

# Resumé

## PRADIP DUTTA

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**DATE OF BIRTH:** October 2, 1960

### EDUCATION

**Ph.D.**, Mechanical Engineering, 1992, Columbia University, New York.  
**M. Phil.**, Mechanical Engineering, 1990, Columbia University, New York.  
**M.Tech.**, Mechanical Engineering, 1987, Indian Institute of Technology, Madras.  
**B.Tech.**, Mechanical Engineering, 1983, Indian Institute of Technology, Kharagpur.

### RESEARCH AND PROFESSIONAL EXPERIENCE

From	To	Position
3/2007	Present	<b>Professor (Department Chair: March 2015 - January 2020)</b> <b>J.C.. Bose National Fellow (January 2017 - )</b> <b>(INAE Chair Professor from April 2012 to March 2014)</b> Dept. of Mechanical Engineering, Indian Institute of Science, Bangalore,
9/2001	3/2007	<b>Associate Professor</b> , Dept. of Mechanical Engineering, Indian Institute of Science, Bangalore,
10/1996	9/2001	<b>Assistant Professor</b> , Dept. of Mechanical Engineering, Indian Institute of Science, Bangalore,
1/8/1995	31/7/1996	<b>Assistant Professor</b> Department of Mechanical Engineering, Tennessee Technological University, Cookeville, TN
1/8/1993	31/7/1995	<b>Lecturer</b> , Department of Mechanical Engineering, Columbia University, New York City
1/9/1992	31/7/1993	<b>National Research Council Postdoctoral Fellow</b> , Naval Postgraduate School, Monterey
2/1/1987	14/9/1987	<b>Research Associate</b> , TATA Energy Research Institute (TERI), New Delhi
1/8/1983	31/7/1985	<b>Project Engineer</b> , FLAKT INDIA LTD., Calcutta

### Visiting positions:

May 2000 – June 2000 **Visiting Professor**, University of Maryland, College Park, MD, USA.  
Jan. 2004 – Feb. 2004 **Visiting Faculty**, Nanyang Technological University, Singapore.

## RESEARCH INTERESTS:

- Thermal storage; Solar thermal technologies
- Computational Fluid Dynamics (CFD)
- Advanced cooling technologies (adsorption cooling, loop heat pipes, phase change materials)
- Heat Transfer in Manufacturing and Materials Processing

## AWARDS / PRIZES

- J.C. Bose National Fellowship, 2017
- IIT Madras Distinguished Alumnus Award, 2017.
- IIT Kharagpur Distinguished Alumnus Award, 2015.
- Indian National Academy of Engineering Outstanding Teacher Award, 2014.
- Fellow, American Society of Thermal and Fluids Engineers (ASTFE) (elected in 2020).
- Fellow, Indian National Science Academy (INSA) (elected in 2014).
- Fellow, National Academy of Sciences (NASI) (elected in 2014).
- Fellow, Indian Academy of Sciences (elected in 2012).
- Fellow, American Society of Mechanical Engineers (ASME); (elected in 2011).
- Fellow, Indian National Academy of Engineering (INAE) (elected in 2005).
- VASVIK Award for Excellence in Industrial Research (Category: Mechanical and Structural Sciences and Technology), 2010.
- IISc Alumni Award for Excellence in Research, IISc, 2013.
- Indian National Academy of Engineering (INAE) Chair Professorship Award, 2012-2014.
- Overseas Attachment Fellowship Award for visit to Nanyang Technological University, Singapore, 2004.
- Best paper award conferred at the International Symposium on Innovative Materials for Processes in Energy Systems (IMPRES2010), 29<sup>th</sup> November- 1<sup>st</sup> December, 2010, Singapore
- Best Paper Award, 7th ASME/ISHMT Heat and Mass Transfer Conference, Guwahati (2006).
- Best Technical Paper Award at the First FLUENT CFD Conference for India & South East Asia (2003).
- Best Paper Award, 5th ASME/ISHMT Heat and Mass Transfer Conference, Kolkata (2002).
- Best Paper Award, 4th ASME/ISHMT Heat and Mass Transfer Conference, Pune (2000)
- National Research Council (USA) Research Associateship Award, 1992-93
- Bakhmeteff Award for Research in Fluid Mechanics, Columbia Univ., 1990-91
- Best Teaching Assistant Award, Dept. of Mechanical Engineering, Columbia University, 1989.

## PROFESSIONAL POSITIONS

- President, Indian Society for Heat and Mass Transfer (2018-present)
- Vice President, Indian Society for Heat and Mass Transfer (2010-2013)

## INVITED KEYNOTE/PLENARY LECTURES (selected)

- May 2019, **Keynote Speaker** at the International Conference of Polygeneration – ICP 2019, May 15-17, 2019 Fukuoka, JAPAN. Talk title: “Two-stage Air Cooled Water/Silica gel Adsorption System”.
- Oct. 26, 2016, **Keynote Speaker** at the IVth International Symposium on Innovative Materials for Processes in Energy Systems 2016 (IMPRES 2016), Taormina, Italy. Talk title: “High Temperature Receivers and Storage Materials for Concentrating Solar Power”.
- August 14, 2014, **Keynote Speaker** at the 15<sup>th</sup> International Heat Transfer Conference (IHTC-15), Kyoto, Japan. Talk title: “Heat Transfer Challenges in Novel Power Cycles for Concentrating Solar Power”.
- December 12, 2013, **Plenary Lecture** at the International Conference on Advances in Energy Research, Mumbai, entitled: “Distributed Solar Thermal Technologies for India: Suitability and Challenges”.

