

# Dr Alexandros Philotheou

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I have 7+ years of hands-on experience in robotics which includes SLAM, [Localisation](#), [Autonomous Navigation](#), [Control](#), [Computer Vision](#), and general integration, problem-solving, and troubleshooting. These I have acquired in [real conditions with real robots](#) as well as in simulation, working for research projects funded by the European Commission and the Greek State, or through volunteering. I am proficient in ROS and ROS 2, but also MATLAB/Octave, all the while under Linux, which has been my primary OS since 2008. My primary coding language is [C++](#) and my secondary [Python](#).

I hold a [diploma](#) and a [PhD](#) in Electrical and Computer Engineering and I am qualified with a [Master's degree in Control and Robotics](#). I have deliberately chosen the academic  $\oplus$  software engineering path because I wanted to reconcile the two dominant types of engineers: the academic type whose coding boundary is MATLAB, and the software engineering type whose theoretic boundary remains in code.

It is my pleasure to document my motivation and contributions in a clear and concise manner that acknowledges my audience's existing knowledge with regard to [code](#), [presentations](#), [technical papers](#), or [tutorials](#). Most of all I enjoy being a member of a team and solving problems together with other people.

## Contents

- 1 [Work Experience](#)
- 2 [Experience in R&D Projects](#)
- 3 [Voluntary Experience](#)
- 4 [Education](#)
- 5 [Publications](#)
- 6 [Distinctions](#)
- 7 [Computer Skills](#)
- 8 [Languages](#)
- 9 [Links](#)
- 10 [References](#)

## Work Experience

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- 2023.09 – present    **Robotics Engineer**  
Center for Research and Technology Hellas (CERTH), Thessaloniki, Greece
- 2018.09 – 2023.03    **Robotics and Control Engineer**  
Aristotle University of Thessaloniki, Greece  
Electrical and Computer Engineering Department
- 2016.09 – 2016.11    **Teaching Assistant** · DD2380 Artificial Intelligence  
KTH Royal Institute of Technology, Stockholm, Sweden
- 2011.10 – 2012.03    **Database Designer**  
Egnatia Motorway S.A., Thessaloniki, Greece  
Design and implementation of a unified database, suitable for the needs of the Instrumental Landslide and Geotechnical Issues monitoring system, in the context of the European Research Program IRIS.
- 2011.03 – 2011.05    **Database Developer**  
Internship · Egnatia Motorway S.A., Thessaloniki, Greece  
Design, development and technical and user documentation of a system for data recovery and report-issuing from the company's bridge register using customizable criteria. The application was developed using ORACLE developer tools.
- 2008.07 – 2009.06    **Telecommunications Engineer**  
Hellenic Telecommunications Organisation (OTE S.A.) Thessaloniki, Greece  
Remote service in matters of local and wide area networks.

## Experience in R&D Projects

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- 2023.09 – present    **ROBETARME**  
*Center for Research and Technology Hellas (CERTH), Thessaloniki, Greece*  
Development of ROS packages for planning, scheduling, orchestrating and triggering ROS Noetic and ROS 2 Humble packages and other software, and their integration with Behaviour Trees. Integration onto three mobile platforms (two ROBOTNIK mobile bases and one trailer). Integration of in-house and third-party ROS Noetic and ROS 2 Humble packages. Work with 3D LIDARs, RGBD cameras, robot URDFs. Translation of custom interfaces between ROS 1 and ROS 2. Network configuration and troubleshooting for ROS 2 via DDS, Zenoh. Virtualisation via Docker. General software and hardware troubleshooting and integration. Documentation.
- 2020.04 – 2023.03    **CULTUREID**  
*Aristotle University of Thessaloniki, Greece*  
*Electrical and Computer Engineering Department*  
Development of ROS packages for mapping, localisation, navigation, visualisation (Tkinter). Integration onto one mobile platform (Turtlebot). Integration of RFID-related factory- and custom-built software and wrapping into ROS. General software and hardware troubleshooting and integration. Work with 2D LIDARs, RGBD cameras, RFID readers. Documentation.
- 2018.09 – 2021.08    **RELIEF**  
*Aristotle University of Thessaloniki, Greece*  
*Electrical and Computer Engineering Department*  
Development of ROS packages for mapping, localisation, navigation, and visualisation (Qt). Integration onto two mobile platforms (Turtlebot & Robotnik RB1). Integration of RFID-related factory- and custom-built software and wrapping into ROS. General software and hardware troubleshooting and integration. Work with 2D LIDARs, RGBD cameras, RFID readers. Documentation.

