




Chrysostomos Karakasis

Ph.D. Candidate in Mechanical Engineering

Address: 68 Welsh Tract Road
Newark, DE, 19713
Phone: (+1) 302-898-8542
e-mail: chryskar@udel.edu
 in/chrys-karakasis
 chryskar
 Chrysostomos Karakasis

Education

Ph.D. in Mechanical Engineering

UNIVERSITY OF DELAWARE, USA

GPA: 4.0/4.0
AUG. 2019 - PRESENT

- **Dissertation:** “Robust and Stable Locomotion over Compliant Terrains: Application to Lower-limb Prostheses and Bipedal Robots”
Advisor: Dr Panagiotis Artemiadis
Committee: Ioannis Poulakakis (UD); Thomas Buchanan (UD); Robert Gregg (UMich)

M.Sc. in Mechanical Engineering

UNIVERSITY OF DELAWARE, USA

GPA: 4.0/4.0
MAY 2023

B.Sc. & M.Sc. in Electrical and Computer Engineering (Top 5%)

NATIONAL TECHNICAL UNIVERSITY OF ATHENS, GREECE (5-YEAR JOINT DEGREE; 300 ECTS)

GPA: 9.02/10
DEC. 2013 - FEB. 2019

- **Thesis:** “Implementation of Quadruped Robot’s Motion Control on SoC FPGA”
Supervisors: Prof. Dimitrios Soudris & Prof. Evangelos Papadopoulos

Research Interests

Legged Robots Rehabilitation Robotics Dynamical Systems and Control Embedded Systems Design

Professional Experience

Robotics and Controls Engineer Intern

Johnson & Johnson Medtech

Manager: Douglas Spencer Maughan - Mentor: Michael Dermksian

June - Aug. 2022

- Developing and deploying a hard-stop algorithm to prevent overloading in a cable-driven surgical instrument wrist.

Research Assistant

University of Delaware

Advisor: Dr. Panagiotis Artemiadis

2019 - PRESENT

- Robust and stable biped locomotion (3D Dual-SLIP) under one-step low-stiffness perturbations.
- Development of controller for an ankle-foot prosthesis that improves walking stability over compliant terrains.
- Development of novel kinematic data-based algorithm (F-VESPA) for real-time heel-strike detection.
- Development of user-friendly interface for performing experiments using the Variable Stiffness Treadmill (VST).

Research Assistant

National Technical University of Athens

Advisor: Dr. Dimitrios Soudris & Dr. Evangelos Papadopoulos (MicroLab & CSL-EP)

2018-2019

- Implementation of highly affordable control architecture for the quadruped robot Laelaps II based on a SoC FPGA.

Technical Skills

- **Operating Systems:** Microsoft Windows, Unix (Linux)
- **Programming Languages:** C/C++, Python, Pascal, Assembly (ARM, AVR architecture)
- **Computer Hardware Design:** VHDL, Verilog, Xilinx Vivado/ISE Design Suite, High-Level Synthesis (HLS)
- **Software Tools:** Mathworks MATLAB/Simulink, CLion IDE, Bitbucket, GitHub, Vicon Nexus/DataStream SDK, Gazebo, Jupyter Notebook, Microsoft Azure, Eclipse IDE, Matplotlib
- **Application Software:** T_EX (L^AT_EX, B_IB_TE_X), Microsoft Office, OpenOffice

Academic Scholarships and Awards

- IEEE/RAS Member Support Program for IROS 2023 IEEE Robotics and Automation Society, 2023
- Graduate Student Travel Award for IROS 2023 University of Delaware, 2023
- George W. Laird Merit Fellowship (Finalist) University of Delaware, 2020
- Onassis Foundation Scholarship Alexander S. Onassis Foundation, 2020-2023
- Gerondelis Foundation Scholarship for Academic Excellence Gerondelis Foundation Inc., 2020

