MD SOJIB HOSSAIN

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CORE COMPETENCIES

• Physical Metallurgy • Additive Manufacturing • Equilibrium, and Non-Equilibrium Solidification • Laser Surface Modification • Electrochemistry • Composites • Metallurgical Process Development

EDUCATION

University of Virginia *Charlottesville, VA*
PhD in Materials Science & Engineering. ***Summer; 2025 (expected)***

Relevant Courses: Electronic and Crystal Structure of Materials, Thermodynamics of Materials, Continuum Mechanics, Defects & Microstructure in Materials, Kinetics of Solid-State Reactions, Deformation and Fracture of Materials, Characterization of Materials, Fracture Mechanics of Engineering Materials, Additive Manufacturing of Metals.

Bangladesh University of Eng. & Tech. (BUET) *Dhaka, Bangladesh*
BS in Materials & Metallurgical Engineering. *2016*

EXPERIENCE

Research Assistant, University of Virginia *August 2021 - Present*

Advancing Laser Surface Modification Techniques to Mitigate Intergranular Corrosion of AA5XXX Alloys

- Enhanced corrosion resistance of AA5083 alloy through excimer and ADAPT laser surface melting (LSM), reducing susceptibility to intergranular corrosion in marine environments.
- Showed excimer LSM creates a homogenized surface layer with fine sub-grains, interrupting IGC pathways and increasing durability.
- Mentored new PhD and undergraduate students in the research group.

Collaborating with Virginia Transportation Research Council on Dissimilar Metal Joining Standards for Bridge Construction

- Optimized processing parameters to prevent solidification and cold cracking in dissimilar metal joints, improving reliability in bridge infrastructure.
- Revised constitutional diagrams for accurate delta ferrite prediction and refined filler metal selection criteria, reducing solidification cracking risks.
- Demonstrated the efficacy of cored wire electrodes in minimizing cracking by promoting finer grains and favorable orientations.
- Contributed to standardized procedures for dissimilar metal joining, aiding the Virginia Transportation Research Council in establishing new guidelines.

Assistant Engineer, Titas Gas Transmission & Distribution Company Ltd., Bangladesh *December 2018 – August 2021*

Responsibilities: Gas pipeline design, welding, NDT, and cathodic protection.

Deputy Director, Walton Hi-Tech Industries PLC, Bangladesh *November 2016 – December 2018*

Establishing Metallurgical Processes for Compressor Block Manufacturing

- Developed cost-effective casting processes, enabling exports to European markets.
- Innovated gating and feeding systems for seamless compressor block casting.
- Integrated thermal analysis to ensure metallurgical consistency and reduce costs.
- Scaled up as-cast ferritic gray iron production, minimizing annealing needs.
- Designed economical melting processes, replacing costly pre-conditioners while maintaining quality.
- Optimized inoculant usage across varying sulfur levels to improve process reliability.

Adjunct Lecturer, Sonargaon University, Bangladesh *March 2016 – June 2018*

- Taught undergraduate courses and laboratories in materials science and engineering.
- Designed course curricula and mentored students.

LABORATORY SKILLS

X-ray Diffraction:

- Empyrean, Malvern Panalytical Diffractometer: Regular XRD, Grazing Incident XRD (GIXRD), Residual stress measurement.
- PANalytical X'Pert Pro Diffractometer: Regular XRD, Pole figure analysis.
- D2 PHASER: Regular XRD with digital monochromator mode.

Microscopy:

- FEI Quanta 650 FEG Scanning Electron Microscope.
- Hirox RH-8800 Light Microscope.
- Inverted metallurgical microscope (ECLIPSE MA 200).
- Image analyzer (Clemex Vision PE).

EBSD and FIB:

- Helios UC G4 Dual Beam FIB-SEM.
- FEI Quanta 650 FEG Scanning Electron Microscope.

Laser Surface Modification:

- Lambda Physik COMPex 150 Laser System.

Electrochemical Analysis:

- Standard 3 cell electrodes.

Elemental Analysis:

- Spectrometer (Spectrolab M12).
- EDS analysis with Oxford Aztec Software.
- Benchtop Panalytical Epsilon 3x Energy-Dispersive XRF spectrometer.

Hardness Testing:

- Tinius Olsen F14-1 Vickers & Knoop Indentation Hardness Tester.
- Afri Brinnel Hardness Tester (Integral 1).

Others:

- Universal testing machine (UTM).
- Lab furnace (TMF15-RH1).

TECHNICAL SKILLS

Programming Language	C, MATLAB.
Data Analysis	TOPAS, STRESS, DIFFRAC.EVA, HighScore.
Graphics Software	AutoCAD, Solid Works.
Others	LaTeX, CALPHAD: Thermocalc, FEA: ANSYS workbench.