## Voluntary Experience

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- 2013.10 – 2014.07    **Computer Vision Engineer** · PANDORA Robotics Undergrad Team, Electrical and Computer Engineering Department, Aristotle University of Thessaloniki  
Design of the architecture, implementation and thorough documentation of the Hole Detection system of the PANDORA robot under ROS, using RGB+Depth sensors (Microsoft Kinect and ASUS Xtion) in the context of the conditions of the international RoboCup Rescue competition.

## Education

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- 2018.09 – 2023.06    **Doctorate**  
Aristotle University of Thessaloniki, Greece  
Electrical and Computer Engineering Department
- Thesis** · 2D LIDAR sensor pose estimation via scan-to-map-scan matching  
Advisor: Prof. Georgios Sergiadis, Department of Telecommunications  
Defended: 28/06/2023  
Committee: Georgios Sergiadis (AUTh), Andreas Symeonidis (AUTh), Traianos Yioultsis (AUTh), Zoe Doulgeri (AUTh), Nikolaos Fachantidis (UoM), Aggelos Bletsas (TUC), Anastasios Delopoulos (AUTh)
- 2015.09 – 2017.06    **Master of Science**  
KTH Royal Institute of Technology, Stockholm, Sweden  
School of Electrical Engineering  
Programme title: *Systems, Control, and Robotics*
- Thesis** · Robust Decentralized Control of Cooperative Multi-robot Systems:  
An inter-constraint Receding Horizon approach  
Advisor: Prof. Dimos Dimarogonas, Department of Automatic Control
- 2005.09 – 2013.07    **Diploma**  
Aristotle University of Thessaloniki, Greece  
Electrical and Computer Engineering Department  
GPA: 7.94/10.0  
Class rank: 23/280 – 92<sup>nd</sup> percentile
- Thesis** · Multi-label classification using Learning Classifier Systems  
Advisor: Prof. Pericles Mitkas, Department of Electronics and Computer Engineering  
Committee: Pericles Mitkas (AUTh), Anastasios Delopoulos (AUTh), Andreas Symeonidis (AUTh)

**Alexandros Filotheou**. “CBGL: Fast Monte Carlo Passive Global Localisation of 2D LIDAR Sensor”. In: *2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. 2024, pp. 3268–3275. doi: [10.1109/IROS58592.2024.10802235](#)

Anastasios Tzitzis, **Alexandros Filotheou**, Aristidis Raptopoulos Chatzistefanou, Traianos Yioultsis, and Antonis G. Dimitriou. “Real-Time Global Localization of a Mobile Robot by Exploiting RFID Technology”. In: *IEEE Journal of Radio Frequency Identification* (2023), pp. 1–1. issn: 2469-7281. doi: [10.1109/JRFID.2023.3288982](#). url: <https://ieeexplore.ieee.org/document/10160120/>

**Alexandros Filotheou**, Andreas L. Symeonidis, Georgios D. Sergiadis, and Antonis G. Dimitriou. “Correspondenceless scan-to-map-scan matching of 2D panoramic range scans”. In: *Array* 18 (July 2023), p. 100288. issn: 25900056. doi: [10.1016/j.array.2023.100288](#). url: <https://linkinghub.elsevier.com/retrieve/pii/S2590005623000139>

**Alexandros Filotheou**, Georgios D. Sergiadis, and Antonis G. Dimitriou. “FSM: Correspondenceless scan-matching of panoramic 2D range scans”. In: *2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. Oct. 2022, pp. 6968–6975. doi: [10.1109/IROS47612.2022.9981228](#)

**Alexandros Filotheou**. “Correspondenceless scan-to-map-scan matching of homororiented 2D scans for mobile robot localisation”. In: *Robotics and Autonomous Systems* 149 (Mar. 2022), p. 103957. issn: 09218890. doi: [10.1016/j.robot.2021.103957](#). url: <https://linkinghub.elsevier.com/retrieve/pii/S0921889021002323>

