

Deepu Mathew John

Integrated Computational Materials Engineering (ICME)
Laboratory
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Academic Qualifications

Program	Specialization	Institute/University	CGPA/Marks	Time Period
Ph.D*	Metallurgical and Materials Engineering	Indian Institute of Technology (IIT) Madras, India	8.88 out of 10	2014-2019*
B.Tech	Mechanical Engineering	University of Kerala	8.45 out of 10 (First Class with Distinction)	2010-2014
ISCE (Std. XII)	Science and Mathematics	Marthoma Residential (ISC)	89.7%	2008-2009

*Integrated M.S and Ph.D. Expected thesis submission in 2019.

Domains of Interest

Integrated Computational Materials Engineering (ICME), Phase Field Simulation, Homogenization, Finite Element Simulation, Physical Simulation with Gleeble®, Virtual Testing

Recent Projects

- 2015-2018 **Indo-German (IGSTC) project on Combined Process and Alloy Design of a micro-alloyed DP Forging Steel based on ICME (DP-Forge)**
Project Partners
- Tata Research Development and Design Centre (TRDDC), Pune, India
 - Simufact Engineering, Hamburg, Germany
 - RWTH-Aachen University, Aachen, Germany
 - Indian Institute of Technology (IIT) Madras, Chennai, India
- 2015-2016 **A Finite Volume study on heat transfer in Fluidized Bed heat exchanger**
- Simulated the heat transfer between gas and particles in a fluidized bed heat exchanger
 - Used ANSYS® software for the Finite Volume simulations
- 2014-2015 **Simulation of residual stress in quenched stainless-steel spheres**
- Used Finite Element Method (FEM) to simulate the residual stress during quenching in three dimensions
 - FEM simulations performed using Abaqus® software

2014-2015

Coupled Grain Boundary Motion due to Shear Deformation

- Coupling behavior of grain boundaries when a copper bi-crystal is subjected to shear was studied
- Molecular Dynamics (MD) simulations were performed using LAMMPS code.

Short-Term Research Visits

7-14 October, 2017 &
1 – 3 September, 2016

**Guest Researcher at Department of Ferrous Metallurgy (IEHK),
RWTH, Aachen, Germany**

Project: Indo - German 'DP-Forge' project

Research Area – Phase Field Simulation, Finite Element Simulation

4-5 October, 2017

Guest Researcher at Simufact Engineering GmbH, Hamburg, Germany

Project: Indo - German 'DP-Forge' project

Research Area – Finite Element Simulation of carburization and heat treatment in DP steel

22-26 November, 2017 &
28, 29 October, 2016

**Guest Researcher at Tata Research Development and Design Center
(TRDDC), Pune, India**

Project: Indo - German 'DP-Forge' project

Research Area – Integration of software on PREMAP (Platform for Realization of Engineered Materials and Products) platform for ICME implementation.

Research and Development (R&D) Lab Visits

23rd February, 2018

Tata Research Development and Design Center (TRDDC), Pune, India

22nd February, 2018

Eaton India Innovation Center (EIIC), Pune, India

13th December, 2017

Ford Research and Innovation Center, Aachen, Germany

21st and 22nd August, 2017

JSW R&D, Bellary, India

20th June, 2017

National Institute of Standards and Technology (NIST), Maryland, USA

1st & 2nd June, 2017

AK Steel Research and Innovation Center, Ohio, USA

25th May, 2017

Ford Research and Innovation Center, Michigan, USA

Seminar Talks Delivered

20th June, 2017

Seminar on 'ICME for DP steel Gear with Reduced Distortion' at NIST (National Institute of Standards and Technology), Maryland, USA

1st June, 2017

Seminar on 'ICME based Microstructure and Property Evolution Simulation in DP Steel' at AK Steel Research and Innovation Center, Ohio, USA

30th May, 2017

Seminar on 'ICME for DP steel Gear with Reduced Distortion' at Ohio State University, Ohio, USA

30th March, 2018

Seminar on 'Microstructure and Property evolution simulation towards Integrated Computational Materials Engineering (ICME)' at Aditya Birla Science and Technology Company (ABSTC), Mumbai, India

