

MALAVIKHA RAJIVMOORTHY

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EDUCATION

Colorado School of Mines, Golden, CO

Doctor of Philosophy in Metallurgical and Materials Engineering
Thesis Title: Grain Boundary and Interface Engineering in Steels

May 2021
GPA: 3.75

SSN College of Engineering, Anna University, Chennai, India

Bachelor of Technology in Chemical Engineering
Anna University Rank 3

May 2016
GPA: 9.42/10

RESEARCH EXPERIENCE

PhD Candidate

(August 2016-present)

Molecular Theory Group and the Advanced Steel Processing and Products Research Center, Colorado School of Mines

Research focus: Development of a realistic grain boundary model to facilitate studying grain boundary structures and phases and understand the effect of solute segregation in steels with computation (charge density analysis) and experimental (atomic) characterization techniques. Funded by Office of Naval Research, United States of America.

Industrial Collaborators: TimkenSteel, Caterpillar Inc., Los Alamos National Laboratory

Research Intern

(June–July 2015)

Tube Investments of India Limited, in association with the Materials Science Research Centre, Indian Institute of Technology Madras, Chennai, India

Research focus: The project aimed at characterizing diamond coatings which were deposited on tube drawing dies. The aim was to achieve a uniformly coated die. Characterization tools like Raman spectroscopy and scanning electron microscopy were utilized to obtain information about the coating on the surface of the tungsten carbide die.

Research Intern

(December 2014–May 2015)

Materials Science Research Centre, Indian Institute of Technology Madras, Chennai, India

Research focus: Objective was to study the effects of etching of concentrated and dilute acids on nano and micro crystalline diamond coatings synthesized on silicon substrate. Using characterization tools like Raman spectroscopy, the effect of acids on the substrate was studied. Optical images of the surface were analyzed for any aberrant surface properties.

PUBLICATIONS AND CONFERENCE PRESENTATIONS

- [7] “Developing a Realistic Grain Boundary Model to Study Solute Segregation from First Principles”, In Contributed Papers from Materials Science & Technology 2019, (pp. 952-959), M. Rajivmoorthy, A. Clarke, M. E. Eberhart
 - [7] “Observing the 3D chemical bond and its energy distribution in a projected space”, T. Wilson, M. Rajivmoorthy, J. Goss, S. Riddle, and M. Eberhart, *ChemPhysChem* (2019).
 - [6] “Ultra High Performance Metallic Systems for Aerospace, Defense, and Automotive Applications”, J. Jankowski, J. Miorelli, M. Rajivmoorthy, M. Eberhart, A. Clarke, M. Kaufman, P. Wilson, K. Krishnamurthy, *Materials Science and Technology 2019*, October 2019, Portland, OR
 - [5] “Relationships between Charge Density and Grain Boundary Energy of Austenitic Iron”, M. Rajivmoorthy, M. Hoerner, M. E. Eberhart, and J. G. Speer, *Department of Defense Steels Summit*, October 2018, Naval Surface Warfare Center, Carderock Division, Bethesda, MD
 - [4] “Application of QTAIM toward an Understanding of Segregation Phenomena”, M. Rajivmoorthy, M. Hoerner, M. E. Eberhart, and J. G. Speer, *Materials Science and Technology (MS&T)*, October 2018, Columbus, OH
 - [3] “The Chemistry of Transition Metal Structure”, M. Rajivmoorthy, T. Wilson, M. E. Eberhart, *Sagamore 2018 - International Union of Crystallography Conference*, July 2018, Halifax, NS, Canada (Obtained best poster award)
 - [2] “Grain Boundary and Interface Engineering in Steels”, M. Rajivmoorthy, M. Eberhart, A. J. Clarke, J. G. Speer, *ASPPRC Research Progress Sponsor Meetings*, Colorado School of Mines, Golden, CO
 - [1] “Etching Effects of Nano and Micro Crystalline Diamond Coatings”, M. Rajivmoorthy, R. Ramadoss, M. S. R. Rao, Nano Functional Materials Technology Centre, August 2015, Indian Institute of Technology, Madras, Tamil Nadu, India
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NOTABLE AWARDS AND ACHIEVEMENTS

Honors	Outstanding Teaching Assistant Award: Department of Chemistry Anna University Rank Holder, B. Tech Chemical Engineering Batch of 2016 Continuous recipient of gold and silver medals for excellence in academic performance	(March 2019) (May 2016) (2013-2016)
Scholarships	Merit Scholarship Award, SSN College of Engineering Scholarship for Higher Education, Department of Science and Technology, Govt. of India	(2013-2014) (2012)

CONTINUAL DEVELOPMENT TRAININGS

Summer School for Integrated Computational Materials Education (ICMED)	(June 2018)
Department of Materials Science and Engineering, University of Michigan, Ann Arbor, MI	
Description: A course on computational materials science and engineering techniques with the aim of integrating these tools into undergraduate curricula.	

LEADERSHIP

Student Representative, Advanced Steel Processing and Products Research Center (ASPPRC), Colorado School of Mines	(January 2019-present)
Role: Represent interests of students to faculty and sponsors of ASPPRC, help with organizing sponsor meetings, sponsor reports and student recruiting activities	
Graduate Student Representative, Department of Metallurgical and Materials Engineering, Colorado School of Mines	(August 2018-present)
Role: Representing MME grad students and their interests, serve as a link to the students and the academic administration, member of the graduate student council in Colorado School of Mines	
Secretary, Indian Institute of Chemical Engineers-SSN Student Chapter	(August 2014-May 2016)
Spearheaded the organization of the conference "Sustainable Trends in Energy and Environmental Research" in 2015 and 2016. Represented the student members of IChE from SSN College of Engineering	

TEACHING EXPERIENCE

Lead Teaching Assistant	(Fall 2018, Fall 2019)
Course: Molecular Engineering and Materials Chemistry (CH 125)	
Instructor: Prof. Mark E. Eberhart	
Role: Lead the laboratory module for the course, designed and developed a lab on constructing the phase diagram of Sn-Bi alloy, by monitoring the cooling curves. Recognition with Outstanding Teaching Assistant award.	
Teaching Assistant	
Courses: Engineering Materials (Fall 2016, Spring 2017), Mechanical Properties of Materials (Fall 2017), Molecular Engineering and Materials Chemistry (Spring 2018-Fall 2019)	
Volunteer	
Teach-A-School: Teaching basic math and science to children belonging to economically challenged backgrounds	

TECHNICAL SKILLS AND PROFESSIONAL COMPETENCY

- Programming Languages: C, C++, Python
- Computational Software: VASP, BAND, ADF, Quantum ESPRESSO, OOF, SingleCrystal, CrystalDiffract, ThermoCalc®, TC-Prisma®
- Visualization: Tecplot 360, Vesta, CrystalMaker, Mathematica, ImageJ
- Experimental Materials Science: Raman Spectroscopy, LOM, SEM, TEM, EDS, EBSD, FIB sample prep
- Productivity: Word, Excel, PowerPoint, LaTeX