Publications

- [J3] V. Chambers, B. Hobbs, W. Gaither, Z. The, A. Zhou, **C. Karakasis**, and P. Artemiadis, “The Variable Stiffness Treadmill (VST) 2.0: Development and Validation of a Unique Tool to Investigate Locomotion on Compliant Terrains,” *ASME Journal of Mechanisms and Robotics*, 2023, Under Review.
- [J2] C. Karakasis, I. Poulakakis, and P. Artemiadis, “An Energy-Based Framework for Robust Dynamic Bipedal Walking Over Compliant Terrain,” *Journal of Dynamic Systems, Measurement, and Control*, pp. 1–12, Nov. 2023, ISSN: 0022-0434. DOI: 10.1115/1.4064094. eprint: <https://asmedigitalcollection.asme.org/dynamicsystems/article-pdf/doi/10.1115/1.4064094/7060193/ds-23-1181.pdf>. [Online]. Available: <https://doi.org/10.1115/1.4064094>.
- [J1] **C. Karakasis** and P. Artemiadis, “Real-time kinematic-based detection of foot-strike during walking,” *Journal of Biomechanics*, p. 110 849, 2021.
- [C4] **C. Karakasis**, R. Salati, and P. Artemiadis, “Adjusting the Quasi-Stiffness of an Ankle-Foot Prosthesis Improves Walking Stability during Locomotion over Compliant Terrain,” in *2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, To Appear.
- [C3] **C. Karakasis**, I. Poulakakis, and P. Artemiadis, “Robust Dynamic Walking for a 3D Dual-SLIP Model under One-Step Unilateral Stiffness Perturbations: Towards Bipedal Locomotion over Compliant Terrain,” in *2022 30th Mediterranean Conference on Control and Automation (MED)*, 2022, pp. 969–975. DOI: 10.1109/MED54222.2022.9837236.
- [C2] **C. Karakasis** and P. Artemiadis, “F-VESPA: A Kinematic-based Algorithm for Real-time Heel-strike Detection During Walking,” in *2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, IEEE, 2021, pp. 5098–5103.
- [C1] **C. Karakasis**, K. Machairas, C. Marantos, I. S. Paraskevas, E. Papadopoulos, and D. Soudris, “Exploiting the SoC FPGA Capabilities in the Control Architecture of a Quadruped Robot,” in *2020 IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM)*, IEEE, 2020, pp. 501–507. [Online]. Available: <https://ieeexplore.ieee.org/document/9159012>.

Presentations

- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)** Detroit, USA, Oct. 2023
In-person presentation of the accepted paper “Adjusting the Quasi-Stiffness of an Ankle-Foot Prosthesis Improves Walking Stability during Locomotion over Compliant Terrain” as part of the “Prosthesis Design and Control” Technical Session.
- 30th Mediterranean Conference on Control and Automation (MED)** Athens, Greece, July 2022
Presentation of the accepted paper “Robust Dynamic Walking for a 3D Dual-SLIP Model under One-Step Unilateral Stiffness Perturbations: Towards Bipedal Locomotion over Compliant Terrain” as part of the “Robotics V” Regular Session.
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)** Prague, Czech Republic, Sep. 2021
Virtual presentation of the accepted paper “F-VESPA: A Kinematic-based Algorithm for Real-time Heel-strike Detection During Walking” as part of the “Prosthetics and Exoskeletons I” Technical Session.
- IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM)** Boston, USA, July 2020
Virtual presentation of the accepted paper “Exploiting the SoC FPGA Capabilities in the Control Architecture of a Quadruped Robot” as part of the “Legged Robots II” Technical Session.

Mentoring

Research Advising at the University of Delaware (HORC Lab)

- Camryn Scully (Master’s in Robotics) Feb. 2023 - Present
Development of an inline bypass adapter for an ankle-foot prosthesis based on the iWALK3.0 Hands Free Crutch.
- Robert Salati (Master’s in Robotics) Sep. 2022 - Aug. 2023
Development of admittance controller for the adjustment of the quasi-stiffness of an ankle-foot prosthesis.