

# Ozgur Ege Aydogan

Toyonaka, Osaka/Japan | ozgur-ege-aydogan-xj@alumni.osaka-u.ac.jp | (+81) 8055850145

<https://www.ozguregeaydogan.com/>

## EDUCATION

---

**Osaka University** Osaka, Japan  
MS in Robotics Engineering Sept. 2023  
CGPA: 3.79/4.00

- Thesis: "3D Walking of a Bio-inspired Musculoskeletal Soft Quadruped Robot Driven by Pneumatic Artificial Muscles" (Advisor: Prof. Kensuke Harada, collaborated extensively with Professor Koh Hosoda)

**Yildiz Technical University** Istanbul, Turkey  
BS in Mechatronics Engineering July 2020  
CGPA: 3.16/4.00, Graduated with Honors

- Thesis: "Development of a 4-DOF Upper Limb Robotic Exoskeleton for Shoulder and Elbow Rehabilitation" (Advisor: Prof. Erhan Akdogan)

## RESEARCH EXPERIENCE

---

**Osaka University, Yanagisawa Lab** Osaka, Japan  
Research Assistant – Advisor: Prof. Takufumi Yanagisawa Nov. 2023 – present

- Led the development of a Brain-Computer Interface (BCI) system for individuals with severe motor disabilities, enabling control of robotic arms using motor imagery and EEG signals
- Implemented Support Vector Machines (SVM) for real-time decoding of motor intentions from EEG signals, achieving high accuracy and reliability

**Osaka University, Hosoda Lab (Adaptive Robotics Group)** Osaka, Japan  
Graduate Research Assistant – Advisor: Prof. Koh Hosoda and Prof. Kensuke Harada Oct. 2021 – Sept. 2023

- Designed and fabricated 30 McKibben-type artificial muscles for a bio-inspired musculoskeletal soft quadruped robot, mimicking the anatomical functions and structure of a greyhound
- Utilized motion capture techniques for precise biomechanical analysis, contributing to the design of bio-inspired robotic systems
- Implemented a solenoid valve system to manage the pressurized air supply, achieving a maximum of 20% contraction in the artificial muscles for adaptive walking control

**Yildiz Technical University, Biomechatronics Research Lab** Istanbul, Turkey  
Post-Baccalaureate Research Assistant – Advisor: Prof. Erhan Akdogan Mar. – Sept. 2021

- Developed a 5-DOF wearable upper-limb robotic exoskeleton to enhance mobility and reduce physical strain for workers and individuals with weak muscles
- Implemented force-based impedance control for effective human-machine interaction, empirically adjusting inertia, stiffness, and damping parameters
- Created a low-cost wearable EMG sensor system to measure muscle activation and achieved 99% assistance for the biceps muscle during elbow flexion-extension while lifting weight

**Koc University, DxBiotech Lab** Remote  
Post-Baccalaureate Research Assistant – Advisor: Assoc. Prof. Savas Tasoglu Apr. – May 2021

- Designed a PCB for a low-cost, portable tuberculosis diagnosis device using loop-mediated isothermal amplification

**Yildiz Technical University, Biomechatronics Research Lab** Istanbul, Turkey  
Undergraduate Research Assistant – Advisor: Prof. Erhan Akdogan Sept. 2019 – July 2020

- Led a team to develop a 4-DOF grounded robotic exoskeleton for shoulder and elbow rehabilitation, designed for users with a height range of 150 - 200 cm
- Developed and integrated a low-cost EMG sensor system for measuring muscular activation, utilizing time-domain and frequency-domain analysis for real-time feedback
- Created a graphical user interface (GUI) for entering patient information and selecting exercise types, enhancing usability

**Yildiz Technical University, Advanced Systems and Innovation Lab** Istanbul, Turkey  
**Undergraduate Research Assistant** – Advisor: Assoc. Prof. Huseyin Uvet Nov. 2017 – Feb. 2018

- Designed an experimental setup in SolidWorks for a microfluidic system with a microflow sensor

## **TEACHING EXPERIENCE**

---

**Osaka University, Graduate School of Engineering Science** Osaka, Japan  
**English Instructor** Apr. 2022 – Aug. 2023

- Taught academic English to Japanese graduate students twice a week and focused on enhancing their technical writing and presentation skills
- Trained Japanese graduate students for oral and poster presentations