- Oct 23 2012, **Invited Lecture** at the Indo Swiss Symposium on Renewable Energies and Rational Energy End-use, Lausanne, Switzerland, entitled: “Solar Thermal Technologies at Small and Medium Scales”.
- Nov. 29 –Dec. 1, 2012, **Invited Lecture** at the Indo French Seminar on “Energies for the Future”, Paris, France.
- April 30, 2012, **Invited Lecture** at the 3rd EU-India (EICOON) School on Science and Technology of Renewable and Clean Energy Sources, Kolkata, entitled: “Solar Thermal Technologies”.
- Nov. 26, 2012, **Invited Lecture** at the Indo German Workshop on Integrated Computational Materials Engineering, Pune, entitled: “Semisolid Manufacturing of Aluminium Alloy Components for Automobiles”.
- November 22, 2012, **Invited Lecture** at the Fifth International Conference on Solidification Science and Processing (ICSSP5), Bhubaneswar, entitled: “Scaling analysis and modeling of semisolid slurry formation using cooling slope”.
- Nov. 4, 2012, **Invited Lecture** at the Seventy-eighth Annual Meeting of the Indian Academy of Sciences, Dehradun, entitled: “Multiphase Convection during Solidification of Binary Alloys”.
- Nov. 29, 2010: **Invited Lecture** at the International Symposium on Innovative Materials for Processes in Energy Systems (IMPRES2010), entitled, “Performance of PCM-based heat sinks subjected to cyclic heat load”.
- October 29, 2010: **Plenary lecture** at International Conference on Modeling Optimization and Computing, NIT Durgapur, India, entitled “Cooling of Electronics with Phase change Materials”.
- February 5, 2010, **Invited Lecture** at the 58<sup>th</sup> Indian Foundry Congress, Ahmedabad , entitled, “Development of a Thixocasting Process for a Near Net Shape Automobile Component”.
- Feb. 13, 2009, **Invited Lecture** at the 57<sup>th</sup> Indian Foundry Congress, Kolkata, entitled “Semisolid Manufacturing”.
- Nov. 21, 2009, **Invited Lecture** at the 4<sup>th</sup> International Conference on Solidification Science and Processing (ICSSP4), IIT Madras, entitled “Influence of Solid Phase Movement and Melt Convection on Macrosegregation and Microstructure Formation”.

## PROJECTS / RESEARCH GRANTS

Title	Funding Agency	Duration
National Centre for Clean Coal Research & Development ( <b>PI</b> ) (Consortium project lead by IISc. Participating institutions include IIT Kharagpur, IIT Madras, IIT Bombay, IIT Hyderabad and IIT Guwahati, <b>total funding: Rs. 3000 lakhs / US\$4.2 million</b> )	DST	2018 - present
<b>(Co-PI) Solar Energy Research Institute for India and the United States (SERIUS)</b> – a consortium under the Joint Clean Energy Research and Development Centre (JCERDC)  Consortium has 34 partner institutions across both countries, with >200 researchers working on 24 projects. Dr. Dutta is the co-PI and the lead coordinator from the India side. <b>Total funding US\$50 million</b> including 50% cost share from industries ( <a href="http://www.serius.org">www.serius.org</a> ).  <b>IISc’s funding share Rs. 1771 lakhs / US\$2.5 million</b>	Govt. of India (DST) US Government (DOE)	2012-2018
Development of High Efficiency Receiver for Supercritical CO <sub>2</sub> Integrated with Static Focus Parabolic Dish ( <b>PI</b> )  <b>Funding: Rs. 245 lakhs /US\$343000</b>	Ministry of New and Renewable Energy (MNRE)	2016-2018

Integral Fin Extruded Aluminium Flat Plate Solar Water Heater (PI) <b>Funding: Rs. 79.5 lakhs / US\$111000</b>	DST ; Aditya Birla S&T Ltd. Is the industry partner	2015-2017
Chemi-Sorption Thermal Energy Storage- Application of Metal Hydrides. (PI) <b>Funding: Rs. 60 lakhs/US\$84000</b>	DST	2015-2018
Solar Cooling and Production of Potable Water with 2-Stage Silica Gel – Water Adsorption system (PI). <b>Funding: Rs. 250 lakhs / US\$350000</b>	DST	2012-2015
Process Development in Semisolid Forming and Squeeze Casting of Aluminium Alloy Components for Automobile (PI) <b>Funding: Rs. 320 lakhs / US\$447000</b>	Consortium project with TIFAC, TVS Motors, Sundaram Clayton, Mahindra and Mahindra	2008-2012
Microstructural characterization of aluminium alloy billets cast in a linear electromagnetic stirrer (PI) <b>Funding: Rs. 66 lakhs</b>	DST, Ministry of Mines	2008-2012
Study of Die Filling during Semisolid Casting of Aluminium Components (PI) <b>Funding: Rs. 46 lakhs</b>	DST, Ministry of Mines	2008-2012
Determination of parameters for semisolid processing of aluminium billets (PI) <b>Funding: Rs. 21 lakhs</b>	Dept. of Science and Technology (DST)	2007-2008
National Facility for Semisolid Forming* (Co-PI) <b>Funding: Rs. 700 lakhs / US\$979000</b>	Ministry of Mines, DST, DRDO	2001-2007
Development of Support System for Cooling of Electronic Equipment (co-PI) <b>Funding: Rs. 65 lakhs</b>	DRDO	2001-2005
Modelling of Transport Phenomena during Laser Surface Alloying of Dissimilar Metals (PI) <b>Funding: Rs. 7 lakhs</b>	CSIR	1999-2002
A Finite-Volume Based Computational Procedure for Calculation of Radiation Heat Transfer in Spacecraft Application (PI) <b>Funding: Rs. 3 lakhs</b>	ISRO	1997-1999
Process Modelling and Evaluation of Weld Metal Microstructures and Properties in GTA and GMA Welding (PI) <b>Funding: Rs. 12 lakhs</b>	DST	1997-2000

