# REES W. CHANG

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## EDUCATION

**UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN** 2020 – present
**PhD student, Materials Science & Engineering**

**CORNELL UNIVERSITY** 2016 – 2020
**B.S. Materials Science & Engineering**
**Cum Laude with Honors | GPA: 3.601**

Activities: Theta Tau Professional Engineering Fraternity, Cornell Materials Society, Cornell Prison Education Program, Intramural Soccer

Featured Coursework: Computational Chemistry; Computational Materials Science; Bayesian Estimation; Machine Learning for AI; Machine Learning for Data Science; Large-Scale Machine Learning; Numerical Linear Algebra; Networks; Quantum Mechanics; Waves and Oscillations; Thermodynamics; Kinetics; Materials Chemistry

## SKILLS

Proficient: Python (NumPy, SciKit-learn), Git, Bash, MATLAB, LaTeX
Experienced: VASP, HOOMD-Blue, PyTorch, TensorFlow, BoTorch, Mongo, HTML/CSS, R, Mathematica, Java

## RESEARCH EXPERIENCE

**Cornell University, Materials Science & Engineering** Aug 2019 – May 2020
Undergraduate Researcher
PI: Prof. Julia Dshemuchadse
Project: "Active Machine Learning of Binary Compound Pair Potentials to Discover Exotic Self-Assembling Materials"
- Led independent project using molecular dynamics to study how molecular building blocks self-assemble
- Built a Bayesian Optimization framework to accelerate discovery of new self-assembling structures

**Lawrence Berkeley National Lab** Summer 2019
SULI Research Intern
PI: Dr. Anubhav Jain
Project: "Compressed Sensing Lattice Dynamics for High-Throughput Thermal Conductivity Calculations"
- Developed and implemented a supercell generation algorithm into *pymatgen*
- Conducted Density Functional Theory (DFT) calculations with VASP to calculate electronic band diagrams, electronic density of states, and atomic forces
- Used Compressive Sensing Lattice Dynamics (CSLD) to calculate 2$^{nd}$ through 4$^{th}$ order interatomic force constants, phonon dispersion curves, and anharmonic lattice thermal conductivities
- Developed an automated workflow in *atomate* incorporating DFT and CSLD to rapidly produce high-fidelity vibrational property calculations of materials

**Cornell University, Chemical Engineering** Jan 2017 – Jun 2019
Undergraduate Researcher
PI: Prof. Tobias Hanrath
Project: "Computational Optimization of Light Absorption in Thin Film Solar Cells"
- Awarded $1850 from Air Products
- Developed genetic algorithms in Python and MATLAB, interfacing them with electromagnetic simulations via Bash scripts
- Achieved 822% increased absorption from introducing nanostructures to an amorphous silicon thin film
- Generated data visualization workflows in MATLAB for on-the-fly interpretability

**NASA Goddard Space Flight Center, Detector Systems** Jun – Aug 2018
Research and Development Intern
PI: Dr. Larry Hess
Project: "Quasi-Resonant Absorption for Quantum Efficiency Improvement in UV Detectors"
- Designed, fabricated, patterned, and characterized multilayer thin film UV detectors for the LUVOIR mission with photolithographic and optical methods
- Modeled devices for 3D printing using SolidWorks

**Columbia University, Environmental Engineering** May 2015 – Aug 2016
Research Intern
PI: Prof. Robert Farrauto
Project: "Carbon Capture and Conversion to Methane with a Dual-Functioning Material"
- Conducted high-throughput experiments of new carbon dioxide adsorbents and methanation catalysts
- Conceptualized/tested catalyst processing procedures
- Examined surface area and adsorption properties using BET analysis and a thermal gravimetric analyzer
- Drove scale-up studies using gas flow reactors

## TEACHING EXPERIENCE

**Cornell CS 4780, Prof. Thorsten Joachims** Fall 2019
Undergraduate Teaching Assistant
Course: Machine Learning for Intelligent Systems
- Held weekly office hours and graded assignments and exams for a course of over 600 students

**Cornell Prison Education Program, Prof. Marjo Schat** Fall 2019
Volunteer Teaching Assistant
Course: Environmental Science Tutorial
- Led discussions and activities for 17 incarcerated students at Cayuga Correctional Facility

**Cornell MSE 2610, Prof. Shefford Baker** Fall 2017
Undergraduate Teaching Assistant
Course: Mechanical Properties of Materials
- Graded problem sets for a course of ~80 sophomores and first-year graduate students