**Neuromatch Academy** Remote  
**Teaching Assistant**, "Deep Learning" course July 2023

- Mentored a team of 13 graduate students and guided them through course materials
- Supervised two group projects on using LSTMs to model naturalistic fMRI data and on LSTM prediction of behavioral outputs from preparatory neural activity

**Osaka University, Graduate School of Engineering** Osaka, Japan  
**Teaching Assistant**, "Fundamentals of Information Science" course Apr. – Sept. 2022

- Guided 250 undergraduate students through course materials
- Evaluated the assignments and quizzes of 150 undergraduate students

## **WORK EXPERIENCE**

---

**Arcelik A.S.** Tekirdag, Turkey  
**Project Engineer** (Full-time) June – July 2021

- Conducted patent research on sustainable packaging solutions
- Led a team in designing a novel packing box using biomechanical principles

**Eurobotik** Kocaeli, Turkey  
**Automation R&D Engineer** (Full-time) Mar. – May 2021

- Conducted a comprehensive literature review focused on the control of high-speed dynamic balanced robotic manipulators utilizing robot operating system (ROS)

**Eurobotik** Kocaeli, Turkey  
**Engineering Intern** (Full-time) Aug. – Sept. 2019

- Developed a screw-driving automation system that enhanced screw placement accuracy by 25%

**ASELSAN A.S.** Ankara, Turkey  
**Engineering Intern** (Full-time) July 2019

- Developed a buck converter and controlled the speed of the DC motor using PWM signals

**GURDESAN Maritime Ship Machinery Industry and Trade Inc.** Kocaeli, Turkey  
**Engineering Intern** (Full-time) July 2018

- Designed and manufactured the middle gear shaft of the Lifeboat Davit Reducer

## **JOURNAL PUBLICATIONS**

---

1. Dikbas, F. E. H. M., **Aydogan, O.**, Aydin, I., Cetin, D., Emin Aktan, M., & Akdogan, E. (2023). Development of A 5-DOF Impedance-Controlled Wearable Upper Limb Exoskeletal Robot. *Journal of Mechanics in Medicine and Biology*. doi:10.1142/S0219519423500574
2. Karadeniz, F., **Aydogan, O. E.**, Kazanci, E. A., & Akdogan, E. (2020). Design of a 4-DOF grounded exoskeletal robot for shoulder and elbow rehabilitation. *Sustainable Engineering and Innovation*, 2(1), 41-65, cited by 6. doi:10.37868/sei.v2i1.106

## **CONFERENCE PRESENTATIONS**

---

1. **Aydogan, O. E.**, Ceylan, G., Yilmaz, F., Ertekin, S. N., Tekerek O. E. (2022). Transfer Learning from Real to Imagined Motor Actions in ECoG Data. *Neuromatch Conference 2022*, Flash Talk
2. **Aydogan, O. E.**, Zhang, Y., Barry, B., Haram, L., Mishra, U. (2021). Classification of motor planning into overt or imagery using an ECoG signal. *Neuromatch Conference 2021*, Flash Talk

## **RESEARCH GRANTS**

---

1. **TUBITAK 2209-B Industry-Oriented Research Projects Grant** Jan. – Dec. 2020  
Grounded Upper-Limb Robotic Rehabilitation Exoskeleton, TUBITAK BIDEB, 3,957 Turkish Lira, Grant No:1139B411900912
2. **TEKNOFEST 2020 Technology for Humanity Competition Grant** July – Sept. 2020  
Grounded Upper-Limb Robotic Rehabilitation Exoskeleton, Turkish Technology Team Foundation, 1,500 Turkish Lira

