# Ray Matsumoto

(843) 475-8628 | ray.a.matsumoto@vanderbilt.edu | http://www.raymatsumoto.com | rmatsum836

## 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*

- Implemented computational screening over 400+ novel electrolytes to develop connections between chemical structure and energy storage performance
- Developed a random forest machine learning model to validate key trends related to electrolytes
- Performed hypothesis testing to validate thermodynamic distributions of molecular simulations
- Implemented clustering algorithms in Python that provided key findings in 2 journal articles
- Developed a Python package to initialize MXene systems for molecular simulation
- Co-authored 8 peer-reviewed journal articles

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

- Packaged and deployed new software releases on PyPI and Anaconda Cloud
- Expanded the functionality of readers/writers for input files of simulation engines
- Setup and maintained continuous integration with Azure Pipelines
- Developed Cookiecutter templates to help users build their own Python packages
- Replicated a previous study using 5 molecular simulation engines with MoSDeF

## Skills

Python, Git, Continuous Integration, SciPy (NumPy, Pandas, Matplotlib), DS Frameworks (Scikit-learn, Keras), Unix

## Teaching Experience

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

- Supervised 1 graduate and 3 undergraduate research projects in molecular dynamics and energy storage
- Taught basics of Python, Git, and high-performance computing

## Independent Projects

**Phase-Separation**

- Wrote a Python package that predicts phase separation of liquid mixtures through image processing, k-means clustering, and image analysis

**MLB Pitch Classification**

- Developed machine learning classification models to predict pitch types using large datasets from MLB Statcast