

PARTH DESAI

4547 Chestnut Ridge Rd, Apt 209, Buffalo, New York, 14228 | 7165796156 | parthsam@buffalo.edu
GitHub: <https://github.com/parthsam>

EDUCATION

PhD Candidate, Materials Science

The State University of New York at Buffalo, US

Summer 2024 (expected)

Master of Science, Materials Science

The State University of New York at Buffalo, US

Fall 2020

Bachelor of Engineering, Chemical Engineering

University of Mumbai, India

Spring 2019

RESEARCH INTERESTS

Data-Driven Materials Characterization, Machine Learning in Materials Design, Advanced Analytical Techniques, Feature Extraction and Dimensionality Reduction, Materials Informatics, Algorithm Development, Integration of Experimental and Computational Data, Automation in Materials Science

KEY SKILLS

• Predictive Analysis, • Statistical Modeling, • Data Mining, • Clustering and Classification, • Quantitative Analysis, • Proficient in Programming Languages, • Knowledge in Graph Theory, • Machine Learning and Data, • Mining Large-Scale Data Handling and Optimization, • Material Science Domain Knowledge, • Analytical and Problem-Solving Skills, • Point Cloud Data Processing

RESEARCH EXPERIENCE

Research Assistant, The State University of New York at Buffalo, NY Fall 2021- Spring 2024

Mentor: Prof. Olga Wodo, Materials Design and Innovation

Project: Microstructure informatics: atomistic graph-based microstructure representation to unravel mechanism of low temperature degradation in zirconia-based ceramics

- Developed novel feature extraction methods to characterize local atomistic environments and ion distributions, enabling in-depth analysis of phase transformations using atom probe tomography data.
- Introduced a graph-based order parameter to quantify local atomic connectivity, providing valuable insights into the structural arrangement and density of atoms within the local neighborhood.
- Unveiled ion distribution patterns to identify segregation and vacancies within the sample, shedding light on material defects and potential performance limitations.
- Engineered signature functions to distinguish and separate grains and grain boundaries, facilitating accurate material characterization and classification.
- Collaborated effectively with a multidisciplinary team to integrate graph theory principles into materials characterization, demonstrating strong teamwork and problem-solving skills.
- Employed graph algorithms to develop diffusion pathways, enhancing understanding of ion diffusivity and its role in phase transformations.

Project: Configurable morphology distance operator

- Engineered a data-driven pipeline to uncover and analyze microstructure-property relationships, enhancing material design and development.
- Leveraged graph theory principles and algorithms to construct and evaluate complex morphologies, advancing material research.
- Conducted rigorous experiments and data analysis to validate the distance operator's efficacy, ensuring its reliability for large-scale applications.
- Developed software tools and algorithms to enhance the distance operator's efficiency in processing massive datasets, enabling real-time analysis and decision-making.
- Conceptualized a novel distance operator that extracts structural information and domain-specific features from microstructural data, facilitating clustering of large datasets, leading to improved material characterization and classification.

Research Project Trainee, Bhabha Atomic Research Centre, Mumbai, India October 2018 - April 2019

Mentor: Prof. Sanjay Kumar, Scientific Officer (F), Materials processing & Corrosion Engineering Division

Project: Vanadium based BCC alloy for Hydrogen storage applications

- Synthesized hydrogen samples of V-Ti-Cr alloy using the electrolytic hydrogen charging method
- Estimated the thermodynamics and kinetics of hydrogen absorption- desorption of V-Ti-Cr prepared by aluminothermy using the Sievert's apparatus
- Tested a 700-gm capacity lab scale hydrogen storage system
- Conducted experiments to estimate the kinetics of partial oxidation in V-Ti-Cr alloy

PEERED-REVIEW JOURNAL PAPERS

- **P. Desai**, N. Juneja, J. Zola, V. Chandola, O. Wodo. *COMODO: Configurable Morphology Distance Operator*. (Accepted)
- **P. Desai**, B. Mazumder, O. Wodo. *Unsupervised learning of local atomistic environments in atom probe tomography data*. (in-preparation)
- N. Juneja, V. Chandola, J. Zola, O. Wodo and **P. Desai**. *Resource Efficient Bayesian Optimization*. (In print)

PRESENTATIONS AND PROCEEDINGS

- P. Desai, P. Garg, B. Mazumder, O. Wodo (2023, November). *Atomic-Level Investigation of Oxygen Distribution in Grain Boundaries in Yttria-Stabilized Zirconia using Graph-Order Parameter*. Presented at Materials Research Society (MRS) fall 2023 exhibit and meeting, Boston, USA.
- P. Desai, B. Mazumder, O. Wodo (2023, June). *Finding invisible; Vacancy identification in ceramic materials*. Poster presented at Erich Bloch symposium, University at Buffalo, USA.
- P. Desai, N. Juneja, J. Zola, V. Chandola, O. Wodo (2022, June). *Configurable Morphology Distance Operator (COMODO)*. Poster presented at Erich Bloch symposium, University at Buffalo, USA.
- P. Desai, N. Juneja, J. Zola, V. Chandola, O. Wodo (2022, May). *Graph-Based Strategy for Microstructure Similarity in Large Datasets*. Presented at Materials Research Society (MRS) spring 2022 exhibit and meeting, Hawaii, USA.
- N. Masli, **P. Desai**, S. Kumar, V. Kain (2019, April). *Aluminothermy Synthesis and Hydrogen Storage Properties of Vanadium Based bcc Alloy*. Poster presented at the national conference on Critical Non- Ferrous Metals: Establishing the Value Chains, Mumbai, India.

PEER REVIEWING EXPERIENCE

- ACS in focus, Mark Dimond Research Fellowship, University at Buffalo.

AWARDS AND HONORS

- First Place, Departmental 3 Minute Thesis Competition: Demonstrated exceptional communication and presentation skills by effectively conveying complex research findings to a non-expert audience within a concise three-minute timeframe.

TECHNICAL SKILLS

- **Programming languages:** Python, Bash, MATLAB, C, C++
- **Operating systems:** Microsoft, Linux, Mac OS
- **Packages:** Scikit-Learn, NumPy, SciPy, Pandas, Matplotlib, Jupyter notebook, PyTorch
- **Statistics/Machine Learning:** Statistical Analysis, Linear/Logistic Regression, Classification, Clustering, Graph Theory, Bayesian statistics, Reinforcement learning, Uncertainty quantification

EXTRACURRICULAR / LEADERSHIP ACTIVITIES

- Materials Research Society (MRS) Student Engagement Subcommittee Member
 - Demonstrated commitment to fostering a vibrant research community by actively engaging with fellow students and organizing events to promote research and networking opportunities.
- Talk Organizer and Chair, MRS Conference 2023 Fall Meeting
 - Exhibited exceptional leadership and organizational skills by successfully planning and executing a compelling talk at a prestigious international conference, showcasing research expertise and communication prowess.
- Event Coordinator, Graduate Indian Student Association, SUNY at Buffalo
- President, Graduate student association at Dept of MDI, SUNY at Buffalo
- Class representative, Dept of chemical engineering, TSEC