Christine Allen-Blanchette

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PROFESSIONAL APPOINTMENTS

Princeton University Assistant Professor, Mechanical and Aerospace Engineering Assistant Professor, Center for Statistics and Machine Learning (CSML) Associated Faculty, Computer Science	Princeton, NJ July 2022 - Present	
Postdoctoral Researcher, Mechanical and Aerospace Engineering Presidential Postdoctoral Research Fellow	August 2019 - July 2022	
CAB Lab Founder and Director	2022 - Present	
Machine Learning for Political Economy and Race Lab Co-Founder and Scientific Advisor	2020 - Present	
EDUCATION		
University of Pennsylvania Ph.D., Computer Information Science M.S.E, Robotics Dissertation: Leveraging Symmetric Structure for Improved Learning in Convolution Advisor: Prof. Kostas Daniilidis NSF IGERT Complex Scene Perception Fellow Distinguished Fontaine Fellow GEM Fellow	Philadelphia, PA Spring 2020 May 2013 nal Neural Networks	
San Jose State University B.S. Computer Engineering B.S. Mechanical Engineering	San Jose, CA August 2011 August 2011	

B.S. Mechanical Engineering David A. Brown Mechatronics Fellow

AWARDS & FELLOWSHIPS

- 2023 CSML Research Software Engineer, Princeton University
- 2023-25 PCI Collaboration Funding, Princeton University
- 2023-24 SEAS Innovation Research Grant, Princeton University
- 2023 CSML Research Software Engineer, Princeton University
- 2023 Keller Center Course Development Support, Princeton University
- 2023 DARPA AI Forward Workshop
- 2020-21 Council on Science and Technology (CST) Award, Princeton University
- 2019-22 Presidential Postdoctoral Research Fellows, Princeton University
- 2019-21 Provost Postdoctoral Fellow, University of Pennsylvania, (declined offer)
- 2012-19 Fontaine Fellowship, University of Pennsylvania
- 2016 FOCUS Fellows, Georgia Institute of Technology
- 2015 NextProf Future Faculty Workshop, University of Michigan
- 2012-14 NSF IGERT Complex Scene Perception Fellowship, University of Pennsylvania
- 2012 GEM Fellowship, University of Pennsylvania
- 2010 Summer Undergraduate Research Fellowship, Georgia Institute of Technology
- 2007 David A. Brown Fellowship in Mechatronics, San Jose State University

PUBLICATIONS

* indicates equal contribution

- J. Mason*, C. Allen-Blanchette*, N.F. Zolman, E. Davison, N.E. Leonard, *Learning to predict 3D rotational dynamics from images of a rigid body with unknown mass distribution*, Aerospace 2023
- J. Mason*, C. Allen-Blanchette*, N.F. Zolman, E. Davison, N.E. Leonard, *Learning interpretable dynamics from images of a freely rotating 3D rigid body*, AAAI, 2022 Symposium on Knowledge-Guided AI

- C. Allen-Blanchette, S. Veer, A. Majumdar, N.E. Leonard, *LagNetViP: A Lagrangian Neural Network for Video Prediction*, AAAI, 2020 Symposium on Physics-Guided AI
- C. Esteves, Y. Xu, C. Allen-Blanchette, K. Daniilidis, *Equivariant Multi-View Networks*, ICCV, 2019 (Oral)
- C. Esteves, C. Allen-Blanchette, A. Makadia, K. Daniilidis, *Learning SO(3) Equivariant Representations with Spherical CNNs*, ECCV, 2018 (Oral)
- C. Esteves, C. Allen-Blanchette, X. Zhou, K. Daniilidis, Polar Transformer Networks, ICLR, 2018
- S. Leonardos, C. Allen-Blanchette, J. Gallier, *The exponential map for the group of similarity transformations and applications to motion interpolation*, ICRA, 2015

