

ESEN YEL

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RESEARCH INTERESTS

• Assured autonomy • Safe planning under uncertainty • Runtime monitoring • Robot learning

EDUCATION

University of Virginia Charlottesville, VA
Ph.D., Systems Engineering 08/2021
Dissertation: *Online Predictive Monitoring and Proactive Planning for Safe Autonomous Robot Operations*

Bogazici University Istanbul, Turkey
M.S., Electrical and Electronics Engineering 08/2016
Thesis: *Appearance-based Self Localization and Navigation Using Place Memory*
B.S., Electrical and Electronics Engineering 06/2014

RESEARCH EXPERIENCE

Stanford University Stanford, CA
Position: Postdoctoral Scholar 10/2021 - Present
Affiliations: Stanford Intelligent Systems Lab (SISL), Stanford Center for AI Safety
Advisor: Mykel Kochenderfer
- Leading industry-sponsored research projects on safe planning for and validation of autonomous vehicles operating under uncertainties

University of Virginia Charlottesville, VA
Affiliations: Autonomous Mobile Robots Lab, Link Lab
Position: Graduate Research Assistant 2016 - 2021
Advisor: Nicola Bezzo
- Research on safe planning, runtime learning, scheduling and runtime monitoring for autonomous systems under disturbances and uncertainties

Bogazici University Istanbul, Turkey
Affiliations: Intelligent Systems Lab (ISL)
Position: Graduate Research Assistant 2014 - 2016
Advisor: H. Işıl Bozma
- Research on appearance-based self-localization and navigation for mobile ground robots

AWARDS

Link Lab Outstanding Graduate Research Award 2021
Link Lab, University of Virginia
"This award was established as a way for faculty to recognize Link Lab students who have demonstrated excellence in research during the academic year."

RSS Pioneers Workshop Participant 2021
"RSS Pioneers brings together a cohort of the world's top early-career researchers."

Link Lab Student Seminar Award

2020

Link Lab, University of Virginia

“The Link Lab Graduate Seminar provides a prestigious honor and award for a PhD student to showcase the highest quality research happening at Link Lab conveying impact and relevance in the CPS field”

Travel Awards

IEEE/RSJ International Conference on Intelligent Robots and Systems

2019

IEEE International Conference on Robotics and Automation PhD Forum

2018

Ruthie Oxford Memorial Award - Promising Graduate Student

2018

University of Virginia, Department of Systems and Information Engineering

Dean’s High Honor List

2014

Bogazici University, School of Engineering

GRANT PREPERATION

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- **Google Seed Funding** (\$195,000) PI: Mykel Kochenderfer 2022
Robust Out-of-Distribution Detection for Safety Critical Systems
 - **Motional** (\$300,000) PI: Mykel Kochenderfer 2022
Online Safety Verification of Trajectory Planners
 - **NSF** (\$20,000,000) PI: Mykel Kochenderfer, Co-PI: Russ Altman 2022
Trustworthy Intelligence for Critical Systems (TICS)
 - **ONR** (\$25,000) PI: Mykel Kochenderfer 2022
Funding for Learning for Dynamics and Control (L4DC) Conference
 - **AFOSR** (\$10,000) PI: Mykel Kochenderfer 2022
Funding for Learning for Dynamics and Control (L4DC) Conference

PUBLICATIONS**Journal and Magazine Articles**

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- **E. Yel***, S. Gao*, N. Bezzo, “Meta-Learning-based Proactive Online Planning for UAVs under Degraded Conditions”, (*equal contribution), Robotics and Automation Letters (RA-L), 2022 (accepted)
 - **E. Yel**, T. X. Lin, N. Bezzo, “Computation-Aware Adaptive Planning and Scheduling for Safe Unmanned Airborne Operations” Journal of Intelligent and Robotic Systems, 2020, pp.575–596
 - **E. Yel**, T. Carpenter, C. di Franco, R. Ivanov, Y. Kantaros, I. Lee, J. Weimer, N. Bezzo, “Assured Runtime Monitoring and Planning: Towards Verification of Deep Neural Networks for Safe Autonomous Operations” Robotics and Automation Magazine, Special Issue on Deep Learning and Machine Learning in Robotics, June 2020, vol. 27, no. 2, pp. 102-116.

