

## Poornachandra

Post-Doctoral Fellow

Department of Materials Engineering

Indian Institute of Science Bangalore.

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## Education Details

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Year	Examination	Specialization	Institute	CGPA
2016-23	Ph.D.	Metallurgical Engineering and Materials Science	IIT Bombay	8.63/10
2013-15	M.Tech	Materials Engineering	NIT Karnataka Surathkal	8.30/10
2008-12	B.E.	Industrial and Production Engineering	PDACEG Kalaburagi Karnataka	9.05/10

## Skills and Expertise

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- **Material Characterization Techniques:** Transmission electron microscopy (TEM), Scanning electron microscopy (SEM), Optical microscopy, Electron backscattered diffraction (EBSD), X-ray diffraction.
- **Instruments/Material Testing:** Thermo-mechanical simulator (DSI Gleeble 3800), Dilatometer, X-ray diffractometer, micro/nano indenter, Universal testing machine (Tension/Compression/Fatigue), Nakazima/Limiting dome height test (Formability analysis), Thermogravimetric analyzer.
- **Softwares:** Thermo-calc and JMatPro (thermodynamic calculations), OIM (EBSD analysis), XPert high score plus, and MAUD (XRD data analysis), VIC 2D (digital image correlation), CATIA V5 (2D/3D design).
- **Programming Languages:** Basics of MATLAB and Python.

## Work Experience

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- **Post-Doctoral Fellow** at IISc Bangalore from 10-01-2024 to present.  
(Working with Prof. Vikram Jayaram and Prof. Praveen Kumar, Department of Materials Engineering on “Residual life measurement of Ti6242 alloy using bending creep experiments”).
- **Research Associate** at IIT Bombay, Mumbai from 22-06-2023 to 11-12-2023.  
(Worked with Prof. Prita Pant, Department of Metallurgical and Materials Engineering on “Effect of rolling conditions (hot/cold/warm) on work hardening behavior of medium Mn steel”).
- **Assistant Lecturer** (Temporary) at the Department of Metallurgical and Materials Engineering, NIT Karnataka Surathkal from 03-08-2015 to 11-12-2015.  
(Handled Physical Metallurgy course and Metallography lab for B. Tech students).

## Industrial Research Collaboration

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- **Investigator in a collaborative project with TATA Steel Limited, Jamshedpur, India** on "Exploring Deformation Mechanisms in Medium Mn Steel". The project was led by Prof. Prita Pant and Prof. M.P. Gururajan from IIT Bombay, in conjunction with Dr. Saurabh Kundu and Dr. Monojit Dutta from TATA Steel. We identified a heat treatment strategy for the new medium Mn alloy developed by TATA Steel to prevent Luder's band formation which is detrimental to the surface finish of automotive bodies. We reported both the transformation-induced plasticity (TRIP) and twinning-induced plasticity (TWIP) in a low-alloy medium Mn steel and created a forming limit diagram for automotive component design. A group member, Mr. Subhas Bhunia used the experimentally obtained microstructural information to

incorporate into a model of deformation-induced microstructure evolution to predict the mechanical behavior of medium Mn steels.

## Publications

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- **Poornachandra Satyampet**, Subhas Bhunia, M. P. Gururajan, and Prita Pant, "Simultaneous Occurrence of Twinning and Phase Transformation During Yield Point Elongation in Medium Manganese Steels" Metallurgical and Materials Transactions A 54, no. 1 (2023): 6-10.
- Patil, Akshata G., **Poornachandra Satyampet**, Ramesh Gumageri, K. Rajkumar, and S. Anandhan, "Chitosan composites reinforced with nanostructured waste fly ash" Journal of Material Cycles and Waste Management 19 (2017): 870-883.
- **Poornachandra Satyampet**, Subhas Bhunia, Saurabh Kundu, and Prita Pant, "Effect of deformation mode on martensitic transformation in medium Mn steel" (Submitted to Materialia Journal).
- **Poornachandra Satyampet**, Subhas Bhunia, Saurabh Kundu, and Prita Pant, "Effect of intercritical annealing parameters austenite fraction and its stability in medium Mn steels" (Manuscript under preparation).
- Subhas Bhunia, Ved Gumaste, **Poornachandra Satyampet**, Harita Seekala, Sudharshan Phani, and Prita Pant, "Strain partitioning study in dual phase medium manganese steels using DIC and nanoindentation techniques" (Manuscript under preparation).
- Subhas Bhunia, **Poornachandra Satyampet**, M. P. Gururajan, S Wang, Prita Pant, "Effect of initial microstructure on austenite reversion kinetics and elemental partitioning during intercritical annealing of medium Mn steel- in-situ synchrotron experiments (Manuscript under preparation).