PATENTS

- M. Rodnick, and C. Allen-Blanchette, Systems and methods for dynamic alignment beam calibration, U.S. Patent No. 9,269,529, 23 Feb. 2016
- M. Rodnick, and C. Allen-Blanchette, Systems and methods for calibrating end effector alignment using at least a light source, U.S. Patent No. 8,954,287, 10 Feb. 2015
- M. Rodnick, and C. Allen-Blanchette, Systems and methods for calibrating end effector alignment in a plasma processing system, U.S. Patent No. 8,751,047, 10 Jun. 2014
- M. Rodnick, and C. Allen-Blanchette, Arrangements and methods for determining positions and offsets, U.S. Patent No. 8,860,955, 14 Oct. 2014

INVITED TALKS

2023

- Oct 27 Princeton University, Creative Convergence: At the Crossroads of Dance, Ecology, Neuroscience, and Control Engineering Learning Hamiltonian Dynamics from Video
- Aug 25 Waseda University, International Council for Industrial and Applied Mathematics (ICIAM) Workshop on Learning Dynamical Systems by Preserving Symmetries, Energies, and Variational Principles Learning video models with Lagrangian/Hamiltonian neural networks
- May 5 University of Washington, AI Institute in Dynamical Systems Video modeling with Lagrangian/Hamiltonian neural networks
- April 12 Princeton University, SML 301 guest lecture Video modeling with Lagrangian/Hamiltonian neural networks
- March 3 Society for Industrial and Applied Mathematics Conference on Computational Science and Engineering (SIAM CSE) Workshop on Structure-preserving model reduction for Lagrangian and Hamiltonian systems Learning Dynamics from Images Using Lagrangian/Hamiltonian Structure

2022

- Sept 30 Society for Industrial and Applied Mathematics Conference on Mathematics of Datascience (SIAM MDS) Workshop on Exploiting Hamiltonian Structure in Learning Dynamical System Models for Prediction and Control Leveraging Hamiltonian Structure to Learn Rigid Body Dynamics from Images
- Sept 26 Society for Industrial and Applied Mathematics Conference on Mathematics of Datascience (SIAM MDS) Workshop on Learning Dynamical Systems by Preserving Symmetries, Energies, and Variational Principles Leveraging Dataset Symmetries in Neural Network Prediction
- Feb 11Boston University, Center for Information & Systems Engineering (CISE)Leveraging Dataset Structure for Neural Network Prediction

2021

- Dec 12 IEEE Conference on Decision and Control (CDC), Workshop on Robust Deep Learning-based Control Leveraging Dataset Symmetries in Neural Network Prediction
- Aug 4 Lawrence Livermore National Laboratory, Center for Advanced Signal and Image Sciences (CASIS) Leveraging Dataset Symmetries in Neural Network Prediction
- May 10 University of Pennsylvania, Matni Lab GIRL: A Generative Model of Image Representations and Learned Lie Invariants

2020

Oct 9 UC Berkeley, SemiAutonomous Seminar

- Learning & Leveraging Dataset Symmetries in Neural Network Prediction
- Sept 4 UPenn, Foundations of Image Processing, Workshop on Equivariance and Data Augmentation LagNetViP: A Lagrangian Neural Network for Video Prediction
- Sept 16 University of Florida, Nonlinear Controls and Robotics Seminar
- LagNetViP: A Lagrangian Neural Network for Video Prediction

Aug 31 University of Pennsylvania, Kod*lab

2018-2019

Jan 31, 2019Princeton University
Equivariant Filtering in CNNsJune 26, 2018University of Pennsylvania, Kod*lab
Equivariant Filtering in CNNs

PRESENTATIONS

2020 LagNet: Lagrangian Neural Networks, Princeton Neuroscience Institute

2020 LagNet: Lagrangian Neural Networks, Princeton University

2018 3D Object Classification, NSF-IUCRC ROSE-HUB, Minneapolis, MN

2017 Equivariant networks, NSF-IUCRC ROSE-HUB, Denver, CO

2014 Motion Interpolation in SIM(3), GEM Annual Board Meeting and Conference, San Diego, CA

TEACHING EXPERIENCE

Princeton University

Advanced Dynamics, *Instructor* (Fall 2022 & 2023) Special Topics: Deep Learning and Physical Systems, *Instructor* (Spring 2021 & 2023) Reading Seminar: Machine Learning and Dynamical Systems - Reinforcement Learning, *Instructor* (Fall 2020) Reading Seminar: Machine Learning and Dynamical Systems - Graph Neural Networks, *Instructor* (Summer 2020)

