- Exploiting inherent parallelization of lattice-Boltzmann method to accelerate simulations using GPU

**Course Project: Finite Element Analysis of High Strength and Stiffness to Weight Scaffolds produced by Selective Laser Melting**

Advisor: Dr. Anand K Kanjarla

*Nov 2015*

- Analyzed the failure modes of porous scaffolds designed for drug delivery as a function of arm-width

**Course Project: Modelling and Simulation of Frank-Read Source using Molecular Dynamics**

Advisor: Dr. Anand K Kanjarla

*Oct 2015*

- Simulated dislocation source for pure Nickel and analyzed the effect of block size on the dislocation loop
- Parameterized the input files for seamless job submission to GNR computing cluster

**Internship Project: Modelling and Simulation of Dendritic Morphology in Solidification of Undercooled Melt using Phase-Field and Lattice-Boltzmann Method**

Advisor: Dr. Gerald Tennyson

*May–July 2015*

- Modelled and simulated dendritic growth using phase-field method coupled with lattice-Boltzmann model for fluid-flow in the undercooled melt; applied explicit and implicit schemes for solving partial differential equations in C
- Improved simulation time using parallel programming through MPI routines on RedHat cluster

## Teaching Experience

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### Teaching Assistant - *Transport Phenomena in Materials (MM2041)*

Faculty: Prof. G Phanikumar

Jan–May 2017

- Provide solutions for tutorials, clear doubts outside the classroom

## Professional Experience

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### Tata Research Development and Design Center

Project Trainee

Pune

May–July 2015

- Modelled and simulated dendritic growth using phase-field method coupled with lattice-Boltzmann model for fluid-flow in the undercooled melt; applied explicit and implicit schemes for solving partial differential equations in C
- Improved simulation time using parallel programming through MPI routines on RedHat cluster

### AdWyze

Front-end Web Developer Intern

Bangalore

Dec 2014

- Improved the UI/UX using CSS, jQuery, DataTables and Bootstrap on Ruby-on-Rails framework
- Setup rigorous front-end form verification for Rules module

### R&D Department, Tata Steel

Industrial Intern

Jamshedpur

May–July 2014

- Conducted physical-simulations to study effects of tundish furniture on residence time distribution curves
- Setup sensor mount and tracer injector system for seamless simulation and accurate readings

## Computer Skills

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**Operating Systems:** Linux, Windows

**Programming Lang.:** C, C++, Python, Java

**Parallel Computing Tools:** OpenMP, MPI

**GPU Computing:** CUDA, OpenCL

**Scientific Softwares:** MATLAB, ThermoCalc, Abaqus, LAMMPS, SolidWorks

## Relevant Coursework

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### Computational Materials Science.....

- Basics and Application of Phase-Field Modeling in Materials Science by Prof. Mathis Plapp (GIAN)
- Numerical Methods for Metallurgists
- Introduction to Multi-Scale Modeling of Materials
- Computational Material Thermodynamics

### Metallurgical and Materials Engineering.....

- Introduction to Transport Phenomena
- Metallurgical Thermodynamics
- Materials Characterization

### Computer Science.....

- High Performance Parallel Computing by Prof. P Sadayappan (GIAN)
- Machine Learning by Prof. Andrew Ng (Coursera)

### Mathematics.....

- Probability, Statistics and Stochastic Process
- Differential Equations

## Extra Curricular Activities

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### Technical Competitions.....

- Member of Design & Fabrication Team which represented IIT Madras at the Indian leg of ABU Robocon
- Ranked 6th (Middle East, India, Africa Region) in the 8th Virtual Steelmaking Challenge
- Secured 2nd position in Robo-Oceana, an aqua-robotic event at Shaastra-2013
- 2nd runner-up in Aqua Challenge (Race A), an aqua-robotic event at Quanta-2010
- 1st runner-up in Industrial Defined Problem by Titan Watches

### Web Development.....

- Developed websites for college events and research groups
- Developed a Time Management Windows App in Microsoft Code.Fun.Do Hackathon
- Headed the CFI - WebOps Club for the academic year 2015-16

### Sports.....

- I enjoy playing basketball, swimming and cricket
- Completed various cycling marathons up to 200 km as a member of Institute Cycling Club
- Gold medallist in Long Jump in middle school

### Writing.....

- Chief-Editor of Immerse - Science Magazine of IIT Madras

### Photography.....

- I capture nature, landscape, animals and still life using Canon 1200D
- Processing in Adobe Lightroom

## Professional Affiliations

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### **Indian Institute of Metals (IIM)**

*Student member*

*Since October 2015*

### **Metallurgy Students Association (MetSA)**

*Member*

*Since August 2012*