Conference Papers

- M. Toyungyernsub, **E. Yel**, J. Li, M. Kochenderfer, “Dynamics-Aware Spatiotemporal Occupancy Prediction in Urban Environments”, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2022 (accepted)
- M. Cleaveland, **E. Yel**, Y. Kantaros, I. Lee, N. Bezzo, “Learning Enabled Fast Planning and Control in Dynamic Environments with Intermittent Information”, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2022 (accepted)
- L. Kruse, **E. Yel**, R. Senanayake, M. Kochenderfer, “Uncertainty-Aware Online Merge Planning with Learned Driver Behavior”, IEEE International Conference on Intelligent Transportation Systems (ITSC), 2022 (accepted)

- **E. Yel**, N. Bezzo, “A Meta-Learning-based Trajectory Tracking Framework for UAVs under Degraded Conditions”, 2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2021, pp. 6884-6890.
- **E. Yel**, N. Bezzo, “GP-based Runtime Planning, Learning, and Recovery for Safe UAV Operations under Unforeseen Disturbances” 2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2020, pp. 2173-2180.
- **E. Yel** and N. Bezzo, “Fast Run-time Monitoring, Replanning, and Recovery for Safe Autonomous System Operations” 2019 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2019, pp. 1661-1667.
- **E. Yel**, T. X. Lin and N. Bezzo, “Self-triggered Adaptive Planning and Scheduling of UAV Operations,” 2018 IEEE International Conference on Robotics and Automation (ICRA), 2018, pp. 7518-7524.
- T. X. Lin, **E. Yel** and N. Bezzo, “Energy-aware Persistent Control of Heterogeneous Robotic Systems,” 2018 Annual American Control Conference (ACC), 2018, pp. 2782-2787.
- **E. Yel**, T. X. Lin and N. Bezzo, “Reachability-based self-triggered scheduling and replanning of UAV operations,” 2017 NASA/ESA Conference on Adaptive Hardware and Systems (AHS), 2017, pp. 221-228.

Workshop and Symposium Papers

- G. Glaubit, K. Kleeman, N. Law, J. Thomas, S. Gao, R. Peddi, **E. Yel**, N. Bezzo “Fast, Safe, and Proactive Runtime Planning and Control of Autonomous Ground Vehicles in Changing Environments” IEEE Systems and Information Engineering Design Symposium (SIEDS), 2021
- **E. Yel** and N. Bezzo, “Reachability-based Adaptive UAV Scheduling and Planning in Cluttered and Dynamic Environments” ICRA Workshop on Informative Path Planning and Adaptive Sampling, Brisbane, 2018
- **E. Yel**, T. X. Lin and N. Bezzo, “Reachability-based Self-triggered UAV Motion Planning,” International Symposium on Aerial Robotics, Philadelphia, PA, 2017
- **E. Yel** and H.I. Bozma, “Verifying the Recognized Place Through Localization, ” IROS Workshop on Introspective Methods for Reliable Autonomy, Vancouver 2017

TEACHING EXPERIENCE

Guest Lecture	Stanford University
Sequential Decision Making	Winter 2022
Graduate Teaching Assistantship	Bogazici University
System Dynamics and Control (Discussion and Grading TA)	Spring 2015, Spring 2016
Control Technology and Design (Lab and Grading TA)	Fall 2015
Introduction to Electrical Engineering (Discussion TA)	Fall 2015
Undergraduate Teaching Assistantship	Bogazici University
System Dynamics and Control (Discussion TA)	Spring 2014
Orientation to Electrical Engineering (Lab TA)	Fall 2013

MENTORSHIP EXPERIENCE

Mentor for Stanford Undergraduate Research Fellowship (SURF) Summer 2022
 Research mentor for an 8-week program for students from communities underrepresented in engineering. I advised the student on her research topic, monitored her research progress, and advised research alongside a graduate student. Student: Michelle Ho.

