Cassidy K. Buhler (she/her)

cb3452@drexel.edu cassiebuhler.github.io/ cassiebuhler

Education

2019 – 2024 **Ph.D. Operations & Business Analytics,** Drexel University
Minor: **Computational Data Science**
Thesis: *Advances in optimization with applications to environmental sustainability*

2015 – 2019 **B.S. Mathematics,** University of Utah.

Keywords

Nonlinear optimization, machine learning, computational sustainability, spatial conservation planning

Research Publications

Refereed Journal Articles

- **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.

Refereed Conference Proceedings

- **C. K. Buhler** and H. Y. Benson, "Optimal land conservation decisions for multiple species," To appear in 2023 Northeast Decision Science Institute Conference Proceedings.

Under Review

- **C. K. Buhler** and H. Y. Benson, "Efficient solution of portfolio optimization problems via dimension reduction and sparsification," Under first round of review at The International Journal of Data Science and Analytics.
- **C. K. Buhler**, H. Y. Benson, and D. F. Shanno, "Regularized step directions in nonlinear conjugate gradient methods," Under first round of review at Mathematical Programming Computation.

In Progress

- **C. K. Buhler** and H. Y. Benson, "Black-box optimization for reserve design in biodiversity conservation," 2023.
- **C. K. Buhler** and H. Y. Benson, "Regularized nonlinear conjugate gradient methods for machine learning," 2023.

Non Refereed Journal Articles

- **C. K. Buhler**, R. S. Terry, K. G. Link, and F. R. Adler, "Mathematical modeling of adaptive therapy in prostate cancer," *Undergraduate Research Journal*, 2019.

Technical Skills

Coding

Language	*Proficiency*	*Applications*
Python	★★★★	machine learning, data collection, data visualization, mathematical modeling, web scraping
R	★★★★	data collection, data visualization, mathematical modeling, statistical testing, numerical analysis, spatial data analysis
MATLAB	★★★★	machine learning, deep learning, data collection, data visualization, mathematical modeling, numerical analysis
SAS	★☆☆☆	data collection
Stata	★☆☆☆	data collection

Optimization Software

Solver	*Proficiency*	*Applications*
GUROBI	★★★☆	quadratic programming
CVX	★★☆☆	convex programming
CPLEX	★★☆☆	integer programming
AMPL	★★☆☆	unconstrained nonlinear programming

Basic: ★☆☆☆ *Intermediate:* ★★☆☆ *Advanced:* ★★★☆ *Expert:* ★★★★

Software

Conmin-CG Hybrid Cubic Regularization of Conjugate Gradient Minimization Method.
Implemented in C, MATLAB, and Python.
Open source download: `https://github.com/cassiebuhler/ConminCG`

Conference Talks

2023 **Reserve design in biodiversity conservation**,
SIAM Conference on Optimization, *Seattle, WA.*

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

2021 **Regularized step directions in conjugate gradient minimization for machine learning**,
INFORMS Annual Meeting, *Virtual.*

Conjugate gradient methods for machine learning,
SIAM Conference on Optimization, *Virtual.*

2020 **Efficient solution of portfolio optimization problems via dimension reduction and sparsification**,
INFORMS Annual Meeting, *Virtual.*

Teaching

Instructor

Responsible for all lectures, course materials, and grading.

2022 – Present **BSAN 360: Programming for Data Analytics**
- *Winter 2022*
- Data analytics applied to business processes and data-driven decision making.
- Language: R

2021 – Present **Ph.D. Programming Bootcamp**
- *Summer 2021, Summer 2022*
- Graduate level data workshop for incoming Ph.D. students.
- Language: Python

2019 – Present **MIS 200: Management Information Systems (Recitation Section)**
- *Fall 2019, Fall 2020, Winter 2021*
- Integrating technical skills to the functional areas of a business.
- Tools: Excel, Microsoft Access, HTML

Teaching Assistant

Assists primary instructor with duties such as holding office hours, preparing assignments, and grading.

2020 – Present **BSAN 360: Programming for Data Analytics**
- *Spring 2021*

OPM 200: Operations Management
- *Spring 2020, Fall 2021, Spring 2023*
- Process and techniques for planning and controlling the operations function.

OPM 341: Supply Chain Management
- *Spring 2021, Spring 2022, Fall 2022*
- Concepts, insights, and practical tools for the effective managements of supply chains.

OPM 344: Revenue Management
- *Fall 2022*
- Aligning operational management of product demand with supply.

OPR 320: Linear Models for Decision Making
- *Summer 2020, Spring 2021*
- Linear programming, integer programming, goal programming, and networks in business.

