

Nicholas Kincaid

Education

- 2018–Present **Cornell University**, Ithaca, NY
Ph.D. Student in Mechanical Engineering, GPA: 4.17
- 2014–2017 **Colorado School of Mines**, Golden, CO
B.S. in Mechanical Engineering, GPA: 3.98

Research Experience

- 2023 **National Renewable Energy Lab**
Graduate Student Intern | Golden, CO
- Collaborated with High-Performance Algorithms and Complex Fluids group as part of the DOE Office of Science Graduate Student Research program
 - Developed error control methods for machine learning models for more robust simulations
- 2018–Present **Pepiot Research Group**
NSF Graduate Research Fellow | Cornell University, Ithaca, NY
- Generated reduced-order kinetic models for reacting flow systems
 - Applied machine learning techniques to create data-driven models of chemical kinetics
 - Performed CFD simulations on high-performance computing resources
- 2017–2018 **National Renewable Energy Lab**
Thermal Systems Engineering Intern | Golden, CO
- Developed optical models for CSP systems using ray-tracing methodology
 - Assisted in the evaluation and optimization of a novel linear Fresnel CSP system
- 2017 **Norwich Solar Technologies**
Concentrated Solar Power R&D Intern | White River Junction, VT
- Developed thermal models of CSP receivers using CFD simulations
 - Performed system modeling to analyze PV and CSP plant efficiency
- 2016–2017 **Advanced Multiscale Building Energy Research Group**
Undergraduate Research Assistant | Colorado School of Mines, Golden, CO
- Developed code to couple finite difference conduction equations with green roof model
 - Evaluated coupled green roof model and validated against experimental data

Publications

- A. Bellemans, **N. Kincaid**, N. Deak, P. Pepiot, and F. Bisetti. P-DRGEP: a novel methodology for the reduction of kinetics mechanisms for plasma-assisted combustion applications. *Proceedings of the Combustion Institute*, 2020
- J. McTigue, D. Wendt, K. Kitz, J. Gunderson, **N. Kincaid**, and G. Zhu. Assessing geothermal/solar hybridization – Integrating a solar thermal topping cycle into a geothermal bottoming cycle with energy storage. *Applied Thermal Engineering*, 2020

- N. Kincaid**, G. Mungas, N. Kramer, and G. Zhu. Sensitivity analysis on optical performance of a novel linear Fresnel concentrating solar power collector. *Solar Energy*, 2019
- J. Mctigue, J. Castro, G. Mungas, J. King, N. Kramer, D. Wendt, K. Kitz, J. Gunderson, C. Turchi, **N. Kincaid**, and G. Zhu. Techno-economic Assessment of Geothermal Power Plants Hybridized with Solar Heat and Thermal Storage. *44th Annual Stanford Geothermal Workshop*, 2019
- S. Vera, C. Pinto, P. Tabares-Velasco, G. Molina, G. Flamant, W. Bustamante, A. Pianella, and **N. Kincaid**. Analysis and comparison of two vegetative roof heat and mass transfer models in three different climates. *Energy and Buildings*, 2019
- N. Kincaid**, G. Mungas, N. Kramer, M. Wagner, and G. Zhu. A Performance Comparison of Three Concentrating Solar Power Collector Designs in Linear Fresnel, Parabolic Trough, and Power Tower. *Applied Energy*, 2018
- Q. Ding, S. Barna, K. Jacobs, A. Choubal, G. Mensing, Z. Zhang, K. Yamada, **N. Kincaid**, G. Zhu, R. Tirawat, T. Wendelin, L. Guo, P. Ferreira, and K. Toussaint. Feasibility Analysis of Nanostructured Planar Focusing Collectors for Concentrating Solar Power Applications. *ACS Applied Energy Materials*, 2018

Presentations

- N. Kincaid***, A. Newale, and P. Pepiot. DRGEP Autoencoders: physics-based data-driven low-dimensional manifolds for capturing complex chemistry. Presentation at the *13th U.S. National Combustion Meeting*, 2023
- A. Bellemans*, **N. Kincaid***, N. Deak, P. Pepiot, and F. Bisetti. P-DRGEP: a novel methodology for the reduction of kinetics mechanisms for plasma-assisted combustion applications. Presentation at the *38th International Symposium on Combustion*, 2020
- N. Kincaid***, A. Newale, and P. Pepiot. Investigation of principal component methodologies to capture low-temperature chemistry in LES-PDF. Presentation at the *12th U.S. National Combustion Meeting*, 2020
- N. Kincaid**, G. Zhu*, G. Mungas, N. Kramer. Sensitivity Analysis of Optical Performance on a Novel Linear Fresnel Concentrating Solar Power Collector, Presentation at *SolarPACES*, 2018

N. Kincaid*, P. Tabares. A Green Roof Heat and Mass Transfer Model Coupled with a Finite Difference Method for Building Energy Simulations, Poster Session at the *Graduate Research and Discovery Symposium*. Colorado School of Mines, 2017.

Awards

- 2022 **Office of Science Graduate Student Research Fellowship**, *Cornell University*
- 2019 **NSF Graduate Research Fellowship**, *Cornell University*
- 2019 **Sibley Prize for Excellence in Graduate Teaching Assistance**, *Cornell University*
- 2017 **1st Place CECS Poster Session**, *Graduate Research and Discovery Symposium, Colorado School of Mines*
- 2016 **ASHRAE Rocky Mountain Chapter Student Scholarship**, *Colorado School of Mines*

Selected Graduate Coursework

- CHEME 6800 **Computational Optimization**
- CS 5786 **Machine Learning for Data Science**
- MAE 6010 **Foundations of Fluid Mechanics I**
- MAE 6230 **Computational Fluid Dynamics**
- MAE 6310 **Turbulence and Turbulent Flows**
- MAE 6330 **Multiphase Flow Dynamics**
- MAE 6430 **Computational Combustion**
- PHYS 7680 **Computational Physics**

Other Experience

- 2015–2017 **Center for Academic Services and Advising**
Academic Tutor | *Colorado School of Mines*, Golden, CO
 - Tutored fellow classmates and assisted with concepts from a variety of courses
- 2016 **Generation Teach Summer Academy**
Teaching Fellow | Boston, MA
 - Taught a general engineering course to 6th grade students
- 2013–2014 **West Pharmaceuticals**
Analytical Chemist Intern | Exton, PA
- 2011–2013 **Newport City Public Works Department**
Work Crew | Newport, VT
- 2007–2014 **Kincaid's Heating and Cooling**
Assistant Service Technician | Newport, VT

Teaching

- 2022 **Fluids and Heat Transfer Laboratory**, *Teaching Assistant, Cornell University*
- 2020–Present **Rock Climbing**, *Instructor, Cornell University*

2019–2020 **Telemark Skiing**, *Instructor, Cornell University*
2019 **Intermediate Fluid Dynamics**, *Teaching Assistant, Cornell University*

Technical skills

Languages Python, Fortran, C/C++, MATLAB
Other Fluent, COMSOL, Cantera, PyTorch, TensorFlow, Git, L^AT_EX

Extracurricular Activities

2019–2022 Cornell Energy Systems Club, *Director of Alumni Relations, Cornell University*
2018–2020 Sibley Grads in Mechanical Engineering, *Social Committee, Cornell University*
2015–2017 CSM Triathlon Club, *Sponsorship Coordinator, Colorado School of Mines*