

Resumé

PRADIP DUTTA

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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 (IIT), Madras.
- B.Tech.**, Mechanical Engineering, 1983, Indian Institute of Technology (IIT), Kharagpur.

RESEARCH AND PROFESSIONAL EXPERIENCE

From	To	Position
17/3/2007	Present	Professor (Department Chair: March 2015 - January 2020) <ul style="list-style-type: none">○ J. R. D. TATA Chair (Oct. 2020 – Sept. 2023)○ Sir J.C. Bose National Fellow (January 2017 - present)○ INAE Chair Professor (April 2012 to March 2014) Dept. of Mechanical Engineering, Indian Institute of Science, Bangalore,
29/9/2001	16/3/2007	Associate Professor , Dept. of Mechanical Engineering, Indian Institute of Science, Bangalore,
16/10/1996	28/9/2001	Assistant Professor , Dept. of Mechanical Engineering, Indian Institute of Science, Bangalore,
1/8/1995	31/7/1996	Assistant Professor Department of Mechanical Engineering, Tennessee Technological University, Cookeville, TN
14/8/1993	30/6/1995	Lecturer , Department of Mechanical Engineering, Columbia University, New York City
18/9/1992	13/8/1993	National Research Council Postdoctoral Fellow , Naval Postgraduate School, Monterey
2/1/1987	14/9/1987	Research Associate , TATA Energy Research Institute (TERI), New Delhi
1/8/1983	31/7/1985	Project Engineer , 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.
May 2006 – June 2006 **Visiting Scientist**, General Motors R&D, Warren, Michigan, USA.

RESEARCH INTERESTS:

- Decarbonizing energy intensive manufacturing/ materials processing (renewable energy-based heating systems, solar thermal receivers, high temperature thermal storage systems).
- Sorption based hydrogen storage, multifunctional thermal battery, carbon capture.
- Integrated Renewable Energy Sources and Energy Storage Mix
- Active and passive cooling technologies for EV batteries, motors, power electronics.
- Heat Transfer in Manufacturing and Materials Processing

MAJOR AWARDS / RECOGNITION:

- Fellow, American Society of Mechanical Engineers (ASME); (elected in 2011).
- 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, Indian National Academy of Engineering (INAE) (elected in 2005).
- Distinguished Alumnus Award, IIT Madras (2017).
- Distinguished Alumnus Award, IIT Kharagpur (2015).
- J.C. Bose National Fellowship, 2017
- Outstanding Teacher Award, Indian National Academy of Engineering (INAE), 2014.
- VASVIK Award for Excellence in Industrial Research (Category: Mechanical and Structural Sciences and Technology), 2010.

EDITORIAL ACTIVITIES

- Subject Editor, *Applied Thermal Engineering* (Elsevier) (2024 – present).
- Associate Editor, *Thermal Science and Engineering Progress* (Elsevier), (2019 – present) .
- Associate Editor, *IEEE Transactions on Components, Packaging and Manufacturing Technology* (2007 – present).
- Associate Editor, *ASME Journal of Electronics Packaging* (2010 – 2019).
- Guest Editor, *Applied Thermal Engineering* (Elsevier), Special Issue on Solar Energy Research Institute for India and US (SERIUS), 2017.
- Regional Editor, *International Heat Transfer Conference* (IHTC), 2018, Beijing, China.

ADMINISTRATIVE POSITIONS and ACADEMIC GOVERNANCE:

At IISc Bangalore

- Co-Director, SHELL-IISc Collaborative Research Programme on Net-Zero Technologies (February 2023 – present)
- Chair, Dept. of Mechanical Engineering, IISc (March 2015 – Jan. 2020)
- Co-founder and Chair in-charge, Interdisciplinary Centre for Energy Research (ICER), IISc (2013; 2017-18).
- Director, Indian Scientific Innovation Co. Ltd. (A Section 8 Company involved in promoting start-ups and innovation ventures, with registered office at IISc campus) - 2016-present.
- Chair, External Research Program (ERP) Committee, IISc (October 2020 – present)
- Co-PI, Solar Energy Research Institute for India and the United States (SERIUS) www.serius.org
- Co-Director, General Motors-IISc Collaborative Research Laboratory (2010 – 2012)
- Convener, IISc Energy Initiative (2011-12)
- Co-Founder, National Facility for Semisolid Forming, IISc
- Member, IISc Buildings and Works Committee, IISc (2011-14, 2020 – present)
- 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)

At Columbia University, New York, USA:

- 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.

