

# MELIHA DENİZ ALBAYRAK

+1(857)3132787 ✉ [mdeniz@bu.edu](mailto:mdeniz@bu.edu) [linkedin.com/in/deniz-a-1b5765106](https://www.linkedin.com/in/deniz-a-1b5765106)

## Education

---

### Boston University

Sep. 2022 – May 2024

*Master of Science (MS) in Mechanical Engineering*

*Boston, MA*

- Focus Area: Dynamics, Systems and Controls
- GPA: 4.00/4.00

### Sabancı University

Sep. 2018 – June 2022

*Bachelor of Science in Materials Science and Nano Engineering*

*Istanbul, Turkey*

- Minor in Energy
- GPA: 3.96/4.00 (Ranked 1<sup>st</sup>) - Dean's High Honour List
- Sakıp Sabancı 100% Encouragement Scholarship

## Publications

---

- Gaeta, L.T., **Albayrak, D.**, Kinnicutt, L., Aufrichtig, S., Sultania, P., Schlegel, H., Ellis, T.D., Ranzani, T. “A Magnetically-Controlled Soft Robotic Glove for Hand Rehabilitation” | *Work-in-Progress*
- Sultania, P., **Albayrak, D.**, Yan, W., Bianchi, D., Ranzani, T. “Towards self-adaptive and generalised controls for soft robots using Artificial Intelligence” | *Work-in-Progress*
- Sultania, P., Cheng, C., Kinnicutt, L., Chong, J.H.V., **Albayrak, D.**, Ranzani, T. “Harnessing Bistability to achieve fast and energy efficient underwater locomotion using Jet Propulsion” | *Work-in-Progress*
- Demir, G., **Albayrak, D.**, Ay, A., Arel, I., Memikoglu, D.S., Akbulut, O. “Circular Economy and Sustainable Practices in Advanced Ceramics: Energy-Efficient Green Machining and Recycling with a Single Additive Approach” | *Work-in-Progress*

## Research Experience

---

### Member of Morphable Biorobotics Lab | Boston, MA

May 2023 - May 2024

- Designed a variety of actuators through heat-sealing thermoplastic thin films and modeled the actuation on Abaqus.
- Found a new design to integrate sensors to soft balloon actuators with minimal hindrance to its mechanical properties.
- Used inkjet printing to create a precisely controlled masking layer for heat-sealed actuators.
- Worked with magnetorheological fluid and electropermanent magnets to create electronically controlled stiffening.
- **Supervisor:** Prof. Tommaso Ranzani

### Modeling the piezoelectric response of AGO reinforced PVDF-TrFE | Istanbul, Turkey

Jan. 2022 - Aug. 2022

- Incorporated AGO into PVDF-TrFE matrix with different weight ratios by modeling the system in Materials Studio software.
- Measured the piezoelectric performance and compared it with the experimental data.
- Worked in collaboration with Prof. Shweta Agarwala from Aarhus University.
- **Supervisor:** Prof. Canan Atilgan

### Member of Akbulut Lab | Istanbul, Turkey

Oct. 2021 - Jun. 2022

- Formulating Ceramic Inks for 3D Printing
  - \* Developed single additive inks (magnesium oxide and zirconia) for near-net fabrication of ceramics through 3D printing.
  - \* Gained knowledge in polymer synthesis, sonication and characterization tools such as rheometer and zeta potential analyzer.
- Recycling of and Surface Machining of Green Ceramics
  - \* Worked on a recycling route to incorporate waste ceramics that are produced during mechanical machining back into the design process.
  - \* Used CO<sub>2</sub> laser for the surface machining of recycled green ceramics.
  - \* Analysed the surface structures through SEM.
- Designing Dielectric Resonator Antenna for 5G Applications
  - \* Used ceramics as dielectric materials due to their high-quality factors.
  - \* Created a manufacturing method to minimize energy consumption while manufacturing the desired antenna shapes.
- **Supervisor:** Prof. Ozge Akbulut

### Designing an approach to neutralizing the COVID-19 virus | Istanbul, Turkey

May 2020 - Nov. 2020

- Aimed to neutralized the Covid-19 virus by attacking the spike protein with its resonance frequency.
- Developed computational methods using Python to calculate the slowest mode frequency of the spike protein.
- **Supervisors:** Prof. Clevea Ow-Yang and Prof. Canan Atilgan

## Work Experience

---

### Sabancı University

Mar 2021 – Jan 2022

*Learning Assistant*

*Istanbul, Turkey*

- ENS 202 - Thermodynamics (Fall 2021)
  - \* Held weekly recitations, and discussions of concepts during office hours.
  - \* Graded homeworks and pre-lectures.
  - \* **Instructor:** Prof. Canan Atilgan
- MAT 204 - Electrical Optical and Magnetic Properties of Materials (Spring 2021)
  - \* Held weekly office hours for the discussion of concepts.
  - \* Supervised team projects.
  - \* **Instructor:** Prof. Cleva Ow-Yang

### Google WTM

Nov. 2020 – June 2022

*Women Techmakers Ambassador*

*Istanbul, Turkey*

- Organized publicly available webinars and mentorships for women.

### Appsilon Enterprise

May 2021 – Sep. 2021

*Business Innovation Intern*

*Istanbul, Turkey*

- Conducted advanced material characterization of MPCVD diamonds.
- Worked on university and high-tech institution partnerships.

### Socrates Sports Magazine

Oct. 2020 – July 2021

*Data Analyst Intern*

*Istanbul, Turkey*

- Conducted analysis on social media data and compared the performance with other sports magazines.
- Estimated the optimum platforms for advertisement.

### Sabancı University

Sep. 2018 – Oct. 2020

*Academic Support Programme*

*Istanbul, Turkey*

- Senior Session Coordinator (January 2020 - October 2020)
  - \* Coordinated Math courses and provided additional support to the students who required assistance in Math and Natural Sciences courses in Academic Support Programme (ADP).
- NS Senior Session Moderator (September 2019 - January 2020)
  - \* Explained the contents of Natural Sciences course to the students who had difficulties in passing the course several times.
- SPS Moderator (September 2018 - June 2019)
  - \* Explained and revised the contents of Social and Political Sciences course to other freshman students in order to support active learning environment between peers.

## Technical Skills

---

**Languages:** Python, R, MATLAB

**CAD, Simulations, Design:** Comsol, SolidWorks, OnShape, Abaqus, Adobe Illustrator

**Electronic Equipment:** CO<sub>2</sub> and Nd:YAG lasers, Plasma Asher, UV-Vis, Instron