Relevant Coursework Completed

- Mechanics of Materials with Microstructure
- Introduction to Multi-Scale Modeling of Materials
- Mechanics of Materials with Microstructure
- Advanced Phase Transformations
- Computational Methods in Engineering
- Transport Phenomena in Metallurgical Processes
- Casting, Forming and Joining
- Metal Forming Processes

Skills with Software Packages

- Phase Field Simulation with Micress[®]
- Finite Element Simulation with Abaqus[®]
- Finite Element Simulation with Simufact[®]
- Asymptotic Homogenization with Homat[®]
- Thermodynamic and Property Calculations with JMatPro[®]
- Thermodynamic Calculations with ThermoCalc[®]

Work Experience

- February 2014 - present **Position:** Part-time assistance for the Indo-German project on ‘Combined Process and Alloy Design of a micro-alloyed DP Forging Steel based on Integrative Computational Material Engineering (**DP-Forge**)’
Institute: Department of Metallurgical and Materials Engineering, IIT Madras
Areas of Research: Phase Field Simulation, Homogenization, Micro and Macroscale Finite Element Simulation, Gleeble[®] Simulation
- January 2017 – present **Position:** Teaching Assistant for NPTEL (National Programme on Technology Enhanced Learning) nation-wide massive open online certification course on ‘Modeling and Analysis of Welding’.
- July 2014 - present **Position:** Half Time Teaching/Research Assistant (HTRA)
Institute: Department of Metallurgical and Materials Engineering, IIT Madras
Areas of Research: Phase Field Simulation, Thermodynamic calculations using CALPHAD, Finite Element Simulation, Metal Casting

Research Publications

Peer-reviewed International Conference Papers:

Deepu Mathew John, Hamidreza Farivar, Gerald Rothenbacher, Ranjeet Kumar, Pramod Zagade, Danish Khan, Aravind Babu, BP Gautham, Ralph Bernhardt, G. Phanikumar and Ulrich Prael. An attempt to integrate software tools at microscale and above towards an ICME approach for heat treatment of a DP steel gear with reduced distortion, *4th World Congress on Integrated Computational Materials Engineering (ICME)*, Michigan, USA, 21–25 May, 2017.

M.J. Deepu, H. Farivar, U. Prael and G. Phanikumar, 2017. Microstructure based simulations for prediction of flow curves and selection of process parameters for inter-critical annealing in DP steel, *IOP Conference Series: Materials Science and Engineering* (under review).

International Conference Papers:

Deepu Mathew John, Hamidreza Farivar, Gerald Rothenbacher, Pramod Zagade, Danish Khan, G. Phanikumar, Ulrich Prael, Ralph Bernhardt and BP Gautham. A study on the effect of incorporation of microstructure information on macroscale finite element simulation of inter-critical annealing in Dual Phase Steel. *Materials Science and Engineering Congress, Darmstadt, Germany, 27-29 September, 2016.*

Deepu Mathew John and G. Phanikumar. A study on the microstructure evolution during Inter-critical annealing of Dual Phase Steel, *International Symposium for Research Scholars (ISRS)*, Chennai, India, 21-23 December, 2016.

Aravind Babu, **Deepu Mathew John** and Phanikumar Gandham. Simulation and Experimental Validation of Residual stresses in Heat-Treated Multiphase Steel Rectangular plate with asymmetric hole, *7th International Conference on Key Engineering Materials (ICKEM)*, Penang, Malaysia, 11-13 March, 2017.

Aravind Babu, **Deepu Mathew John** and Phanikumar Gandham. An attempt to incorporate the effect of microstructure on the macroscale simulation of heat transfer during heat treatment in multi-component dual phase steel, *24th International ISHMT-ASTFE Heat and Mass Transfer Conference*, BITS Pilani, Hyderabad, India, 27-30 December, 2017.

Deepu Mathew John, Rangan Kannan, G. Phanikumar. Simulation of microstructure and property evolution in DP steel sheets. *Asia Steel International Conference*, Bhubaneswar, India, 6-9 February, 2018.