At Tennessee Tech. University, USA:

- Basic Engineering Faculty Advisor, Tennessee Technological University, 1995-96.

PROFESSIONAL / LEADERSHIP POSITIONS

- President, Indian Society for Heat and Mass Transfer (2018-2022).
- Theme Chair, Solar Thermal, Solar World Congress 2023.
- Chair, Expert Committee on Solar Energy Research and Demonstration, Department of Science and Technology (DST), Government of India (2019- present)

- Vice President, Indian Society for Heat and Mass Transfer (2010-2013)
- Convener, Sectional Committee III (Mechanical Engineering), Indian National Academy of Engineering (2018- 2020)

MAJOR INTERNATIONAL PROJECTS/GRANTS

Title	Funding Agency	Amount	Duration
(Co-PI and Lead coordinator from India) Solar Energy Research Institute for India and the United States (SERIUS) – a consortium under the Joint Clean Energy Research and Development Centre (JCERDC) (www.serius.org). Consortium had 34 partner institutions across both countries, with >200 researchers working on 24 projects. Dr. Dutta was the co-PI and the <i>lead coordinator from India side</i> .	Dept. of Science and Technology (DST), Govt. of India + Department of Energy (DOE), USA	Total funding US\$50 million including 50% cost share from industries	2012-2018
System Level Modelling and Optimization of Integrated Renewable Energy Sources and Storage Mix (PI) , as part of Indo-UK consortium project UKICERI	United Kingdom (UK)-India Clean Energy Programme)	Rs. 58.34 lakhs (US\$80,000)	2017-2021
Renewable Energy Based Multifunctional Solid Sorption Thermal Battery for Year-Round Building Thermal Management for Diverse Climatic Conditions of Russia, India and China (PI from India)	BRICS Programme	Rs. 41.64 lakhs (US\$58,000)	March 2019 – March 2022
Edu-Cool: Educational Program for Sustainable Heating and Cooling Solutions for India– Indo-EU Consortium Project (co-PI)	European Union (EU) - India	Rs. 32 lakhs (US\$43,000)	(2020-2023)
Future Refrigeration India: INDEE+ : Indo-NTNU, Norway Consortium project (co-PI)	Indo-Norway	Rs. 80 lakhs (US\$110,000)	(2020-2023)

OTHER GRANTS

Title	Funding Agency	Amount	Duration
National Centre for Clean Coal Research & Development (PI) (Consortium project lead by IISc. Participating institutions include IIT Kharagpur, IIT Madras, IIT Bombay, IIT Hyderabad and IIT Guwahati)	Dept. of Science and Technology (DST), Govt. of India	Total funding: Rs. 3400 lakhs (US\$4.66 million)	2018 – present
Detailed Project Report (DPR) for Concentrated Solar Power (CSP) Plant with Supercritical Carbon Dioxide (s-CO ₂) Power Cycle (PI)	DST	Rs. 151 lakhs (US\$200,000)	Sep. 2020 – March 2023
Development of Compact Heat Exchangers for Supercritical Carbon-dioxide Brayton Power Plants for CSP applications (co-PI)	DST	Rs. 273 lakhs (US\$375,000)	(2021-2024)

