Arin R. Greenwood

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Summary

- Interdisciplinary data scientist and computational researcher with experience working with large simulation data sets and using statistics to provide predictions for renewable energy materials
- 5 years of experience working with Pandas, SciPy and other python packages; experienced with machine learning packages such as scikit-learn and TensorFlow
- Developed 3 open-source python bots for Discord platforms using Pandas, SQL and data cleaning techniques
- Extensive teaching and science outreach experience for communicating technical topics to broad audiences in easy-to-understand ways

Education

University of Chicago, Ph.D. Molecular Engineering Chicago, IL Expected Dec. 2019
Relevant Courses: Intro to Data Engineering, Intro to Machine Learning (Udacity), Materials Modelling, Numerical Methods

University of Washington, B.S. Chemical Engineering Seattle, WA 2014
Relevant Courses: Scientific Computing, Applied Mathematics, Intro to Technical Writing, Process Optimization

Research & Work Experience

University of Chicago, Pritzker School of Molecular Engineering, Ph.D. Candidate 2014-present
- Developed a computational framework that coupled three open-source massively-parallel codes with python for novel calculations of properties of two-dimensional materials; paper in preparation as first author
- Collaborated with an experimental chemistry group to discover "design rules" for complex nanoheterostructures using simulations and analytical modelling
- Conducted and analyzed large, state-of-the-art Molecular Dynamics simulations of nanoparticle assemblies to predict the effect of tunable parameters on the disorder that plagues experimental synthesis; results published as first author
- Analyzed novel Metal Organic Framework systems to help an experimental research group decide which set of materials to use; results published as first computational author
- Created an automatic image and video rendering tool using python and Blender to visualize the motion of atoms and electrons; project involved pipelining simulation data in various formats from supercomputers to a local rendering engine
- Webmaster for research group website for past 3 years

Center for Nanotechnology, Nanotech Researcher Seattle, WA 2011-2014
- Independently designed and built semiconductor nanowire devices using precise electron imaging techniques
- Conducted one-on-one training sessions on electron microscopes for new users and maintained equipment

The Boeing Company, Engineering Intern Seattle, WA 2013-2014
- Improved data analysis and test methods to optimize material properties for electromagnetic protection on aircraft
- Optimized an automatic unit that eliminated previous labor-intensive methods of extracting hydraulic fluid from jet fuel

NASA Jet Propulsion Laboratory, Amgen Scholar Pasadena, CA 2012
- Developed a method for depositing and transferring a dense layer of bacterial endospores onto substrates, which was used to measure sterility of spacecraft for Planetary Protection
- Improved an automatic bacteria-counting code to obtain statistics from hundreds of micrographs based on image contrast
- Awarded first place in AbGradCon (NASA astrobiology convention) poster competition

University of Washington Department of Chemistry, Undergraduate Researcher 2011
- Synthesized and characterized magnetically doped semiconductor nanocrystals for compact, inexpensive lasers

Skills

Programming Languages: Python, SQL, C++, HTML, CSS, Matlab, bash, LaTeX
Tools: git, pandas, numpy, scikit-learn, scipy, matplotlib, Jupyter notebooks, Excel, A/B testing

Leadership Experience

UChicago Society of Women Engineers (SWE), Section Co-Founder 2017-present
- Coordinated with the administration of UChicago and the National SWE to found a Collegiate Section
- Organized general meetings, reached out to active members of the professional community to help members network and develop relationships with successful female engineers

Lead Moderator of 9,000-Member Discord Server 2017-present
- Develop, service and run python bots to simplify tasks for members; projects have involved Pandas, SQL, data cleaning, web scraping and basic javascript

- Maintain server structure, organization and integrity
- Organize virtual and physical events with hundreds of attendees, on average 4 times a month
- Keep community members up-to-date by writing announcements approximately twice a week

Museum of Science and Industry, Science Communication Fellow Chicago, IL 2015-2018
- Developed skills to tailor highly technical or complex information to communicate effectively with a variety of audiences, through a 2-year communication workshop series with dozens of hands-on communication activities
- Led 2 workshops with middle school classes to teach students about the challenges of solar energy

UChicago Interdisciplinary Science and Art Show, Organizer Chicago, IL 2016
- Coordinated with scientists in other UChicago divisions to organize the annual Science-Art Show on campus
- Organized a public event, *"The Science of Art"* through the Chicago Arts District

STAGE, Science Advisor/Playwright Chicago, IL 2014-present
- Collaborated with other scientists, artists, and actors to write and produce plays that use technology and science to tell engaging stories about science

University of Chicago, Teaching Assistant/Lecturer Chicago, IL 2014-present
- Lectured for 1 high school engineering, 1 8th grade physics, and 1 undergraduate engineering course; mentored undergraduate and graduate students and a postdoc researcher
- Nominated for the Physical Sciences Teaching Prize for outstanding contribution to undergraduate teaching at UChicago

Publications

1. **A. R. Greenwood**, S. Mazzotti and G. Galli. *Strain-induced band gap tuning in nanoplatelet heterostructures. In Preparation.*

2. **A. R. Greenwood**, S. Mazzotti and G. Galli. *Computational prediction of optoelectronic and dielectric properties in two dimensions. In Preparation.*

3. **A. R. Greenwood**, M. Vörös, F. Giberti, G. Galli. *Emergent electronic and dielectric properties of interacting nanoparticles at finite temperature.* Nano Letters, 18(1), 255-261 (2018)

4. A. Kawamura, **A. R. Greenwood**, A. Filatov, A. Gallagher, G. Galli, and J. S. Anderson. *Incorporation of pyrazine and bipyridine linkers with high spin Fe(II) and Co(II) in a Metal-Organic Framework.* Inorganic Chemistry, 56(6), 3349-3356 (2017)

5. A. C. Noell, **A. R. Greenwood**, C. M. Lee and A. Ponce. *High-density, homogeneous endospore monolayer deposition on test surfaces.* Journal of Microbiological Methods, 94(3), 245-248 (2013)

Conference Presentations

1. *First principles calculations of nanoplatelet heterostructures: optoelectronic properties.* Contributed talk, APS March Meeting, Boston MA (2019)

2. *Emergent electronic and dielectric properties of interacting nanoparticles at finite temperature.* Contributed talk, APS March Meeting, Los Angeles CA (2018)

3. *Finite temperature properties of nanoparticle solids: ab initio simulations.* Contributed talk, APS March Meeting, New Orleans LA (2017)

4. *First principles simulations of nanoparticle solids.* Contributed talk, APS March Meeting, Baltimore MD (2016)

5. 6 poster presentations including an international conference (CPMD 2016, Chicago IL) and the MICCoM Center Scientific Advisory Board Meetings (October 2016 and September 2018)