

Cassidy K. Buhler, Ph.D.

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EMPLOYMENT

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|----------------|--|
| 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

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|------|---|--------------------|
| 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,” *Mathematical Programming Computation*, 2024, ISSN: 1867-2957. [DOI: 10.1007/s12532-024-00265-9](#).
- 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. 21932–21939. [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*, [DOI: 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

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|------|---|---------------------------------|
| 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

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|------|---|--|
| 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)

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|------|---|
| 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