Development of High Temperature Vacuum Hot Press (co-PI)	ADA	Rs. 347 lakhs (US\$476,000)	2021-2022
Development of a T-CO ₂ (R-744) Chilled Water-Cooling Unit for Indian Navy (co-PI)	Indian NAVY	Rs. 199 lakhs (US\$273,000)	2020-2022
Development of High Efficiency Receiver for Supercritical CO ₂ Integrated with Static Focus Parabolic Dish (PI)	Ministry of New and Renewable Energy (MNRE)	Rs. 245 lakhs (US\$336,000)	2016-2018
Integral Fin Extruded Aluminium Flat Plate Solar Water Heater (PI)	DST ; Aditya Birla S&T Ltd. Is the industry partner	Rs. 79.5 lakhs (US\$110,000)	2015-2017
Chemi-Sorption Thermal Energy Storage- Application of Metal Hydrides. (PI)	DST	Rs. 68.35 lakhs (US\$85,000)	2015-2018
Solar Cooling and Production of Potable Water with 2-Stage Silica Gel – Water Adsorption system (PI) .	DST	Rs. 250 lakhs (US\$343,000)	2012-2015
Process Development in Semisolid Forming and Squeeze Casting of Aluminium Alloy Components for Automobile (PI)	Consortium project with TIFAC, TVS Motors, Sundaram Clayton, Mahindra and Mahindra	Rs. 320 lakhs (US\$439,000)	2008-2012
Microstructural characterization of aluminium alloy billets cast in a linear electromagnetic stirrer (PI)	DST, Ministry of Mines	Rs. 66 lakhs (US\$90,000)	2008-2012
Study of Die Filling during Semisolid Casting of Aluminium Components (PI)	DST, Ministry of Mines	Rs. 46 lakhs (US\$63,000)	2008-2012
Determination of parameters for semisolid processing of aluminium billets (PI)	Dept. of Science and Technology (DST)	Rs. 21 lakhs (US\$29,000)	2007-2008
National Facility for Semisolid Forming* (Co-PI)	Ministry of Mines, DST, DRDO	Rs. 700 lakhs (US\$960,000)	2001-2007
Development of Support System for Cooling of Electronic Equipment (co-PI)	DRDO	Rs. 65 lakhs (US\$89,000)	2001-2005
Modelling of Transport Phenomena during Laser Surface Alloying of Dissimilar Metals (PI)	CSIR	Rs. 7 lakhs (US\$10,000)	1999-2002
A Finite-Volume Based Computational Procedure for Calculation of Radiation Heat Transfer in Spacecraft Application (PI)	ISRO	Rs. 3 lakhs (US\$4,000)	1997-1999
Process Modelling and Evaluation of Weld Metal Microstructures and Properties in GTA and GMA Welding (PI)	DST	Rs. 12 lakhs (US\$16,500)	1997-2000

PROJECTS (Sponsored by Industries)

Title	Client	Funding	Duration
Controlled Atmosphere (CA)	Trane Technologies	Rs. 100 lakhs (US\$ 137,000)	2021- present
Danfoss Centre of Excellence (CoE) "Assessment of Natural Refrigerant Systems in Tropical Climates- Potential Applications and Case studies". (co-PI)	Danfoss (Multinational based in Denmark)	Rs. 100 lakhs (US\$137,000)	(2020-2024)
Chemical research for thermo-chemical energy storage (PI) :	Faurecia (Multinational based in France)	Rs. 45 lakhs (US\$62,000)	2018-2019
Development of Metal Hydride based High Temperature Thermal Energy Storage Systems for Waste Heat Utilization (PI)	GAIL (Gas Authority of India Limited)	Rs. 168 lakhs (US\$230,000)	2018-2020
Development of a Mechanistic Model for Shrinkage Prediction (PI)	General Motors, USA	Rs. 68 lakhs (US\$93,000)	2010-2014
Role of solid phase movement and re-melting on macrosegregation in binary alloy solidification process (PI)	General Motors (USA)	Rs. 85 lakhs (US\$117,000)	2005-2009
Thermal and Mechanical Design of Electronic Equipment	HCL Technologies, Bangalore	Rs. 5 lakhs	2006 – 2008
Evaluation of Cooling Tower Performance	RVUNL, Kota, Rajasthan		2005
Incabin and underhood thermal analysis (PI)	TATA Motors	Rs. 45 lakhs (US\$62,000)	2005-2007
Use of phase change materials for cooling of automotive electronics (PI)	Delphi , USA	Rs. 6 lakhs	2005
Microstructure and modelling of the fusion zone during welding of Al-Mg castings to Al-Mg extrusions (PI)	General Motors (USA)	Rs. 80 lakh (US\$110,000)	2001-2004

INVITED KEYNOTE/PLENARY LECTURES (selected)

