

Zeynep Özge Orhan

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Education

École Polytechnique Fédérale de Lausanne

Lausanne, Switzerland

PH.D. IN ROBOTICS, CONTROL AND INTELLIGENT SYSTEMS

Anticipated March 2025

- Research Topic: Control of a lower-limb exoskeleton for partial assistance
- Advisor: Prof. Auke Ijspeert, Dr. Mohamed Bouri
- Relevant Courses: Learning to Control, Design of Experiments, Scientific Programming

Sabancı University

Istanbul, Turkey

M.SC. IN MECHATRONICS ENGINEERING

September 2020

- Research Topic: Co-design optimization of a variable stiffness actuator
- Advisor: Prof. Volkan Patoglu
- Relevant Courses: Robotics, Kinematics and Dynamics of Machines, Force Control and Bilateral Teleoperation, Real-Time System Design, Autonomous Mobile Robotics, Machine Learning

Middle East Technical University

Ankara, Turkey

B.S. IN MECHANICAL ENGINEERING

June 2017

- Graduation Project: Design and control of a cable driven aerial camera system
- Relevant Courses: Dynamics, System Dynamics, Design of Control Systems, Mechatronic Design

Skills

Software and Development: MATLAB-Simulink, Python, C++, Git, STM32 Microcontrollers

Rapid Prototyping: Soldering, CAD, 3D Printing, Laser Cutting

Language: English-*Advanced*, Spanish-*Intermediate*, French-*Beginner*

Experience

The Biorobotics Laboratory (BIOROB-REHAssist), EPFL

Lausanne, Switzerland

GRADUATE STUDENT RESEARCH ASSISTANT

October 2021 - present

- Led the development, implementation and testing of control strategies for partial assistance with a lower-limb exoskeleton for people with walking disorders during daily living activities.
- Conducted human subject experiments to validate and refine control strategies, ensuring the effectiveness of controller strategies.
- Guided and supervised 2 master thesis, 7 semester projects, and 2 internships, providing technical mentorship and fostering a collaborative research environment.

Human Machine Interaction (HMI) Laboratory, Sabancı University

Istanbul, Turkey

GRADUATE STUDENT RESEARCH ASSISTANT

September 2017-September 2020

- Implemented the co-design optimization of a variable stiffness actuator, improving the adaptability and performance of overall system.
- Conducted experiments on an impedance controlled device to compare different optimization methods, leading to enhanced control strategies and better performance metrics.
- Designed and implemented a controller to ensure coupled stability on series elastic actuators, enhancing the reliability and safety of robotic interactions with human users.

Universidad de Castilla-La Mancha

Ciudad Real, Spain

MECHANICAL DESIGN INTERN

June 2016-August 2016

- Involved in a European Union project by contributing to the detailed 3D CAD models of a historical hydraulic mill, enhancing the project's documentation and visualization capabilities.

Siemens Building Technologies

Istanbul, Turkey

MANAGEMENT INTERN

June 2015-July 2015

- Conducted cost analyses for three automation projects, identifying potential savings and efficiency improvements. Attended PLC Programming training.

Siemens AG

Kocaeli, Turkey

MANUFACTURING INTERN

August 2014 - September 2014

- Gained practical experience in manufacturing processes, including welding, metal sheet folding, sanding, and electrostatic coating.

Publications

- **Orhan, Z. Ö.**, Dal Prete, A., Bolotnikova, A., Gandolla, M., Ijspeert, A., and Bouri, M. 2024. “Real-Time Locomotion Transitions Detection: Maximizing Performances with Minimal Resources”. In: *IEEE International Conference on Robotics and Automation (ICRA)*, pp. 3241–3247.
- **Orhan, Z. Ö.**, Shafiee, M., Juillard, V., Oliveira, J. C., Ijspeert, A., and Bouri, M. 2024. “ExoRecovery: Push Recovery with a Lower-Limb Exoskeleton Based on Stepping Strategy”. In: *IEEE International Conference on Robotics and Automation (ICRA)*, pp. 3248–3255.
- Mengilli, U., **Orhan, Z. Ö.**, Caliskan, U., and Patoglu, V. 2021. “Passivity of Series Damped Elastic Actuation under Velocity-Sourced Impedance Control”. In: *IEEE World Haptics Conference (WHC)*, pp. 379–384.
- **Orhan, Z. Ö.** 2020. “Co-design optimization for lever-type variable stiffness actuation”. MA thesis.
- Küçüktabak, E. B., Pelit, M. M., **Orhan, Z. Ö.**, and Emre, A. 2017. “Indoor UAV Exploration Method with UWB Localization”. In: *National Meeting of the Turkish National Committee of Automatic Control (TOK)*.

Poster Presentations

- **Orhan, Z. Ö.**, Sizaret, A. M. E., Ijspeert, A., and Bouri, M. 2024. *Assessing Balance During Gait with a Lower Limb Exoskeleton*. IEEE International Conference on NeuroRehabilitation (ICNR).
- Ortlieb, A., Zheng, Y., Demeure, E., **Orhan, Z. Ö.**, Ulrich, B., Favre, J., Carda, S., Serino, A., and Bouri, M. 2022. *Kinematic and Muscle Impact of a Bio-Mimetic Assistance with a Lower Limb Exoskeleton in MS and NMD Patients During Overground Walking*. World Congress for NeuroRehabilitation (WCNR).
- **Orhan, Z. Ö.**, Ortlieb, A., Ijspeert, A., and Bouri, M. 2021. *Preliminary Results in Partial Gait Assistance Using the Lower Limb Exoskeleton Autonomy*. IEEE International Conference on Rehabilitation Robotics (ICORR).

Teaching

EPFL

Lausanne, Switzerland

TEACHING ASSISTANT

October 2020 - present

- Conducted exercise and practical sessions, developed, wrote, and graded assignments on: Basics of Mobile Robotics, Haptic Human Robot Interfaces, Robotics Practicals, Basics of Robotics classes.

Sabanci University

Istanbul, Turkey

TEACHING ASSISTANT

September 2017 - June 2020

- Assisted students during exercise sessions and held office hours on: Mechanical Systems and Dynamics classes.

Honors & Awards

IEEE RAS TC on Model-based Optimization for Robotics Travel Grant for ICRA	2024
IEEE ICORR Poster submission selected for podium presentation	2021
Sabanci University graduate full tuition waiver	2017-20
Winner of the METU undergraduate design project competition	2017
YITAK Ankara Chamber of Commerce internship scholarship	2016
Siemens Future Professionals fellowship	2014-16
Ranked top 0.07% in national university entrance examination	2011

Service

Reviewer/Sub-reviewer: ICRA, ICORR, TNSRE, T-RO, RA-L