## INDUSTRIAL CONSULTANCY

Title	Client	Duration
Chemical research for thermo-chemical energy storage (PI) : <b>Funding Rs. 45 lakhs</b>	Faurecia	2018-2019
Development of Metal Hydride based High Temperature Thermal Energy Storage Systems for Waste Heat Utilization (PI) <b>Funding: Rs. 168 lakhs</b>	GAIL	2018-2020
Development of a Mechanistic Model for Shrinkage Prediction (PI) <b>Funding: Rs. 68 lakhs</b>	General Motors, USA	2010-1014
Role of solid phase movement and re-melting on macrosegregation in binary alloy solidification process (PI) <b>Funding Rs. 85 lakhs</b>	General Motors (USA)	2005-2009
Thermal and Mechanical Design of Electronic Equipment	HCL Technologies, Bangalore	2006 – 2008

Evaluation of Cooling Tower Performance	RVUNL, Kota, Rajasthan	2005
Incabin and underhood thermal analysis <b>(PI)</b> <b>Funding: Rs. 45 lakhs</b>	TATA Motors	2005-2007
Use of phase change materials for cooling of automotive electronics <b>(PI)</b> <b>Funding : Rs. 6 lakhs</b>	Delphi	2005
Microstructure and modelling of the fusion zone during welding of Al-Mg castings to Al-Mg extrusions <b>(PI)</b> <b>Funding : Rs. 80 lakh</b>	General Motors (USA)	2001-2004
Evaluation of Cooling Tower Performance	Paharpur Cooling Tower, Kolkata	2004-2005
Training on Thermodynamics of Power Plant and Cooling Towers	Karnataka Power Corporation Ltd., Raichur	2004
Training on CFD for Data Centre Modelling and Design	Hewlett Packard, Bangalore	2003
Radiation Heat Transfer Model for Wire-rod Mill Furnace Automation	TATA STEEL, Jamshedpur	2000
Thermal Evaluation and Study of Identical Aluminium Frame and Plastic Frame Double Glaze Windows to find out U-values	Aluminium Association of India	1998

## OTHER PROFESSIONAL ACTIVITIES

- Chairman, Expert Committee on Solar Energy Research and Demonstration, DST (2019- present)
- President, Indian Society for Heat and Mass Transfer (2018-present)
- Vice President, Indian Society for Heat and Mass Transfer (2010-2013)
- Member, International Advisory Committee of “Fast Forward with Solar Mission”, FFSM-2014
- Member, Editorial Board, IEEE Transactions on Components and Packaging Technology (2007 -
- Member, Editorial Board, ASME Journal of Electronics Packaging (2010 – 2019)
- Member, Editorial Board, Thermal Science and Engineering Progress (Elsevier) ( 2019 -)
- Convener, Sectional Committee III, INAE (2018- present); Member (2015-2017)
- Member, Sectional Committee on Engineering and Technology, INSA (2017 – present)
- Member, PAC, Mechanical and Civil engineering, Department of Science and Technology (DST), 2012 – present
- Member, PAC, Solar energy Research Initiative (SERI), Department of Science and Technology (DST), 2012 - present
- Member of Technical Advisory Group, Centre for Railway Research (CRR), IIT Kharagpur
- Member of Technical Advisory Group, ARCI’s Centre for Solar Energy Materials
- Member, Research Council, IIT Bhubaneshwar
- Senior Research Advisor, TKM College of Engineering, Kollam, Kerala
- Member, International Scientific Committee, International Conferences on Semisolid Processing of Alloys and Composites, 2010 – present.
- Member, International Scientific Committee, 19<sup>th</sup> Solar Power and Chemical Energy Systems (SolarPACES) Conference, Las Vegas, September 2013.
- Member, International Scientific Committee, International Symposium on Innovative Materials for Processes in Energy Systems 2013(IMPRES2013), Fukuoka, Japan
- Member, International Scientific Committee, International Symposium on Innovative Materials for Processes in Energy Systems 2010(IMPRES2010), 29 November 2010 - 1 December 2010, Singapore
- Organizing Chair, Indo-US Frontier of Engineering Symposium, Irvine, California, 2008

### *Membership in professional societies:*

- American Society of Mechanical Engineers (Fellow grade).
- Indian National Science Academy (INSA) (Fellow grade).
- National Academy of Sciences (NASI) (Fellow grade)
- Indian Academy of Sciences (Fellow grade).

- Indian National Academy of Engineering (Fellow grade).
- Life Member, Indian Society for Heat and Mass Transfer.
- Life Member, Investment Casting Society of India
- Life Member, Aluminium Association of India

*Reviewer of:*

International Journal of Heat and Mass Transfer, International Communications in Heat and Mass Transfer, Metallurgical and Materials Transactions, Journal of Materials Science, Journal of Fluids Engineering (ASME), Journal of Heat Transfer (ASME), Journal of Energy Resources Conversion (ASME), Journal of Electronics Packaging (ASME), IEEE Transactions on Components and Packaging, International Journal of Numerical Methods for Heat and Fluid Flow, International Journal of Thermal Sciences, National Heat Transfer Conference (USA), International Heat Transfer Conference, International Mechanical Engineering Congress and Exposition, ASME/ISHMT International Heat and Mass Transfer Conference.

