# 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 -

**Colorado School of Mines** **Golden, CO**
*M.S. Materials Science* *2016 - 2018*

**University of California** **Berkeley, CA**
*B.S. Materials Science & Engineering* *2011 - 2015*

## - Experience -

**CoorsTek** **Golden, CO**
*Materials Engineer* *Aug. 2018 - Current*
Leading efforts within the Computational Materials group to assess and adopt best practices within R&D ceramics data.
*Detailed achievements*:
- 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.
- 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** **Golden, CO**
*ADAPT Center Researcher* *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*:
- 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.
- Defined shape descriptors for powder particle morphology investigations of virgin versus recycled metallic powders.

**Lawrence Berkeley National Laboratory** **Berkeley, CA**
*Affiliate* *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*:
- Used existing elastic constants data from the database to feed into continuum model for interactions.
- Generated (interstitial) defect structures of varying supercell size and chemical species for DFT calculations using the "Python Materials Genomics" package.

**Lawrence Berkeley National Laboratory** **Berkeley, CA**
*Intern* *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*:
- Search methodologies included genetic algorithms and as well as more black box global optimization engines.
- Applications included water splitting materials (band gap/edge) and ductile intermetallics (bulk/shear modulus).

## - Publications -

- 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 -

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

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

**Technical**: Lammps, Excel, JMP, ParaView

**Languages**: Python, Bash, Matlab, SQL

## - 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 -

**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