

Jonathan Spencer

PhD Candidate, Electrical Engineering

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Passionate educator, mentor, and researcher with deep expertise in imitation learning, robotics, and machine learning and a broad command of Electrical Engineering fundamentals. Taught two courses as sole instructor and supervised three BSE theses.

Education

- 2018 – 2022 **Princeton University, Ph.D. in Electrical Engineering**
Thesis: *Learning from Humans: Imitation Learning and Beyond*
Advisors: Mung Chiang, Peter Ramadge
- 2016 – 2018 **Princeton University, M.A. in Electrical Engineering**
- 2014 – 2015 **Brigham Young University, M.S. in Electrical Engineering**
Thesis: *A Compact Phased Array Radar for UAS Sense and Avoid*
Advisor: Karl Warnick
- 2008 – 2014 **Brigham Young University, B.S. in Electrical Engineering**
Academic Achievements:
 - *Magna Cum Laude*
 - Dean's List five times
 - Full tuition academic scholarship

Employment

- 2021.8 – 2021.12 **Teaching Fellow**, Camden County College, *Camden, NJ* / Princeton University
Taught and designed curriculum and interactive labs for two undergraduate circuits courses as sole instructor.
- 2020.5 – 2020.11 **Graduate Research Intern**, Aurora Innovation, *Pittsburgh, PA*
Developed new methods for imitation learning in autonomous driving (in collaboration with Sanjiban Choudhury, Arun Venkatraman, Brian Ziebart, J. Andrew Bagnell)
- 2017– 2020 **Teaching Assistant**, Princeton University, *Princeton, NJ*
Created interactive labs for new robotics course. Supervised independent projects and created homework/exams for undergrad course with 100+ students.
- 2016– 2022 **Graduate Researcher**, Princeton University, *Princeton, NJ*
Core member of Princeton Edge Lab, developing full stack imitation learning and machine learning at the network edge on top of the MuSHR miniature driving platform.
- 2015.1 – 2015.4 **Analog Design Intern**, ON Semiconductor, *American Fork, UT*
Designed autocalibration circuits for analog-to-digital converters.

- 2012 – 2015 **Research Assistant**, Brigham Young University, *Provo, UT*
Designed, implemented, and debugged 10GHz Phased Array RF transceiver from scratch. Developed predictive radar models and phased array radar processing pipeline.
- 2012 – 2014 **Teaching Assistant**, Brigham Young University, Provo, UT
Created hands-on labs for circuits and signal processing and lectured lab sessions.

Advising and Mentoring

- 2021 “Towards Socially Aware Robot Learning: Inferring Human Objectives and Latent Safety Preferences from Observations” - Jovana Kondic, *Princeton Undergraduate Thesis*
- 2020 “Extending Classical Deep Reinforcement Learning Techniques for use in Multi-Agent Systems” - Oliver Matthews, *Princeton Undergraduate Thesis*
- 2017 “Alternative Methods for Avalanche Search and Rescue” - Rebekah Sichel, *Princeton Undergraduate Thesis*

Teaching Experience

- 2021 Fall **Electrical Circuits**, Camden County College, *Camden, NJ*
Sole Instructor. Crafted curriculum, lectures, interactive labs, homework, and exams
- 2021 Fall **Circuits I**, Camden County College, *Camden, NJ*
Sole Instructor. Crafted curriculum, lectures, interactive labs, homework, and exams
- 2020 Fall **Safety Critical Robotics Systems (Graduate)**, Princeton University, *Princeton, NJ*
Sole TA for Jaime Fernandez-Fisac. Developed interactive labs and gave some lectures.
- 2017 Fall **Networks: Friends, Money, Bytes**, Princeton University, *Princeton, NJ*
TA for Chris Brinton. Created homework and exams, mentored projects (two publications)
- 2016 Spring **English as a Second Language**, Yun Long Primary School, *Hunan, China*
Sole Instructor. Crafted curriculum and lectures for 600+ students in grades 1, 3, and 5.
- 2013 Fall **VLSI Communications Circuits**, Brigham Young University, *Provo, UT*
Sole TA for David Comer. Lab instructor and homework help.
- 2013 Fall **Signals and Systems**, Brigham Young University, *Provo, UT*
TA for Neal Bangerter. Designed labs, lab instructor and homework help.
- 2013 Fall **Circuits I**, Brigham Young University, *Provo, UT*
Lab TA for Doran Wilde. Lab instructor and homework help.

