

# Henry Geerlings | Resume

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*Materials engineer with data analytics experience in academia and corporate R&D. Seeking a hands-on graduate research opportunity within alloy development from a thermal-mechanical processing lens.*

## - Education -

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### Colorado School of Mines

*M.S. Materials Science*

**Golden, CO**

*2016 - 2018*

### University of California

*B.S. Materials Science & Engineering*

**Berkeley, CA**

*2011 - 2015*

## - Experience -

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### CoorsTek

*Materials Engineer*

**Golden, CO**

*Aug. 2018 - Current*

Leading efforts within the Computational Materials group to assess and adopt best practices within R&D ceramics data.

*Detailed achievements:*

- o Standardizing data structure among multiple R&D programs in order to effectively share and reach target properties faster and more efficiently. Primarily investigating alumina and silicon nitride material systems.
- o Developing and deploying high-throughput data processing tools, empowering R&D engineers to boost productivity and rapidly populate both historical and forward-facing datasets. Primary tools are SQL and Python-based.

### Colorado School of Mines

*ADAPT Center Researcher*

**Golden, CO**

*Feb. 2016 - June 2018*

Performed materials characterization within The Alliance for Development of Additive Processing Technologies, an industry-academia consortium aimed at advancing metal 3D printing technologies from a high-throughput prototyping perspective.

*Detailed achievements:*

- o Developed high-throughput routines for scraping, analyzing, and feeding powder and porosity 3D  $\mu$ X-ray CT data into a predictive physical model of selectively laser molten (SLM) Inconel 718 parts built with varying process parameters.
- o Defined shape descriptors for powder particle morphology investigations of virgin versus recycled metallic powders.

### Lawrence Berkeley National Laboratory

*Affiliate*

**Berkeley, CA**

*Aug. - 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, CA**

*June - 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).

## - Publications -

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- Liu, R., Geerlings, H., Moorthy, S., Kappes, B., Stebner, A., Zhang, X. **A physics-informed machine learning model for porosity analysis in laser powder bed fusion additive manufacturing.** *Submitted to IEEE Transaction of Industrial Informatics.* 2019.
- Poschmann, M., Lin, J., Geerlings, H., Winter, I., Chrzan, D. C. **Strain-induced variant selection in heterogeneous nucleation of  $\alpha$ -Ti at screw dislocations in  $\beta$ -Ti.** *Phys. Rev. Materials* 2. 2018.
- Kappes, B., Moorthy, S., Geerlings, H., Stebner, A., Drake, D. **Machine learning to optimize additive manufacturing parameters for laser powder bed fusion of Inconel 718.** *9th International Symposium on Superalloy 718 and Derivatives.* 2017.
- De Jong, M., Chen, W., Geerlings, H., Asta, M., and Persson, K. **A database to enable discovery and design of piezoelectric materials.** *Scientific Data* 2 2015.

## - Computing -

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**OS:** Windows, macOS, Ubuntu (Linux)

**Utility:** Git, Azure DevOps, MS Office

**Technical:** Lammmps, Excel, JMP, ParaView

**Languages:** Python, Bash, Matlab, SQL, L<sup>A</sup>T<sub>E</sub>X

## - Training -

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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 -

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### Materials Science and Engineering:

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

### Mechanical Engineering:

Simulation of Advanced Manufacturing Processes  
Engineering Analysis using FEM  
Continuum Mechanics  
Engineering Dynamics  
Fatigue and Fracture  
Solid Mechanics  
Heat Transfer