## **HONORS AND AWARDS**

---

1. **Recipient** of Japanese Government (Monbukagakusho: MEXT) Scholarship, 147,000 JPY/month, Oct. 2021 – Sept. 2023
2. **Finalist**, TEKNOFEST Aerospace and Technology Festival 2021, Technology for Humanity Competition, Health and First Aid Category, Undergraduate and Graduate Level, Sept. 2021
3. **Selected Participant**, Special Training Program for Robotics Engineers for the Post-Corona Society, Osaka University, Jan. 2021
4. **1st Prize**, TEKNOFEST Aerospace and Technology Festival 2020, Technology for Humanity Competition, Health and First Aid Category, University and Above Level, awarded 1st prize out of 894 projects in the Health Category, Sept. 2020
5. **2nd Prize**, TUBITAK 2242 University Students Research Projects Competitions, Health Category, The Scientific and Technological Research Council of Turkey (TUBITAK), awarded 2nd prize out of 204 projects in the Health Category, Sept. 2020
6. **1st Prize**, 8th University Students Research Project Competitions, Istanbul-Asian Side, Health Category, TUBITAK, 1st place among 20 projects in the grand finale, Aug. 2020
7. **Recipient** of Full Merit Scholarship (100% OSYM - Student Selection and Placement Center), Aug. 2015 – Nov. 2017

## **LEADERSHIP AND MENTORSHIP**

---

- Research Mentor for the Biomechatronics Research Lab** Mar. 2021 – Sept. 2021
- Mentored 3 undergraduate students on the development of a wearable upper-limb robotic exoskeleton. Taught wearable mechanical design, sensor system design, and signal processing
- Research Mentor for IEEE YTU EMBS (Engineering in Medicine & Biology Society)** Jan. – Mar. 2021
- Mentored 36 undergraduate students on the development of the bionic arm. Taught human-robot interaction and EMG sensor design
- Team Leader for the Biomechatronics Research Lab** Sept. 2019 – Sept. 2020

- Led 2 undergraduate students on the design and control of a 4-DOF grounded robotic exoskeleton for shoulder and elbow rehabilitation

## **INVITED TALKS**

---

### **You Wear It Well Podcast:**

- Wearable robotic exoskeleton design for the shoulder area Oct. 2023
- Medical conditions for wearable robotics Nov. 2022
- Usage of brain-machine interface in wearable devices Nov. 2022
- The role of mechatronics in the future of rehabilitation robotics May 2021

### **Yildiz 1911 Podcast:**

- Development of an upper limb robotic exoskeleton for rehabilitation Oct. 2020

## **PRESS COVERAGE**

---

- "Outstanding Success of Upper Limb Rehabilitation Robot at Teknofest", Hurriyet Newspaper, Oct. 9, 2020

## **SKILLS**

---

- **Programming Languages:** Python, C/C++, and MATLAB
- **Embedded Systems:** Raspberry Pi, Arduino, and TI microcontrollers
- **Software:** Simulink, SolidWorks, Autodesk Inventor, Siemens NX, ROS, Kinovea, MS Visual Studio, PyTorch, Project Jupyter, LATEX, FluidSIM, Beckhoff TwinCAT, Panasonic PLC
- **Language:** English, Advanced (IELTS Academic: 7.5); Japanese, Intermediate; German, Beginner; Turkish, Native

## **PROFESSIONAL MEMBERSHIPS**

---

- The American Society of Mechanical Engineers (ASME) July 2023 – present
- The Japan Society of Mechanical Engineers (JSME) July 2023 – present
- The Robotics Society of Japan (RSJ) July 2023 – present
- IEEE Robotics and Automation Society (RAS) Apr. 2023 – present
- IEEE Engineering in Medicine and Biology Society (EMBS) Apr. 2023 – present
- Institute of Electrical and Electronics Engineers (IEEE) July 2022 – present
- National Society of Professional Engineers (NSPE) July 2022 – present
- UCTEA Chamber of the Mechanical Engineers Apr. 2021 – present

## **COMMUNITY SERVICE**

---

- Foundation for Children with Leukemia (LOSEV) May 2021 – present
- Turkish Foundation for Combating Soil Erosion (TEMA) May 2021 – present
- Laughter Heals Association May 2021 – present
- Turkish Marine Environment Protection Association (TURMEPA) Apr. 2021 – present
- World Wide Fund for Nature Turkey (WWF-Turkey) Apr. 2021 – present

## **EXTRACURRICULAR ACTIVITIES**

---

- **Member**, Osaka University Competitive Programming Club Oct. 2022 – Aug. 2023
- **Semifinalist**, Turkey 26th Intelligence Games Competition, Turkey Intelligence Foundation May 2021
- **Member**, YTU Machine Technologies Club (MAKTEK) Oct. 2018 – Sept. 2019