

ZAINUL ABEDIN

Doctoral Student

Department of Materials Science and Engineering

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RESEARCH INTERESTS

Computational Fluid Dynamics (CFD), Process Metallurgy, Heat Transfer, Transport Phenomena, Data-driven Modelling

EDUCATION

M.Tech & Ph.D., Dual Degree in Materials Science and Engineering, IIT Kanpur (2018-2026)	8.0/10
B.Tech., Metallurgical and Materials Engineering, NIT Durgapur (2013–2017)	7.95/10
Class 12, The Assembly of God Church School, Purulia (2013)	85.80%
Class 10, The Assembly of God Church School, Purulia (2011)	9.6/10

ACADEMIC CONTRIBUTIONS

Patents

1. A Capacitance-Based Liquid Level Sensor System for Continuous Monitoring of Liquid Level of Metals, Z. Abedin, V. Ravi, A.K. Singh, IN Patent 540270 (Granted)
2. High-throughput rapid temperature scanner cum data logger, Z. Abedin, V. Ravi, A.K. Singh, IN Patent (under examination)

Journals

1. Abedin, Z., V., Ravi, & Singh, A.K. Experimental and Numerical Investigation of Scrap Melting Progression Using Concentric Capacitive Molten Metal Level Sensing (communicated)
2. Abedin, Z., Dey, R., & Singh, A.K., Explicit Void-Resolved Modeling and Experimental Validation of Porous Scrap Melting (communicated)

RESEARCH EXPERIENCE

Ph.D.- Experimental and Numerical Investigation of Laboratory-scale Scrap Melting Progression (Pre-Defence Seminar 11th May 2026; Thesis Supervisor: Prof. Amarendra K. Singh)

M.Tech. Dissertation - Section Thickness-Driven Solidification and Property Evolution in Binary Alloy Wedge Castings: A High-Throughput Study (25th Mar 2026; Thesis Supervisor: Prof. Amarendra K. Singh)

Undergraduate Projects - Tribological behaviour of hyper-eutectic Al-Si alloy after semi-solid heat treatment (2017; Supervisor: Prof. Bijay K. Show)

Laser Welding of DP-600 and IF Steel and its Failure Analysis (2016; Supervisor: Dr. Kanwer Singh Arora, Principal Researcher, Tata Steel Jamshedpur)

Preparation and Characterisation of Nanocomposites using Molecular Precursors and their Application in Catalytic Photodegradation of Dyes (2015; Supervisor: Prof. Shaikh M. Mobin, IIT Indore)

National and International Conferences

1. Abedin, Z., Dey, R., & Singh, A.K. (2020), Numerical Study and Experimental Validation for Porous Mass Melting, 58th National Metallurgists Day And 74th Annual Technical Meeting, IIT Bombay
2. Abedin, Z., & Singh, A.K. (2022), Numerical and experimental studies on melting of scrap in an Electric Arc Furnace, International Conference on Physical and Mathematical Modelling in Iron and Steelmaking, IIT Kanpur
3. Abedin, Z., V., Ravi, Dey, R., & Singh, A.K. (2024), Numerical and Experimental Investigation of Scrap Melting Progression of Low Melting Point Metals, 9th Asia Steel International Conference, Changsha, China
4. Abedin, Z., & Singh, A.K. (2024), Numerical and Experimental Investigation of Porous Scrap Melting using a Metal Analog, 78th Annual Technical Meeting of The Indian Institute of Metals, Dr. Babu Rajendra Prasad International Convention Centre, Bangalore
5. Abedin, Z., & Singh, A.K. (2025), Influence of Porosity on Melting Dynamics of Low-Melting Alloys, Fifth International Conference on the Science & Technology of Ironmaking and Steelmaking, IISc Bangalore

Presentations

1. Poster: Physical and mathematical modelling of scrap melting process, IRS-IITK (2023)
2. Oral: Numerical and Experimental Investigation of Scrap Melting Progression of Low Melting Point Metals, National Symposium of Research Scholars (NSRS-2025)
3. Oral: Influence of Porosity on Melting Dynamics of Low-Melting Alloys, Padarth-Research Scholar's Day (2026)

WORKSHOPS/ SHORT TERM COURSES

1. Short term course on Sustainability in the Steel and its Refractory Industry by Prof. Geoffrey Brooks (Joint Swinburne–CSIRO Professor of Sustainable Mineral Engineering, Australia) at IIT Kanpur
2. Workshop on Standardization and Conformity Assessment (BIS and IIT Kanpur)
3. Short term course on Mechanical Behavior and Modelling of Materials organized by TEQIP II, NIT Durgapur.

AWARDS AND HONORS

1. Global Students Research Travel Grant (2025), King Fahd University of Petroleum and Minerals
2. JRF (2018) and SRF (2020) by MHRD

TECHNICAL SKILLS

1. **Simulation Tools:** ANSYS Fluent
2. **Programming:** C, C++, Python
3. **Materials Tools:** Thermo-Calc, Origin
4. **Other:** Experimental design, high-temperature measurements, data analysis, Digital Twin Modelling, MS Office, LaTeX

PROFESSIONAL MEMBERSHIPS

Indian Institute of Metals (IIM), The American Ceramic Society (ACerS), American Iron & Steel Technology (AIST), Advanced Materials & Processes International (ASM), The Minerals and Metals Society (TMS)

LEADERSHIP EXPERIENCE

1. Student guide for Institute counseling service at IIT Kanpur (2018-2019)
2. Material Advantage IIT Kanpur Chapter [Treasurer (2020- 2021), Vice-Chair (2021-2022)]
3. Member of the Hall-Executive Committee, IIT Kanpur (2022-2023)
4. Indian Society for Technical Education, [Executive committee member (2014-2016), Head of core committee (2016-2017)]

TEACHING EXPERIENCE

1. Process Engineering Laboratory tutor, MSE314A (Aug 2021-Dec 2021)
2. TA for Process Engineering Laboratory, MSE314A (Jan 2022- May 2022)
3. TA for Steel Plant Technologies- Operations & Equipment, Corrosion Engineering.

INDUSTRIAL EXPERIENCE

1. Graduate Engineer Trainee, Thin strip caster operations, Bhushan Power & Steel Ltd., India (Jul 2017 – Dec 2017).
2. Vocational Training at Durgapur Steel Plant (SAIL)- 2016.

EXTRA CURRICULAR

Cooking, Photography, Athletics (Discus Throw)

PERSONAL INFORMATION

Date of Birth: 02 Jul 1995

Languages: English, Hindi, Bengali

REFERENCES

1. **Prof. Amarendra Kumar Singh**

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2. **Prof. Dipak Mazumdar**

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3. **Prof. Bijay Kumar Show**

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