ESEN YEL

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RESEARCH INTERESTS

• Safe planning under uncertainty • Assured autonomy • 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: Ph.D. Student *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: Masters Student *2014 - 2016*
Advisor: H. Işıl Bozma

- Research on appearance-based self-localization and navigation for mobile ground robots

AWARDS

Rising Stars in Electrical Engineering and Computer Science *2022*

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

PUBLICATIONS

Refereed Journal and Magazine Articles

- **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.

Refereed 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.

Refereed Workshop Papers

- **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** and H.I. Bozma, "*Verifying the Recognized Place Through Localization, *" IROS Workshop on Introspective Methods for Reliable Autonomy, Vancouver 2017

Other Publications

- 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**, T. X. Lin and N. Bezzo,"*Reachability-based Self-triggered UAV Motion Planning,*" International Symposium on Aerial Robotics, Philadelphia, PA, 2017

TEACHING EXPERIENCE/TRAINING

Stanford Scientific Teaching Summer Institute *Summer 2022*

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

Mentor for Undergradute Students Research Stanford University
Ellie Talius - Trajectory verification for autonomous driving *Winter, Spring 2022*

Mentor for Capstone Project University of Virginia
Grace Glaubit, Katie Kleeman, Noelle Law, Jeremiah Thomas *Spring 2021*
- Robot navigation in unknown terrains

Mentor for Society of Women Engineers, University of Virginia *Spring 2017*
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.

INVITED PRESENTATIONS

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

PROFESSIONAL SERVICE AND LEADERSHIP

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

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 *08/2013 - 09/2013*
RMK Marine Istanbul, Turkey

Engineering Intern *06/2013 - 07/2013*
Turkish Aerospace Industries Ankara, Turkey

Engineering Intern *06/2012 - 07/2012*
Lely Industries Istanbul, Turkey