

Dr. Anirban Bhattacharya

CONTACT INFORMATION

Assistant Professor
School of Mechanical Sciences
IIT Bhubaneswar
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RESEARCH INTERESTS

Multi-scale and multi-phase transport phenomena, Modelling of microstructure evolution, phase transformation and defect formation in alloys.

WORK EXPERIENCE

Assistant Professor, Mar 2016 - Present
School of Mechanical Sciences, IIT Bhubaneswar

Postdoctoral Consultant, Mar 2015 - Feb 2016

GE Global Research, Bangalore

Research Topic: Modelling of casting and additive manufacturing for super-alloys.

Postdoctoral Research Associate, June 2014 - Mar 2015

School of Materials, University of Manchester, UK

Research Topic: Modelling of porosity and defect formation in alloys and nano-composites.

Senior Engineer, Aug 2007 - July 2009

General Motors, Bangalore, India

Responsibilities: Development of CFD models for automobile exhaust gas after-treatment devices.

EDUCATION

Ph.D. August 2009 - May 2014

Department of Mechanical Engineering

Indian Institute of Science, Bangalore, India

GPA: 8.0/8.0

Advisor: Prof. Pradip Dutta

Thesis Topic: Effect of convection and shrinkage on solidification and microstructure formation.

(Doctoral work performed as General Motors Fellow under GM-IISc Collaborative Research Programme).

Internship at General Motors R&D Center, Warren, USA, Sep 2012-Dec 2012.

M.E. August 2005 - July 2007

Department of Mechanical Engineering

Indian Institute of Science, Bangalore, India

GPA: 7.9/8.0 (1st Rank in class)

Advisor: Prof. Pradip Dutta

Thesis Topic: An enthalpy-based micro-scale model for binary alloy solidification.

B.E., August, 2001 - July, 2005

Department of Mechanical Engineering,

Jadavpur University, Kolkata, India

Aggregate Percentage: 82.7% (Among top 5% in the class)

Project Topic: Design of a two-stage Curtis turbine.

**HONORS &
AWARDS**

- Recipient of **General Motors Doctoral Fellowship** (2009).
- **S.V. Shastry Memorial Gold Medal** for the **best M.E. student** in the Department of Mechanical Engineering, IISc (2007).
- Recipient of **General Electric (GE) Foundation Scholarship** (2006) for Master's study.
- **All India Rank 2** (out of ~25000 students), in Graduate Aptitude Test in Engineering, GATE (2005).
- **99.85 percentile** in Common Admission Test (CAT-2004).

**JOURNAL
PUBLICATIONS**

- A. Bhattacharya, A. Kiran, S. Karagadde and P. Dutta, "An enthalpy method for modeling eutectic solidification", *Journal of Computational Physics* 262 (2014) 217-230.
- A. Bhattacharya and P. Dutta, "Effect of shrinkage induced flow on binary alloy dendrite growth: An equivalent undercooling model", *International Communications in Heat and Mass Transfer* 57 (2014) 216-220.
- A. Bhattacharya and P. Dutta, "An enthalpy-based model of dendritic growth in a convecting binary alloy melt", *International Journal of Numerical Methods for Heat & Fluid Flow* 23 (2013) 1121-1135.
- A. Bhattacharya, S. Karagadde and P. Dutta, "An equivalent undercooling model to account for flow effect on binary alloy dendrite growth rate", *International Communications in Heat and Mass Transfer* 47 (2013) 15-19.
- A. Bhattacharya and P. Dutta, "Role of convection in microstructure evolution during solidification", *Current Science* 105(4) (2013) 113891.
- S. Karagadde, A. Bhattacharya, G. Tomar and P. Dutta, "A coupled VOF-IBM-enthalpy approach for modeling motion and growth of equiaxed dendrites in a solidifying melt", *Journal of Computational Physics* 231 (2012) 3987-4000.
- A. Bhattacharya and P. Dutta, "A computational model for binary alloy dendrite growth in presence of solidification shrinkage", (in preparation).
- A. Bhattacharya, M.J. Walker, G. Tomar and P. Dutta, "A model for predicting shrinkage driven flow during solidification", (in preparation).

**CONFERENCE
PROCEEDINGS**

- S. Sarkar, A. Bhattacharya, P. Dutta and S.K. Ajmani, "Numerical simulations of dendrite growth in a convective binary alloy melt with a super-imposed magnetic field". *5th International and 41st National Conference on Fluid Mechanics and Fluid Power*, Dec 12-14, 2014, IIT Kanpur, India.
- S. Karagadde, A. Bhattacharya, G. Tomar and P. Dutta, "Study of dendrite growth in a rotational flow field" *Proceedings of the 21st National & 10th ISHMT-ASME Heat and Mass Transfer Conference*, December 27-30, 2011, IIT Madras, India.
- A. Bhattacharya, S. Karagadde and P. Dutta, "A Scaling Analysis for dendrite tip growth rate". *3rd International Conference on Advances in Solidification Processes, ICASP3*, June 7-10, 2011, Rolduc (Netherlands).
- S. Karagadde, A. Bhattacharya, G. Tomar and P. Dutta, "Numerical modeling of floatation of equiaxed dendrites", *3rd International Conference on Advances in Solidification Processes, ICASP3*, June 7-10, 2011, Rolduc (Netherlands).
- S. Karagadde, A. Bhattacharya, G. Tomar and P. Dutta, "Modeling growth and motion of equiaxed dendrites in a convecting melt". *Thermal Issues in Emerging Technologies, ThETA3*, December 19-22, 2010, Cairo, Egypt.