

Phillip Buelow — Modeling and Simulation Engineer

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As a physicist-turned-engineer, I aspire to unraveling the intricacies of fundamental physical processes and leverage this knowledge to drive technological advancements that positively impact lives. My career focuses on three technical domains: computational fluid dynamics, systems-level thermodynamics and optimization modeling.

Work Experience

Carbon America

Modeling and Simulation Engineer, 40 Hours Weekly

2 years

April 2022–February 2024

- Modeled and simulated cryogenic carbon capture and thermal energy storage systems.
- Develop 1D, multi-phase, dynamic system models.
- Build 3D CFD models to characterize multi-phase, cryogenic, CO₂ capture in shell-and-tube heat exchangers.
- Draw P&ID and Process Flow Diagrams for designed piping systems.
- Design experimental testing strategies.
- Propagate instrumentation accuracy and calibration errors into models (Validated 170 tests).
- Manage team of 7 focused on designing/constructing a new R&D characterization instrument.
- Manage budget and resource allocation for \$250,000 project.

Colorado School of Mines & National Renewable Energy Laboratory

PhD Candidate Researcher, 40+ Hours Weekly

3 years 5 months

August 2018–December 2021

- Modeled and simulated 110MW, molten-salt concentrated solar power plant
- Developed 1D dynamic, reduced-order models of power generation system.
- Developed a mixed-integer-linear optimization program of power plant dispatch in Python.
- Developed 3D CFD models for multiphase, utility-scale shell-and-tube heat exchangers in commercial software.
- Performed FEAs with coupled CFD results to simulate heat-transfer, and thermo-mechanical stress.
- Generated 3D CADs from engineering drawings.
- Developed and filtered months of operational datasets for model validation.
- Worked with operators at a 100+ MW pilot power plant.
- Applied ASME Section II & VIII Div. 1 Codes to the design of shell-and-tube heat exchangers.
- Applied TEMA standards to design of shell-and-tube heat exchangers.
- Identified gaps in industry codes regarding relationship between geometry, operations, and thermo-mechanical stress for complex zones (e.g., tubesheet) when transient thermal loading occurs, or when temperature gradients on junctions appear.
- Presented over 100+ presentations and technical reports.

ColdQuanta

Mechanical Engineer, 40 Hours Weekly

6 months

May 2018–October 2018

- Manufactured magnetic-optical traps.
- Designed cooling loop for vacuum pumps.
- Performed 100+ hrs of milling and turning components.

University of Wisconsin Madison

Thermohydraulics Technician, 25-30 Hours Weekly

8 months

October 2016–May 2017

- Assembled high voltage circuits for critical heat flux experiments.
- Performed 200+ hrs of milling and turning components.

Education

Colorado School of Mines

Ph.D. Mechanical Engineering,

2018 - 2021

Incomplete

Colorado School of Mines

M.S. Mechanical Engineering,

2017 - 2019

University of Wisconsin - Madison

B.S. Physics, Minor in Math,

2012 - 2016

Skills

Programming: Julia, Matlab, Python (Pyomo,Pandas), LaTeX and Beamer, Git, Unix.

Engineering Software: ANSYS Fluent and Mechanical, OpenFOAM, SolidWorks and other CAD software.

Public Speaking: Keynote speaker at NREL's OpenSource Conference, 2 INFORMS conference presentation, 100+ presentations.

Technical Writing: 8+ technical reports submitted to the U.S. Department of Energy, 3 journal publications, 1 white paper proposal.

References

(phone numbers available at request)

Prof. Greg Bogin—Professor of Mechanical Engineering at Colorado School of Mines

gbogin@mines.edu

Chris Hampel—Modeling and Simulation Engineer

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Dr. Jeffery Young—Senior Modeling and Simulation Engineer

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