

Bio data of Dr. Shitanshu Shekhar Chakraborty (Email: ss.chakraborty@cmeri.res.in / situspeaks@gmail.com)



Dr. Shitanshu Shekhar Chakraborty is currently working as a Senior Scientist at CSIR-Central Mechanical Engineering Research Institute (CSIR-CMERI). He joined as a Scientist here on 31/10/2016. His research interest includes Laser Materials Processing, Modelling of Thermo-mechanical problems, Additive Manufacturing and Friction Stir Welding. He has been working on research projects in these areas funded by Department of Science and Technology, Science and Engineering Research Board and Council of Scientific and Industrial Research. He has presented invited lectures on different occasions at venues like IIT Kharagpur, IIT Guwahati and other institutions. He is a reviewer of International Journal of Machine Tools and Manufacture, Journal of Manufacturing Processes, Optics and Laser Technology, Journal of Laser Applications, Metals (MDPI), Crystals (MDPI), Materials (MDPI), International Journal of Materials Research, Sādhanā, Materials Today Proceedings, Smart Materials in Manufacturing and Advances in Materials & Processing Technologies. He served as a guest Editor of the special issue “Symposium on Failure and Preventive Maintenance of Machineries 2022” in Materials Today: Proceedings. He is also an Assistant Professor of Academy of Scientific and Innovative Research where he is engaged in teaching *Research Methodology* (portion related to Design and Analysis of Experiments), *Manufacturing Process Modelling* and *Research Publication and Ethics*. He jointly guided past thesis works of 5 M.Tech. students. He is supervising 3 PhD students. He is a member of ‘Indian Laser Association’ and ‘The Institution of Engineers (India)’. He completed his Ph.D. and Masters from Indian Institute of Technology Kharagpur, in 2015 and 2010 respectively, in the field of Manufacturing Science and Engineering. In 2008, he graduated as a Mechanical Engineer from Jalpaiguri Government Engineering College.

Academic Qualification (Undergraduate Onwards)

	Degree	Year	Specialization	University/Institution	% of Marks
1	Bachelor of Technology	2008	Mechanical Engineering	Jalpaiguri Govt. Engg. College (West Bengal University of Technology)	DGPA (Degree Grade Point Average) - 8.42 (on a 10-point scale)
2	Master of Technology	2010	Manufacturing Science and Engineering	Indian Institute of Technology Kharagpur	CGPA (Cumulative Grade Point Average) – 9.58 (on a 10-point scale)
3	Doctor of Philosophy	2015	Laser metal forming	Indian Institute of Technology Kharagpur	Not applicable

Work Experience (in chronological order)

Sl. no.	Position held	Name of the Institute	From	To	Pay scale
1	Assistant Professor	Academy of Technology	06/01/2016	28/10/2016	Basic pay: Rs. 24,670 Grade Pay: Rs. 8,000
2	Scientist	CSIR-Central Mechanical Engineering Research Institute	31/10/2016	30/10/2020	Pay level: 11, 7 th CPC
3	Senior Scientist	CSIR-Central Mechanical Engineering Research Institute	31/10/2020	Till Date	Pay level: 12, 7 th CPC

Google Scholar Profile: <https://scholar.google.com/citations?user=z2TZZmMAAAJ&hl=en>

Scopus Profile: <https://www.scopus.com/authid/detail.uri?authorId=57211726778>

MAJOR R&D PROJECTS COMPLETED AS PRINCIPAL INVESTIGATOR

Project title: Laser forming of aluminium foam plate to produce curved surfaces
Cost: 36.17 lakhs INR
Funding agency: Science and Engineering Research Board (SERB), Government of India
Duration: 08/10/2018 to 02/03/2022
Output: Published 5 journal papers and a book chapter. A Ph.D. thesis is to be submitted.

Project title: Design and development of a versatile welding fixture for manufacturing of prototypes
Cost: 6 lakhs INR
Funding agency: Council of Scientific and Industrial Research
Duration: 01/12/2016 to 31/03/2018
Output: Filed one Indian patent application on the welding fixture developed

MAJOR R&D PROJECTS CURRENTLY EXECUTING AS PRINCIPAL INVESTIGATOR

Project title: Laser additive manufacturing of tungsten carbide tool for friction stir welding of aluminium to steel
Cost: 31.54 lakhs INR
Funding agency: Department of Science and Technology (DST), Government of India
Duration: 02/03/2020 to 31/03/2024

