MUHAMMAD ANWARUL NAZIM

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EDUCATION

Missouri University of Science and Technology, Rolla, MO, USA
Doctor of Philosophy in Materials Science and Engineering
June 2022 - Present
Cumulative GPA: 4.00/4.00
Dissertation Title: *"Continuous Casting Mold Simulator to Characterize Meniscus Behavior and Mold Flux Properties."*
Relevant Coursework: Thermodynamics and Phase Equilibria, Kinetics Theory for Materials, Bonding, Crystallography, and Structure-Property Relations, Communication in Materials Science and Engineering, Advanced Steelmaking, Electron Microscopy.

RWTH Aachen University, Aachen, Germany
Master of Science in Metallurgical Engineering (Major: Materials Science of Steels)
April 2017
Cumulative GPA: 2.20 (German Scale- max: 1.00 min: 4.00), US Equivalent: 3.39/4.00
Relative Coursework: Thermochemistry, Physical Metallurgy, Process Metallurgy and Recycling, Metallic Materials, Introduction to Texture Analysis, Materials Science and Steel, Materials Characterization.

Chittagong University of Engineering and Technology, Chattogram, Bangladesh
Bachelor of Science in Mechanical Engineering
October 2012
Cumulative GPA: 3.49/4.00

RESEARCH EXPERIENCE

Graduate Research Assistant | The Kent D. Peaslee Steel Manufacturing Research Center, Department of Materials Science and Engineering, Missouri University of Science and Technology Rolla, MO, USA
Advisor: Prof. Dr. Ronald O'Malley
June 2022 – Present
- To modify existing dip tester to incorporate casting parameters to simulate industrial continuous casting process in lab scale.
- To design and implement optical fiber-based mold using the Rayleigh Backscattered Technology to investigate various steel grades and mold fluxes.
- To evaluate oscillation practice and mold flux impact on mold heat transfer and shell growth for peritectic steel grades.
- To model and predict shell growth based on the temperatures measured by optical fiber.

Summer Internship | Department of Process Innovation, The US Steel Research and Technology Center, Munhall, PA, USA
May 2025 – August 2025
- To Investigate the effect of hydrogen in steel initial solidification and mold flux crystallization properties in terms of mold heat transfer and shell growth using fiber-optics mold simulator.
- To characterize (in-situ) initial shell solidification of AHSS grades (effect of Mn and Si) in peritectic range using the Confocal Laser Scanning Microscope.
- To develop a methodology to characterize elemental segregation analysis in AHSS thick and thin slabs.
- To model interfacial heat transfer in the meniscus region during the fiber-mounted mold simulator experiments.

Summer Internship | Department of Process Innovation, The US Steel Research and Technology Center, Munhall, PA, USA
May 2024 – August 2024
- To design fiber-instrumented mold and commissioned fiber-instrumented mold simulator experiments.
- To investigate on peritectic sensitivity of AHSS grades as a function of Mn and Si content using the mold simulator experiments.
- To use advance characterization techniques to characterize the steel shell and the mold flux film for heat transfer analysis.

Master's Thesis: Experimental and numerical investigation upon the dependence of yield strength and hardening of dual phase steels on various temperatures and strain rates | Department of Ferrous Metallurgy, RWTH Aachen University, Aachen, Germany
October 2016 – March 2017

- Investigated on high temperature formability of DP1000 steel grade by conducting high temperature tensile tests and using ABAQUS numerical simulations.
- From the simulation and experimental results, optimum industrial forming process parameters for DP1000 were selected.

Internship: Constructing a new and upgrading existing steel surface defect catalogs| Product Management Department, ISRA VISION PARSYTEC AG, Aachen, Germany
October 2015 – March 2016

- Formulated a technical catalog based on defects generated in steel's various process lines incorporated with thorough information about common defects from metallurgical point of view.

Study Integrated Thesis: Literature study on thermo-mechanical modeling of quenching-induced phase transformations and associated distortion | Department of Ferrous Metallurgy, RWTH Aachen University, Aachen, Germany
April 2015 – May 2015

- Conducted a literature review based on modeling and simulation of improved phase transformation kinetic models in predicting distortion and residual stresses of quenched steel part.

TEACHING AND MENTORING EXPERIENCE

Teaching Assistant | Mechanical Testing of Materials, MET 3125, Department of Materials Science and Engineering, Missouri University of Science and Technology Rolla, MO, USA
Semesters: Fall 2023 & Fall 2024

- Supervised and conducted lab classes and experiments of basic mechanical tests in Materials Science and Engineering for 20-25 senior level undergraduates.
- Graded course assessments to ensure students understood materials and stayed on track.

