Cassidy K. Buhler, Ph.D.

cassidy.buhler@gmail.com | cassie-buhler | cassiebuhler.github.io/ | cassiebuhler

Employment

Starting 09/2024 — **Postdoctoral Associate**
University of Colorado, Boulder | *Environmental Data Science Innovation & Inclusion Lab (ESIIL)*

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

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

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

Research

Journal Articles

C. K. Buhler, H. Y. Benson, and D. F. Shanno, "Regularized step directions in nonlinear conjugate gradient methods," *arXiv preprint arXiv:2110.06308*, 2024, To appear in Mathematical Programming Computation.

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.

Conference Proceedings

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.

Preprints

C. K. Buhler and H. Y. Benson, "Efficient solution of portfolio optimization problems via dimension reduction and sparsification," *arXiv preprint arXiv:2306.12639*, 2020. DOI: 10.48550/arXiv.2306.12639.

In Progress

C. K. Buhler and H. Y. Benson, "Regularized nonlinear conjugate gradient methods for machine learning," 2023, Working paper.

Teaching

2019 – 2024 **Instructor**
Drexel University | *Decision Sciences & MIS Department*

Course	Level	Quarter	Skills
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	Skills
BSAN 360: Programming for Data Analytics	U	Spring 2021	R
BSAN 601: Business Analytics for Managers	MS; MBA	Spring 2024	Excel
MIS 612: Aligning Information Systems & Business Strategies	EMBA; MBA	Fall 2023	-
MIS 625: Management of Information Technology 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)*

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

Software

Conmin-CG: Hybrid Cubic Regularization of Conjugate Gradient Methods
`https://github.com/cassiebuhler/ConminCG`
</> C, MATLAB, and Python.
`10.5281/zenodo.13315592`

Derivative-Free Optimization for Land Conservation
`https://github.com/cassiebuhler/conservation-dfo`
</> R, Python, RAMAS.

Presentations

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.

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*
Tutored students who are incarcerated in a Salt Lake Community College math course.

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

Awards & Grants (continued)

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

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

Skills

Programming

Language	*Libraries/Packages/Toolboxes*
Python	PyTorch | TensorFlow | Pandas | BeautifulSoup | scikit-learn | Keras | Seaborn | ee
R	tidyverse | ggplot | rgdal | raster | rgeos | SDMTools | 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

Organizations

AAAI: Association for the Advancement of Artificial Intelligence

AWM: Association for Women in Mathematics

ESA: Ecological Society of America

INFORMS: The Institute for Operations Research and the Management Sciences

SIAM: Society for Industrial and Applied Mathematics