Lily Xu

lily_xu@g.harvard.edu
lily-x.github.io

EDUCATION

Harvard University, Cambridge, MA   2019 – present
PhD Candidate, School of Engineering and Applied Sciences
Advised by Prof. Milind Tambe

Dartmouth College, Hanover, NH   2014 – 2018
A.B. with Honors in Computer Science, minor in Spanish
Magna cum laude

PUBLICATIONS

Robust Restless Bandits: Tackling Interval Uncertainty with Deep Reinforcement Learning
Under review
Jackson A. Killian, **Lily Xu**, Arpita Biswas, Milind Tambe

Coordinating Followers to Reach Better Equilibria: End-to-End Gradient Descent for Stackelberg Games
Under review
Kai Wang, **Lily Xu**, Andrew Perrault, Michael K. Reiter, Milind Tambe

Robust Reinforcement Learning Under Minimax Regret for Green Security
UAI-21: Proc. 37th Conference on Uncertainty in Artificial Intelligence
Lily Xu, Andrew Perrault, Fei Fang, Haipeng Chen, Milind Tambe
Oral Presentation (6.17% of submissions)

Envisioning Communities: A Participatory Approach Towards AI for Social Good
AIES-21: Proc. 4th AAAI/ACM Conference on AI, Ethics, and Society
Elizabeth Bondi*, **Lily Xu***, Diana Acosta-Navas, Jackson A. Killian
*Equal contribution

Dual-Mandate Patrols: Multi-Armed Bandits for Green Security
AAAI-21: Proc. 35th AAAI Conference on Artificial Intelligence
Lily Xu, Elizabeth Bondi, Fei Fang, Andrew Perrault, Kai Wang, and Milind Tambe
Best Paper Award Runner Up Top 6 of 1692 accepted papers

Stay Ahead of Poachers: Illegal Wildlife Poaching Prediction and Patrol Planning Under Uncertainty with Field Test Evaluations
ICDE-20: Proc. 36th IEEE International Conference on Data Engineering 2020
Lily Xu*, Shahrzad Gholami*, Sara Mc Carthy, Bistra Dilkina, Andrew Plumptre, Milind Tambe, Rohit Singh, Mustapha Nsubuga, Joshua Mabonga, Margaret Driciru, Fred Wanyama, Aggrey Rwetsiba, Tom Okello, Eric Enyel
*Equal contribution

WORKSHOP PAPERS

Enhancing Poaching Predictions for Under-Resourced Wildlife Conservation Parks Using Remote Sensing Imagery
NeurIPS Workshop on Machine Learning for Development 2020
Rachel Guo, **Lily Xu**, Andrew Plumptre, Drew Cronin, Francis Okeke, and Milind Tambe

Game Theory on the Ground: The Effect of Increased Patrols on Deterring Poachers
Working paper
Appeared at Harvard CRCS Workshop on AI for Social Good 2020
Lily Xu, Andrew Perrault, Andrew Plumptre, Margaret Driciru, Fred Wanyama, Aggrey Rwetsiba, and Milind Tambe

A High-Performance Graph Model for Near-Optimal Payments for Ecosystem Services
Working paper
Appeared at Mechanism Design for Social Good (MD4SG) Workshop 2020
Florian Berlinger*, **Lily Xu***, Yiling Chen
*Equal contribution

HONORS AND AWARDS	INFORMS Doing Good in Good OR Competition – Finalist	2021
	Harvard University Certificate of Distinction in Teaching	2021
	AAAI Best Paper Award Runner Up	2021
	Certificate of Appreciation from the SMART Consortium	2018
	Five Citations for Academic Excellence at Dartmouth College	2014 – 2018

> *Special distinction rarely awarded by faculty members "for meritorious characteristics not indicated adequately by academic grades."*
>> Computational Photography (Wojciech Jarosz, CS 89.15)
>> Latin American Film (Silvia Spitta, Spanish 63.01)
>> Computer Graphics (Emily Whiting, CS 77)
>> Object-Oriented Programming (Travis Peters, CS 10)
>> Introduction to Programming and Computation (Hany Farid, CS 1)

	Adobe Women-In-Technology Scholarship – Honorable Mention	2017
	Rick Angulo World Experience Award	2016

> *For "intellectual openness, enthusiasm, and impressive academic performance" following a study abroad program in Cusco, Peru. Award in $1,500.*

	James O. Freedman Presidential Scholar	2016
	Willis S. Fitch '17 Metropolitan Washington Scholarship	2015
	Bank of America's Joe Martin Scholarship	2014

RESEARCH EXPERIENCE	**Harvard University**, Cambridge, MA	
	Doctoral Research Assistant	2019 – present
	Advised by Prof. Milind Tambe	
	University of Southern California, Los Angeles, CA	
	Doctoral Research Assistant	2018 – 2019
	Advised by Prof. Bistra Dilkina and Prof. Milind Tambe	
	Dartmouth College, Hanover, NH	
	Undergraduate Senior Thesis Researcher	2017 – 2018
	Advised by Prof. Amro Farid	
	Presidential Scholar Research Assistant	2016 – 2017
	Advised by Prof. Emily Whiting and Prof. David Kotz	