- **Plenary Lecture**, 2nd China Heat Pump Conference (CHPC2024), to be held on August 27-30, 2024 in Shenzhen (China).
- **Invited Lecture**, Sixth International Conference on Computational Methods for Thermal and Energy Problems, to be held between September 9 and 11, 2024 in Budva, Montenegro.
- **Plenary Lecture**, 2nd International Conference on Energy Storage and Saving (ICENSS-2023) at Xi'an Jiaotong University, 24th – 28th November 2023.
- **Plenary Lecture**, 7th International Workshop on Heat Transfer Advances for Energy Conservation and Pollution Control (IWHT2023), August 4-8, Tokushima, Japan.2023.
- December 2021, **Plenary Lecture**, 48th NATIONAL CONFERENCE ON FLUID MECHANICS AND FLUID POWER (FMFP 2021), BITS Pilani, 27TH – 29TH DEC., 2021.
- October 2021, **Keynote Speaker** at the International Conference of Polygeneration – ICP 2021, 4-6 October 2021 (online; Organized by Universitat Rovira i Virgili, Tarragona, Spain).
- 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 15th 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 58th Indian Foundry Congress, Ahmedabad , entitled, “Development of a Thixocasting Process for a Near Net Shape Automobile Component”.
- Feb. 13, 2009, **Invited Lecture** at the 57th Indian Foundry Congress, Kolkata, entitled “Semisolid Manufacturing”.
- Nov. 21, 2009, **Invited Lecture** at the 4th International Conference on Solidification Science and Processing (ICSSP4), IIT Madras, entitled “Influence of Solid Phase Movement and Melt Convection on Macrosegregation and Microstructure Formation”.

OTHER PROFESSIONAL ACTIVITIES

- Member, International Advisory Committee of “Fast Forward with Solar Mission”, FFSM-2014
- Convener, Sectional Committee III, INAE (2018-2020); Member (2015-2017).
- Chair, DST INSPIRE faculty selection committee (Engineering and Technology section).
- 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, 19th 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 - ASME (Fellow grade).
- American Society of Thermal and Fluids Engineers - ASTFE (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.

TEACHING EXPERIENCE

Courses taught at IISc, Bangalore

- Renewable Energy Technologies (ER 201)
- Thermal Management of Electronics (ME 272)
- Design and Analysis of Thermal Systems (ER 205)
- Thermodynamics (ME 271)
- Computational Heat Transfer and Fluid Flow (ME 282)
- Convective Heat Transfer (ME 274)

PATENTS

- 1) "A THERMOCHEMICAL REACTOR CARTRIDGE" (*Indian Patent granted, 2023*).
- 2) "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*)
- 3) "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: 220 approx.; Google Scholar citations: ~9906; H-index = 2*)
 Google Scholar: <https://scholar.google.co.in/citations?user=9Kc9XlkAAAAJ&hl=en>

THESIS SUPERVISION (see Appendix B for full list)

- **Total PhD Thesis guidance : 42** (32 completed, 10 in progress)
- **Total Masters Thesis guidance : 64** (19 M. Tech. Res. + 45 M. Tech.)

Appendix A

List of Publications

Books and book chapters

1. Sourav Mitra, Pradip Dutta, and Bidyut Baran Saha, “Scaling of heat and mass transfer processes in adsorption column”, in ADVANCES IN HEAT TRANSFER, Edited by: J. P. Abraham, J. M. Morgan, and W. J. Minkowycz; Academic Press (Elsevier), 2023.
2. S. Khivisara, S. Sayuj and P. Dutta, “Commercial CSP Plants and Markets”. In *Handbook of Solar Thermal Technologies*, Volume 1: Concentrating Solar Power — Principles and Applications. Edited By: Clifford K Ho; World Scientific Publishing Company, November 2022.
3. P. Dutta and P. Kumar, “Supercritical Carbon Dioxide-Based Power Cycles”, in *Encyclopedia of Sustainable Technologies*, 2017, Pages 419-428, Elsevier.
4. P. Dutta, “COMPUTATIONAL FLUID DYNAMICS AND HEAT TRANSFER”, Web based course material under the National Programme on Technology Enhanced Learning (NPTEL, Phase 2), 2012.
5. P. Dutta, “HEAT AND MASS TRANSFER”, Web based course material under the National Programme on Technology Enhanced Learning (NPTEL, Phase 1), 2006.
6. P. Dutta and K. Srinivasan, “THERMODYNAMICS”, Web based course material under the National Programme on Technology Enhanced Learning (NPTEL, Phase 1), 2006.
7. 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).
8. 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).
9. 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:

Papers published / accepted:

- J1. MR Madhuri, K Srinivasan, P Dutta, “Experimental studies on the impact of adsorbent particle size on the adsorption chiller performance”, *International Journal of Refrigeration*, Volume 164, August 2024, Pages 154-166.
- J2. K. Jain, S. Dash and P. Dutta, “A scaling procedure for designing thermochemical energy storage system”, *International Journal of Heat and Mass Transfer*, Volume 220, March 2024, 124981.