Publications

Thesis

- [1] J Spencer. “A compact phased array radar for UAS sense and avoid”. Brigham Young University, 2015

Journal

- [3] J Spencer, S Choudhury, M Barnes, M Schmittle, M Chiang, P Ramadge, S Srinivasa. “Expert Intervention Learning: An online framework for robot learning from explicit and implicit human feedback”. *Autonomous Robots*, 2021.

- [2] L Sahawneh, J Wickle, A Roberts, J Spencer, T McLain, K Warnick, R Beard. “Ground-based sense-and-avoid system for small unmanned aircraft”. *Journal of Aerospace Information Systems*, 2018.
- [1] L Sahawneh, J Mackie, J Spencer, R Beard, K Warnick. “Airborne radar-based collision detection and risk estimation for small unmanned aircraft systems”. *Journal of Aerospace Information Systems*, 2015.

Conference/Other

- [7] J Spencer, S Choudhury, A Venkatraman, B Ziebart, JA Bagnell. “Feedback in Imitation Learning: Three Regimes of Covariate Shift”. *ArXiv*, 2021
- [6] J Spencer, S Choudhury, M Barnes, M Schmittle, M Chiang, P Ramadge, S Srinivasa. “Learning from Interventions: Human-robot interaction as both explicit and implicit feedback”. *Robotics: Science and Systems*, 2020.
- [5] A Lan, J Spencer, Z Chen, C Brinton, M Chiang. “Personalized thread recommendation for MOOC discussion forums”. *Joint European Conference on Machine Learning and Knowledge Discovery in Databases*, 2018.
- [4] M Shridharan, A Willingham, J Spencer, TY Yang, C Brinton. “Predictive learning analytics for video-watching behavior in MOOCs”. *Conference on Information Sciences and Systems*, 2018.
- [3] C Bridges, J Jared, J Weissmann, A Montanez-Garay, J Spencer, C Brinton. “Course recommendation as graphical analysis”. *Conference on Information Sciences and Systems*, 2018.
- [2] L Sahawneh, J Spencer, R Beard, K Warnick. “Minimum required sensing range for UAS sense and avoid systems”. *AIAA Infotech@ Aerospace*, 2016.
- [1] J Mackie, J Spencer, K Warnick. “Compact FMCW radar for a UAS sense and avoid system”. *IEEE antennas and propagation society international symposium*, 2014.

Invited Talks

- 2021 “Learning from Humans: Enabling a Scalable and Efficient Future of Robotics”. *Machine Learning and Friends Seminar, University of Massachusetts, Amherst*
- 2020 “Imitation Learning from Interventions: Human-robot interaction as both explicit and implicit feedback”. *ELE Machine Learning Seminar, Princeton University*
- 2020 “Imitation Learning from Interventions: Human-robot interaction as both explicit and implicit feedback”. *Tesla Autopilot Team*.

Patents

- [1] K Warnick, J Spencer. “Phased Array Radar Systems for Small Unmanned Aerial Vehicles”. *US Patent US10317518B2*, 2018.

Professional Activities

Reviewer NeurIPS 2021, CoRL 2021, AI-HRI 2021, CISS 2018, 2020, 2022

Outreach

- 2020-2022 **Resident Graduate Student, Princeton University.** Selected for a highly competitive position that pairs graduate students with groups of first year undergraduates for mentoring and well-being outreach.
- 2017-2021 **Latter-day Saint Student Association Officer, Princeton University.** Leader of faith-based outreach organization. Planned and hosted regional activity with 250+ attendees.
- 2012-2015 **Volunteer Tutor, Brigham Young University.** Volunteered 5+ hours per week over the course of 3 years to help fellow students in various engineering topics.
- 2010-2012 **Volunteer Representative, The Church of Jesus Christ of Latter-day Saints, Salta, Argentina.** Community service and outreach as well as teaching and counseling work with individuals and families.

Languages

- Spanish Fluent written and speaking (ACTFL Excellent certification)
- Mandarin Moderate speaking and written fluency