Victoria Dean

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APPOINTMENTS

Olin College of Engineering   2023 – present

Assistant Professor of Computer Science

EDUCATION

Carnegie Mellon University   2018 – 2023

PhD in Robotics, School of Computer Science

Thesis: *Improving Robotic Exploration with Self-Supervision and Diverse Data*

Committee: Abhinav Gupta (Advisor), David Held, Shubham Tulsiani, Rob Fergus, Chelsea Finn

Future Faculty Program Participant, Eberly Center for Teaching Excellence and Educational Innovation

Massachusetts Institute of Technology   2013 – 2017

Bachelor of Science, Computer Science and Engineering

TEACHING EXPERIENCE

Olin Software Design (ENGR2510-03), <u>Instructor of Record</u>   Spring 2024

Taught Olin's introductory course in computing. Managed the integration of ethics and machine learning concepts throughout the semester. Designed the course's Large Language Model policy.

Olin Reinforcement Learning Reading Grp (ENGR0077-G-06), <u>Instructor of Record</u>   Spring 2024

Led paper reading seminar on reinforcement learning with topics including metalearning, safety constraints, robotics, and climate solutions. 13 students participated, and discussion leaders rotated for each unit.

Olin Artificial Intelligence and Society (AHSE2199B), <u>Instructor of Record</u>   Fall 2023

Developed and taught course with Profs Paul Ruvolo and Caitrin Lynch. Implemented embedded ethics project in which students developed ethics content for 5 technical Olin courses. (Course rating: 4.8/5.0)

Olin Deep Reinforcement Learning (ENGR0077-G-12), <u>Instructor of Record</u>   Fall 2023

Led independent study course covering deep reinforcement learning, going through topics and assignments from Berkeley's course.

Olin Introductory Fundamentals of Robotic Math (MTH0077-01), <u>Instructor of Record</u> Fall 2023

Led independent study course covering linear algebra for deep learning as well as topics from MIT's Computational Probability and Inference course.

CMU Ethics and Robotics (16-735), <u>Instructor of Record</u>   Spring 2021

Designed and taught course with Professor Illah Nourbakhsh. Created module design project in which students developed ethics curricula for 11 CS courses with CMU faculty. Authored 2022 SIGCSE paper. Received a course evaluation rating of 4.94/5.0 (Department average is 4.41 and School average is 4.30).

CMU Deep RL for Robotics (16-881), Teaching Assistant   Spring 2020
  As sole TA for Professor David Held, gave guest lectures, led discussions, and graded writing and projects.

FIRST Robotics Team Castilleja Gatorbotics, Head Coach   2017 – 2018
  Mentored all-girls high school robotics team on topics ranging from programming to project management.

MIT Introduction to Deep Learning (6.S191), Lecturer and Co-Chair   January 2017
  Co-taught MIT's first deep learning course for 231 students. My multimodality lecture has 23,000+ views.

MIT Global Teaching Labs, Computer Science Instructor   January 2016
  Developed and taught a month's worth of curriculum on elective topics, including algorithms and machine learning, to 4th and 5th year computer science students at a vocational school in Prato, Italy.

MIT Society of Women Engineers #HelloWorld, Lead Instructor   2014 – 2017
  Developed and taught 7-week course encouraging middle school girls to pursue computer science. Still run every semester, the program enables students to build websites using HTML, CSS, and JavaScript.

MIT Code for Good (6.S187), Founder and <u>Instructor of Record</u>   2014 – 2017
  Created and managed course connecting students and nonprofits on CS projects. Cumulatively since 2014, hundreds of students have worked with 60+ nonprofits. Helped start related programs at 3 schools.

MIT Introduction to EECS (6.01), Student Lab Assistant   Spring 2014
  Led students through course labs on topics ranging from probability to PID control on real robots.

Khan Academy Discovery Lab, Student Instructor   Summer 2012
  Taught middle school students math and science with activities in probability, engineering, and CS.

Research and Industry Experience

CMU Robotics Institute, Graduate Student Researcher   2018 – 2023
  Conducting research to improve efficiency and evaluation of robot learning advised by Professor Abhinav Gupta. Published 4 papers (5th in submission) at top learning conferences, including NeurIPS and CoRL.

DeepMind, Research Scientist Intern   Fall 2021
  Investigated policy fine-tuning in task transfer, advised by Professor Doina Precup on the Montreal team.