Students guided

Guided past (in joint supervision): 05 M. Tech. thesis
Ongoing supervision (in joint supervision): 03 Ph.D. thesis

Journal papers

1. Anirban Changdar, **Shitanshu Shekhar Chakraborty**, Yuncang Li, Cuie Wen*, "Laser additive manufacturing of aluminum-based stochastic and nonstochastic cellular materials", *Journal of Materials Science & Technology*, <https://doi.org/10.1016/j.jmst.2023.09.045>.
2. Anirban Changdar, Ankit Shrivastava, **Shitanshu Shekhar Chakraborty***, Samik Dutta, "Laser forming of aluminium foam sandwich into a shock-absorbing structural part", *Proceedings of the Institution of Mechanical Engineers, Part B: Journal of Engineering Manufacture*, <https://doi.org/10.1177/09544054231205102>.
3. Moumita Sarkar, **Shitanshu Shekhar Chakraborty**, Nilrudra Mandal*, "Influence of Vanadium Carbide as an Anti-wear Reinforcement in Zirconia-Toughened Alumina for High-Temperature Tribological Application", *Journal of Materials Engineering and Performance*, <https://doi.org/10.1007/s11665-023-08777-6>.
4. Abhijit Datta, Ankit Shrivastava, Nilrudra Mandal, Himadri Roy, **Shitanshu Shekhar Chakraborty***, "A comparative investigation of butt friction stir welding of aluminium alloys, AA 1100 and AA 7075, with AISI 304 stainless steel", *Welding in the World*, <https://doi.org/10.1007/s40194-023-01514-6>.
5. Subhrojyoti Mazumder, Kunal Ghosh, Bipin Kumar Singh, **Shitanshu Shekhar Chakraborty**, Nilrudra Mandal*, "Experimental and Finite Element Analyses for High-Speed Machining of AISI 4340 steel with ZTA Insert", *Journal of The Institution of Engineers (India): Series C*, <https://doi.org/10.1007/s40032-023-00917-0>.
6. Anirban Changdar, Ankit Shrivastava, **Shitanshu Shekhar Chakraborty***, Samik Dutta, "Investigation on laser forming of open cell aluminium foam", *Journal of Laser Applications*, <https://doi.org/10.2351/7.0000676>.
7. Ankit Shrivastava, **Shitanshu Shekhar Chakraborty***, Surjya Kanta Pal, "Thermo-mechanical finite element analysis of single-track deposition of Inconel-625 on AISI-1020 substrate", *Materials Today: Proceedings*, <https://doi.org/10.1016/j.matpr.2022.06.300>.
8. Abhijit Datta, Ankit Shrivastava, **Shitanshu Shekhar Chakraborty***, Surjya Kanta Pal, "Effect of work material combination and welding speed in dissimilar friction stir welding of aluminium to steel", *Materials Today: Proceedings*, <https://doi.org/10.1016/j.matpr.2022.05.558>.