SELECTED PUBLICATIONS

- **Hossain, Md Sojib**, Jonathan Skelton; William Moffat; James Fitz-Gerald. "Laser Surface Melting to Mitigate Intergranular Corrosion of Sensitized AA5083" *CORROSION* (2023).
- **Hossain, Md Sojib**, "A Process of As-Cast Ferritic Gray Cast Iron Production." *Archives of Foundry Engineering* (2021).
- **Hossain, Md, S. Sojib**, Bazlur B. Rashid. "Preconditioning and Inoculation of Low Sulphur Grey Iron." *Archives of Foundry Engineering* (2020).
- **Hossain, Md Sojib**, Md Nasrul Haque, and Mahbub Hasan. "Thermo-Mechanical Properties of Banana and Jute Fiber Reinforced Polypropylene Composites." *International Journal of Composite Materials and Matrices* (2019).

Manuscripts in Process

- **Hossain, Md Sojib**, Stephen Sharp, Jason Provines, Sean Agnew, James Fitz-Gerald. "Effects of Manganese and Other Alloying Elements on Austenite Stabilization in Dissimilar Steel Welds: Implications for Ferrite Prediction." (Presented in Technical Meeting and Exhibition MS&T24, and ready to submit for journal publication) *Meeting and Exhibition MS&T24* (2024).
- **Hossain, Md Sojib**, Jonathan Skelton, William Moffat, James Fitz-Gerald. "Optimizing Laser Surface Melting Parameters for Enhanced Corrosion Resistance of AA5083." (Presented in AVS 70th International Symposium Exhibition and the manuscript is in process) *AVS 70th International Symposium Exhibition* (2024).
- **Hossain, Md Sojib**, Stephen Sharp, Jason Provines, James Fitz-Gerald, Sean Agnew. "Mitigating Solidification Cracking in Dissimilar Metal Welds (Mild Steel to Dual Phase Stainless Steel)." (Accepted for oral presentation and manuscript in TMS 2025 Annual Meeting Exhibition) *TMS 2025 Annual Meeting Exhibition* (2025).
- **Hossain, Md Sojib**, Stephen Sharp, Jason Provines, James Fitz-Gerald, Sean Agnew. "Dissimilar Metal welding of Carbon steel to Ferritic-Martensitic Stainless Steel: Weldability, Metallurgical and Mechanical properties."
- **Hossain, Md Sojib**, Arafat Rahman "Machine Learning for Ferrous and Non-Ferrous Alloy Design: A review."

SELECTED CONFERENCE PRESENTATIONS

- *AVS 70th International Symposium and Exhibition in Tampa, Florida, November 3-8*, 2024.
- *The Materials Science & Technology (MS&T) technical meeting and exhibition,David L. Lawrence Convention Center,Pittsburgh, Pennsylvania, USA, October 6–9*, 2024.
- *AVS 68th International Symposium and Exhibition in Pittsburgh, PA, November 6-11,* 2022.
- *Solidification and Crystallization of Metals 2020 conference in Poland Organized by the Alumni Association of Silesian University of Technology for September 28-30.* 2021.
- *Participation in the workshop "Casting reliably" (Organized by DMME of BUET in 2019).*
- *Attended the workshop "RMS Design, Corrosion Control and Cathodic Protection, Pipeline Construction Design, Operation, and Maintenance" (Organized by BPI in 2021)*
- *TMS 2025 Annual Meeting Exhibition,Las Vegas, Nevada, USA,March 23–27*,2025.

PROJECT EXPERIENCE

- **Dissimilar Metal Welds Between ASTM A709 Grade 50CR and Bridge Steels (*Aug. 2023–Sep. 2025*):** Evaluated weldability, mechanical, and electrochemical properties to establish nationwide standards for joining these steels.
- **Mitigating Intergranular Corrosion in 5XXX Series Aluminum Alloys by Laser Surface melting (*Aug 2021-Aug 2023*):** Applied laser surface melting to reduce intergranular corrosion in sensitized 5XXX aluminum alloys.
- **Metallurgical Process Development at Walton's Casting Plant (*Nov. 2016–Dec. 2018*):** Collaborated with Panasonic (Singapore) to establish metallurgical parameters for a 1.6 million-unit metal casting plant for compressor blocks in Bangladesh.
- **Successful Export of Compressor Blocks from Bangladesh:(*2018*):** Led the technical team of Walton Metal Casting Plant to meet European and Japanese standards, securing partnerships with SECOP, NIDEC, and Panasonic.

AWARDS

- Conference Travel Grant, AVS. *2022,2024*
- Departmental Conference Travel Grant, University of Virginia. *2022, 2024*
- Recipient of multiple R&D grants from Walton Hi-Tech Industries PLC for innovative solutions to complex industrial problems *2017-2018*

LEADERSHIP/COMMUNITY SERVICE

- Diversity, Equity, and Inclusion Chair, Graduate Student Board, MSE, University of Virginia (UVA). *2022 - 2023*
- Life-long blood donor, Quantum blood bank, Bangladesh. Donated 10 times since '08.
- Outreach Chair, Association of Bangladeshi Students (ABS), UVA. *2022 - 2023*
- Member of TMS, AVS and ASM international. *2024 - 2025*