Waymo, Machine Learning Research Resident   2017 – 2018
  Combined imitation learning with reinforcement learning for better trajectory generation. Designed and deployed a low-latency text detection and recognition system that runs on the Waymo fleet.

MIT Computer Vision Group, Undergraduate Researcher   2015 – 2017
  Trained video models using dynamics and audio with Professor Antonio Torralba and Carl Vondrick.

Deep Genomics, Research Intern   Summer 2016
  Designed RNA pattern recognition model that improved sensitivity by 1.2x with Professor Brendan Frey and Andrew Delong. Won 2nd best paper at 2016 Machine Learning for Computational Biology workshop.

Counsyl, Computational Biology Research Intern   Summer 2015

   Developed analysis pipeline for a liquid biopsy that reconstructs a tumor's genome from circulating tumor DNA. Used signal processing techniques to reduce sequencer and polymerase noise by 1000x.

Google, Software Engineering Intern   Summer 2014

   Designed and implemented a distributed video analysis system for finding coherent animated clips in YouTube videos. Launched the system internally, allowing all Google employees to test out the project.

Coursera, Software Engineering Intern   Summer 2013

   Created internationalization architecture for Coursera's website and shortened page load time by 10-20%.

UC Santa Cruz Astronomy Group, Research Intern   Summers 2011, 2012

   Developed pattern-matching software to search spectra for distant galaxies advised by Professor Raja Guhathakurta. Wrote paper and presented at the 2013 American Astronomical Society conference.

Honors and Awards

Siebel Scholars Award Recipient ($35,000)   2023
Best Paper Award at NeurIPS Broadening Collaborations in Machine Learning Workshop   2022
Schmidt Futures Grant for CMU Robotics Testbed ($209,000 over 2 years)   2021
NSF Graduate Research Fellowship Program Awardee ($102,000 over 3 years)   2020
2nd Place Oral Presentation at NeurIPS Machine Learning in Computational Biology Workshop   2016
Cisco Undergraduate Research and Innovation Scholar   2015
Dropbox Engineering Prize at Stanford TreeHacks   2015
Winner of MIT Education DesignShop   2014
Intel Science Talent Search Semifinalist (One of 300 across US)   2013

Publications

Conference Papers

J. Mejia, **V. Dean**, T. Hellebrekers, A. Gupta. Hearing Touch: Using Contact Microphones for Robot Manipulation. *ICRA* 2024.

G. Zhou*, **V. Dean***, M. Srirama, A. Rajeswaran, J. Pari, K. Hatch, A. Jain, T. Yu, P. Abbeel, L. Pinto, C. Finn, A. Gupta. Train Offline, Test Online: A Real Robot Learning Benchmark. *ICRA* 2023.

V. Dean, I. Nourbakhsh. Teaching Ethics by Teaching Ethics Pedagogy. *ACM SIGCSE* 2022.

S. Parisi*, **V. Dean***, D. Pathak, A. Gupta. Interesting Object, Curious Agent: Learning Task-Agnostic Exploration. *Oral at NeurIPS* 2021.

V. Dean, Y. Shavit, A. Gupta. Robots on Demand: A Democratized Robotics Research Cloud. *Blue Sky Oral at CoRL* 2021.

V. Dean, S. Tulsiani, A. Gupta. See, Hear, Explore: Curiosity via Audio-Visual Association. *NeurIPS* 2020.

Other Publications (Preprints, Workshops, Posters, and Patents)

V. Dean, L. Kirabo, S. Krause-Levy, C. Taylor. Primarily Undergraduate Institution Faculty. *Birds of a Feather at ACM SIGCSE* 2024.

G. Challen, **V. Dean**, N. Derbinsky, M. Wang, J. Smith. Interviewing the Teaching Faculty Hiring Process. *Panel at ACM SIGCSE* 2024.

S. Alshammari, **V. Dean**, T. Hellebrekers, P. Morgado, A. Gupta. Hearing Touch: Using Contact Microphones for Robot Manipulation. *Women in Machine Learning workshop at NeurIPS* 2022.

V. Dean, D. Toyama, D. Precup. Don't Freeze Your Embedding: Lessons from Policy Finetuning in Environment Transfer. *Agent Learning in Open-Endedness (spotlight) and Generalizable Policy Learning in the Physical World workshops at ICLR* 2022.

