Andrew Garcia, Ph.D.

garcia.gtr@gmail.com

GitHub | Linkedin | Portfolio

Scientist with experience in Monte Carlo simulations, 3-D graphics, and machine learning. During my Ph.D. I developed methods to predict the complete set of chemical properties of crystal processes under different conditions as well as to model dynamic crystal growth in 2-D and 3-D environments.

Education

University of Florida Gainesville, FL
Doctorate (Ph. D.) Engineering / Chemical 2017 - 2022

Skills

Occupational:	Machine Learning, Deep Learning, Monte Carlo Simulations, Computer Vision, Computer Graphics, High Performance Computing, Cloud Computing
Programming Languages:	C++, Python, JavaScript, LaTeX, Bash Unix shell
Libraries/Frameworks:	CUDA, Git, HTML/CSS, NumPy, Numba, pandas, pathos, SciPy, TensorFlow, Keras, three.js, jQuery.ajax

Experience

University of Florida | Graduate Research Assistant - Ph. D. Gainesville, FL | Aug 2017 - May 2022

- Experimental and theoretical research on crystal growth.
- Developed kinetic Monte Carlo simulations in three dimensions (3D) to model the complex anisotropic nature of metal organic frameworks (MOFs) with uni-directional channels
- Applied artificial intelligence (AI) algorithms to expand the breadth of knowledge on structure-function.

University of Florida | T.A. Computer Model Formulation Gainesville, FL | Jan 2018 - May 2018

- Reviewed the numerical algorithms taught in class to students during my office hours.
- Taught students how to handle different programming elements from Python needed for the course.
- Reviewed several lines of written Python code from the exams of the 75 students in class to assign grades.

University of Florida | T.A. Chem. Kinetics & Reactor Design Gainesville, FL | Aug 2017 - Dec 2017

- Derived theoretical expressions of chemical kinetics and held pre-exam reviews for students.
- Taught students how to use spreadsheets to calculate complex heat transfer and chemical reaction properties on reactors.

Academic Research Projects

Thermodynamic and Kinetic Crystal Growth Theory for the Design of Metallic and Molecular Crystals (2-year campus restriction access)
Andrew Garcia, 2022 *Ph. D. Dissertation*

1. A. Garcia, et al. "Kinetic Monte Carlo Modeling of MIL-53 Metal Organic Framework Crystal Growth" *2021 AIChE Annual Meeting (Oral Presentation)*
2. A. Garcia, et al. "Thermodynamic Modeling of Competing Crystal Species from a MIL-53 Metal Organic Framework (MOF) Reaction" *2021 AIChE Annual Meeting (Oral Presentation)*
3. A. Garcia, et al. "Monte Carlo Simulations of Hydrothermal Metal Organic Framework (MOF) Crystal Growth" *2020 AIChE Annual Meeting (Oral Presentation)*
4. A. Garcia, et al. "Crystallization of MIL-53 Metal Organic Frameworks (MOFs) through Changes in the Hydrothermal Process" *2019 AIChE Annual Meeting (Oral Presentation)*

Selected Open-Source

`voxelmap` | **pip install voxelmap** | **Jupyter notebook** Python
A Python library for making voxel models from NumPy arrays.

`materialsML` | **pip install materialsml** Python
A Machine Learning package for materials informatics using data from *The Materials Project*.

`powerxrd` | **pip install powerxrd** | **Jupyter notebook** Python

`tensorscout` | **pip install tensorscout** Python

`streamdice` | **web** C++, JavaScript