Bernadette K. Bucher

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http://bernadettekbucher.com

Research Interests: Semantic Navigation, Robotic Manipulation, Embodied AI, Representation Learning, Exploration-Exploitation Tradeoffs, Reinforcement Learning, Curiosity and Exploration

Education

University of Pennsylvania
Ph.D. Computer Science — *August 2018 - present*
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

Publications

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.* Submitted, 2021.

Georgios Georgakis, **Bernadette Bucher**, Anton Arapin, Karl Schmeckpeper, Nikolai Matni, Kostas Daniilidis. *Uncertainty-driven Planner for Exploration and Navigation.* Submitted, 2021.

Georgios Georgakis*, **Bernadette Bucher***, Karl Schmeckpeper, Siddharth Singh, Kostas Daniilidis. *Learning to Map for Active Semantic Goal Navigation.* Submitted, 2021.

Kendall J. Queen, Karl Schmeckpeper, **Bernadette Bucher**, Siddharth Singh, Kostas Daniilidis, Nikolai Matni. *Event-Based Lane Detection for Autonomous Ground Vehicles.* Submitted, 2021.

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.

Workshop Papers and Preprints

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.

Sadat Shaik*, **Bernadette Bucher***, Nephele Agrafiotis, Stephen Phillips, Kostas Daniilidis, William Schmenner. *Learning Portrait Style Representations.* arXiv Preprint, 2020.

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 Mutalier, 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.

Industry Experience

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

- Developed novel algorithms for precision placing under the supervision of Dr. Dieter Fox.

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

- Engineering team author for $200+ million winning government 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.
- Author and demo lead for multiple RFI responses to various government customers.
- Designed and developed suite of configurable digital signal processing algorithms for real-time software defined radio platforms in C++ and CUDA.
- Supported integration of algorithm software suite for different applications and waveforms across multiple programs including government contracts and internal research efforts.
- Led and supported multiple physical layer development and RF integration processes from algorithm simulation through hardware integration.
- Interviewed 50+ engineering candidates to support division staffing.

Software Engineer (January 2015 - September 2016, Gaithersburg, MD & King of Prussia, PA)
GEOINT Visualization Services
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)
Integrated Exploitation Capabilities
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.

Selected Presentations

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.

The Navier-Stokes Equations: A Survey of Progress and Problems. Invited speaker. University of Alabama, Department of Mathematics, Mathematics Seminar, November 2013.

Infectious Disease Modeling and the Spread of Methamphetamine Use. Invited speaker. University of Alabama, Department of Mathematics, Pi Mu Epsilon, October 2013.

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

Reviewer for RSS Workshops and JMLR — *May 2020 - present*

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

Team Mentor, George Washington Carver High School — *August 2019 - February 2020*
FIRST Tech Challenge

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

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

Volunteer, Girls Lead in Science and Technology Coding Camp — *August 2019*

Volunteer Robot Design Judge — *February 2019*
FIRST LEGO League

Volunteer Teacher, Lockheed Martin Corporation Representative — *December 2014*
Cool Careers in Cybersecurity for Girls Workshop

Lab Instructor, Mathematics Technology Learning Center — *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*