ALIHAN BAKIR [iD]

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Bilkent University
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EDUCATION

M.Sc., Mechanical Engineering — September 2020 - June 2023 (expected)
Miniature Robotics Laboratory, Department of Mechanical Engineering, Bilkent University
- Thesis: *"A Miniature, Foldable, Collision Resilient Quadcopter"*
- Advisor: Asst. Prof. Onur Ozcan
- Highlights: Engineering electrical/mechanical design, mobile robotics, linear system theory, dynamics of aerospace vehicles, flying robot control, autonomous flight, path planning. signal processing.

B.Sc., Mechanical Engineering — September 2016 - June 2020
Department of Mechanical Engineering, Bilkent University
- English Language Prep School — September 2015 - May 2016
- Highlights: Engineering electrical/mechanical design, mobile robotics, controller design, mechatronic system manufacturing and programming, signal processing, dynamics and control.

PUBLICATIONS AND WORKING PAPERS

- **Bakir A.**, Ozbek D., Abazari A., Ozcan O. (2023). "Sensor Optimization for an Impact Sensing Foldable Quadcopter". *IEEE Robotics & Automation Letters.* (to be Submitted).

- **Bakir A.**, Abazari A., Ozcan O. (2023). "Body Design for Collision-Resilient Foldable Quadcopter". *IEEE International Conference on Robotics and Automation (ICRA).* (to be Submitted).

- **Bakir A.**, Ozbek D., Abazari A., Ozcan O. (2022). "SCoReR: A Sensored, Collision Resilient, Foldable Quadcopter". *IEEE International Conference on Soft Robotics (RoboSoft 2023).* Singapore, April 3-7, 2023 (Submitted).

- Ugur M. , Uygun M. , **Bakir A.** , Ozcan O. "Path Tracking and Connection Mechanism of a Reconfigurable, Foldable, Legged, and Miniature Robot". *Hittite Journal of Science and Engineering.* vol. 9, no. 3, pp. 205-211, Sep. 2022, doi:10.17350/HJSE19030000272.

- Mahkam, N., **Bakir, A.**, Ozcan, O. "Miniature Modular Legged Robot with Compliant Backbones". *IEEE Robotics & Automation Letters.* vol. 5, no. 3, pp. 3923-3930, 2020, doi: 10.1109/LRA.2020.2982362.

PROJECTS

Affordable, Miniature, and Coordinated Aerial Robot Team for Infrastructure Inspection — September 2020 - August 2022
Miniature Robotics Laboratory, Bilkent University

- *Objective:* to design and manufacture a flying robot team consisting of at least 3 robots, to be used in infrastructure inspection
- *Responsibilities:*
  - All tasks related to autonomous robot controls, such as designing the attitude, altitude, position and heading controllers of the robot
  - All tasks related to autonomous flight such as path planning
  - All tasks related to PCBs, such as design, component selection, and soldering

– Design of the foldability aspect of robots (Since the robots are produced from PET sheets, the main task is to think and design the robots in 2-D, which will function as desired when folded to 3-D.)
– General design of robots

Modular Miniature Foldable Robot Analysis and Design

Miniature Robotics Laboratory, Bilkent University

May 2018 - August 2020

- *Objective:* To have a perfectly functioning PCB under many different circumstances, which is easy to program, and easy and cheap to build.
- *Responsibilities (as undergraduate researcher):*
  - General design of robots
  - All tasks related to PCBs, such as design, component selection, and soldering
  - Design of the foldability aspect of robots (Since the robots are produced from PET sheets, the main task is to think and design the robots in 2-D, which will function as desired when folded to 3-D.)

Senior Design Project: Designing and Building a Half-Autonomous Drone

Bilkent University

September 2019 - June 2020

- *Objective:* To design a half-autonomous drone which can detect the child from a designated altitude by a thermal camera and inform the authorities.
- *Responsibilities:*
  - All tasks related to electronics, such as design, component selection, and soldering
  - Checking the whole system and troubleshooting

Bilkent University Mechanical Engineering Society

- Designing/Building a CNC plane cutting machine   September 2015 - June 2016
- Designing/Building an RC plane   September 2016 - June 2017
- Designing/Building a CNC egg painting robot   September 2017 - June 2018

TUBITAK Efficiency Challenge Electric Vehicle

February - October 2018

- Bilkent University Team

Term Projects

- 2nd Semester Project: Designing and building a compressed air engine
- 3rd Semester Project: Designing and building a crane made of spaghetti
- 4th Semester Project-1: Designing and building a cup holder suitable for all cups available in Starbucks
- 4th Semester Project-2: Modeling the cooling behavior of a vacuum flask using the principles of heat transfer
- 5th Semester Project: Designing and modeling a compression and tension load cell
- 6th Semester Project: Designing and building a rover which can cross a gap as large as its length

EXPERIENCE

Teaching Asistant

Bilkent University

September 2020 - *present*

- ME101 - Fundamentals of Mechanical Engineering
- ME384 - Mechatronic Systems
- ME342 - Dynamics and Control II

Supervisor: Dr. Onur Ozcan (onurozcan@bilkent.edu.tr)

Start-up Company

- Embedded Systems and Control, Bronix Engineering Solutions   July 2021 - *present*

Undergraduate Research

- Miniature Robotics Laboratory, Bilkent University   May 2018 - August 2020
  Supervisor: Dr. Onur Ozcan (onurozcan@bilkent.edu.tr)

Internships

- Summer Orientation (Gaziantep University)   July 2016 - August 2016
  Advisor: Prof. Dr. Canan Dulger (canan.dulger@ieu.edu.tr)

- Summer Practice 1 (Altinay Robot Technologies)   June 2018 - July 2018
  Coordinator: Dr. Sakir Baytaroglu (sakir.baytaroglu@bilkent.edu.tr)

- Summer Practice 2 (ASELSAN)   July 2019- August 2019
  Coordinator: Dr. Sakir Baytaroglu (sakir.baytaroglu@bilkent.edu.tr)

AWARDS AND HONORS

- Bilkent University Full Scholarship (M.Sc.)   September 2020 - *present*
  (Funded by Scientific and Technological Research Council of Turkey (TUBITAK))
- Bilkent University 50% Scholarship (B.Sc.)   September 2015 - June 2020
  (Ranking top 0.5% in the university entrance exam)

LANGUAGE

- Turkish (Native)
- English (Fluent)

SKILLS

- *Advanced:* Arduino, MATLAB, Python, SolidWorks, Eagle, Slic3r PE, PCB design, soldering
- *Good:* Java, LaTeX, Shotcut, Premier Pro
- *Intermediate:* Pronterface, Cura, AutoCAD
- *Basic:* COMSOL, ANSYS, Meshmixer, Machine Learning, ROS

AFFILIATIONS

- Active member, Bilkent University Miniature Robotics Laboratory   May 2018 - *present*
- Active member, Bilkent University Mechanical Engineering Society   Sept. 2016 - Sept. 2019
- Team member, TUBITAK Efficiency Challenge Bilkent University Team   Feb. - Oct. 2018
- Active member, Bilkent University IEEE Student Branch   Sept. 2015 - June 2016

ACTIVITIES

- Building drones
- 3D printing
- Building RC planes
- Basketball
- Water polo
- Electric guitar

REFERENCES

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