University of Pennsylvania

Machine Perception (graduate course), *Teaching Assistant* (Spring 2018)
Course in College Teaching, *Trainee* (Spring 2017)
edX Robotics: Vision Intelligence and Machine Learning, *Teaching Assistant & Course Developer* (Summer 2017)
Research Experience for Teachers (RET) - Linear Algebra, *Instructor* (Summer 2016)
Computer Organization and Design (undergraduate course), *Teaching Assistant* (Spring 2014)
Introduction to Cognitive Science (undergraduate course), *Teaching Assistant*, (Fall 2013)

San Jose State University

Robotics, *Teaching Assistant - Curriculum Design* (Summer 2007, Spring 2007, 2007 AY) Robotics, *Teaching Assistant - Course Developer* (Summer 2006)

RESEARCH EXPERIENCE

University of Pennsylvania Graduate Researcher, GRASP Laboratory

Georgia Institute of Technology

Undergraduate Researcher, HumAnS Lab

SERVICE TO PROFESSION

Area chair

2023 - Learning for Dynamics & Control Conference

Workshop co-organizer

2022 - Learning Dynamical Systems by Preserving Symmetries, Energies, and Variational Principles, SIAM Conference on Mathematics of Data Science

2021 - Robust Deep Learning-Based Control, Conference on Decision and Control (CDC)

Reviewer

National Science Foundation (NSF) Panelist (2023) Physica D: Nonlinear Phenomena (2023) Artificial Intelligence and Statistics (AISTATS) International Conference on Machine Learning (ICML) Conference on Computer Vision and Pattern Recognition (CVPR) International Conference on Learning Representations (ICLR) European Conference on Computer Vision (ECCV), *High-quality Review Award 2020* Conference on Neural Information Processing Systems (NeurIPS) Winter Conference on Applications of Computer Vision (WACV) Asian Conference on Computer Vision (ACCV)

Philadelphia, PA September 2012 - May 2013

> Atlanta, GA May 2010 - July 2010

UNIVERSITY SERVICE

2023 AY Machine Intelligence Initiative Executive Committee, Member

- 2023 AY BSE First Year Advisor
- 2023 PACM Preliminary Examiner
- 2022-2024 Rocky Faculty Fellows

DEPARTMENT SERVICE

2022 AY Master of Engineering, Advisor

2022 AY CSML UG Certificate Executive Committee, Member

OUTREACH

2023	Princeton University NSBE Chapter's Fall Zone Conference, Distinguished Speaker, October 28
2022	Council on Science and Technology (CST) Women in STEM, Panelist, September 21
Summer 2022	UK NACME Google Applied Machine Learning Intensive (AMLI) Bootcamp, Instructor
Summer 2021	UK NACME Google Applied Machine Learning Intensive (AMLI) Bootcamp, Instructor
2018	AMP GEM GRAD Lab, Why Graduate School? - Panelist, April 6
2017	Data for Black Lives Conference, Ask a Data Scientist - Panelist, November 17-19
2017	DataRescue Philly, Seeder/Sorter, January 14
Summer 2016	Research Experience for Teachers (RET), Mentor
Spring 2015	iPraxis, Coding Scienteer
Fall 2014	West Philly Tutoring Project (WPTP), Math Tutor (4th grade)
2011	Google Hack212: Urban Innovation, Hacker, November 5-7

PROFESSIONAL EXPERIENCE

BAE Systems

Software Engineering Intern Developed software emulators for vehicle components

Lam Research

Mechatronics Intern Developed techniques for improved silicon wafer centering Santa Clara, CA June 2009 - April 2010

Fremont, CA July 2007 - August 2008