Ray Matsumoto

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Education

Vanderbilt University — *Nashville, TN*
Doctorate of Philosophy in Chemical and Biomolecular Engineering — *May 2021*

Clemson University — *Clemson, SC*
Bachelor of Science in Materials Science — *December 2015*

Experience

FIRST (Fluid Interface Reactions, Structure, and Transport) Center — *Nashville, TN*
Graduate Researcher — *January 2017 - Present*

- Developed a computational screening workflow of 400+ novel electrolytes to run and analyze simulations on a computer cluster.
- Performed hypothesis testing to validate thermodynamic distributions of molecular simulations
- Implemented clustering algorithms with NumPy and multiprocessing packages that provided key findings in 2 journal articles
- Collaborated with other researchers to publish our findings through 10 peer-reviewed journal articles
- Gave talks on research findings at 2 conferences

MoSDeF (Molecular Simulation and Design Framework) — *Nashville, TN*
Developer — *January 2017 - Present*

- Led graduate students in project to replicate previous work through the use of open-source software which was published in a peer-reviewed journal
- Setup and maintained continuous integration with Azure Pipelines
- Developed Cookiecutter templates to help users build their own Python packages
- Wrote unit tests which helped to achieve code coverage over 85%
- Wrote Docker files to ensure consistency across different hardware and operating systems

Skills

Python, Git, Continuous Integration, SciPy (NumPy, Pandas, Matplotlib), Scikit-learn, Unix, SQL

Teaching Experience

Cummings Research Group — *Nashville, TN*
Undergraduate Lab Adviser — *January 2019 - Present*

- Supervised 1 graduate and 3 undergraduate research projects in molecular dynamics and energy storage
- Created and presented interactive tutorials on Git, Python, and high-performance computing

Independent Projects

Phase-Separation

- Developed a workflow in Python that predicts phase separation of liquid mixtures through image processing, k-means clustering, and image analysis

MLB Pitch Classification

- Developed machine learning classification model to predict pitch types using data sets from MLB Statcast through the use of Pandas, Scikit-learn, and imbalanced-learn