### **ADMINISTRATIVE POSITIONS and COMMITTEE ASSIGNMENTS:**

- Chairman, Dept. of Mechanical Engineering, IISc (March 2015 – Jan. 2020)
- Co-PI from India, Solar Energy Research Institute for India and the United States (SERIUS) [www.serius.org](http://www.serius.org)
- Co-Director, General Motors-IISc Collaborative Research Laboratory (2010 - 2012)
- Coordinator, IISc Solar Energy Programme under IISc Energy Initiative (2011 -)
- Co-Founder, National Facility for Semisolid Forming, IISc
- Member, IISc Buildings Committee, IISc (2011-14)
- Member, IISc Power Committee, IISc (2007-2010)
- Convener, Department Curriculum Committee (DCC), ME Dept, IISc (2006-2011)
- Member, Mechanical Engg. Departmental Curriculum Committee, IISc (1997-2005)
- Convenor, Mechanical Engg. Departmental Seminar Committee (1998)
- Member, Mechanical Engg. Departmental Infrastructural Committee (2000-2005)
- Coordinator, IISc-General Motors Collaborative Research Laboratory (CRL) (2001)
- Undergraduate Committee, Dept. of Mechanical Engineering, Columbia University, 93-94, 94-95.
- Laboratory Committee, Dept. of Mechanical Engineering, Columbia University, 1993-94, 1994-95
- Graduate Committee, Dept. of Mechanical Engineering, Columbia University, 94-95.
- Basic Engineering Faculty Advisor, Tennessee Technological University, 1995-96.

### **COURSES TAUGHT**

*Courses taught at IISc, Bangalore (1997 – present)*

Thermodynamics, Computational Heat Transfer and Fluid Flow, Convective Heat Transfer, Thermal Management of Electronics.

*Courses taught at Columbia University, USA (1993-1995)*

Heat Transfer, Advanced Thermodynamics, Design of Thermal Systems, Mechanical Engng. Lab. I, Mechanical Engng. Lab. III .

*Courses taught at Tennessee Technological University, USA (1995-1996)*

Heat Transfer, Design of Thermal Systems..

### **PATENTS**

1) 1) “A Device for Non-intrusive Detection of Liquid Metals/Alloys and a Method Thereof”, (*Indian Patent Application No. 01074/CHE/2007; Patent No. 251300 Awarded on 9/3/2012*)

2) “A Device for Casting and Reheating of Metals/Alloys Electromagnetic Stirring to Produce Billets with Non-dendritic Globular Microstructure”. (*Indian Patent Application No. 03136/CHE/2007; Patent No. 257202, Awarded on 11/09/2013*)

### **PUBLICATIONS** (see Appendix A for full list)

(Total International Journal Papers: 195 approx.)

## **THESIS SUPERVISION** (see Appendix B for full list)

### Thesis Guidance

- **Total PhD Thesis guidance : 34** (26 completed, 8 in progress)
- **Total Masters Thesis/Project guidance : 59**

# Appendix A

## List of Publications

### *Books and book chapters*

1. P. Dutta and P. Kumar, “Supercritical Carbon Dioxide-Based Power Cycles”, in *Encyclopedia of Sustainable Technologies*, 2017, Pages 419-428, Elsevier.
2. P. Dutta, “COMPUTATIONAL FLUID DYNAMICS AND HEAT TRANSFER”, Web based course material under the National Programme on Technology Enhanced Learning (NPTEL, Phase 2), 2012.
3. P. Dutta, “HEAT AND MASS TRANSFER”, Web based course material under the National Programme on Technology Enhanced Learning (NPTEL, Phase 1), 2006.
4. P. Dutta and K. Srinivasan, “THERMODYNAMICS”, Web based course material under the National Programme on Technology Enhanced Learning (NPTEL, Phase 1), 2006.
5. K. Srinivasan, M. Prasad and P. Dutta, “Activated Carbon Based Adsorption Thermal Compression Systems for Cryocooling, Refrigeration and Gas Storage”, in *Advances in Adsorption Technology*, editors: K. C. Ng and B. B. Saha; *Publisher: Nova Science Publishers. Publication date: 2010.* (ISBN: 978-1-61761-759-1).
6. Y. Joshi, M. Patterson and P. Dutta, “Thermal Characterization and Management” in *INTRODUCTION TO SYSTEM-ON-PACKAGE (SOP)*, editor Rao R. Tummala. *Publisher: McGraw-Hill, NY, USA Publication date: 2008* (ISBN-10:0071459065).
7. P. Dutta and S. Chakraborty, “Continuum simulation: Finite Volume Method” in *Microfluidics and Nanofluidics Handbook*; editors: S. K. Mitra, S. Chakraborty. *Publisher: CRC Press/Taylor & Francis Group. Publication date: Aug. 2011* (ISBN: 9781439816714).

