

Dimitrios PAPAGEORGIOU

BRIEF CV

Dimitrios Papageorgiou graduated the Electrical and Computer Engineering (ECE) department of the Aristotle University of Thessaloniki (AUTH) in 2013 and received a PhD from the same department in 2019. His PhD is related to the control of collaborative robots for safe operation and assisted kinesthetic guidance utilizing dynamical systems and constraint enforcement, while his PhD supervisor was Prof. Zoe Doulgeri (ECE-AUTH). Since July 2022, Dimitrios Papageorgiou is an Assistant Professor at the Department of Electrical and Computer Engineering of the Hellenic Mediterranean University (HMU) in the following scientific field: "Control systems and automation focusing on robotic applications". His research interests are in the area of robot control, physical human-robot interaction, virtual fixtures and dynamical system based motion generation. He has participated in 4 European and 2 national research projects, which are related to robot control in industry, robot-assisted surgery and agricultural robotics, while he has also received 2 scholarships for his doctoral studies and post-doctoral research respectively. He has co-authored 24 papers that are published in scientific journals (such as "IEEE Transaction on Robotics" and "Robotics and Computer integrated Manufacturing") and international conferences (such as IEEE ICRA, IROS and CDC) in the field of Robotics and Automatic Control. He is a member of IEEE (Robotics and Automation Society and Control Systems Society) and the Technical Chamber of Greece.

EDUCATION

APR 2019	Ph.D.: CONTROL OF COLLABORATIVE ROBOTS FOR SAFE OPERATION AND ASSISTED KINESTHETIC GUIDANCE UTILIZING DYNAMICAL SYSTEMS AND CONSTRAINT ENFORCEMENT, https://ikee.lib.auth.gr/record/303363 Aristotle University of Thessaloniki, Greece Supervisor: Prof. Z. DOULGERI
JAN 2009 - JUL 2013	Diploma in ELECTRICAL AND COMPUTER ENGINEERING, Aristotle University of Thessaloniki, Greece Final Grade: 8.14 / 10 Department: Electronics and Computer Engineering Thesis: "Noninvasive Intracranial Pressure (nICP) Estimation" Supervisor: Prof. L. HADJILEONTIADIS

RESEARCH EXPERIENCE

JUL 2022 - NOW	Assistant Professor at the Department of Electrical and Computer Engineering of the Hellenic Mediterranean University, Heraklion, Greece Scientific field: Control systems and automation focusing on robotic applications https://ece.hmu.gr/
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JAN 2020 - JUL 2022	<p>Postdoctoral researcher at ELKE-AUTH, Thessaloniki</p> <p>PROJECT: BACCHUS - Mobile robotic platforms for active inspection and harvesting in agricultural areas https://cordis.europa.eu/project/id/871704</p> <ul style="list-style-type: none"> -Research on control for robotic crop harvesting. -Research on control based on point-clouds gathered by RGB-D in-hand cameras. -Research on control for the active perception of grapes and grape stems. -Research on control for facilitating the stem cutting. -The lab test are conducted utilizing a bi-manual stationary robot (2 x UR5e), while the field tests are conducted on Ktima Gerovassileiou, utilizing the project's mobile bi-manual robot (Robotnik pseudo-omnidirectional platform with 2 x UR10e).
JAN 2020 - DEC 2021	<p>Postdoctoral researcher with an IKY scholarship</p> <p>PROJECT: Kinesthetic teaching of robots for tasks that involve contact with the environment.</p> <ul style="list-style-type: none"> -Research on dynamical systems for online motion generation under the existence of spatial constraints. -Research on kinesthetic teaching of robots in task that involve spatial constraints. -Research on the facilitation of the human during the kinesthetic teaching of a robot, under the existence of spatial constraints. -For the experiments a KUKA LWR4+ was utilized, as well as a bi-manual robot having 2 x KUKA iiwa. -The experimental evaluation is done through statistical analysis, utilizing a number of participants.
NOE 2020 - APR 2022	<p>Postdoctoral researcher at ELKE-AUTH, Thessaloniki</p> <p>PROJECT: ProgHRC - <i>Progressive automation of tasks with human-robot collaboration.</i></p> <ul style="list-style-type: none"> -Definition of the scientific ethics research protocol for the experimentation and research activity.
AUG 2019 - DEC 2019	<p>Postdoctoral researcher at ELKE-AUTH, Thessaloniki</p> <p>PROJECT: CoLLaboratE - <i>Co-production cell performing human-robot collaborative assembly</i> https://cordis.europa.eu/project/id/820767</p> <ul style="list-style-type: none"> -Research on controllers for assistive human-robot collaborative manipulation of large and heavy objects. -Research on control for facilitating the kinesthetic teaching of robots. -The development is done in C++ and Robot Operating System (ROS), utilizing the KUKA LWR4+ robot.
MAY 2018 - AUG 2019	<p>Member of research team, Scholarship: "Development of Human Resources, Education and Lifelong Learning", Aristotle University of Thessaloniki</p> <p>PROJECT: Automatic programming of repetitive motions of robotic manipulator via kinesthetic guidance.</p> <ul style="list-style-type: none"> -Research on control schemes for encoding of kinematic behaviors via dynamical systems and control schemes for enforcing virtual fixtures. -Research on progressive automation of a task via kinesthetic teaching. -The development and experimental validation were done in C++ and ROS, utilizing the KUKA LWR4+ robotic manipulator.
APR 2018 - JUN 2019	<p>Research Assistant at CERTH-ITI, Thessaloniki</p> <p>PROJECT: SMARTSurg - <i>SMart weArable Robotic Teleoperated Surgery</i> http://www.smartsurg-project.eu</p> <ul style="list-style-type: none"> -Research on robot control for virtual constraints enforcement in teleoperated (master-slave) robotic manipulators with haptic feedback.