- J3. MR Madhuri, K Srinivasan, P Dutta, “Performance evaluation of a two-stage air-cooled silica gel+ water adsorption cooling system: Effect of key operational parameters”, *Applied Thermal Engineering*, Volume 232, September 2023, 120991.
- J4. K. Malleswararao, Pramod Kumar, Pradip Dutta, S. Srinivasa Murthy, “Experimental studies on LaNi₄.25Al_{0.75} alloy for hydrogen and thermal energy storage applications”, *International Journal of Hydrogen Energy*, Volume 48, Issue 69, 12 August 2023, Pages 26911-26920.
- J5. Akshay Chate, Pradip Dutta, Srinivasa Murthy S, “Performance analysis of a thermochemical energy storage system for battery preheating in electric vehicles”, *Applied Thermal Engineering*, Volume 219, Part A, 25 January 2023, 119439.
- J6. Akshay Chate, Rakesh Sharma, Pradip Dutta, Srinivasa Murthy S, “Studies on a potassium carbonate salt hydrate based thermochemical energy storage system”, *Energy*, Volume 258, 1 November 2022, 124873.
- J7. S. Sayuj and P. Dutta, “Numerical and experimental studies on a pressurized hybrid tubular and cavity solar air receiver using a Scheffler reflector”, *Applied Thermal Engineering*, Volume 214, September 2022, 118898. (<https://doi.org/10.1016/j.applthermaleng.2022.118898>).
- J8. S. Sayuj and P. Dutta, “Studies on thermal energy storage system with ceramic honeycomb channels”, *Journal of Energy Storage*, Volume 52, Part B, 15, 2022, 104867.
- J9. K. Malleswararao, N.Aswin, Pramod Kumar, Pradip Dutta, S. Srinivasa Murthy, “Experiments on a novel metal hydride cartridge for hydrogen storage and low temperature thermal storage”, *International Journal of Hydrogen Energy*, Volume 47, Issue 36, 29 April 2022, Pages 16144-16155.
- J10. Sachin Kumar, Rakesh Sharma, S. Srinivasa Murthy, Pradip Dutta, Wei He, Jihong Wang, “Thermal analysis and optimization of stand-alone microgrids with metal hydride based hydrogen storage”, *Sustainable Energy Technologies and Assessments*, Volume 52, Part A, August 2022, 102043.
- J11. H. Venu Madhav, Venkata Raghavendra, Pramod Kumar, Amrit Ambirajan, Pradip Dutta, “Development of a Canister Module for PCM Coupled Heat Pipe in Spacecraft Thermal Management”, *IEEE Transactions on Components, Packaging and Manufacturing Technology*, Volume: 11, Issue: 11, 2021.
- J12. S. Sayuj and P. Dutta, “Optical Characterization of a Fixed Focus Scheffler Reflector for Pressurized Solar Receiver Testing”, *Solar Energy*, Volume 227, October 2021, Pages 89-100.
- J13. Taisen Yan, Tingxian Li, Jiaying Xu, Jingwei Chao, Ruzhu Wang, Yuri I. Aristov, Larisa G. Gordeeva, Pradip Dutta, and S. Srinivasa Murthy, “Ultrahigh-Energy-Density Sorption Thermal Battery Enabled by Graphene Aerogel-Based Composite Sorbents for Thermal Energy Harvesting from Air” *ACS Energy Lett.*, 2021, 6, 1795–1802.
- J14. S. S. Murthy, Rakesh Sharma, Pradip Dutta, E. Anil Kumar, Yuri Aristov, M.M. Tokrev, Tingxian Li, Ruzhu Wang, “AMMONIATED SALT BASED SOLID SORPTION THERMAL BATTERIES: A COMPARATIVE STUDY”, *Applied Thermal Engineering*, 191 (2021) 116875.
- J15. Malleswararao M Katamala, Aswin N, S. Srinivasa Murthy, Pradip Dutta, “Studies on a Dynamically Coupled Multifunctional Metal Hydride Thermal Battery”, *Journal of Alloys and Compounds*, Volume 866, 15 June 2021, 158979.
- J16. Sachin Kumar, Pradip Dutta, S. Srinivasa Murthy, Y. Aristov, L.Gordeeva, T.X. Li, R.Z. Wang, “A Metal Hydride Based Year-Round Comfort Heating and Cooling System for Extreme Climates”, *Energy and Buildings*, Volume 244, 1 August 2021, 111042.
- J17. Madhuri R. Manila, S. Mitra, P. Dutta, “Studies on dynamics of two-stage air cooled water/silica gel adsorption system”, *Applied Thermal Engineering*, 2020, DOI: 10.1016/j.applthermaleng.2020.115552.
- J18. S. Sayuj and P. Dutta, “Numerical analysis of a hybrid tubular and cavity air receiver for solar thermal