E. Xing, A. Gupta, S. Powers, **V. Dean**. KitchenShift: Evaluating Zero-Shot Generalization of Imitation-Based Policy Learning Under Domain Shifts. *Distribution Shifts workshop at NeurIPS* 2021.

V. Dean, A. Ogale, H. Kretzschmar, D. Silver, C. Kershaw, P. Chaudhari, C. Wu, C. Li. Phrase Recognition Model for Autonomous Vehicles. *US Patent Number 10699141B2*.

V. Dean, S. Tulsiani, A. Gupta. Audio Prediction as Instrinsic Reward for Exploration. *Women in Machine Learning workshop at NeurIPS* 2019.

V. Dean, A. Delong, B.J. Frey. Deep Learning for Branch Point Selection in RNA Splicing. *Machine Learning for Computational Biology (oral) and Women in Machine Learning workshops at NeurIPS* 2016.

V. Dean, C. Vondrick, A. Torralba. Understanding Personality with Deep Convolutional Neural Networks. *MIT EECSCon* 2016.

V. Dean, C. Vondrick, A. Torralba. Predicting the Future: Generative Models for Video. *MIT SuperUROP Poster Session* 2015.

V. Dean, P. Guhathakurta, et al. Search for High-Redshift Lyman-Alpha Emitters in the DEEP3 Galaxy Redshift Survey. *American Astronomical Society meeting* 2013.

K. McCormick, A. Alvarez-Buylla, **V. Dean**, et al. Semi-automated Search For Lyman-alpha And Other Emission Lines In The DEEP2 And DEEP3 Databases. *American Astronomical Society meeting* 2012.

RESEARCH ADVISING

Brooke Wager, Olin Undergraduate Researcher	2024 – present
Lily Wei, Olin Undergraduate Researcher	2024 – present
Kenneth Xiong, Olin Undergraduate Researcher	2024 – present
Cherry Pham, Olin Undergraduate Researcher	2024 – present
Sohum Kothavade, Olin Undergraduate Researcher	2024 – present
Dakota Chang, Olin Undergraduate Researcher	2023 – present
Ayush Chakraborty, Olin Undergraduate Researcher	2023 – present
Jessica Brown, Olin Undergraduate Researcher	2023 – present
Krishna Suresh, Olin Undergraduate Researcher	2023 – present
Luke Witten, Olin Undergraduate Researcher	2023 – present
Madie Tong, Olin Undergraduate Researcher	2023 – present
Sally Lee, Olin Undergraduate Researcher	2023 – present
Andrew Kurtz, Olin Undergraduate Researcher	2023 – present
Dongim Lee, Olin Undergraduate Researcher	2023 – present
Ryan Aponte, Robotics Institute MS Student	2022 – 2023
Jared Mejia, Machine Learning MS Student	2022 – 2023
Gaoyue Zhou, Robotics Institute MS Student	2021 – 2023
Shaden Alshammari, Robotics Institute Summer Scholar	Summer 2022
Krishna Patel, CMU Undergraduate Researcher	Spring 2022
Jacob Adkins, Robotics Institute Summer Scholar	2021 – 2022
Maxine Lui, CMU Undergraduate Researcher	Spring 2021
Esther Brown, Duke Undergraduate → Harvard MS Student	2020 – 2021
Eliot Xing, Robotics Institute Summer Scholar	2020 – 2021
Sunayana Rane, High School Student	2015 – 2016

Academic Service

Conference Reviewing

Reinforcement Learning Conference (RLC) (*Senior Reviewer*)	2024
Special Interest Group on Computer Science Education (SIGCSE)	2024
International Conference on Robotics and Automation (ICRA)	2023
Conference on Robot Learning (CoRL)	2021, 2022
Neural Information Processing Systems (NeurIPS)	2021, 2022
International Conference on Machine Learning (ICML)	2022
International Conference on Learning Representations (ICLR)	2022

Workshop Organizing

Learning from Diverse, Offline Data at ICRA (*organizer*)	2023
Robot Learning in the Cloud: Remote Operations and Benchmarking at RSS (*lead organizer*)	2022
Learning from Diverse, Offline Data at RSS (*meta-reviewer and organizer*)	2022
Differentiable Computer Vision, Graphics, and Physics at NeurIPS (*meta-reviewer and organizer*)	2020