STAT 201: Intro to Business Statistics
- *Winter 2020, Spring 2020, Fall 2021, Summer 2022, Spring 2023*
- Descriptive statistics, probability, statistical inference, and simple regression analysis.

STAT 202: Business Statistics II
- *Summer 2021, Spring 2023*
- Two sample procedures, categorical data analysis, ANOVA, and regression analysis.

STAT 205: Statistical Inference I
- *Spring 2020, Fall 2021*
- Probability, joint distributions, sampling distributions, and interval estimation.

STAT 206: Statistical Inference II
- *Summer 2021*
- Hypothesis testing, two sample procedures, ANOVA, regression, and statistical software.

Teaching (continued)

STAT 510: Introduction to Statistics for Business Analytics
- *Summer 2023*
- Graduate level course for MBA students
- Statistics and analytical tools used in business decision making.

STAT 642: Data Mining for Business Analytics
- *Winter 2023*
- Graduate level course for MS Business Analytics students
- Logistic regression, trees, neural networks, support vector machines, and random forests.
- Language: R

Computer Lab & Mathematics Teaching Assistant

Provided math and programming assistance at the T. Benny Rushing Mathematics Student Center, University of Utah.

2018 – 2019
- Languages: MATLAB, Python, & R
- MATH 1010: Intermediate Algebra
- MATH 1050: College Algebra
- MATH 1210: Calculus I
- MATH 1220: Calculus II
- MATH 2210: Calculus III
- MATH 2270: Linear Algebra
- MATH 3070: Applied Statistics I
- MATH 3080: Applied Statistics II

Grants

2023 **DEI & Environment and Sustainability Innovation Micro-Grant**
Lebow College of Business, Drexel University
- Awarded to research projects with unique contributions to environmental sustainability
- Project: "Black-box optimization for reserve design in biodiversity conservation"

ESIIL Travel Grant
Environmental Data Science Innovation & Inclusion Lab
- Funding to attend the ESIIL Summit at CU Boulder

Teck-Kah Lim Graduate Student Travel Subsidy Award
Graduate College, Drexel University
- Funding to attend 2023 SIAM Conference on Optimization in Seattle, WA.

SIAM Student Travel Award
2023 SIAM Conference on Optimization
- Funded by NSF to participate at a SIAM conference.

2021 **SIAM Student Travel Award**
2021 SIAM Conference on Optimization
- Funded by NSF to participate at a SIAM conference.

Grants (continued)

2019 – 2021 **Modeling the Dynamics of Life Fund**
University of Utah
- Research support provided by Professor Frederick R. Adler.

2019 **Research Experience for Undergraduates (REU)**
Department of Mathematics, University of Utah
- Grant for undergraduate students conducting research with a faculty member.

Awards

2022 **Teaching Assistant Excellence Award**
Graduate College, Drexel University
- Recognizes graduate students who exhibit exemplary commitment to student learning, based on nominations and evaluations from undergraduate students and faculty.

2021 **Teaching Assistant Excellence Award (Highly Commended)**
Graduate College, Drexel University
- Nominees given close consideration by the review committee were given recognition as "highly commended" award finalists.

2019 **Undergraduate Research Scholar Designation**
University of Utah
- Undergraduate students who have completed two semesters of research, presented in the Undergraduate Research Symposium, and published research in the Undergraduate Research Journal.

2015 – 2017 **Honors at Entrance Scholarship**
University of Utah

2015 **Utah Centennial Scholarship for Early High School Graduation**
State of Utah

Work Experience

2018 **Computer Scientist Intern**
United States Air Force
- Conducted research related to improving software for US Air Force aircraft.
- Hired under the Premier College Intern Program (PCIP) and earned a position in the PALACE Acquire (PAQ) program.

Service

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

» **Session Organizer** Nonlinear Optimization and Applications
SIAM Conference on Optimization

Service (continued)

» **Session Chair** Land, Sand, and Plastic Management
NEDSI Annual Conference

2022 » **Panelist** Teaching Assistance Orientation Session
Graduate College, Drexel University

2019 » **Math Tutor** Utah Prison Education Project
Timpanogos Women's Correctional Facility
- Supported students who are incarcerated in a Salt Lake Community College math course.

Organizations

- **SIAM:** Society for Industrial and Applied Mathematics
- **INFORMS:** The Institute for Operations Research and the Management Sciences
- **AWM:** Association for Women in Mathematics

References

Hande Benson, *Ph.D. Research Advisor*
Professor of Decision Sciences and MIS
Drexel University
hvb22 [at] drexel [dot] edu

Frederick Adler, *Undergraduate Research Advisor*
Professor of Biology and Mathematics
Director, School of Biological Sciences
University of Utah
adler [at] math [dot] utah [dot] edu