JUL 2015 - FEB 2018	<p>Research Assistant at CErTH-ITI, Thessaloniki PROJECT: SARAFun - Smart Assembly Robot with Advanced Functionalities http://h2020sarafun.eu</p> <ul style="list-style-type: none"> -Research on Physical Human-Robot Interaction (pHRI) control schemes (virtual constraints for assistance and safety) and dynamical system based automatic motion generation with constraints (joint limits, obstacles) for bi-manual robots. -The developed schemes were implemented as software modules in C++ with the Robot Operating System (ROS), utilizing the ABB YuMi robot.
MAY 2014 - JUN 2015	<p>Research Assistant at ELKE-AUTH, Thessaloniki PROJECT: PIROS - Physically Interactive Robotics Services http://piros.web.auth.gr</p> <ul style="list-style-type: none"> -Research on Physical Human-Robot Interaction (pHRI) control schemes and their social acceptance. More specifically, the developed methods involved human intention estimation and dynamical systems based robotic motion generation. -The developed schemes were implemented as software modules in C++ with the Robot Operating System (ROS), utilizing the KUKA LWR4+ robotic manipulator.

TEACHING EXPERIENCE

JUL 2022 - NOW	<p>Assistant Professor at the Department of Electrical and Computer Engineering of the Hellenic Mediterranean University (HMU), Heraklion, Greece Scientific field: Control systems and automation focusing on robotic applications</p>
OCT 2021 - FEB 2022	<p>Visiting Lecturer at the Department of Information and Electronic Engineering of International Hellenic University (IHU), Thessaloniki, Greece Courses:</p> <ul style="list-style-type: none"> -Robotics (Theory - 9th semester) -Computer Assisted Measurement Systems (Theory & Laboratory - 9th semester)
OCT 2020 - FEB 2021	<p>Visiting Lecturer at the Department of Information and Electronic Engineering of International Hellenic University (IHU), Thessaloniki, Greece Courses: Robotics (Theory - 9th semester)</p>
JAN 2014 - FEB 2019	<p>Teaching Assistant at Aristotle University of Thessaloniki, Greece Courses:</p> <ul style="list-style-type: none"> -Robotics (Theory - 6th semester) -Control Systems (Theory - 5th semester) -Electric Circuits III (Theory - 4th semester)
OCT 2009 - FEB 2013	<p>Instructor at Delta Institute of Vocational Training, Thessaloniki, Greece</p>
FEB 2014 - FEB 2015	<p>Courses:</p> <ul style="list-style-type: none"> -Automation -Industrial Electronics -Industrial Informatics -Measurements and Sensors

