# Muhammed Emin Söylemez

3rd-Year Engineering Student

## Personal Information


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## Employment

2024-Now Undergraduate Researcher at Smart Nanophotonics Research Group, **Abdullah Gül University**, Kayseri, Turkiye

## Education

2021-Now Bachelor of Science (B.Sc.) in Electrical & Electronics Engineering, **Abdullah Gül University**, Kayseri, Turkiye
Advisor: Asst. Prof. Talha Erdem

## Awards

Summer 2024 | Finalist Team TEKNOFEST Digital Technologies in Industry Competition

## Research Interests

**Transparent Conductive Electrodes, Silver Nanowire (AgNWs), Optoelectronics Deceives**

- Developing AgNWs-based flexible transparent conductive electrodes as an alternative to indium tin oxide (ITO) for optoelectronic devices.
- Exploring layer-by-layer (LbL) electrostatic self-assembly (ESA) to enhance conductivity, transparency, and mechanical flexibility.
- Focusing on low-cost, scalable fabrication and surface passivation to improve performance and durability.

## Projects

7. Fall 2024, **Adaptive Cruise Control Line Follower Robot Register-Level C**
   - *Projects Highlight*

     Designed and implemented a line follower robot with adaptive cruise control using the STM32F103RB microcontroller and register-level C programming. The robot uses QTR-8RC reflectance sensors for precise line tracking and an HC-SR04 ultrasonic sensor for dynamic distance control.
6. Fall 2024, **Transferring Audio Information via Laser Light**
   - *Projects Highlight*

     In this project, an optical communication system was designed to transmit audio signals over 50 cm using a laser source and an optical microphone. Both transmitter and receiver circuits were developed, with the receiver configured to drive a speaker for audio output.

5. FALL 2024, **LED Driver Circuit Design for Research Applications**
    - *Projects Highlight*

      Designed and implemented a brightness-adjustable LED driver circuit for photodetector research. The circuit enables precise control of brightness and wavelength conditions for detailed experimental analysis.

4. SUMMER 2024, **Design and Implementation of an Automated Dip Coating Machine for Research Applications**
    - *Projects Highlight*

      Developed and optimized a dip coating machine for research applications with the Smart Nanophotonics Research Group. A dual stepper motor system, controlled via Arduino and integrated with a Nextion Display-based interface, ensures precise dipping and rotational movements. The design combines robust hardware wiring, 3D-printed components, and comprehensive software debugging for reliable machine performance.

3. SPRING 2024, **Lock Door with Student's ID Using VHDL Vivado Xilinx**
    - *Projects Highlight*

      Designed and implemented a door locker on an FPGA board using structural VHDL. A 12-bit password derived from the student's ID unlocks the door. The design integrates a shift register, state machine, and top-level module, verified by comprehensive testbenches.

2. SPRING 2024, **Uneven Seven-Sided Dice Roller Circuit**
    - *Projects Highlight*

      Designed this paper presents the design and implementation of an uneven seven-sided dice roller using digital techniques.

1. FALL 2023, **Electronic Stethoscope**
    - *Projects Highlight*

      Designed the project highlights the importance of maintaining heart and respiratory health for overall well-being, advocating for electronic stethoscopes due to their superior sound quality and precise diagnosis. MATLAB GUI design facilitates signal acquisition and real-time monitoring.

## SERVICE

2024 JANUARY- NOW

*AGU Photonics Club, Abdullah Gül University*

Co-founded and actively managed the AGU Photonics Club at the university. Coordinated and organized a series of recurring events *LightStalk*, *CO-STOP*, *BEES*, *Post-it*, and *Pholtran* that varied in format between webinars, seminars, and coffee meetings, encourage strong academic and professional engagement.