### *Journal Publications:*

- J1. Prosenjit Das and P. Dutta, “Three-dimensional phase field simulation of spheroidal grain formation during semi solid processing of Al-7Si-0.3 Mg alloy”, *Computational Materials Science*, Volume 184, 2020, 109856
- J2. A.R. Anand, Amrit Ambirajan, Pradip Dutta, “Investigations on vapour blanket formation inside capillary wick of loop heat pipe”, *International Journal of Heat and Mass Transfer*, Volume 156, 2020, 119685.
- J3. I.S. Gimik, A.D. Grekova, T.X. Li, R.Z. Wang, P. Dutta, S. Srinivasa Murthy, Yu.I. Aristov, “Composite "LiCl/MWCNT/PVA" for adsorption thermal battery: Dynamics of methanol sorption”, *Renewable & Sustainable Energy Reviews* (accepted).
- J4. K. Malleswararao, Aswin N., Srinivasa Murthy, S and Pradip Dutta, “Performance prediction of coupled hydride thermal energy storage system using Mg<sub>2</sub>Ni and LaNi<sub>5</sub> pair: Computational study”, *International Journal of Hydrogen Energy* (accepted)
- J5. K. Srinivasan and Pradip Dutta, “Activated carbon–carbon dioxide based two stage adsorption compression Brayton cycle power generation”, *Adsorption*, (2019) 25:1663–1672.
- J6. Prosenjit Das, Bikash Bhuniya, Sudip K. Samanta, Pradip Dutta, “Studies on die filling of A356 Al



alloy and development of a steering knuckle component using rheo pressure die casting system”, *Journal of Materials Processing Tech.* 271 (2019) 293–311.

- J7. Sagar Khivsara, Matta Uma Maheswara Reddy, K.P.J. Reddy, Pradip Dutta, “Measurement of radiation heat transfer in supercritical carbon dioxide medium”, *Measurement*, Volume 139, June 2019, Pages 40-48.
- J8. A. R. Anand, A. Jaiswal, A. Ambirajan and P. Dutta. “Experimental studies on a miniature loop heat pipe with flat evaporator with various working fluids”, *Applied Thermal Engineering*, vol. 144, 2018, pp. 495-503.
- J9. Das, P., Samanta, S.K., Mondal, B., Dutta, P. “Multiphase Model of Semisolid Slurry Generation and Isothermal Holding During Cooling Slope Rheoprocessing of A356 Al Alloy”, (2018) *Metallurgical and Materials Transactions B*, 49 (4), pp. 1925-1944.
- J10. P.C. Thimmaiah, A. K. Panda, U. K. Pandey, C. McCague, P. Dutta & M. Bahrami, “A New Approach to Compute the Porosity and Surface Roughness of Porous Coated Capillary-Assisted Low Pressure Evaporators”, *Scientific Reports*, volume 8, Article number: 11708 (2018).
- J11. A.R. Anand, Akhil Jaiswal, Amrit Ambirajan, and Pradip Dutta, “Experimental studies on a miniature loop heat pipe with flat evaporator with various working fluids”, *Applied Thermal Engineering*, DOI: 10.1016/j.applthermaleng.2018.08.092 (2018).
- J12. P. Dutta, “High temperature solar receiver and thermal storage systems”, *Applied Thermal Engineering*, vol. 124 (2017) pp. 624–632.
- J13. Sourav Mitra, Kyaw Thu, Bidyut Baran Saha, Pradip Dutta, “Modeling the effect of heat source temperature on the performance of two-stage air cooled silica gel + water adsorption system”, *Energy Procedia*, vol. 105 ( 2017 ) pp. 2010 – 2015.
- J14. Sandip Sarkar, Suvankar Ganguly and Pradip Dutta, “Electrokinetically induced thermofluidic transport of power-law fluids under the influence of superimposed magnetic field”, *Chemical Engineering Science*, vol. 171 (2017) pages 391–403
- J15. Sourav Mitra, Kyaw Thua, Bidyut Baran Saha, Pradip Dutta, “Performance evaluation and determination of minimum desorption temperature of a two-stage air cooled silica gel/water adsorption system”, *Applied Energy*, vol. 206 (2017) pp. 507–518
- J16. Sourav Mitra, Kyaw Thu, Bidyut Baran Saha, Kandadai Srinivasan, and Pradip Dutta, “Modeling study of two-stage, multi-bed air cooled silica gel + water adsorption cooling cum desalination system”, *Applied Thermal Engineering*, Volume 114, 5 March 2017, Pages 704–712.
- J17. S Sarkar, S Ganguly, P Dutta, “Thermofluidic characteristics of combined electroosmotic and pressure driven flows in narrow confinements in presence of spatially non-uniform magnetic field”, *International Journal of Heat and Mass Transfer*, Volume 104, January 2017, Pages 1325–1340.
- J18. Sandip Sarkar, Suvankar Ganguly and Pradip Dutta, “Magnetohydrodynamic stationary and oscillatory convective stability in a mushy layer during binary alloy solidification”, *Applied Mathematical Modelling*, vol. 48, (2017), 233–249.
- J19. Jesus Ortega, Sagar Khivsara, Joshua Christian, Clifford Ho, Julius Yellowhair, Pradip Dutta, “Coupled modeling of a directly heated tubular solar receiver for supercritical carbon dioxide Brayton cycle: Optical and thermal-fluid evaluation”, *Applied Thermal Engineering*, Volume 109, Part B, 25 October 2016, Pages 970–978.
- J20. Jesus Ortega, Sagar Khivsara, Joshua Christian, Clifford Ho, Pradip Dutta, “Coupled modeling of a directly heated tubular solar receiver for supercritical carbon dioxide Brayton cycle: Structural and creep-fatigue evaluation”, *Applied Thermal Engineering*, Volume 109, Part B, 25 October 2016, Pages 979–987

