

Cassidy K. Buhler, Ph.D.

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EMPLOYMENT

2024 – Present	Postdoctoral Associate <i>University of Colorado, Boulder Environmental Data Science Innovation & Inclusion Lab (ESIIIL)</i>
2019 – 2024	Doctoral Research Fellow <i>Drexel University Decision Sciences & MIS Department</i>
2018 – 2021	Research Assistant <i>University of Utah Mathematics Department</i>
2018	Computer Science Intern <i>United States Air Force Hill Air Force Base</i>

EDUCATION

2024	Drexel University Ph.D. Operations Research Computational Data Science Minor <i>Thesis: Advances in Optimization with Applications to Biodiversity Conservation</i>	Philadelphia, PA
2019	University of Utah B.S. Mathematics Statistics Emphasis	Salt Lake City, UT

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](https://doi.org/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. 21932–21939. [DOI: 10.1609/aaai.v38i20.30195](https://doi.org/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*, [DOI: 10.48550/arXiv.2306.12639](https://doi.org/10.48550/arXiv.2306.12639).

IN PROGRESS

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

TEACHING

2019 – **Instructor**
2024 *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 – **Teaching Assistant**
2024 *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)*

2018 – **Computer Lab Assistant & Mathematics Tutor**
2019 *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, 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) Poster: Decision-making for land conservation: A derivative-free optimization framework with nonlinear inputs.	Vancouver, BC, Canada.
2023	MIT Sloan Rising Scholars Conference Talk: Decision-making for land conservation: A derivative-free optimization framework with nonlinear inputs.	Cambridge, MA (Virtual)
2023	INFORMS Annual Meeting Talk: Decision-making for land conservation: A derivative-free optimization framework with nonlinear inputs.	Phoenix, AZ.
2023	SIAM Conference on Optimization (OP23) Talk: Reserve design in biodiversity conservation.	Seattle, WA.
2023	NEDSI Annual Conference Talk: Optimal land conservation decisions for multiple species.	Washington, D.C.
2021	INFORMS Annual Meeting Talk: Regularized step directions in conjugate gradient minimization for machine learning.	Anaheim, CA. (Virtual)
2021	SIAM Conference on Optimization (OP21) Talk: Conjugate gradient methods for machine learning.	Virtual.
2020	INFORMS Annual Meeting Talk: Efficient solution of portfolio optimization problems via dimension reduction & sparsification.	Virtual.

SERVICE

2023	Session Chair Session: Nonlinear Optimization in Machine Learning.	INFORMS Annual Meeting
2023	Session Organizer Session: Nonlinear Optimization and Applications.	SIAM Conference on Optimization
2023	Session Chair Session: Land, Sand, and Plastic Management.	NEDSI Annual Conference
2022	Panelist Session: Teaching Assistance Orientation Session.	Drexel University
2019	Mathematics Tutor - Volunteer Tutored students who are incarcerated in a Salt Lake Community College math course.	Utah Prison Education Project

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 <i>Drexel University</i>
2023	Student Travel Award <i>Society for Industrial and Applied Mathematics (SIAM)</i>
2022	Teaching Assistant Excellence Award <i>Drexel University</i>
2021	Teaching Assistant Excellence Award (Highly Commended) <i>Drexel University</i>
2021	Student Travel Award <i>Society for Industrial and Applied Mathematics (SIAM)</i>
2019	Undergraduate Research Scholar Designation <i>University of Utah</i>
2019	Research Experience for Undergraduates (REU) <i>University of Utah</i>

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