applications”, *International Journal of Numerical Methods for Heat & Fluid Flow*, Dec. 2020, DOI: 10.1108/HFF-01-2020-0006.

- J19. SK Singh, K Chattopadhyay, P Dutta, “Determination of Optimum Process Parameters and Residual Stress in Friction Welding of Thixocast A356 Aluminum Alloy”, *Metallurgical and Materials Transactions B*, volume 51, pages3079–3088(2020).
- J20. P. Das and P. Dutta, “Globularization of Primary phase of Al-7Si-0.3Mg alloy during cooling slope processing and isothermal holding”, *Transactions of the Indian Institute of Metals*, vol. 74(2) DOI:10.1007/s12666-020-02177-3 (Special Issue: Design and Manufacturing).
- J21. V Pandey, P Kumar, P Dutta, “Thermo-hydraulic analysis of compact heat exchanger for a simple recuperated sCO₂ Brayton cycle”, *Renewable and Sustainable Energy Reviews*, Volume 134, December 2020, 110091.
- J22. S. Srinivasa Murthy, Pradip Dutta, Badri S. Rao, Rakesh Sharma, “Performance analysis of a stand-alone polygeneration microgrid”, *Thermal Science and Engineering Progress*, Volume 19, 1 October 2020, 100623.
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Appendix B

Thesis Supervised

Total: 42 PhDs (32 completed + 10 in progress); 61 Masters

Ph.D. thesis Awarded				
Sl. No.	Name	Year graduated	Thesis Title	Present position
1	K. Malleswararao	2023	Studies on performance of metal hydride based thermal energy storage systems	Post Doctoral Fellow, Stuttgart University, Germany.
2	Manila Madhuri Reddy	2023	Studies on Two-stage Air-cooled Silica gel + Water Adsorption Cooling System	Post Doctoral Fellow, TU Delft, Netherlands
3	Sayuj Sasidharan	2022	Studies on Pressurized Solar Thermal Receiver and Thermal Energy Storage System	Post Doctoral Fellow, Trinity College, Dublin
4	Venkat Raghavendra (co-guide:Prof. Pramod Kumar)	2020	Development of PCM coupled heat pipe for space application	Scientist, Indian Space Research Organization (ISRO)
5	K. Vijayaraj ((co-guide:Dr. Punit Singh of CST)	2020	Thermal Turbomachinery Design for Closed Thermal Cycles and Multiple Fluids	Assistant Professor, NIT Calicut.
6	Avinash Dash	2021	Analysis and Modelling of Small Scale Organic Rankine Cycle System with Scroll Expander	Analyst, PwC Mumbai
7	Sagar D. Khivsara	2019	Development of Tubular Solar Receiver with Supercritical Carbon Dioxide as Working Fluid	R&D Engineer at Taiwan Semiconductor Manufacturing Company (TSMC), Taiwan
8	A. R. Anand	2017	Investigations on miniature loop heat pipe with flat evaporator	Scientist, Indian Space Research Organization (ISRO)
9	Sandip Sarkar	2017	Studies on multiphase and multiscale transport phenomena in presence of superimposed magnetic field	Associate Professor, Jadavpur University
10	Prosenjit Das	2016	Study of Rheo-pressure die casting of Al alloys using Cooling slope technique	Assistant Professor, IISc Bangalore
11	Swapnil Dalal (jointly with Prof. G. Tomar)	2016	Numerical Simulation of Two Phase Polymeric Flows	Post doctoral fellow at Ecole Polytechnique, France
12	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.
13	Diptimayee Samantaray	2015	Effect of Semi-Solid Processing on microstructural Evolution and Mechanical Behavior of Austenitic Stainless Steel	Scientist at IGCAR, Kalpakkam
14	Kali Charan Nayak	2014	Studies on labyrinth seal leakage and windage heating	Rolls-Royce Aerospace Engineering
15	Anirban Bhattacharya	2015	Development of mechanistic model for prediction of solidification shrinkage	Associate Professor, IIT Bhubaneswar (after post doc at U of Manchester, GE Bangalore)