- J21. S Dalal, G Tomar, P Dutta, "Numerical study of driven flows of shear thinning viscoelastic fluids in rectangular cavities", *Journal of Non-Newtonian Fluid Mechanics*, Volume 229, March 2016, Pages 59–78
- J22. P Das, SK Samanta, S Bera, P Dutta, "Microstructure Evolution and Rheological Behavior of Cooling Slope Processed Al-Si-Cu-Fe Alloy Slurry", *Metallurgical and Materials Transactions A*, May 2016, Volume 47, Issue 5, pp 2243–2256
- J23. P Kumar, P Dutta, SS Murthy, K Srinivasan, "Solar driven carbon dioxide Brayton cycle power generation with thermal compression", *Applied Thermal Engineering*, Volume 109, Part B, 25 October 2016, Pages 854–860
- J24. Ajinkya Meshram, Ankush Kumar Jaiswal, Sagar D. Khivsara, Jesus D. Ortega, Clifford Ho, Rucha Bapat, Pradip Dutta, "Modeling and analysis of a printed circuit heat exchanger for supercritical CO<sub>2</sub> power cycle applications", *Applied Thermal Engineering*, Volume 109, Part B, 25 October 2016, Pages 861–870
- J25. P Das and P Dutta, "Phase field modelling of microstructure evolution and ripening driven grain growth during cooling slope processing of A356 Al alloy", *Computational Materials Science*, Volume 125, December 2016, Pages 8–19
- J26. N Aswin, P Dutta, SS Murthy, "Screening of metal hydride pairs for closed thermal energy storage systems", *Applied Thermal Engineering*, Volume 109, Part B, 25 October 2016, Pages 949–957
- J27. AK Jaiswal, S Mitra, P Dutta, K Srinivasan, SS Murthy, "Influence of cycle time and collector area on solar driven adsorption chillers", *Solar Energy*, Volume 136, 15 October 2016, Pages 450–459
- J28. S Karagadde and P Dutta, "A comparison of time-scales governing the interaction and growth of hydrogen bubbles with a solidifying front", *International Communications in Heat and Mass Transfer*, Volume 79, December 2016, Pages 16–20
- J29. S. D. Khivsara, V. Srinivasan, P. Dutta, "Radiative heating of supercritical carbon dioxide flowing through tubes", *Applied Thermal Engineering*, Volume 109, Part B, 25 October 2016, Pages 871–877
- J30. Sandip Sarkar, Suvankar Ganguly, Pradip Dutta, "Thermally developing combined magnetohydrodynamic and electrokinetic transport in narrow confinements with interfacial slip", *International Journal of Heat and Mass Transfer*, Volume 100, September 2016, Pages 451–463.
- J31. D. Samantaray, A. Chaudhuri, U. Borah, A.K. Bhaduri, P. Dutta, "Role of grain boundary ferrite layer in dynamic recrystallization of semi-solid processed type 304L austenitic stainless steel", *Materials Letters*, Volume 179, 15 September 2016, Pages 65–68.
- J32. D. Samantaray, U. Borah, A.K. Bhaduri, P. Dutta, "Effect of semi-solid heat treatment on elevated temperature plasticity of 304L stainless steel", *Journal of Materials Science*, 51(9), 4306–4319
- J33. K. C. Nayak and P. Dutta, Numerical investigations for leakage and windage heating in straight-through labyrinth seals, *ASME Journal of Engineering for Gas Turbines and Power*, Volume 138, Issue 1, 1 January 2016
- J34. K. C. Nayak and P. Dutta, Effect of Rub-Grooves on Leakage and Windage Heating in Straight-Through Labyrinth Seals, *Journal of Tribology*, Volume 138, Issue 2, 1 April 2016
- J35. S. Mitra, P. Kumar, K. Srinivasan, P. Dutta, "Development and performance studies of an air cooled two-stage multi-bed silica-gel + water adsorption system", *International Journal of Refrigeration*, Volume 67, 2016, Pages 174–189.
- J36. Sourav Mitra, N. Aswin, Pradip Dutta, "Scaling analysis and numerical studies on water vapour adsorption in a columnar porous silica gel bed", *International Journal of Heat and Mass Transfer*, Volume 95, April 2016, Pages 853–864.
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## Appendix B Thesis Supervised

**Total:** 34 PhDs (26 completed + 8 in progress); 59 Masters (19 MSc. Engg + 40 ME Projects)

### Ph.D. thesis Awarded

Sl. No.	Name	Year graduated	Thesis Title	Present position
1	Sagar D. Khivsara	2019	Development of Tubular Solar Receiver with Supercritical Carbon Dioxide as Working Fluid	R&D Engineer at Taiwan Semiconductor Manufacturing Company, Taiwan
2	A. R. Anand	2017	Investigations on miniature loop heat pipe with flat evaporator	Scientist, Indian Space Research Organization (ISRO)
3	Sandip Sarkar	2017	Studies on multiphase and multiscale transport phenomena in presence of superimposed magnetic field	Associate Professor, Jadavpur University
4	Prosenjit Das	2016	Study of Rheo-pressure die casting of Al alloys using Cooling slope technique	Scientist, CSIR – Central Mechanical Research Institute, Durgapur
5	Swapnil Dalal (jointly with Prof. G. Tomar)	2016	Numerical Simulation of Two Phase Polymeric Flows	Post doctoral fellow at Ecole Polytechnique, France
6	Sourav Mitra	2015	Development and Investigation of Two-Stage Silica gel + Water Adsorption Cooling cum Desalination System	Joined IIT Kharagpur as Assistant Professor, after post doc at Kyushu University, Japan.
7	Diptimayee Samantaray	2015	Effect of Semi-Solid Processing on microstructural Evolution and Mechanical Behavior of Austenitic Stainless Steel	IGCAR, Kalpakkam
8	Kali Charan Nayak	2014	Studies on labyrinth seal leakage and windage heating	Rolls-Royce Aerospace Engineering
9	Anirban Bhattacharya	2015	Development of mechanistic model for prediction of solidification shrinkage	Assistant Professor, IIT Bhubaneswar (after post doc at U of Manchester)
10	K. Shyamprasad	2012	Modeling growth and motion of hydrogen bubbles and equiaxed dendrites during solidification of aluminum alloys	Associate Professor, IIT Bombay (after post doc at U of Manchester)
11	Shailesh Kumar Singh (co-guided with Prof. K. Chattopadhyay)	2014	Studies on friction welding of thixocast aluminium alloys	Senior Scientist, CSIR-CMERI, Durgapur (after working in Boeing India, Bangalore)

