Tolga Özaslan
PhD.

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Summary

Dr. Tolga Özaslan

tozaslan@aybu.edu.tr

I am a roboticist holding a PhD. degree with specialization in Autonomous Micro Aerial Vehicles (MAV). During my PhD. I worked on projects supported by Army Research Laboratories (ARL) and Army Corp of Engineers. In particular, the *autonomous* MAVs that I developed are used to collect imagery inside dam penstocks for visual inspection and maintenance purposes. I was the principal researcher responsible for platform design and construction, system design, state estimation formulation and implementation, field testing and reporting.

At nuTonomy *(now Motional)* my role was to make our cars perform Simultaneous Localization and Mapping (SLAM) in real-time using a heterogeneous sensor suite which includes multiple IMUs, Lidars, GPS and cameras. In particular, I work on *point cloud segmentation*, *moving object detection*, *point cloud registration*, *and visual-inertial navigation*.

I am currently an assistant professor at Ankara Yıldırım Beyazıt University, Mechanical Engineering Department. I am also one of the co-founders of Tayyar Robotics, a spin-off focusing on autonomous mobile robotic systems.

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Experience

Tayyar Robotics / Founder (tayyar.ai)
JULY 2021 - present, Ankara, TÜRKİYE

Tayyar Robotics is a university spin-off that focuses on autonomous mobility, high-definition mapping and multi-rotor aerial vehicles. Tayyar Robotics recently successfully completed the TÜBİTAK 1512 programme.

OTEO Health / Director of R&D
SEPT 2023 - JUNE 2025, Ankara, TÜRKİYE

Leading R&D activities in Public Health Management, AI-assisted medical image analysis, and railway surveillance, with responsibilities in project management, talent recruitment, and innovation strategy.

Yıldırım Beyazıt University / Asst. Prof.
JANUARY 2020 - present, Ankara, TÜRKİYE

I am teaching at the Mechanical Engineering Department undergraduate and graduate level courses on Dynamics, Control and Robotics. I am also the head of <u>R</u>obust <u>A</u>utonomous <u>M</u>obility Laboratory (ROAM-Lab) where we research on robotics and mobile autonomy.

You can find my university profile at https://avesis.aybu.edu.tr/tozaslan

nuTonomy (Motional) / Research Scientist

Experience *(cont'd)*

Develop and implement algorithms to perform point cloud segmentation, moving object detection and state estimation using a heterogeneous suite of sensors including IMUs, Lidars, GPS and cameras.

University of Pennsylvania / Research Assistant
SEPTEMBER 2012 - AUGUST 2018, Philadelphia, PA

Research assistant at GRASP laboratories under the supervision of Dr. Vijay Kumar and Dr. CJ Taylor. Developed MAV technologies for the Army Corp of Engineers. Performed mandatory teaching practicum for three graduate level courses in the Mechanical Engineering and Applied Materials department.

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Education

University of Pennsylvania / PhD. in Mechanical Engineering
AUGUST 2012 - DECEMBER 2019, Philadelphia, PA

Studied under the supervision of Dr. Vijay Kumar and Dr. CJ Taylor. Performed research on state estimation applied to MAVs, conducted more than a dozen field experiments inside dam penstocks for the Army Corp of Engineers. Wrote six research papers published in robotics conferences and journals.

Dissertation Title : *"Estimation, Mapping and Navigation with Micro Aerial Vehicles for Infrastructure Inspection"*

Bilkent University / MSc. in Computer Science
AUGUST 2008 - JUNE 2011, Ankara, TURKEY

Studied under the supervision of Dr. Uluc Saranli. Worked on state estimation of the RHex platform using cameras.

Middle East Technical Engineering / BSc.
SEPTEMBER 2003 - JUNE 2008, Ankara, TURKEY

Double major in Mechanical Engineering and Computer Science. The first student to pursue a double major in these two departments in university history. Completed almost twice the number of courses compared to a single major student.

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Awards

Scholarship for graduate studies by the Ministry of Education of Turkey.

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Publications

- Duru, Ahmet Sadık, and Tolga Özaslan. "Enhancing Trajectory

- Following in VTOL Cargo UAVs: Adaptive Control in Changing Payload Scenarios." 2023 7th International Symposium on Innovative Approaches in Smart Technologies (ISAS). IEEE, 2023.
- Nguyen, Ty, Shreyas S. Shivakumar, Ian D. Miller, James Keller, Elijah S. Lee, Alex Zhou, Tolga Özaslan et al. "Mavnet: An effective semantic segmentation micro-network for mav-based tasks." IEEE Robotics and Automation Letters 4, no. 4 (2019): 3908-3915.
- Zhu, A. Z., Thakur, D., Özaslan, T., Pfrommer, B., Kumar, V., & Daniilidis, K. (2018). The multivehicle stereo event camera dataset: An event camera dataset for 3D perception. IEEE Robotics and Automation Letters, 3(3), 2032-2039. (*project website*)
- Özaslan, Tolga, et al. "Spatio-temporally smooth local mapping and state estimation inside generalized cylinders with micro aerial vehicles." IEEE Robotics and Automation Letters 3.4 (2018): 4209-4216 (*video*).
- Özaslan, Tolga, et al. "Autonomous navigation and mapping for inspection of penstocks and tunnels with MAVs." IEEE Robotics and Automation Letters 2.3 (2017): 1740-1747. (*video1*, *video2*)
- Özaslan, Tolga, et al. "Towards fully autonomous visual inspection of dark featureless dam penstocks using MAVs." 2016 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). IEEE, 2016 (*video*).
- Özaslan, Tolga, et al. "Inspection of penstocks and featureless tunnel-like environments using micro UAVs." Field and Service Robotics. Springer, Cham, 2015.

Google scholar profile :

https://scholar.google.com/citations?user=ilnEoOMAAAAJ

Talks

- Paper presentation in International Conference on Intelligent Robots and Systems (IROS) 2017, Vancouver, Canada
- Departmental seminar titled "Micro Aerial Vehicles for Safe Autonomous Inspection of Critical Infrastructure", August 2016, Philadelphia, PA
- Research presentation in Micro Autonomous Systems and Technology (MAST) Collaborative Technology Alliance (CTA) Principle Investigator Meeting, March 2016, Baltimore, MD
- Paper presentation in International Conference on Intelligent Robots and Systems (IROS) 2016, Daejeon, Korea
- Paper presentation in Field and Service Robotics (FSR) 2013, Brisbane, Australia.

Software Skills

- C/C++ : Excellent
- Matlab : Excellent
- Python : Good

Languages

- **Turkish** : Native
- **English** : >15 years