RESEARCH GRANTS

Project: Continuous Casting Mold Simulator to Characterize Meniscus Behavior | The Kent D. Peaslee Steel Manufacturing Research Center, Department of Materials Science and Engineering, Missouri University of Science and Technology Rolla, MO, USA
July 2022 – May 2026
Funding Amount: $671,839.00

PUBLICATIONS

Google Scholar Profile:
https://scholar.google.com/citations?user=jNWP1AsAAAAJ&hl=en&inst=1561184572023169180
ResearchGate Profile:
https://www.researchgate.net/profile/Muhammad-Anwarul-Nazim

- **Conference Paper: Nazim, M.;** Buchely, M.; Emdadi, A.; Huang, J.; Saha, R. K.; O'Malley, R., "A Lab-Scale Mold Simulator Employing an Optical-Fiber-Instrumented Mold to Characterize Initial Steel Shell Growth Phenomena," In proceedings of the AISTech, Columbus, USA, 2024, 947–958. doi: 10.33313/388/100.
- **Peer Reviewed Article: Nazim, M.A.;** Emdadi, A.; Sander, T.; O'Malley, R. The Effect of Mold Flux Wetting Conditions with Varying Crucible Materials on Crystallization. Materials 2025, 18, 1174. https://doi.org/10.3390/ma18051174.
- **Peer Reviewed Article: Nazim, M.;** Buchely, M.; Emdadi, A.; Huang, J.; Saha, R. K.; O'Malley, R., "A Lab-Scale Mold Simulator Employing an Optical-Fiber-Instrumented Mold to Characterize Initial Steel Shell Growth Phenomena: Experimental Development," AIST Transactions, Iron & Steel Technology, May 2025, Vol. 22, No. 4, pp. 386-397. DOI 10.33313/TR/0525.

ORAL & POSTER PRESENTATIONS

- **Presentation: Nazim, M. (May 2024)** "A Lab-Scale Mold Simulator Employing an Optical- Fiber-Instrumented Mold to Characterize Initial Steel Shell Growth Phenomena," Continuous Casting Technology Committee, AISTech 2024, Columbus, OH, USA.
- **Presentation: Nazim, M. (February 2025)** "The synergistic effects of Si and Mn on Peritectic Sensitivity of AHSS casting," AIST Metallurgy – Steelmaking and Casting Technical Committee meeting, Mobile, AL, USA.
- **Presentation: Nazim, M. (February 2025)** "Optical fiber instrumented mold simulator: Mold flux impact on peritectic Sensitivity of AHSS casting," AIST Continuous Casting Technology Committee meeting, Louisville, KY, USA.
- **Poster: Nazim, M. et al. (May 2025)** "Optical Fiber Instrumented Mold Simulator," AISTech 2025, Nashville, TN, USA.
- **Poster:** Saha, R. K**., Nazim, M. et al. (September 2025)** " Silica Fiber-Based Thermal Mapping of Solid Shell Growth in Peritectic Steels Using a Continuous Casting Mold Simulator," MS&T25 Technical Meeting and Exhibition, Columbus, OH, USA.

PROFESSIONAL EXPERIENCE

Assistant Manager – CCM (Continuous Casting Machine) Operation | Production Department, GPH Ispat Limited, Chattogram, Bangladesh
March 2021 – May 2022
Senior Engineer – CCM (Continuous Casting Machine) Operation | Production Department, GPH Ispat Limited, Chattogram, Bangladesh
December 2019 – February 2021

- Investigated on mitigating metallurgical problems and defects in semi-finished product (MS – Mild Steel billets) and aiming for high quality product development.
- Worked on maintaining highest productivity of products with superior quality to achieve the set targets according to the production plan.
- Formulated and analyzed production report, breakdown report to take managerial decisions to ensure higher quantitative productivity.
- Supervised the innovative and state-of-the-art process of online feeding of semi-finished product (MS – Mild Steel billets) into the rolling mill.
- Led and supervised a technical team of 15 people.

Senior Engineer | Mechanical Department, GPH Ispat Limited, Chattogram, Bangladesh
February 2018 – November 2019

- Planned, scheduled, coordinated, managed and executed equipment erection followed by cold and hot commissioning of world's one of the fastest Billet Casters supplied by Primetals Technology- (Austria/Germany).
- Provided technical supervision of fabrication works of more than 4000 metric tons of steels including mechanical drawing interpretation & modification as well as instruction of different steel welding techniques.

Analyst – Plant Operation | Operation Department, BSRM Steel Mills Limited, Chattogram, Bangladesh
November 2017 – February 2018

- Facilitated technical support to the top management in decision making of plant operation based on daily production through analyzing the generated data.

TECHNICAL SKILLS

- **Programming Languages:** LabVIEW, MATLAB, AutoCAD (Fusion 360), Python, R, Thermo-Calc, FactSage
- **Technical expertise in Advanced Characterization Equipments:** Scanning Electron Microscopy (SEM), Confocal Laser Scanning Microscopy (CLSM), Differential Scanning Calorimetry (DSC), MicroXRF.
- **Image Processing Software:** ImageJ
- **Additional:** Microsoft Office Packages

LANGUAGES

- **Bengali:** Native Language
- **English:** Fluent
- **German:** Conversational

REFERENCES

Available upon request