## Selected Conference Presentations

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- **Poornachandra Satyampet**, Subhas Bhunia, Saurabh Kundu and Prita Pant, "Effect of strain path on martensitic transformation sequence in medium Mn steels", FEMS EUROMAT, Frankfurt, Germany, 2023.
- **Poornachandra Satyampet**, Saurabh Kundu, and Prita Pant, "Deformation mechanisms during yield point elongation of medium manganese steels", ICSMA 19<sup>th</sup>, Metz, France, 2022.
- **Poornachandra Satyampet**, Saurabh Kundu, and Prita Pant, "Deformation mode effect on martensitic transformation in medium Mn steels", NMD-ATM, 2020.

## Project Details

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- **Ph.D. Project**  
**Title:** Optimization of Annealing Parameters and Investigation of Deformation Behavior of Medium Manganese Steel.  
**Supervisors:** Prof. Prita Pant, IIT Bombay, India, and Dr. Saurabh Kundu, TATA Steel Jamshedpur.  
**Major Highlights:** Optimized the intercritical annealing parameters to attain austenite with optimum stability to achieve the desired properties of medium Mn steel, a 3<sup>rd</sup> generation advanced high-strength steel. Simultaneous occurrence of twinning and phase transformation during YPE was reported for the first time. A forming limit diagram was generated using Nakazima experiments to aid in designing and manufacturing automotive components using medium Mn steel.
- **M. Tech Project**  
**Title:** Development of new poly(styrene-co-acrylonitrile)/poly(ethylene-co-octene) blends by dynamic vulcanization.  
**Supervisor:** Prof. Anandhan Srinivasan, NIT Karnataka Surathkal, Mangalore, India.

**Major Highlights:** Polymer blends based on poly(styrene-co-acrylonitrile) /poly(ethylene-co-octene) polymers were developed by using the methods of compatibilization and dynamic vulcanization. The blends developed were found to be suitable for heat and oil-resistant applications.

### Industrial Training/Apprenticeship

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- ACC Limited, Wadi Cement Works, Wadi, Gulbarga, Karnataka from 20-07-2010 to 18-08-2011. (Project: Performance analysis of a rotary Kiln in the cement Industry).
- Hindustan Aeronautics Limited (HAL), Bengaluru, Karnataka from 15-05-2014 to 26-06-2014. (Project: Comparative study of curing of composites using autoclave and thermal press).
- Indian Rubber Manufacturer's Research Association (IRMRA), Thane, Maharashtra from 03-12-2014 to 30-04-2015 (**Received an appreciation certificate from IRMRA for designing and developing passive mounts for low-frequency vibration isolation. The project was funded by the Ministry of Defence, Government of India**).

### Other Courses/Conferences/workshops Attended

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- GIAN course on "Dislocation dynamics simulation to study plastic deformation" delivered by Prof. Marc Fivel (Université Grenoble Alpes, France), Prof. M Sundararaman (IIT Madras, India) held at IIT Bombay, India from January 15 to 25, 2018.
- GIAN course on "Interfaces in materials" delivered by Prof. Kevin Knowles (University of Cambridge, England), held at IIT Delhi, India from 5<sup>th</sup> to 9<sup>th</sup> March 2018.
- National conference on "Physical simulation of thermo-mechanical processing of materials", held at IIT Bombay from 15<sup>th</sup> to 17<sup>th</sup> June 2017.
- Workshop on "Engineering failure analysis", held at NITK Surathkal during August 1-2, 2014.

### Personal Details

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Sex: Male

Date of birth: 28-07-1990

Languages Known: English, Hindi, Kannada, Telugu.

Permanent address: Basava Marga house, Satyampet, Surapura, Yadgir district, Karnataka, India.

### Reference

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| 1. Prof. Prita Pant<br>Professor<br>Department of Metallurgical Engineering<br>And Materials Science<br>IIT Bombay, Mumbai-400076<br>Email: <a href="mailto:pritapant@iitb.ac.in">pritapant@iitb.ac.in</a>               | 2. Dr. Saurabh Kundu<br>Chief Corporate Sustainability<br>TATA Steel Jamshedpur<br>Jharkhand, India-400076<br>Email: <a href="mailto:saurabhkundu@tatasteel.com">saurabhkundu@tatasteel.com</a>                |
| 3. Prof. Vikram Jayaram<br>Honorary Professor<br>Department of Materials Engineering<br>Indian Institute of Science Bangalore<br>Bengaluru 560012<br>Email: <a href="mailto:qjayaram@iisc.ac.in">qjayaram@iisc.ac.in</a> | 4. Prof. Praveen Kumar<br>Professor<br>Department of Materials Engineering<br>Indian Institute of Science Bangalore<br>Bengaluru 560012<br>Email: <a href="mailto:praveenk@iisc.ac.in">praveenk@iisc.ac.in</a> |