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9. Anirban Changdar, Ankit Shrivastava, **Shitanshu Shekhar Chakraborty***, Samik Dutta, "Laser forming of difficult-to form Al-SiC composite foam – Experimental and numerical analyses", *Optics & Laser Technology*, <https://doi.org/10.1016/j.optlastec.2022.108009>.
10. Moumita Sarkar, Kishor Kumar Sadhu, **Shitanshu Shekhar Chakraborty**, Nilrudra Mandal*, "Simultaneous effect of CaF₂ and TiC on tribological properties of ZTA ceramics for high temperature application", *Materials Today: Proceedings*, <https://doi.org/10.1016/j.matpr.2022.01.442>.
11. Anshu Priya, Ankit Shrivastava, Sakila Khatun, **Shitanshu S. Chakraborty**, Poulomi Roy, Kashif Hasan Kazmi, Prakash Kumar, Sumanta Mukherjee*, "Mechanical and electrochemical properties of friction stir processed magnesium alloy AZ31 for biomedical applications: A pilot study", *Materials Today: Proceedings*, <https://doi.org/10.1016/j.matpr.2021.09.384>.
12. Ankit Shrivastava, Sumanta Mukherjee, **Shitanshu S. Chakraborty***, "Addressing the challenges in remanufacturing by laser-based material deposition techniques", *Optics & Laser Technology*, <https://doi.org/10.1016/j.optlastec.2021.107404>.
13. M Prudhvi Krishna, Simeon A. Babalola, Samik Dutta, **Shitanshu Shekhar Chakraborty**, Murugan Thangadurai, Himadri Roy, Nilrudra Mandal, Harish Hirani*, and Poulomi Roy* "Effectiveness of different facemask materials to combat transmission of airborne diseases" *Sādhanā*, <https://doi.org/10.1007/s12046-021-01634-z>.
14. Anirban Changdar, **Shitanshu S. Chakraborty***, "Laser processing of metal foam - a review", *Journal of Manufacturing Processes*, <https://doi.org/10.1016/j.jmapro.2020.10.012>.
15. Kuntal Maji*, **Shitanshu S. Chakraborty**, Dilip K Pratihari, Ashish K Nath, "Inverse analysis and multi-objective optimization of coupling mechanism based laser forming process", *Sādhanā*, <https://doi.org/10.1007/s12046-019-1245-3>.
16. **Shitanshu Shekhar Chakraborty***, Samik Dutta, "Estimation of dilution in laser cladding based on energy balance approach using regression analysis", *Sādhanā*, <https://doi.org/10.1007/s12046-019-1134-9>.
17. Ankit Shrivastava, Vikash Kumar, Vivek Singh, Sumanta Mukherjee, Prakash Kumar, **Shitanshu Shekhar Chakraborty***, "Estimation of residual stress and deformation of laser deposited tracks of Ni-5Mo-5Al powder using thermo-mechanical finite element simulation", *IOP Conference Series: Materials Science and Engineering*, <https://doi.org/10.1088/1757-899X/561/1/012059>.
18. Vikash Kumar, Ankit Shrivastava, Debapriya Patra Karmakar, **Shitanshu Shekhar Chakraborty**, Himadri Roy, Muvvala Gopinath, Prakash Kumar, Sumanta Mukherjee*, "Effect of process parameters on geometrical aspects in direct metal laser deposition of Ni5Mo5Al hardface coating", *IOP Conference Series: Materials Science and Engineering*, <https://doi.org/10.1088/1757-899X/561/1/012063>.
19. **Shitanshu Shekhar Chakraborty***, Vikranth Racherla, Ashish Kumar Nath, "Thermo-mechanical finite element study on deformation mechanics during radial scan line laser forming of a bowl shaped surface out of a thin sheet", *Journal of Manufacturing Processes*, <https://doi.org/10.1016/j.jmapro.2017.12.025>.
20. **Shitanshu Shekhar Chakraborty**, Harshit More, Ashish Kumar Nath*, "Laser forming of a bowl shaped surface with a stationary laser beam", *Optics and Lasers in Engineering*, <http://dx.doi.org/10.1016/j.optlaseng.2015.08.006>.
21. Sagar Sarkar, Muvvala Gopinath, **Shitanshu Shekhar Chakraborty**, Badirujjaman Syed, Ashish K. Nath*, "Analysis of temperature and surface hardening of low carbon thin steel sheets using Yb-fiber laser", *Surface & Coatings Technology*, <https://doi.org/10.1016/j.surfcoat.2016.06.045>.
22. **Shitanshu Shekhar Chakraborty**, Harshit More, Vikranth Racherla, Ashish Kumar Nath*, "Modification of bent angle of mechanically formed stainless steel sheets by laser forming", *Journal of Materials Processing Technology*, <http://dx.doi.org/10.1016/j.jmatprotec.2015.02.044>.
23. **Shitanshu S. Chakraborty**, Kuntal Maji, Vikranth Racherla, Ashish Kumar Nath*, "Investigation on laser forming of stainless steel sheets under coupling mechanism", *Optics & Laser Technology*, <http://dx.doi.org/10.1016/j.optlastec.2015.02.013>.
24. Yuvraj K. Madhukar, Suvradip Mullick, **Shitanshu S. Chakraborty**, Ashish Kumar Nath*, "Effect of water-jet on laser paint removal", *Procedia Engineering*, <https://doi.org/10.1016/j.proeng.2013.09.120>.

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25. **Shitanshu Shekhar Chakraborty**, Vikranth Racherla, Ashish Kumar Nath*, “Parametric study on bending and thickening in laser forming of a bowl shaped surface”, *Optics and Lasers in Engineering*, <http://dx.doi.org/10.1016/j.optlaseng.2012.06.003>.