LANGUAGES

-GREEK: Mothertongue

-ENGLISH: Fluent (C2: Certificate of Proficiency in English (ECPE))

AWARDS AND ACHIEVEMENTS

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| 2020: | Achieved scholarship: "Reinforcement of Postdoctoral Researchers - 2nd Cycle" (MIS-5033021), implemented by the State Scholarships Foundation (IKY). |
| 2018: | Achieved scholarship: Supporting researchers with emphasis on young researchers" grant no. MIS 5004792 from the "Development of Human Resources, Education and Lifelong Learning" national program. |
| 2016: | IEEE International Symposium on Robotics and Intelligent Sensors (IRIS): Best paper Award for the work: "Yiannis Koveos, Dimitrios Papa-georgiou, Stefanos Doltsinis, and ZoeDoulgeri. A fast robot deployment strategy for successful snap assembly". |
| 2011: | Distinction for PANDORA AUTH Robotics team: Ranked 10 th at world-wide contest RoboCup Rescue |

MORE INFORMATION

Reviewer:

- IEEE Transactions on Robotics (TRO),
- IEEE Transactions on Mechatronics (T-MECH),
- IEEE Transactions on Control Systems Technology (TCST),
- IEEE Transactions on Automation Science Engineering (T-ASE),
- IEEE Robotics and Automation Letters (RA-L),
- IEEE International Conference on Robotics and Automation (ICRA),
- IEEE International Conference on Intelligent Robots and Systems (IROS),
- IEEE Conference on Decision and Control (CDC),
- European Control Conference (ECC).
- Springer: Autonomous Robots,
- Frontiers in Robotics and AI,
- Elsevier: Robotics and Autonomous Systems (RAS),
- ASME Journal of Mechanisms and Robotics,
- MDPI: Applied Sciences, Robotics, Sensors, Machines.

Member: IEEE student member (RAS and CS), Technical Chamber of Greece (TCG).

Conference Chair: Physical human-robot interaction session on 2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2021) in Prague, Czech Republic

LIST OF PUBLICATIONS

Journal articles

- j08. D. Papageorgiou, T. Kastritsi, Z. Doulgeri, and G. A. Rovithakis. A passive phri controller for assisting the user in partially known tasks. *IEEE Transactions on Robotics*, 36(3):802–815, 2020
- j07. D. Papageorgiou, T. Kastritsi, and Z. Doulgeri. A passive robot controller aiding human coaching for kinematic behavior modifications. *Robotics and Computer-Integrated Manufacturing*, 61:101824, 2020
- j06. Dimitrios Papageorgiou, Fotios Dimeas, Theodora Kastritsi, and Zoe Doulgeri. Kinesthetic guidance utilizing dmp synchronization and assistive virtual fixtures for progressive automation. *Robotica*, page 1–18, 2019
- j05. Sotiris Stavridis, Dimitrios Papageorgiou, and Zoe Doulgeri. Dynamical system based robotic motion generation with obstacle avoidance. *IEEE Robotics and Automation Letters*, pages 1–1, 2017
- j04. Abdelrahem Atawnih, Dimitrios Papageorgiou, and Zoe Doulgeri. Kinematic control of redundant robots with guaranteed joint limit avoidance. *Robotics and Autonomous Systems*, 79:122–131, may 2016
- j03. Yiannis Karayiannidis, Dimitrios Papageorgiou, and Zoe Doulgeri. A model-free controller for guaranteed prescribed performance tracking of both robot joint positions and velocities. *IEEE Robotics and Automation Letters*, 1:267–273, 2016
- j02. Yiannis Karayiannidis, Leonidas Droukas, Dimitrios Papageorgiou, and Zoe Doulgeri. Robot control for task performance and enhanced safety under impact. *Front. Robotics and AI*, 2015, 2015
- j01. Abdelrahem Atawnih, Dimitrios Papageorgiou, and Zoe Doulgeri. Reaching for redundant arms with human-like motion and compliance properties. *Robotics and Autonomous Systems*, 2014