**Alexandros Filotheou**, Anastasios Tzitzis, Emmanouil Tsardoulas, Antonis Dimitriou, Andreas Symeonidis, George Sergiadis, and Loukas Petrou. “Passive Global Localisation of Mobile Robot via 2D Fourier-Mellin Invariant Matching”. In: *Journal of Intelligent & Robotic Systems* 104.2 (Feb. 2022), p. 26. issn: 0921-0296. doi: [10.1007/s10846-021-01535-7](#). url: <https://link.springer.com/10.1007/s10846-021-01535-7>

George Mylonopoulos, Aristidis Raptopoulos Chatzistefanou, **Alexandros Filotheou**, Anastasios Tzitzis, Stavroula Siachalou, and Antonis G. Dimitriou. “Localization, Tracking and Following a Moving Target by an RFID Equipped Robot”. In: *2021 IEEE International Conference on RFID Technology and Applications (RFID-TA)*. IEEE, Oct. 2021, pp. 32–35. isbn: 978-1-6654-2657-2. doi: [10.1109/RFID-TA53372.2021.9617436](#). url: <https://ieeexplore.ieee.org/document/9617436/>

Antonis Dimitriou, Anastasios Tzitzis, **Alexandros Filotheou**, Spyros Megalou, Stavroula Siachalou, Aristidis R. Chatzistefanou, Andreana Malama, Emmanouil Tsardoulas, Konstantinos Panayiotou, Evaggelos Giannelos, Thodoris Vasiliadis, Ioannis Mouroutsos, Ioannis Karanikas, Loukas Petrou, Andreas Symeonidis, John Sahalos, Traianos Yioultsis, and Aggelos Bletsas. “Autonomous Robots, Drones and Repeaters for Fast, Reliable, Low-Cost RFID Inventorying & Localization”. In: *2021 6th International Conference on Smart and Sustainable Technologies (SpliTech)*. IEEE, Sept. 2021, pp. 01–06. isbn: 978-953-290-112-2. doi: [10.23919/SpliTech52315.2021.9566425](#). url: <https://ieeexplore.ieee.org/document/9566425/>

**Alexandros Filotheou**, Emmanouil Tsardoulas, Antonis Dimitriou, Andreas Symeonidis, and Loukas Petrou. “Pose Selection and Feedback Methods in Tandem Combinations of Particle Filters with Scan-Matching for 2D Mobile Robot Localisation”. In: *Journal of Intelligent & Robotic Systems* 100.3-4 (Dec. 2020), pp. 925–944. issn: 0921-0296. doi: [10.1007/s10846-020-01253-6](#). url: <https://link.springer.com/10.1007/s10846-020-01253-6>

Anastasios Tzitzis, Spyros Megalou, Stavroula Siachalou, Tsardoulas G. Emmanouil, **Alexandros Filotheou**, Traianos V. Yioultsis, and Antonis G. Dimitriou. “Trajectory Planning of a Moving Robot Empowers 3D Localization of RFID Tags With a Single Antenna”. In: *IEEE Journal of Radio Frequency Identification* 4.4 (Dec. 2020), pp. 283–299. issn: 2469-7281. doi: [10.1109/JRFID.2020.3000332](#). url: <https://ieeexplore.ieee.org/document/9109328/>

Anastasios Tzitzis, **Alexandros Filotheou**, Stavroula Siachalou, Emmanouil Tsardoulis, Spyros Megalou, Aggelos Bletsas, Konstantinos Panayiotou, Andreas Symeonidis, Traianos Yioultsis, and Antonis G. Dimitriou. “Real-time 3D localization of RFID-tagged products by ground robots and drones with commercial off-the-shelf RFID equipment: Challenges and Solutions”. In: *2020 IEEE International Conference on RFID (RFID)*. IEEE, Sept. 2020, pp. 1–8. isbn: 978-1-7281-5576-0. doi: [10.1109/RFID49298.2020.9244904](https://doi.org/10.1109/RFID49298.2020.9244904). url: <https://ieeexplore.ieee.org/document/9244904/>

**Alexandros Filotheou**, Emmanouil Tsardoulis, Antonis Dimitriou, Andreas Symeonidis, and Loukas Petrou. “Quantitative and Qualitative Evaluation of ROS-Enabled Local and Global Planners in 2D Static Environments”. In: *Journal of Intelligent & Robotic Systems* 98.3-4 (June 2020), pp. 567–601. issn: 0921-0296. doi: [10.1007/s10846-019-01086-y](https://doi.org/10.1007/s10846-019-01086-y). url: <http://link.springer.com/10.1007/s10846-019-01086-y>