16	K. Shyamprasad	2012	Modeling growth and motion of hydrogen bubbles and equiaxed dendrites during solidification of aluminum alloys	Professor, IIT Bombay
17	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)
18	Nirmal Kumar Kund	2012	Studies on solidification of aluminum alloy flowing on a cooling slope	Associate Professor, KIIT University, Bhubaneswar
19	Prodyut Chakraborty	2011	Single-phase and Multi-phase Convection during Solidification of Non-eutectic Binary Solutions	Professor & Dept. Head, IIT Jodhpur
20	Ravindra Pardeshi	2010	Multi-scale Segregation Model for Alloy Solidification Process	Aditya Birla Science and Technology Co. Ltd.
21	Sandip Kumar Saha	2010	Cooling of Electronics with Phase Change Materials under Constant and Cyclic Heat Loads	Professor, IIT Bombay
22	Madhusudhana Rao Gavara	2010	Role of Mixed Convection in Cooling of Electronics	Assistant Professor, IIT Guwahati
23	Arvind Kumar	2009	Role of solid phase movement and re-melting on macrosegregation and microstructure in solidification processing	Associate Professor, IIT Kanpur
24	Nilkanta Barman	2009	Studies on Transport Phenomena during Solidification in Presence of Linear Electromagnetic Stirring	Dean, Ghani Khan Choudhury Institute of Engineering and Technology, Malda, W.B.
25	Abhijit Adoni	2008	Studies on Capillary Pumped Loop and Loop Heat Pipe Systems	Scientist at ISRO, Bangalore
26	Pramod Kumar	2008	Experimental Investigation of Rheocasting using Linear Electromagnetic Stirring	Professor, IISc Bangalore
27	Nitin Banker (co-guided with Prof. K. Srinivasan)	2007	Activated Carbon Based Adsorption Refrigeration System	Associate Prof., NIT Calicut
28	Jeevan Jaidi	2003	Modelling Of Transport Phenomenon And Evaluation Of Weld Metal Microstructures In Gas Metal Arc Welding	Professor, BITS Pilani Hyderabad
29	Suman Chakraborty	2002	Studies on Momentum, Heat and Mass Transfer in Binary Alloy Solidification Processes	Professor, IIT Kharagpur
30	G. Phanikumar (co-guided with Prof. K. Chattopadhyay)	2002	Experimental and Computational Studies on Laser Processing of Dissimilar Metals	Professor, IIT Madras
31	C. K. Krishnaprakas	2001	Interaction of Radiation Heat Transfer with Conduction and Convection	<i>Deceased</i> (formerly at ISRO Satellite Centre, Bangalore)
32	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

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

Sl. No.	Name (year graduated)	Thesis Title
1	Sarthak Sharma (2020)	Analysis and Design of Organic Rankine Cycle based Power Plants
2	Sagar K. (2014)	Modeling and simulation of CO ₂ 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

ME / M. Tech Dissertation Projects

Sl. No.	Name (year graduated)	Project Title
1	Angar Komarpant (2021)	System level simulation and performance evaluation of multi-stage silica gel – water adsorption based cooling system
2	Sachin Kumar (2020)	Metal hydride based year-round comfort heating and cooling system for extreme climates
3	Akshay Chate (2019)	Thermochemical energy storage system for cabin heating application in hybrid electric vehicles.