Book chapters

1. Shrivastava, A., Singh, A. K., Sadhu, A., Chattopadhyay, A., Mukherjee, S., & **Chakraborty, S. S.** (2023). Laser Additive Manufacturing of Cemented Carbide. In *Laser Applications in Manufacturing* (pp. 99-119). CRC Press. <https://doi.org/10.1201/9781003279501-6>.
2. Kumar, V., Shrivastava, A., **Chakraborty, S. S.**, & Mukherjee, S. (2023). Directed Energy Deposition of Ni-Based Hard-Facing Alloy. In *Laser Applications in Manufacturing* (pp. 81-98). CRC Press. <https://doi.org/10.1201/9781003279501-5>.
3. Changdar, A. Chakraborty, S.S. (2022). “State-of-the-Art Manufacturing of Metal Foams and Processing—A Review”. Lecture Notes Mechanical Engineering, Uday S. Dixit et al. (Eds) in *Advances in Forming, Machining and Automation*. <https://doi.org/10.1007/978-981-19-3866-5>.
4. Alam, Md. Mofeed, Panda, Surya Narayan, **Chakraborty, Shitanshu S.** (2022) “Friction stir butt welding of commercially pure aluminium alloy sheets and assessment of mechanical properties of the welded joints”. *Advances in Mechanical and Industrial Engineering*, CRC Press (Taylor and Francis), <https://doi.org/10.1201/9781003216742-17>.
5. Mofeed Alam M., Jha A.K., Mukherjee S., Panda S., **Chakraborty S.S.** (2021). A Review on Friction Stir Welding—A Green Manufacturing Technology. In: Osman Zahid M.N., Abdul Sani A.S., Mohamad Yasin M.R., Ismail Z., Che Lah N.A., Mohd Turan F. (eds) *Recent Trends in Manufacturing and Materials Towards Industry 4.0. Lecture Notes in Mechanical Engineering*. Springer, Singapore. https://doi.org/10.1007/978-981-15-9505-9_76.
6. Jha A.K., Mofeed Alam M., **Chakraborty S.S.**, Kazmi K.H., Kumar P., Mukherjee S. (2021) Ductility Improvement in Commercially Pure Aluminium by Friction Stir Processing. In: Bag S., Paul C.P., Baruah M. (eds) *Next Generation Materials and Processing Technologies. Springer Proceedings in Materials*, vol 9. Springer, Singapore. https://doi.org/10.1007/978-981-16-0182-8_3.
7. Nath, Ashish, Sarkar, Sagar, Muvvala, Gopinath, Karmakar, Debapriya, **Chakraborty, Shitanshu S.**, Mullick, Suvradip, Madhukar, Yuvraj. (2019). *LASER-Based Manufacturing as a Green Manufacturing Process. Sustainable Material Forming and Joining* (2019): 303, CRC Press (Taylor and Francis), <https://doi.org/10.1201/9781315163147-15>.

Granted patent

1. Applicant: CSIR, Inventors: **Shitanshu Shekhar Chakraborty**, Palash Kumar Maji, Rakesh Kumar Padhi. A fixture to hold plates of varying sizes at different angles between them, for welding, using two breadboards and a hydraulic cylinder. Indian Patent no. 487847, Filed on: 05/04/2019, Granted on: 22/12/2023.

Filed patent

1. Poulomi Roy, **Shitanshu Shekhar Chakraborty**, Nilrudra Mandal, Bittagopal Mondal, Harish Hirani. Outdoor Air Purifier with Parallel Arrangement of Air Suction and Discharge. Indian Patent Application no. 202111045355, Filed on: 04/10/2021.

Registered copyright

Shitanshu Shekhar Chakraborty, Kalyan Chatterjee, Palash Chowdhury, Harish Hirani, Poulomi Roy. Electronically controlled pulsed mode oxygen rich air inhaler for conservation of oxygen - product description. Copyright registration number: L-117878/2022, Dated: 28/09/2022.

* Indicates corresponding author

Award

Best paper award at 35th National Convention of Production Engineers organized by The Institution of Engineers (India), Durgapur Local Centre during 30-31 October, 2021.

The coauthored paper titled "Investigation on laser forming of open cell aluminium foam" (<https://doi.org/10.2351/7.0000676>) was selected as a Featured Article in Volume 34 (2022) of Journal of Laser Applications.

Edited Journal Issue

Served as a guest Editor of the special issue "Symposium on Failure and Preventive Maintenance of Machineries 2022" in Materials Today: Proceedings.

Edited book

Dutta, S. and Chakraborty, SS. eds. Proceedings of National Conference on Advanced Materials, Manufacturing and Metrology. ISBN: 978-93-87480-56-8, 2018.