12	Nirmal Kumar Kund	2012	Studies on solidification of aluminum alloy flowing on a cooling slope	Associate Professor, KIIT University, Bhubaneswar
13	Prodyut Chakraborty	2011	Single-phase and Multi-phase Convection during Solidification of Non-eutectic Binary Solutions	Associate Professor & Dept. Head, IIT Jodhpur
14	Ravindra Pardeshi	2010	Multi-scale Segregation Model for Alloy Solidification Process	Aditya Birla Science and Technology Co. Ltd.
15	Sandip Kumar Saha	2010	Cooling of Electronics with Phase Change Materials under Constant and Cyclic Heat Loads	Associate Professor, IIT Bombay (after post doc. at University of Leuven,, Belgium)
16	Madhusudhana Rao Gavara	2010	Role of Mixed Convection in Cooling of Electronics	Assistant Professor, IIT Guwahati
17	Arvind Kumar	2009	Role of solid phase movement and re-melting on macrosegregation and microstructure in solidification processing	Associate Professor, IIT Kanpur
18	Nilkanta Barman	2009	Studies on Transport Phenomena during Solidification in Presence of Linear Electromagnetic Stirring	Assistant Professor, Jadavpur University
19	Abhijit Adoni	2008	Studies on Capillary Pumped Loop and Loop Heat Pipe Systems	Scientist at ISRO, Bangalore
20	Pramod Kumar	2008	Experimental Investigation of Rheocasting using Linear Electromagnetic Stirring	Assistant Professor, IISc Bangalore
21	Nitin Banker (co-guided with Prof. K. Srinivasan)	2007	Activated Carbon Based Adsorption Refrigeration System	Associate Prof., Ahmedabad University
22	Jeevan Jaidi	2003	Modelling Of Transport Phenomenon And Evaluation Of Weld Metal Microstructures In Gas Metal Arc Welding	Associate Professor, BITS Pilani Hyderabad
23	Suman Chakraborty	2002	Studies on Momentum, Heat and Mass Transfer in Binary Alloy Solidification Processes	Professor, IIT Kharagpur (currently Dean, Sponsored Research)
24	G. Phanikumar (co-guided with Prof. K. Chattopadhyay)	2002	Experimental and Computational Studies on Laser Processing of Dissimilar Metals	Professor, IIT Madras
25	C. K. Krishnaprakas	2001	Interaction of Radiation Heat Transfer with Conduction and Convection	Deceased (formerly at ISRO Satellite Centre, Bangalore)
26	Jose Prakash (co-guided with Prof. K. Srinivasan)	2000	Activated carbon-nitrogen adsorption cryocoolers: characterisation of sub-systems and experiments on a laboratory scale model	Professor, TKM College of Engineering, Kerala

**PhD thesis In progress**

27	Venkat Raghavendra (co-guide:Dr. Pramod Kumar) ERP	(in progress)	Thermal management with loop heat pipe coupled with phase change materials
28	Avinash Dash	(in progress)	Design and simulation of scroll expander for small scale Organic Rankine Cycle based CSP plants
29	N. Aswin	(in progress)	Chemisorption based thermal storage with metal hydrides
30	S. Sayuj (co-guide: Prof. K. P. J. Reddy)	(in progress)	Development of solar air receivers
31	Vijay Raj	(in progress)	Studies on thermal turbo-machinery in aero thermal loop
32	Ram Prasad (ERP)	(in progress)	Development of Stirling engine for space applications
33	M. Madhuri Reddy	(in progress)	Study on silica gel + water adsorption cooling cum desalination with 2-stage adsorption system
34	S. Sayuj	(in progress)	Development of a Hybrid Cavity and Tubular Solar Receiver for Supercritical Carbon Dioxide

## Masters Thesis

### A. MSc. Engineering (renamed as M.Tech – Research)

Sl. No.	Name (year graduated)	Thesis Title
1	Sarthak Sharma (submitted, 2019)	Experimental study of conventional and unconventional turbomachinery expanders in Organic Rankine Cycle
2	Sagar K. (2014)	Modeling and simulation of CO <sub>2</sub> based solar receivers
3	Amogh Sahaje (2014)	Numerical Heat Transfer Analysis of Volumetric Cavity Solar Receivers
4	Anoop Raghunath Kini (2013)	Studies on thixo-extrusion of aluminium alloys
5	Akila Harith (2012)	Thermodynamic analysis and simulation of a solar thermal power system
6	Apoorva (2012)	Microstructure evolution in semisolid processing
7	Poorva Golatkar (2011)	Modelling of Transport Phenomena in Arteries
8	Nitin Pathak (2009)	Effect of Mould Filling on Evolution of Mushy Zone and Macro-segregation during Solidification
9	Anuradha Sanyal (2006) (co-guided with Prof. K. Srinivasan)	Numerical studies on jet impingement cooling of pin-fin heat sinks
10	Vinod Kumar (2006)	Modelling of multiphase flow using a level set approach
11	Jishnu Bhattacharya (2005)	An enthalpy-based microscale model for alloy solidification

