Henry Geerlings | Resume

+1 (805) 754 6622 • henrygeerlings@gmail.com • hgeerlings.github.io

PhD candidate in materials science seeking career in physical metallurgy. Former materials data engineer with experience in academia and corporate R&D.

Education

Colorado School of Mines **Golden, CO**
PhD Materials Science *2021 - 2025*

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

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

Employment

Colorado School of Mines **Golden, CO**
PhD Candidate in Center for Advanced Non-Ferrous Structural Alloys (CANFSA) *Aug. 2021 - Current*
Researching the effects of copper content on the weldability and annealing behavior of low carbon steel sheet and plate.
Detailed Achievements:
- Performed dilatometry and hardenability assessments across a range of copper content in four common steel products.
- Quantified influence of copper content on heat affected zone hardness/morphology during laser and spot welding.
- Testing cross-weld strength and hot cracking susceptibility using SigmaJig and laser welder. Tailored SC/IC annealing schedules to account for copper content. Designed steel composition to mitigate increased HAZ due to copper.

CoorsTek **Golden, CO**
Materials Data Engineer *Aug. 2018 - July 2021*
Lead efforts within the Computational Materials group to assess and adopt best practices within R&D ceramics data.
Detailed Achievements:
- Standardized 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.
- Developed and deployed high-throughput data processing tools to extract various features from historical datasets.
- Used Python and SQL to create and maintain various data pipelines for data fetching, processing, and modeling.

Colorado School of Mines **Golden, CO**
Researcher in Alliance for Development of Additive Process Technologies (ADAPT) *Feb. 2016 - June 2018*
Defect and powder characterization in laser-based powder bed fusion additive processes.
Detailed Achievements:
- Developed high-throughput routines for scraping, analyzing, and feeding powder and porosity 3D μX-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**
Lab Affiliate *Aug. - Dec. 2015*
Participated in a collaboration between the "Materials Project" and UC Berkeley.
Detailed Achievements:
- Used existing elastic constants data from MP database to feed into continuum model for defect-dislocation interactions.
- Generated (interstitial) defect structures of varying supercell size and chemical species for DFT calculations using the "Python Materials Genomics" package.

Publications & Conferences

· H. Geerlings, J. Klemm-Toole, A. Clarke, K. Clarke, **Effects of Residual Copper on the Laser Weldability of Steel Sheet.** *AWS Professional Program, FabTech Orlando*. 2024.
· H. Geerlings, J. Klemm-Toole, A. Clarke, K. Clarke, **Weldability of Scrap Plate and Sheet with Residual Copper.** *MS&T Conference, Columbus*. 2023.
· M. Poschmann, J. Lin, H. Geerlings, I. Winter, D.C. Chrzan, **Strain-induced variant selection in heterogeneous nucleation of α-Ti at screw dislocations in β-Ti**. *Phys. Rev. Materials 2*. 2018.
· B. Kappes, S. Moorthy, H. Geerlings, D. Drake, A. Stebner, **Machine learning to optimize additive manufacturing parameters for laser powder bed fusion of Inconel 718**. *9th International Symposium on Superalloy 718 and Derivatives*. 2017.
· M. De Jong, W. Chen, H. Geerlings, M. Asta, K. Persson, **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, LaTeX

Equipment

Metallography: LOM, SEM, EBSD, EDS
Mechanical: Tensile, High Cycle Fatigue, Charpy
Thermal: Gleeble, Dilatometry, Box Annealing
Joining: Arc Weld Robot, Laser/Spot Welding, σ-Jig

Coursework and Miscellaneous

Materials Science and Engineering:

Crystallography, Bonding, and Defects
Phase Transformations and Kinetics
Mechanical Behavior of Materials
Experimental Materials Science
Thermodynamics in Materials
Strengthening Mechanisms
Materials Characterization
Forging and Forming
Solidification
Corrosion

Mechanical Engineering and Other:

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

Auxiliary:

Senior Hot Shop (Foundry) TA: 2021 - Current
Woodworking, Woodturning, Joinery: 2011 - Current