4	Suyog Wani (2018)	Analysis and performance evaluation of flat plate solar collector with integral fin extruded aluminium tubes.
5	Anil Verma (2017)	Modelling, design and fabrication of flat plate solar collector with integral fin extruded aluminium tubes
6	Aakash Tyagi (2016)	CFD Modelling and Thermal Analysis of Integral Fin Extruded Aluminium Flat Plate Solar Collector (FPC)
7	Ajinkya Meshram (2015)	CFD Modelling of Printed Circuit Heat Exchanger (PCHE) for single phase Regenerator
8	Chandan Singh (2014)	Design and Analysis of Heat Pipe based Solar Receiver for Pressurized Fluids
9	Ankush Kumar Jaiswal (2014)	Analysis of Annual Performance of a sCO ₂ Brayton Power Plant
10	Pranay P. Raul (2013)	Performance analysis of heat pipe evaporator integrated with PCM
11	Abhishek (2013); (co-guide Dr. S. Basu)	CFD modelling and optimization of air humidifier for fuel cell power systems
12	Pardeep Garg (2012)	Thermodynamic analysis of solar based organic Rankine cycles and closed cycle CO ₂ Brayton Cycle
13	C. Sarma (2012); (co-guide Dr. S. Basu)	Study of evaporation characteristics in loop heat pipes
14	Pradeep Patel (2011)	Development of a Solar Powered Stirling engine / Stirling-Dish system
15	D. Vikas (2011)	Concentration and temperature measurements during solidification of binary alloy using laser Interferometry
16	Shreyas Gulati (2010)	CFD studies on cooling of data centers
17	Atul Verma (2009)	Study of Solidification in Squeeze Casting Process
18	Subhabrata Bannerjee (2009)	Study of Die Filling in Thixocasting Process
19	Anil Yadav (2008)	Simulation of Die Filling during Squeeze Casting Process
20	Anirban Bhattacharyya (2007)	Micro-scale modeling of binary alloy solidification
21	B. B. Murthy (2006)	Underhood and incabin thermal analysis using CFD
22	Jayesh Jain (2005)	Studies on freckles formation during solidification of a binary mixture cooled from below
23	Nirmal Kumar Kund (2005)	Experimental studies on liquid jet impingement cooling
24	Vaibhav Arghode (2004)	Computational modelling of GMAW process for joining dissimilar aluminium alloys
25	Nilkanta Barman (2004)	Measurement of liquid concentration during solidification of a binary mixture
26	Debashish Pal (2003)	A Fixed Grid Enthalpy Based Model For Dendritic Solidification
27	Kali Charan Nayak (2003)	Cooling of electronics using phase change material (PCM) and thermal conductivity enhancers (TCE)
28	S. Srikanth (2002)	Solution of Diffusion Problems using FVM with Unstructured Grids
29	Vinay Gupta (2002)	Modelling of Free Boundaries using Volume of Fluid (VOF) Method
30	Nilanjan Chakraborty (2001)	Development of a K-epsilon Turbulence model for Weld-pool Convection
31	J. Gopinath (MF)* (2001)	Study of laser surface treatment of steels
32	K. Suresh Kumar (MF) * (2001)	MIG Welding Of Cu with Mild Steel Filler Material

33	S. Biju (MF) * (2001)	Friction Stir Welding
34	Tarun Gupta (2000)	Modelling of Transport Phenomena in MIG Welding Process
35	B. S. Akkimaradi (2000)	Adsorption studies of R-134a on activated charcoal
36	Supriya Sarkar (2000)	Computational modeling of heat and mass transfer in laser surface alloying
37	Suman Chakraborty (1999)	Macroscopic modelling of binary alloy solidification: a generalised approach
38	Suvankar Ganguly (1999)	Computational modelling of particle melting and distribution in laser surface alloying
39	Shyama Prasad Das (1999)	Thermal Stratification in a side-heated cavity: experimental and numerical study
40	K. P. Deshkulkarni (1998)	Modelling of flow in an irregular geometry using a body-fitted coordinate system
41	Aravindakshan Pillai (1998)	Numerical simulation of thermal stratification in LH2 storage vessel
42	Ravindra Pardeshi (1998)	Computational modelling of laser welding of dissimilar metals