WORK EXPERIENCE	**Google**, Seattle, WA	
	Software Engineering Intern	Summer 2017

Dyn, Inc., Hanover, NH
Data Analytics Research Intern   Spring 2016

<table>
<tr><td>TEACHING EXPERIENCE</td><td colspan="2">Guest Lecturer</td></tr>
<tr><td></td><td>Cornell Tech, ORIE 5355/INFO 5370. People, Data, Systems</td><td>Fall 2021</td></tr>
<tr><td></td><td>Wellesley University, CS 115. Computing for the Socio-Techno Web</td><td>Fall 2021</td></tr>
<tr><td></td><td>Australian National University, CECS8001. Building Cyber-Physical Systems</td><td>Fall 2021</td></tr>
<tr><td></td><td>University of Pittsburgh, CS 1699. AI for Good: Ethics and Implications</td><td>Spring 2021</td></tr>
<tr><td></td><td>University of Michigan, SI 431. Algorithms and Society</td><td>Spring 2021</td></tr>
<tr><td></td><td>Harvard University, CS 182. Artificial Intelligence</td><td>Fall 2020</td></tr>
<tr><td></td><td>Dartmouth College, CS 11. Foundations of Applied Computer Science</td><td>Spring 2018</td></tr>
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Harvard University
Head Teaching Fellow
CS 182: Artificial Intelligence   Fall 2020

Dartmouth College
Teaching Assistant, Department of Computer Science

CS 31: Algorithms	Winter 2017
CS 11: Foundations of Applied Computer Science	Spring 2018
CS 10: Object-Oriented Programming	Spring 2016
CS 10: Object-Oriented Programming	Spring 2015
CS 1: Intro to Programming and Computation	Spring 2018
CS 1: Intro to Programming and Computation	Fall 2017
CS 1: Intro to Programming and Computation	Spring 2017
CS 1: Intro to Programming and Computation	Winter 2016
CS 1: Intro to Programming and Computation	Fall 2015

Teaching Assistant, Tuck School of Business

Tuck FWP: Fundamentals of Web Programming	Spring 2017
Tuck DSA: Data Structures and Analytics	Spring 2017

<table>
<tr><td>STUDENTS MENTORED</td><td>April Chen '22, Harvard College</td><td>Summer 2021</td></tr>
<tr><td></td><td>Ezenia Diaz-Lembert '23, Harvard College</td><td>Spring 2021</td></tr>
<tr><td></td><td>Emilia Cabrera '21, Harvard College (co-mentored with Haipeng Chen)</td><td>Fall 2020 –</td></tr>
<tr><td></td><td>Rachel Guo '22, Harvard College
    NCWIT Collegiate Award Winner</td><td>Summer 2020 –</td></tr>
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<tr><td>PROFESSIONAL SERVICE</td><td colspan="2">Initiative Organization</td></tr>
<tr><td></td><td>Co-organizer, Mechanism Design for Social Good (MD4SG)</td><td>March 2021 –</td></tr>
<tr><td></td><td>Co-lead, MD4SG Community Engagement</td><td>Oct 2020 – Apr 2021</td></tr>
<tr><td></td><td>Co-organizer, MD4SG Working Group on Environment</td><td>Jan 2020 – Apr 2021</td></tr>
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Program Organization

Social events co-chair, ACM EAAMO	October 2021
Co-organizer, Harvard CRCS Rising Stars Speaker Series	March 2021
Co-organizer, CompSust Open Graduate Seminar (COGS)	Spring 2020
Social co-chair, Fourth Workshop on MD4SG	August 2020
Lead organizer, Harvard CRCS Rising Stars Workshop	March 2020
Co-organizer, Computational Sustainability Doctoral Consortium	October 2019

Program Committee

Conferences

Equity and Access in Algorithms, Mechanisms, and Optimization (EAAMO)	2021
ACM SIGCAS Conference on Computing and Sustainable Societies (COMPASS)	2021
AAAI Emerging Track on AI for Social Impact (AISI)	2021
AAAI Emerging Track on AI for Social Impact (AISI)	2020

Workshops

Machine Learning for the Developing World (ML4D) @ NeurIPS	2021
Data-Driven Humanitarian Mapping @ KDD	2021
Autonomous Agents for Social Good (AASG) Workshop @ AAMAS	2021
AI for Social Good Workshop @ IJCAI	2020
Resistance AI @ NeurIPS	2020
4th Black in AI Workshop @ NeurIPS	2020
Machine Learning for the Developing World (ML4D) @ NeurIPS	2020
Fourth Workshop on Mechanism Design for Social Good (MD4SG)	2020
AI for Social Good Workshop @ Harvard CRCS	2020
Workshop on Humanitarian Mapping @ KDD	2020

Reviewer

ICML, *subreviewer*	2021
NeurIPS, *subreviewer*	2020
IJCAI Special Track on CompSust and Human Well-being, *subreviewer*	2020
COMPASS, *subreviewer*	2019
Bloomberg Data for Good Exchange (D4GX), *subreviewer*	2019

LEADERSHIP

Ledyard Canoe Club at Dartmouth, *Secretary, Canoeing Leader*   2014 – 2018
- Co-governed club functions for over 100 undergraduates. Managed club assets that include $1M in endowments, a student-run rental business with annual revenues of $50K, and boats and equipment valued at $150K.
- Co-organized an Explorers Symposium featuring ten notable speakers, including Olympic racers and members of National Geographic–sponsored expeditions.
- Led a group of twenty-eight students on a nine-day, 220-mile canoe expedition.
- Voted by my peers to receive the Jay Evans '49 Award for service and commitment to the club.