National Conferences Papers:

Deepu Mathew John, Hamidreza Farivar, Gerald Rothenbacher, Pramod Zagade, Danish Khan, G. Phanikumar, Ulrich Prael, Ralph Bernhardt and BP Gautham. An ICME approach towards the design of a new gear steel with reduced distortion, *Heat Treatment and Surface Engineering (HT&SE)*, Chennai, India, 12-14 May, 2016. Secured **best poster award**.

Deepu Mathew John, G. Phanikumar. Simulation of microstructure and property evolution during heat treatment in DP steel gear. *NMD-ATM 2017*, Goa, India, 11-14 November, 2017.

Contributions

- NASA Technical Report – *Vision 2040: A Roadmap for Integrated. Multiscale Modeling and Simulation for Materials and Systems*, NASA/CR-2018-219771, E-19477, GRC-E-DAA-TN52454 (<https://ntrs.nasa.gov/search.jsp?R=20180002010>)

Participation in Workshops/Training Programmes

- GIAN (Global Initiative of Academic Networks) course on *Phase -Field Modelling for Microstructure Evolution*, organized by IIT Bombay, 23-28 March, 2018, Mumbai, India
- *BRNS School on “Computational Methodologies Across Length Scales”*, 28th August - 9th September 2017, Bhabha Atomic Research Centre (BARC), Mumbai
- *Summer School for Integrated Computational Materials Education (ICMEd)*, June 5-16, 2017, University of Michigan, Ann Arbor, Michigan, USA
- *JAIST-India Workshop on Science Simulations* organized by IIT Madras, 12-17 December, 2016, Chennai, India.
- *Indo- Japanese Workshop on Integrated Computational Materials Engineering (ICME)* organized by IIT Madras, 3-9 July, 2016, Chennai, India.
- GIAN (Global Initiative of Academic Networks) course on *Basics and Application of Phase-Field Modeling in Materials Science*, organized by IISC Bangalore, 5-9 December, 2016, Bengaluru, India
- *MICRESS Basic Training Course 2015* organized by Access e.V, 26-28 August, 2015, Aachen, Germany.
- *Code Modernization Workshop based on Intel Platform*, organized by IIT Madras, 17 & 18 March, 2016, Chennai, India
- *Material Characterization using 3D Image Data in Simpleware®*, organized by IIT Madras, 5th March, 2016, Chennai, India.

Teaching Experience

Teaching Assistantship	Principles of Physical Metallurgy (Fall 2016) Physical Metallurgy Laboratory (Fall 2016) Forming and Casting Laboratory (Spring 2015, 2016 and 2017)
International Workshops	Event: JAIST-India Workshop on Science Simulations Duration: 12-17 December, 2016 Session Conducted: Phase Field Simulation using Micress® Event: Indo- Japanese Workshop on ICME Duration: 3-9 July, 2016 Session Conducted: Phase Field Simulation using Micress®

Awards/Recognitions

- Received one of the **best poster awards** in Heat Treatment and Surface Engineering (HT&SE) conference, Chennai, India, 12-14 May, 2016.
- **MHRD Fellowship** for pursuing doctoral studies at Indian Institute of Technology Madras, India.
- TKM Alumni Association '**Proficiency award** for excellent performance in curricular and co-curricular activities' during Bachelors in Technology (2010-2014).

Positions of Responsibility

- Teaching assistant for the international workshop ‘JAIST-India Workshop on Science Simulations’ during December 2016.
- Teaching assistant for the international workshop ‘Indo- Japanese Workshop on ICME’ During July, 2016.
- Student co-ordinator for ‘MATRIX (Mechanical Association for Technical Renaissance and Intellectual eXcellence)’, a Department initiative for enhancing the overall skills of the students.

Personal Details

Date of Birth/Age: 5th July 1991 (25 years)

Nationality: Indian

Languages known: English, Hindi, Malayalam, Tamil

Extra-curricular interests: Travel, Music, Piano and Cycling