Anastasios Tzitzis, Spyros Megalou, Stavroula Siachalou, Traianos Yioultsis, Athanasios Kehagias, Emmanouil Tsardoulis, **Alexandros Filotheou**, Andreas Symeonidis, Loukas Petrou, and Antonis G. Dimitriou. “Phase ReLock - Localization of RFID Tags by a Moving Robot”. In: *2019 13th European Conference on Antennas and Propagation (EuCAP)*. 2019, pp. 1–5

Spyros Megalou, Anastasios Tzitzis, Stavroula Siachalou, Traianos Yioultsis, John Sahalos, Emmanouil Tsardoulis, **Alexandros Filotheou**, Andreas Symeonidis, Loukas Petrou, Aggelos Bletsas, and Antonis G. Dimitriou. “Fingerprinting Localization of RFID tags with Real-Time Performance-Assessment, using a Moving Robot”. In: *2019 13th European Conference on Antennas and Propagation (EuCAP)*. 2019, pp. 1–5

**Alexandros Filotheou**, Alexandros Nikou, and Dimos V. Dimarogonas. “Robust decentralised navigation of multi-agent systems with collision avoidance and connectivity maintenance using model predictive controllers”. In: *International Journal of Control* 93.6 (June 2020), pp. 1470–1484. issn: 0020-7179. doi: [10.1080/00207179.2018.1514129](https://doi.org/10.1080/00207179.2018.1514129). url: <https://www.tandfonline.com/doi/full/10.1080/00207179.2018.1514129>

**Alexandros Filotheou**, Alexandros Nikou, and Dimos V. Dimarogonas. “Decentralized Control of Uncertain Multi-Agent Systems with Connectivity Maintenance and Collision Avoidance”. In: *2018 European Control Conference (ECC)*. IEEE, June 2018, pp. 8–13. isbn: 978-3-9524-2698-2. doi: [10.23919/ECC.2018.8550343](https://doi.org/10.23919/ECC.2018.8550343). url: <https://ieeexplore.ieee.org/document/8550343/>

## Distinctions

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- 2016 Teaching Assistant, DD2380 - Artificial Intelligence, under the supervision of Professor Patric Jensfelt, KTH Royal Institute of Technology, Sweden
- 2015 2<sup>nd</sup> place in Autonomy class in RoboCup Rescue as member of PANDORA robotics team
- 2013 Ranked 30<sup>th</sup> in graduating class among 224 students who graduated in 2013, ECE, AUTH, Greece
- 2011 Top of my class in the course of Database Systems, winter semester 2010 – 2011, AUTH, Greece
- 2005 Ranked 21<sup>st</sup> in entering class among 280 students who enrolled in 2005, ECE, AUTH, Greece

## Computer Skills

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Languages	C/C++, Python, shell, MATLAB/Octave, {PL/}SQL, Java, Assembly
{Meta-}operating Systems	Linux, ROS
Graphics	AutoCAD, Gimp
Tools	git, Docker, OpenCV, Qt (cpp), Tkinter (py), Behavior Trees, L <sup>A</sup> T <sub>E</sub> X, Oracle Forms / Reports, Microsoft {Visio, Project, Office}
Control	MPC

## Languages

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English	Fluent - IELTS Score 8.5
Greek	Mother tongue

## Links

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Indicative publications:	<a href="#">[1]</a> <a href="#">[2]</a> <a href="#">[3]</a> — <a href="#">google scholar</a>
Indicative software packages:	<a href="#">cbgl</a> · <a href="#">fsm-lo</a> · <a href="#">lama-odom</a> · <a href="#">pvhd</a> — <a href="#">github</a>
Demos / videos:	<a href="#">cbgl</a> · <a href="#">cultureid</a> · <a href="#">fsm</a> · <a href="#">relief</a> · <a href="#">mpc</a>
	<a href="#">Portfolio</a>

## References

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Dr. Antonis Dimitriou · Coordinator of the projects for which I worked during my AUTH years  
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For a complete list of references, whether they be supervisors or coworkers, visit

<https://github.com/li9i/cv/tree/master/references>