Cassidy K. Buhler, Ph.D.

cassie.buhler@colorado.edu | cassie-buhler | cassiebuhler.github.io/ | cassiebuhler

Employment

2024 – Present
Postdoctoral Fellow
University of Colorado, Boulder | *Environmental Data Science Innovation & Inclusion Lab (ESIIL)*

2019 – 2024
Doctoral Research/Teaching Fellow
Drexel University | *Decision Sciences & MIS Department*

2018 – 2021
Research Assistant
University of Utah | *Mathematics Department*

2018 – 2019
Computer Lab Assistant & Mathematics Tutor
University of Utah | *T. Benny Rushing Mathematics Student Center*

2018
Computer Science Intern
United States Air Force | *Hill Air Force Base*

Education

2024 **Drexel University** Philadelphia, PA
Ph.D. Operations Research
Computational Data Science Minor
Thesis: Advances in Optimization with Applications to Biodiversity Conservation

2019 **University of Utah** Salt Lake City, UT
B.S. Mathematics
Statistics Emphasis

Papers

C. K. Buhler, H. Y. Benson, and D. F. Shanno, "Regularized step directions in nonlinear conjugate gradient methods," *Mathematical Programming Computation*, vol. 16, pp. 629–664, 2024, ISSN: 1867-2957. DOI: 10.1007/s12532-024-00265-9.

C. K. Buhler and H. Y. Benson, "Decision-making for land conservation: A derivative-free optimization framework with nonlinear inputs," in *Proceedings of the AAAI Conference on Artificial Intelligence*, vol. 38, 2024, pp. 21 932–21 939. DOI: 10.1609/aaai.v38i20.30195.

C. K. Buhler and H. Y. Benson, "Optimal land conservation decisions for multiple species," in *Proceedings of the 52nd Northeast Decision Science Institute Annual Conference*, vol. 52, Washington, D.C., 2023, pp. 808–816.

C. K. Buhler and H. Y. Benson, "Efficient solution of portfolio optimization problems via dimension reduction and sparsification," *arXiv preprint arXiv:2306.12639*, DOI: 10.48550/arXiv.2306.12639.

C. K. Buhler, R. S. Terry, K. G. Link, and F. R. Adler, "Do mechanisms matter? Comparing cancer treatment strategies across mathematical models and outcome objectives," *Mathematical Biosciences and Engineering*, vol. 18, no. 5, pp. 6305–6327, 2021, ISSN: 1551-0018. DOI: 10.3934/mbe.2021315.

Teaching

2019 – 2024 **Instructor**

Drexel University | *Decision Sciences & MIS Department*

Course	Level	Quarter(s)	Tool(s)
BSAN 360: Programming for Data Analytics	U	Winter 2022	R
Ph.D. Programming Bootcamp	PhD	Summer 2021; Summer 2022	Python
MIS 200: Management Information Systems (Recitation Section)	U	Fall 2019; Fall 2020; Winter 2021	MS Access; Excel; HTML

**Undergraduate (U)*

2019 – 2024 **Teaching Assistant**

Drexel University | *Decision Sciences & MIS Department*

Course	Level	Quarter(s)	Tool
BSAN 360: Programming for Data Analytics	U	Spring 2021	R
BSAN 601: Business Analytics for Managers	MS; MBA	Spring 2024	Excel
MIS 612: Aligning IS & Business Strategies	EMBA; MBA	Fall 2023	-
MIS 625: Management of IT Operations	MBA	Fall 2023	-
OPM 200: Operations Management	U	Spring 2020; Fall 2021; Spring 2023	Excel
OPM 341: Supply Chain Management	U	Spring 2021; Spring 2022; Fall 2022	Excel
OPM 344: Revenue Management	U	Fall 2022	Excel
OPR 320: Linear Models for Decision Making	U	Summer 2020; Spring 2021	Excel
STAT 201: Intro to Business Statistics	U	Winter 2020; Spring 2020; Fall 2021; Summer 2022; Spring 2023; Winter 2024	Excel
STAT 202: Business Statistics II	U	Summer 2021; Spring 2023	Excel
STAT 205: Statistical Inference I	U	Spring 2020; Fall 2021	Excel
STAT 206: Statistical Inference II	U	Summer 2021	Excel
STAT 510: Intro to Statistics for Business Analytics	MBA	Summer 2023; Winter 2024	Excel
STAT 642: Data Mining for Business Analytics	MS; PhD	Winter 2023	R

**Undergraduate (U)*

Software

Conmin-CG: Hybrid Cubic Regularization of Conjugate Gradient Methods

`https://github.com/cassiebuhler/ConminCG`

</> C, MATLAB, Python.

