Bernadette K. Bucher

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Education

University of Pennsylvania
Ph.D. Computer Science — *August 2018 - May 2023*[†]
Advisors: Dr. Kostas Daniilidis and Dr. Nikolai Matni
M.S.E. Robotics — *August 2018 - December 2020*
Fully funded through fellowships, department, and advisors

Georgia Institute of Technology — *August 2016 - August 2018*
15 graduate credits, School of Computer Science
Fully funded by Lockheed Martin Corporation

The University of Alabama
M.A. Economics — *January 2012 - May 2014*
M.A. Mathematics, *Thesis Advisor:* Dr. Kabe Moen — *August 2012 - May 2014*
B.S. Mathematics and Economics — *August 2010 - May 2014*
Fully funded through academic scholarships

Experience

Visiting Assistant Professor (October 2023 — present, Remote)
Robotics Department, University of Michigan

- Incoming Assistant Professor starting Fall 2024.

Research Scientist (April 2023 — present, Remote)
Boston Dynamics AI Institute

- Technical leadership role building mobile manipulators which can reliably operate autonomously in novel and dynamic environments.
- Helped scale research institute from first year of operation to 200+ employees through initial project formation, interviewing, and iterating organizational decisions with leadership.

Robotics Research Intern (June 2021 — December 2021, Remote)
Seattle Robotics Lab, NVIDIA Research, NVIDIA Corporation

- Developed novel transformer architectures under the supervision of Dr. Dieter Fox.

Senior Software Engineer (September 2016 — August 2019, King of Prussia, PA)
Rotary and Mission Systems, Lockheed Martin Corporation

- Engineering team author for $200+ million winning government proposal. Interviewed 50+ engineering candidates to support division staffing for winning proposal.
- Architecture team lead for internal research effort of 2 to 12 people. Executed demos for customer engagements. Transitioned technology to affiliated business capture efforts.
- Designed and developed suite of configurable digital signal processing algorithms for real-time software defined radio platforms in C++ and CUDA.

[†]On maternity leave during Fall 2020 and Summer 2022 semesters.

Software Engineer (January 2015 — September 2016, Gaithersburg, MD & King of Prussia, PA)
Space Systems Company, Lockheed Martin Corporation

- Designed, developed, and maintained full stack web-based mapping software.
- POC for users developing with our API to build plugins for our applications.
- Led 3 to 8 person software engineering team in planning complete sprints, ran daily scrum meetings, and wrote new stories during periods as an Agile Scrum Master.

Systems Integration and Test Engineer (September 2014 — January 2015, Gaithersburg, MD)
Information Systems and Global Solutions, Lockheed Martin Corporation

- Evaluated image processing algorithms for technology assessment of existing software.
- Developed and maintained C++ and Java based software products on an Agile team.

Publications

Georgios Georgakis*, **Bernadette Bucher***, Karl Schmeckpeper, Siddharth Singh, Kostas Daniilidis. *Learning to Map for Active Semantic Goal Navigation.* ICLR, 2022.

Frederik Ebert*, Yanlai Yang*, Karl Schmeckpeper, **Bernadette Bucher**, Georgios Georgakis, Kostas Daniilidis, Chelsea Finn, Sergey Levine. *Bridge Data: Boosting Generalization of Robotic Skills with Cross-Domain Datasets.* RSS, 2022.

Georgios Georgakis, **Bernadette Bucher**, Anton Arapin, Karl Schmeckpeper, Nikolai Matni, Kostas Daniilidis. *Uncertainty-driven Planner for Exploration and Navigation.* ICRA, 2022.

Bernadette Bucher*, Karl Schmeckpeper*, Nikolai Matni, Kostas Daniilidis. *An Adversarial Objective for Scalable Exploration.* IROS, 2021.

Sudeep Dasari, Frederik Ebert, Stephen Tian, Suraj Nair, **Bernadette Bucher**, Karl Schmeckpeper, Siddharth Singh, Sergey Levine, Chelsea Finn. *RoboNet: Large-Scale Multi-Robot Learning.* CoRL, 2019.

Refereed Workshop Papers

Naoki Yokoyama, Sehoon Ha, Dhruv Batra, Jiuguang Wang, **Bernadette Bucher**. *VLFM: Vision-Language Frontier Maps for Zero-Shot Semantic Navigation.* CoRL Workshop on Language and Robot Learning, 2023.

Xiaoyi Cai, Siddharth Ancha, Lakshay Sharma, Philip R. Osteen, **Bernadette Bucher**, Stephen Phillips, Jiuguang Wang, Michael Everett, Nicholas Roy, Jonathan P. How. *EVORA: Deep Evidential Traversability Learning for Risk-Aware Off-Road Autonomy.* CoRL Workshop Towards Reliable and Deployable Learning-based Robotic Systems, 2023.

Bo Wu, Bruce D Lee, **Bernadette Bucher**, Nikolai Matni. *Uncertainty Aware Deployment of Pre-trained Task Conditioned Imitation Learning Policies.* CoRL Workshop on Out-of-Distribution Generalization in Robotics Towards Reliable Learning-Based Autonomy, 2023.

Bernadette Bucher*, Katrina Ashton*, Bo Wu, Karl Schmeckpeper, Nikolai Matni, Georgios Georgakis, Kostas Daniilidis. *Unordered Navigation to Multiple Semantic Targets in Novel Environments.* CVPR Embodied AI Workshop, 2023.

*Denotes equal contribution.

Frederik Ebert*, Yanlai Yang*, Karl Schmeckpeper, **Bernadette Bucher**, Georgios Georgakis, Kostas Daniilidis, Chelsea Finn, Sergey Levine. *Bridge Data: Boosting Generalization of Robotic Skills with Cross-Domain Datasets.* NeurIPS Workshop on Deep Reinforcement Learning, 2021.