Fusion Dance Ensemble, *Director*   2014 – 2018
- Led a group of fourteen dancers. Choreographed, taught, and performed contemporary and hip-hop dances.

Dartmouth Sophomore Trips, *Co-director*   2015 – 2016
- Planned the Sophomore Trips program for 130 undergraduates across 14 three-day outdoor trips throughout New Hampshire and Vermont.

Dartmouth First-Year Trips, *Grant Crew Volunteer*   Summer 2015
- Served on a nine-person crew for a 21-day, round-the-clock commitment to assist with five-day outdoor orientation trips for 1,000 incoming students.

INVITED TALKS

PAWS: AI to Predict and Plan Against Poaching

International Congress for Conservation Biology, Kigali, Rwanda	December 2021
IUCN World Conservation Congress, Marseille, France	September 2021
WILDLABS Tech Tutors: Season Three	September 2021
AI for Climate, Mexico Lightning Talks Series powered by Huawei	July 2021
SMART Partnership, Webinar for International Women's Day	March 2021

WWF Webinar on SMART	April 2020

Dual-Mandate Patrols: Multi-Armed Bandits for Green Security

Beijing Academy of Artificial Intelligence	March 2021
University College London, AI Society journal club	February 2021
Thirty-Fifth AAAI Conference on Artificial Intelligence (AAAI-21)	February 2021
CompSust Doctoral Consortium	October 2020
CRCS AI for Social Good Workshop	July 2020
AI and Social Good Symposium, Carnegie Mellon University	April 2020
EconCS Seminar, Harvard University	March 2020

Poaching Prediction and Patrol Planning Under Uncertainty

CRCS Rising Stars Workshop	March 2020
IEEE International Conference on Data Engineering (ICDE-20)	April 2020
PhD on Tap, Harvard University	February 2020
CompSust Doctoral Consortium, Carnegie Mellon University	October 2019
KDD Data Mining and AI for Conservation Workshop	August 2019
AAMAS Strategic Reasoning for Societal Challenges Workshop	May 2019

Outreach

Speaking: Public Events

AI LA Earth Summit	April 2021
South by Southwest (SXSW), Wildlife AI Panel	March 2021
World Science Festival, Science and Storytime	June 2019

Speaking

Harvard Tech for Social Good, *panelist*	April 2021
Harvard SEAS PhD Admitted Students Open House, *panelist*	March 2021
Harvard SEAS Research Labs Open House	November 2020
GirlsComputingLeague, AInnovation Business Summit	September 2020
IEEE Computer Society, Women in Computing, Kerala Chapter	September 2020
Data Science Africa, Tutorial on MD4SG and the Environment	July 2020
Ledyard Canoe Club, Inclusivity in the Outdoors	July 2020
Dartmouth Women in Computer Science, *panelist*	May 2020
Harvard SEAS Diversity, Inclusivity, and Belonging, *panelist*	May 2020
Center for Initiatives in Jewish Education, high school student visit	March 2020
L.A. Unified School District (LAUSD), African American Family Day	May 2019
Zoo Magnet High School, College and Career Day	November 2018

Mentoring

InTouch Peer Mentor, Harvard University	2020 –
Women in STEM Mentor, Harvard University	2019 – 2020
Women in Computer Science, Dartmouth College	2017 – 2018

Volunteering

Graduate Council Outreach Committee, Harvard University	2020
A Guide to Your PhD, Harvard SEAS	October 2020
Project Teach, Harvard University	April 2020
Cambridge Public Schools STEAM It Up!	October 2019
Hustle N' Code Hackathon, *technical lead*	December 2018

> *Hustle N' Code is a Los Angeles hackathon for youth in public housing.*
> *My team won first place, and the four students each received a laptop.*

Press

Rethinking Economics NL, Disruptive Technologies podcast series.	May 2021

Engadget, PAWS anti-poaching AI predicts where illegal hunters will show up next. March 2021

Mongabay, Where to patrol next: 'Netflix' of ranger AI serves up poaching predictions.   November 2020

Harvard SEAS, Preventing poaching.   June 2020

BBC Sounds, How tech is tackling wildlife trafficking.   June 2020

BBC World Service, Using technology to take on poachers.   August 2019

USC Viterbi Magazine, AI is for Animals.   April 2019

PERSONAL   Residential member, Los Angeles Eco Village   2018 – 2019