`10.5281/zenodo.13315592`

Derivative-Free Optimization for Land Conservation

`https://github.com/cassiebuhler/conservation-dfo`

`10.5281/zenodo.13742960`

Presentations

2024 **AGU Annual Meeting (AGU24)** *Washington, DC.*
Poster: Exploring innovation in biodiversity conservation decision-making through open science and generative AI

2024 **AAAI Conference on Artificial Intelligence (AAAI-24)** *Vancouver, BC, Canada.*
Poster: Decision-making for land conservation: A derivative-free optimization framework with nonlinear inputs.

2023 **MIT Sloan Rising Scholars Conference** *Cambridge, MA (Virtual)*
Talk: Decision-making for land conservation: A derivative-free optimization framework with nonlinear inputs.

2023 **INFORMS Annual Meeting** *Phoenix, AZ.*
Talk: Decision-making for land conservation: A derivative-free optimization framework with nonlinear inputs.

2023 **SIAM Conference on Optimization (OP23)** *Seattle, WA.*
Talk: Reserve design in biodiversity conservation.

2023 **NEDSI Annual Conference** *Washington, D.C.*
Talk: Optimal land conservation decisions for multiple species.

2021 **INFORMS Annual Meeting** *Anaheim, CA. (Virtual)*
Talk: Regularized step directions in conjugate gradient minimization for machine learning.

2021 **SIAM Conference on Optimization (OP21)** *Virtual.*
Talk: Conjugate gradient methods for machine learning.

2020 **INFORMS Annual Meeting** *Virtual.*
Talk: Efficient solution of portfolio optimization problems via dimension reduction & sparsification.

Awards & Grants

2023 **Rising Scholar**
MIT Sloan School of Management

2023 **Graduate Student Travel Subsidy Award**
Drexel University

2023 **DEI & Environment and Sustainability Innovation Micro-Grant**
Drexel University

2023 **Teck-Kah Lim Graduate Student Travel Subsidy Award**
Drexel University

2023 **Student Travel Award**
Society for Industrial and Applied Mathematics (SIAM)

2022 **Teaching Assistant Excellence Award**
Drexel University

2021 **Teaching Assistant Excellence Award (Highly Commended)**
Drexel University

Awards & Grants (continued)

2021 **Student Travel Award**
Society for Industrial and Applied Mathematics (SIAM)

2019 **Undergraduate Research Scholar Designation**
University of Utah

2019 **Research Experience for Undergraduates (REU)**
University of Utah

Service

2023 **Session Chair** *INFORMS Annual Meeting*
Session: Nonlinear Optimization in Machine Learning.

2023 **Session Organizer** *SIAM Conference on Optimization*
Session: Nonlinear Optimization and Applications.

2023 **Session Chair** *NEDSI Annual Conference*
Session: Land, Sand, and Plastic Management.

2022 **Panelist** *Drexel University*
Session: Teaching Assistance Orientation Session.

2019 **Mathematics Tutor (Volunteer)** *Utah Prison Education Project*
- Provided weekly tutoring sessions at the Utah State Prison.
- Supported students who are incarcerated and taking a Salt Lake Community College math course.

Skills

Programming

Language	*Libraries/Packages/Toolboxes*
Python	PyTorch | TensorFlow | Pandas | scikit-learn | Keras | Seaborn | Ibis | DuckDB
R	tidyverse | ggplot | deSolve
MATLAB	Deep Learning | Statistics & Machine Learning | Optimization | Financial | Computer Vision

Optimization Software

Software	*Applications*
GUROBI	Quadratic Programming | Linear Programming
Pyomo	Mixed-Integer Nonlinear Programming | Derivative-Free Optimization
CVX	Convex Optimization
CPLEX	Integer Programming | Linear Programming
AMPL	Nonlinear Programming