In conference proceedings

- c16. Dimitrios Papageorgiou, Sotiris Stavridis, Christos Papakonstantinou, and Zoe Doulgeri. Task geometry aware assistance for kinesthetic teaching of redundant robots. In *2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 7285–7291, 2021
- c15. Antonis Sidiropoulos, Theodora Kastritsi, Dimitrios Papageorgiou, and Zoe Doulgeri. A variable admittance controller for human-robot manipulation of large inertia objects. In *2021 30th IEEE International Conference on Robot Human Interactive Communication (RO-MAN)*, pages 509–514, 2021
- c14. D. Papageorgiou and Z. Doulgeri. Learning by demonstration for constrained tasks*. In *2020 29th IEEE International Conference on Robot and Human Interactive Communication (RO-MAN)*, pages 1088–1093, 2020
- c13. D. Papageorgiou and Z. Doulgeri. A control scheme for haptic inspection and partial modification of kinematic behaviors. In *2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). Las Vegas, NV, USA, 2020*
- c12. Theodora Kastritsi, Iason Sarantopoulos, Sotiris Stavridis, Dimitrios Papageorgiou, and Zoe Doulgeri. Manipulation of a whole surgical tool within safe regions utilizing barrier artificial potentials. In *XV Mediterranean Conference on Medical and Biological Engineering and Computing – MEDICON 2019*, pages 1559–1570, Cham, 2020. Springer International Publishing
- c11. Fotios Dimeas, Theodora Kastritsi, Dimitris Papageorgiou, and Zoe Doulgeri. Progressive automation of periodic movements. In *Human-Friendly Robotics 2019*, pages 58–72, Cham, 2020. Springer International Publishing
- c10. Theodora Kastritsi, Dimitrios Papageorgiou, Iason Sarantopoulos, Zoe Doulgeri, and George Rovithakis. Stability of active constraints enforcement in sensitive regions defined by point-clouds for robotic surgical procedures. In *European Control Conference - ECC 2019*, 06 2019

- c09. Theodora Kastritsi, Dimitrios Papageorgiou, Iason Sarantopoulos, Sotiris Stavridis, Zoe Doulgeri, and George Rovithakis. Guaranteed active constraints enforcement on point cloud-approximated regions for surgical applications. In *Proceedings 2019 IEEE International Conference on Robotics and Automation. ICRA 2019.*, 05 2019
- c08. D. Papageorgiou, A. Sidiropoulos, and Z. Doulgeri. Sinc-based dynamic movement primitives for encoding point-to-point kinematic behaviors. In *2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 8339–8345, Oct 2018
- c07. Fotios Dimeas, Filippos Fotiadis, Dimitrios Papageorgiou, Antonis Sidiropoulos, and Zoe Doulgeri. Towards progressive automation of repetitive tasks through physical human-robot interaction. *Human-Friendly Robotics, Springer Proceedings in Advanced Robotics*, 2018
- c06. T. Kastritsi, D. Papageorgiou, and Z. Doulgeri. On the stability of robot kinesthetic guidance in the presence of active constraints. *2018 European Control Conference (ECC)*, pages 622–627, June 2018
- c05. [Best paper award] Yiannis Koveos, Dimitrios Papageorgiou, Stefanos Doltsinis, and Zoe Doulgeri. A fast robot deployment strategy for successful snap assembly. *2016 IEEE International Symposium on Robotics and Intelligent Sensors (IRIS)*, pages 80–85, 2016
- c04. Dimitrios Papageorgiou, Abdelrahem Atawnih, and Zoe Doulgeri. A passivity based control signal guaranteeing joint limit avoidance in redundant robots. *2016 24th Mediterranean Conference on Control and Automation (MED)*, pages 569–574, 2016
- c03. Dimitrios Papageorgiou, Ilias Katsoukis, George A. Rovithakis, and Zoe Doulgeri. Joint position tracking with prescribed performance of uncertain robotic manipulators using only joint position measurements. *2015 54th IEEE Conference on Decision and Control (CDC)*, pages 1503–1508, 2015
- c02. Dimitrios Papageorgiou and Zoe Doulgeri. A kinematic controller for human-robot handshaking using internal motion adaptation. *2015 IEEE International Conference on Robotics and Automation (ICRA)*, pages 5622–5627, 2015
- c01. Iason Sarantopoulos, Dimitrios Papageorgiou, and Zoe Doulgeri. Task-based variation of active compliance of arm/hand robots in physical human robot interactions. In *TAROS*, 2015