Bernadette Bucher*, Karl Schmeckpeper*, Nikolai Matni, Kostas Daniilidis. *Action for Better Prediction.* RSS Workshop on Visual Learning and Reasoning for Robotic Manipulation, 2020.

Bernadette Bucher*, Siddharth Singh*, Clélia de Mulatier, Kostas Daniilidis, Vijay Balasubramanian. *Curiosity Increases Equality in Competitive Resource Allocation.* ICLR Workshop on Bridging AI and Cognitive Science, 2020.

Sudeep Dasari, Frederik Ebert, Stephen Tian, Suraj Nair, **Bernadette Bucher**, Karl Schmeckpeper, Siddharth Singh, Sergey Levine, Chelsea Finn. *RoboNet: Large-Scale Multi-Robot Learning.* NeurIPS Workshop on Deep Reinforcement Learning, 2019.

Bernadette Bucher, Anton Arapin, Ramanan Sekar, Feifei Duan, Marc Badger, Kostas Daniilidis, Oleh Rybkin. *Perception-Driven Curiosity with Bayesian Surprise.* RSS Workshop on Combining Learning and Reasoning Towards Human-Level Robot Intelligence, 2019.

Kenneth Chaney*, **Bernadette Bucher***, Evangelos Chatzipantazis, Jianbo Shi, Kostas Daniilidis. *Unsupervised Monocular Depth and Latent Structure.* CVPR Workshop on 3D Scene Understanding for Vision, Graphics, and Robotics, 2019.

Selected Presentations

Active Learning of Vision-based Representations for Robotics. Invited speaker. Department of Robotics, University of Michigan, Research Seminar, March 2023.

Sampling Policies and State Representations in Robotic Manipulation and Navigation Pipelines. Invited speaker. Samsung Research NYC, Research Seminar, November 2022.

Sampling Policies and State Representations in Robotic Manipulation and Navigation Pipelines. Invited speaker. Siemens Healthineers, Research Seminar, November 2022.

Uncertainty-based Mapping and Navigation. Invited speaker. University of Utah, Robotics Seminar, April 2022.

Adversarial Curiosity. Invited speaker. Honda Research Institute, Curious Minded Machines Winter Seminar Series, December 2020.

Improving Predictive Models with Curiosity. Invited speaker. University of Pennsylvania, GRASP Student Seminar Series, April 2020.

Perception-Driven Representations for Autonomous Robotics. Invited speaker. Massachusetts Institute of Technology, CSAIL, Robotics Seminar, November 2019.

Perception-Driven Curiosity with Bayesian Surprise. Invited speaker. Honda Research Institute, Curious Minded Machines Workshop, August 2019.

Geometric Deep Learning. Invited speaker. University of Alabama, Department of Mathematics, Applied Mathematics Seminar, April 2019.

Error Correcting Codes. Invited speaker. Lockheed Martin Corporation, Rotary and Mission Systems, Warfighter Solutions Lunch and Learn Series, September 2017.

Digital Demodulation. Invited speaker. Lockheed Martin Corporation, Rotary and Mission Systems, Warfighter Solutions Lunch and Learn Series, March 2017.

Mathematics Careers in Digital Signals Processing. Invited speaker. Villanova University, Department of Mathematics, Association of Women in Mathematics, February 2017.

Modeling Illicit Drug Use: How Does Methamphetamine Use Spread Through Urban and Rural Populations? Poster presentation. Joint Mathematics Meetings, January 2014.

Selected Honors and Awards

Haidas and Chryssikou Fellowship	*2020-2021*
Rising Stars Executive Mentoring Program, Lockheed Martin Corporation	*2018-2019*
Special Recognition Award, Lockheed Martin Corporation	*2017*
New Business Capture Award, Lockheed Martin Corporation	*2017*
2 Spot Awards, Lockheed Martin Corporation	*2016-2017*
10+ Peer Awards, Lockheed Martin Corporation	*2015-2018*
Outstanding Presenter Award, Joint Mathematics Meetings	*2014*
Double Major with Distinction Award	*2014*
Faculty Excellence Award in Economics	*2013*
Analytic Excellence in Business Award	*2013*
Special Achievement Award in Economics	*2012*
University of Alabama Presidential Scholarship	*2010-2014*
University of Alabama Engineering Scholarship	*2010-2012*

Selected Teaching and Service

Machine Learning and Computer Vision Reviewing Activities
ICLR 2024, NeurIPS 2023, CVPR 2023 Workshop on 3D Vision and Robotics, JMLR 2022

Robotics Reviewing Activities
ICRA 2024, RSS 2023, ICRA 2023, IROS 2022, RA-L 2022,
RSS 2021 Workshop on Visual Learning and Reasoning for Robotics

Head Teaching Assistant *January 2020 - May 2020*
Automata, Computability and Complexity (CIS 262)
Dr. Jean Gallier, University of Pennsylvania

Teaching Assistant *August 2019 - December 2019*
Advanced Topics in Machine Perception (CIS 680)
Dr. Jianbo Shi, University of Pennsylvania

Research and Engineering Apprenticeship Program Mentor *June 2019 - August 2019*
Army Engineering Outreach Program

Mathematics Technology Learning Center Lab Instructor *January 2013 - May 2014*
The University of Alabama

Selected Research and Leadership Experience

GRASP Lab Student Advisory Committee, University of Pennsylvania	*2020-2021*
Vice President, Pi Mu Epsilon, University of Alabama Chapter	*2013-2014*
REU in Modeling and Industrial Applied Mathematics, NC State University	*2013*
REU in Algorithmic Combinatorics on Words, UNC at Greensboro	*2012*
Coxswain, University of Alabama NCAA Division I Women's Rowing Team	*2010-2013*