12	Sandip Kumar Saha (2005) (co-guided with Prof. K. Srinivasan)	Thermal management of electronics using phase change materials
13	Arvind Kumar (2003)	Modelling of Solidification in presence of Electro-magnetic Stirring
14	R. C. Behera (2003)	Numerical studies on pulsated impinging jets
15	Arnab Guha (2003)	Computational modeling of species transport during a laser surface alloying process
16	Rajib Chakraborty (2001)	Numerical Study of Marangoni Convection in Two Dissimilar Liquids, Separated Horizontally
17	Pramod Kumar (2001) (co-guided with Prof. K. Srinivasan)	Study of double diffusive convection during solidification of a binary alloy cooled from the top
18	P. Mohanraj (2000)	Transport Phenomena in Laser Surface Alloying
19	J. Harish (2000)	Computational Modelling of Heat Transfer in Reheat Furnaces

### B. Masters in Engineering (ME) Projects

Sl. No.	Name (year graduated)	Project Title
1	Akshay Chate (2019)	THERMOCHEMICAL ENERGY STORAGE FOR CABIN HEATING APPLICATION IN HYBRID ELECTRIC VEHICLES
2	Suyog Wani (2018)	MODELLING and DESIGN OF FLAT PLATE SOLAR COLLECTOR WITH INTEGRAL FIN EXTRUDED ALUMINIUM TUBES
3	Anil Verma (2017)	Modelling, design and fabrication of flat plate solar collector with integral fin extruded aluminium tubes
4	Aakash Tyagi (2016)	CFD Modelling and Thermal Analysis of Integral Fin Extruded Aluminium Flat Plate Solar Collector (FPC)
5	Ajinkya Meshram (2015)	CFD Modelling of Printed Circuit Heat Exchanger (PCHE) for single phase Regenerator
6	Chandan Singh (2014)	Design and Analysis of Heat Pipe based Solar Receiver for Pressurized Fluids
7	Ankush Kumar Jaiswal (2014)	Analysis of Annual Performance of a sCO <sub>2</sub> Brayton Power Plant
8	Pranay P. Raul (2013)	Performance analysis of heat pipe evaporator integrated with PCM
9	Abhishek (2013; (co-guide Dr. S. Basu))	Simulation of air humidifier for fuel cells
10	Pardeep Garg (2012)	Thermodynamic analysis of solar based organic Rankine cycles and closed cycle CO <sub>2</sub> Brayton Cycle
11	C. Sarma (2012) (co-guide Dr. S. Basu)	Study of evaporation characteristics in loop heat pipes
12	Pradeep Patel (2011)	Development of a Solar Powered Stirling engine / Stirling-Dish system
13	D. Vikas (2011)	Concentration and temperature measurements during solidification of binary alloy using laser Interferometry

14	Shreyas Gulati (2010)	CFD studies on cooling of data centers
15	Atul Verma (2009)	Study of Solidification in Squeeze Casting Process
16	Subhabrata Bannerjee (2009)	Study if Die Filling in Thixocasting Process
17	Anil Yadav (2008)	Simulation of Die Filling during Squeeze Casting Process
18	Anirban Bhattacharrya (2007)	Micro-scale modeling of binary alloy solidification
19	B. B. Murthy (2006)	Underhood and incabin thermal analysis using CFD
20	Jayesh Jain (2005)	Studies on freckles formation during solidification of a binary mixture cooled from below
21	Nirmal Kumar Kund (2005)	Experimental studies on liquid jet impingement cooling
22	Vaibhav Arghode (2004)	Computational modelling of GMAW process for joining dissimilar aluminium alloys
23	Nilkanta Barman (2004)	Measurement of liquid concentration during solidification of a binary mixture
24	Debashish Pal (2003)	A Fixed Grid Enthalpy Based Model For Dendritic Solidification
25	Kali Charan Nayak (2003)	Cooling of electronics using phase change material (PCM) and thermal conductivity enhancers (TCE)
26	S. Srikanth (2002)	Solution of Diffusion Problems using FVM with Unstructured Grids
27	Vinay Gupta (2002)	Modelling of Free Boundaries using Volume of Fluid (VOF) Method
28	Nilanjan Chakraborty (2001)	Development of a K-epsilon Turbulence model for Weld-pool Convection
29	J. Gopinath (MF)* (2001)	Study of laser surface treatment of steels
30	K. Suresh Kumar (MF)* (2001)	MIG Welding Of Cu with Mild Steel Filler Material
31	S. Biju (MF)* (2001)	Friction Stir Welding
32	Tarun Gupta (2000)	Modelling of Transport Phenomena in MIG Welding Process
33	B. S. Akkimaradi (2000)	Adsorption studies of R-134a on activated charcoal
34	Supriya Sarkar (2000)	Computational modeling of heat and mass transfer in laser surface alloying
35	Suman Chakraborty (1999)	Macroscopic modelling of binary alloy solidification: a generalised approach
36	Suvankar Ganguly (1999)	Computational modelling of particle melting and distribution in laser surface alloying
37	Shyama Prasad Das (1999)	Thermal Stratification in a side-heated cavity: experimental and numerical study
38	K. P. Deshkulkarni (1998)	Modelling of flow in an irregular geometry using a body-fitted coordinate system
39	Aravindakshan Pillai (1998)	Numerical simulation of thermal stratification in LH2 storage vessel
40	Ravindra Pardeshi (1998)	Computational modelling of laser welding of dissimilar metals