

Henry Geerlings | Resume

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Highly motivated materials scientist with an extensive background in mechanical metallurgy, computational modeling, and data processing. Seeking work beginning in August.

Education

Colorado School of Mines

M.S. Materials Science, GPA - 3.7

Golden

2016 - May 2018

University of California

B.S. Materials Science & Engineering, GPA - 3.2

Berkeley

2011 - 2015

Experience

Colorado School of Mines

ADAPT Center Researcher

Golden

2016 - Current

Developed high throughput image processing pipelines for characterizing powder morphology and defect structures in additively manufactured components measured with 3D micro X-ray CT.

Detailed achievements:

- o Automated batch routines for scraping, analyzing, and feeding porosity data into predictive physical model of selectively laser molten (SLM) parts built with varying processing parameters.
- o Developed shape descriptors for powder particle morphology investigations into virgin versus recycled additive powders.

Lawrence Berkeley National Laboratory

Affiliate

Berkeley

Aug. 2015 - Dec. 2015

Participated in a collaboration between the Materials Project and UC Berkeley for implementing defect-dislocation interaction energies into the Materials Project database.

Detailed achievements:

- o Used existing elastic constants data from the database to feed into continuum model for interactions.
- o Generated (interstitial) defect structures of varying supercell size and chemical species for DFT calculations using the "Python Materials Genomics" package.

Lawrence Berkeley National Laboratory

Intern

Berkeley

June 2015 - Aug. 2015

Coded and analyzed multiple searching algorithms for large scale materials optimization. Coupled with the Materials Project, this would allow on-the-fly materials screening using the Materials API for the computationally budget conscious.

Detailed achievements:

- o Search methodologies included genetic algorithms and as well as more black box global optimization engines.
- o Applications included water splitting materials (band gap/edge) and ductile intermetallics (bulk/shear modulus).

Chrzan Computational Materials Group

Undergraduate Researcher

Berkeley

Jan. 2014 - Jan. 2015

Performed molecular dynamics simulations of dislocations near the phase transformation temperature of pure titanium in order to characterize cold working effects.

Detailed achievements:

- o Verified thermal expansion behavior of empirical potential model by comparing to experimental results.
- o Visually mapped out multiple phases near the transition temperature using bond order parameters.

Publications

- o Kappes, B., Moorthy, S., Geerlings, H., Stebner, A., Drake, D. (2017). Machine learning to optimize additive manufacturing parameters for laser powder bed fusion of Inconel 718. *9th International Symposium on Superalloy 718 and Derivatives*
- o De Jong, M., Chen, W., Geerlings, H., Asta, M., and Persson, K. (2015). A database to enable discovery and design of piezoelectric materials. *Scientific Data* **2**, 1500053

Computing

OS: OS X, Ubuntu (Linux), Windows

Utility: Git, L^AT_EX, MS Office

Software: FEnICS, LAMMPS, Knime, Vesta, ParaView

Languages: Python, Matlab, Mathematica, R, Bash

Training

Micro X-Ray Computed Tomography (μ XCT)	Research
Scanning Electron Microscopy (SEM)	Research
Energy Backscatter Diffraction (EBSD)	Research
Focused Ion Beam (FIB)	Research
X-Ray Diffraction (XRD)	Lab Course
Metallography	Lab Course
Radiation Safety Training (EHS-470)	LBNL

Coursework

Materials Science and Engineering

Crystallography, Bonding, and Defects
Phase Transformations and Kinetics
Properties of Electronic Materials
Mechanical Behavior of Materials
Experimental Materials Science
Materials Thermodynamics
Materials Characterization
Materials Production
Polymeric Materials
Corrosion

Mechanical Engineering and Other

Simulation of Advanced Manufacturing Processes
Mathematics of Signals and Systems
Engineering Analysis using FEM
Computational Linear Algebra
Continuum Mechanics
Engineering Dynamics
Fatigue and Fracture
Engineering Analysis
Solid Mechanics
Heat Transfer