Mentor for Graduate Student Research

Anil Yildiz - Transfer learning and validation for autonomous driving tasks	Stanford University <i>Fall 2021 - Present</i>
Liam Kruse - Safe planning for autonomous vehicles	<i>Fall 2021 - Present</i>
Alexandros Tzikas - Trajectory verification for autonomous driving	<i>Winter 2022 - Present</i>
Maneekwan Toyungyernsub - Occupancy grid prediction	<i>Fall 2021 - Present</i>
Chelsea Sidrane, Sydney Katz - Backwards reachability for nonlinear systems	<i>Winter 2022 - Present</i>

Mentor for Undergraduate Students Research

Ellie Talius - Trajectory verification for autonomous driving	Stanford University <i>Winter, Spring 2022</i>
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Mentor for Capstone Project

Grace Glaubit, Katie Kleeman, Noelle Law, Jeremiah Thomas - Robot navigation in unknown terrains	University of Virginia <i>Spring 2021</i>
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Mentor for Society of Women Engineers, University of Virginia

Graduate student mentor for undergraduate engineering students associated with the Society of Women Engineers. This mentorship program involved helping students navigate their engineering education and early career.	<i>Spring 2017</i>
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INVITED PRESENTATIONS

Stanford SystemX 2021 Fall Conference, Poster	<i>11/2021</i>
Stanford Intelligent Systems Lab, Talk	<i>04/2021</i>
UPenn GRASP Lab, Talk	<i>02/2021</i>
UVA Link Lab Student Seminars, Talk	<i>12/2020</i>
UVA Link Lab Student Flash Talks, Talk	<i>12/2020</i>
UVA ESE Graduate Symposium, Poster	<i>02/2018, 02/2020</i>
ICRA PhD Forum, Poster	<i>05/2018</i>
UVA ECE Student Research Session, Poster	<i>08/2017</i>

PROFESSIONAL SERVICE AND LEADERSHIP

Member, Stanford Center for AI Safety Working Group	<i>2022</i>
Co-chair, Learning for Dynamics & Control Conference (L4DC)	<i>2022</i>
Program Committee, RSS Pioneers Workshop	<i>2022</i>
Session Co-chair, IEEE/RSJ International Conference on Intelligent Robots (IROS)	<i>2021</i>
Panelist, UVA Link Lab Academic Writing Panel	<i>2021</i>
Co-organizer, UVA INFORMS Alumni Panel	<i>2020</i>
President, UVA Student Chapter of INFORMS	<i>2020</i>
Vice President, UVA Student Chapter of INFORMS	<i>2018-2019</i>
Session Chair, IEEE Systems and Information Engineering Design Symposium	<i>2019</i>

REVIEW ACTIVITIES**Journals:**

IEEE Robotics and Automation Letters (RA-L)
 Journal of Artificial Intelligence Research (JAIR)
 Journal of Aerospace Information Systems
 IEEE Computer Magazine

Conferences

IEEE International Conference on Robotics and Automation (ICRA)
 IEEE/RSJ International Conference on Intelligent Robots (IROS)
 Conference on Robot Learning (CoRL)

IEEE Conference on Decision and Control (CDC)
American Control Conference (ACC)
ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS) (subreviewer)
International Conference on Runtime Verification (RV)
IEEE International Conference on Intelligent Transportation Systems (ITSC)

PROFESSIONAL EXPERIENCE

Engineering Intern RMK Marine	<i>08/2013 - 09/2013</i> Istanbul, Turkey
Engineering Intern Turkish Aerospace Industries	<i>06/2013 - 07/2013</i> Ankara, Turkey
Engineering Intern Lely Industries	<i>06/2012 - 07/2012</i> Istanbul, Turkey