Advisor: Res. Asst. PhD Sinan GENC

- *Highlighted events*

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| MARCH 5th, 2025 | **POST-IT 2**; *Kuantum Nokta LED Uygulamaları*, Res. Asst. Aysenur BICER |
| FEBRUARY 19th, 2025 | **POST-IT 1;** *Optoelektronik Alanında Yenilikler: MSM Fotodetektörlerin Gelistirilmesi*, Res. Asst. Muzeyyen SAVAS |
| DECEMBER 18th, 2024 | **LIGHTSTALK 13;** *Microscopic 'Lasers in a Jar': self-assembled photonic structures using colloidal quantum dots and*, Dr. Nicolas LAURAND |
| DECEMBER 4th, 2024 | **LIGHTSTALK 12;** *Miniaturisation of Optical Spectrometers*, Prof. Tawfique HASAN |
| DECEMBER 3rd, 2024 | **BEES;** *What did I do when the "Timing" wasn't always ideal for my career and research*, Prof. Jungwon KIM |
| NOVEMBER 20th, 2024 | **LIGHTSTALK 11;** *Engineering Optical Structures & Functional Materials Towards Photonic Devices Development*, Prof. Christos RIZIOTIS |

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| November 6th, 2024 | **LightStalk 10;** *Environmental Photonics from Ultrafast IR Laser Materials Processing for Photovoltaics to Trace Molecule Detection*, Prof. Alpan Bek |
| October 30th, 2024 | **Bees;** *Becoming an effective researcher with leadership skills*, Dr. Sarun Sumriddetchkajorn |
| October 23rd, 2024 | **LightStalk 9;** *Photonics in the Industry and Academia Requirements and Opportunities*, Assoc. Prof. Talha Erdem |
| October 9th, 2024 | **LightStalk 8;** *IEEE and Photonics Society Membership Benefits & Opportunities*, Kithinji Muriungi |
| May 15th, 2024 | **LightStalk 7;** *Unleashing the Power of Agri-Photonics*, Dr. Sarun Sumriddetchkajorn |
| May 1st, 2024 | **LightStalk 6;** *Semiconductor Nanostructures for Optoelectronics Applications*, Chennupati Jagadish |
| April 19th, 2024 | **LightStalk 5;** *Translational Biophotonics for Point-of-Care Diagnostics*, Assoc. Prof. Akhil Kallepalli |
| April 3rd, 2024 | **LightStalk 4;** *Metaphotonics: Tailored Functionalities by Artificial Structuring*, Prof. Hümeyra Caglayan |
| March 20th, 2024 | **LightStalk 3;** *Fundamental Concepts of Laser Science Techniques and Applications*, Prof. Peter Delfyett |
| March 5th, 2024 | **LightStalk 2;** *Volunteering for IEEE Photonics Society*, PhD Naznin Akter |
| February 21st, 2024 | **LightStalk 1;** *Fiber Optical Systems and Their Applications*, Assoc. Prof. Dr. Ibrahim Tuna Ozdur |

## Professional Experience and Collaborative Research

1. Designed and developed a Dip Coating Machine for the *Smart Nanophotonics Research Group*.
2. Developed LED driver circuit for Res. Asst. Muzeyyen Savas to support photodetector research.

## Research Experience

2024 June - August

AGÜ

*Smart Nanophotonics Research Group, Abdullah Gül University*
Undergraduate Internship

Developed software and mechanical parts for a Dip Coating Machine. Programmed stepper motor control, designed a user interface, and assisted in wiring and 3D printing components. Integrated and tested the system for research applications.

Advisor: Asst. Prof. TALHA ERDEM

## Teaching and Mentoring

- Summer 2024, *Abdullah Gül University*
  Mentor for an IoT-based project, guiding high school students in developing a simple plant irrigation system using Arduino, moisture sensors, and a display etc. teaching them basic IoT concepts and sensor integration.

## Conferences

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| September 13th, 2024 | *Ulusal Optik, Elektro-Optik ve Fotonik Çalıştayı*, Ankara, Turkiye |

## Computer Skill

Proficient Knowledge: Python, C++, LabVIEW, Xilinx Vivado, MATLAB, LTSpice, KiCad

## Language Skills

Turkish: Native
English: Fluent