Workshop Reviewing

Self-Supervised Learning for Reasoning and Perception at ICML	2021
Self-Supervised Learning: Theory and Practice at NeurIPS	2020
Women in Machine Learning at NeurIPS	2016, 2018

PhD Qualifier Committees

Michelle Zhao, *Examining the Role of Adaptation in Human-Robot Collaboration*	2023
Adam Villaflor, *Fine-Tuning Offline Reinforcement Learning with Model-Based Policy Optimization*	2021

Olin College Service

Post Graduate Planning, Faculty Partner   2023 – 2024

Advised students navigating graduate school and fellowship applications. Provided feedback on written materials and made suggestions for students planning different career trajectories.

Academic Advising, Student Advisor   2023 – 2024

Served as academic advisor to four students. Oversaw course registration process and organized one-on-one and group check-ins.

Carnegie Mellon Service

Robotics Institute PhD Retreat, Organizer   2022

Secured over \$15,000 in funding from multiple sources to organize the department's first PhD Student retreat. Managed 10-person organizing team to orchestrate the overnight trip for 72 attendees.

School of Computer Science Teaching Assistant Awards Committee, Committee Member   2021

Read nomination packets and participated in awards selection as awards committee student representative.

Robotics Institute Faculty Hiring Committee, Committee Member   2021

Contributed to faculty hiring committee as a full member, including reading packets, interviewing all 16 candidates selected for visits, and soliciting and consolidating feedback from the department.

AI Mentoring Program, Organizer   2018 – 2021

Founded program with goal of involving more women and underrepresented minorities in AI research. Since 2018, the program has cumulatively matched 712 undergraduates with PhD student mentors.

SCS Dean's Advisory Committee, Founding Member   2019 – 2021

Represented Robotics Institute on School of Computer Science committee reporting to Dean Martial Hebert about experiences and challenges facing PhD students. Led Anti-Racism Group, whose letter, Towards Anti-Racist Change in the School of Computer Science, amassed more than 600 signatures.

Robotics Institute Director Search, Interview Committee Member   2021

Interviewed candidates and elevated student interests as representative in department chair search.

OurCS, Committee Member   2019

Co-organized research conference for undergraduate women with Dr. Carol Frieze. Initiated scholarship program and secured $5,000 in travel grants for students from Mexico, Ghana, Uganda, and Ethiopia.

INVITED TALKS AND PANELS

Olin College Community Research Seminar	October 2023
3rd Annual Learning Workshop	March 2023
Pittsburgh Women in Mathematics and Computing Symposium	February 2023
CoRL Learning to Adapt and Improve in the Real World Workshop Panel	December 2022
Institute for Computational and Data Sciences Symposium AI Governance Panel	October 2022
CMU Robots Perceiving and Doing Lab Invited Talk	September 2022
Duke Technology Scholars Program Fireside Chat	June 2019, May 2022
CMU Eberly Center Spotlight on Graduate Teaching Panel	September 2021
Robotics Institute Summer Scholars Graduate Student Panel	July 2020, July 2021
CVPR Sight and Sound Workshop Invited Paper Talk	June 2021
The Nueva School Intersession Self-Supervised Machine Learning Talk	January 2021
University of Washington Reasoning, AI and VisioN Lab Recognition Lunch	November 2020
Robotics Institute DEI Town Hall Panel	September 2020
Castilleja Global Week AI Panel	January 2019
Quantitative Genomics Working Group Series at Harvard School of Public Health	April 2018
MIT Women in EECS Tech Talk	April 2017

COURSEWORK AND SKILLS

CMU Coursework: Deep Reinforcement Learning (10-703), Statistical Techniques in Robotics (16-831), Deep RL for Robotics (16-881), Math for Robotics (16-811), Mechanics of Manipulation (16-741)

MIT Coursework: Autonomous Vehicles (2.166), Computer Vision (6.819), ML for Healthcare (6.S897), NLP (6.806), Performance Engineering (6.172), Inference (6.008), Undergraduate Research (6.UAR)

Languages:	Python	C++	Java	MATLAB
Tools:	PyTorch/Torch	Tensorflow	JAX/Haiku	ROS

OUTSIDE INTERESTS

Experimental baking, swing dancing, reading (Goodreads), and rowing (NCAA Division I, MIT 2017-2018).