Dr. Athanasios Polydoros

Position	Senior Lecturer in Robotics & Autonomous Systems	**Employer**	University of Lincoln
Address	Isaac Newton Building Brayford Pool Lincoln, UK	**Email** **Nationality** **Date of Birth**	apolydoros@lincoln.ac.uk Greek 29^{th} September 1987

Research Interests

Machine Learning	Bayesian Methods
Robot Learning	Learning from Demonstration
Reinforcement Learning	Industrial Robotics

Academic Positions

2022- Senior Lecturer in Robotics & Autonomous Systems - University of Lincoln, UK

2021- 2022 Lecturer in Robotics & Autonomous Systems - University of Lincoln, UK

2018- 2021 Postdoctoral Researcher and Assistant Lecturer - EPFL, Switzerland

2017- 2018 Postdoctoral Researcher - University of Innsbruck, AT

Education

2013-2017 Ph.D. Robot Learning -Aalborg University, DK

Thesis: *Online Learning of Industrial Manipulators' Dynamics Models*

2012-2013 M.Sc. Artificial Intelligence with Distinction - University of Edinburgh, UK

Thesis: *Effect of Internal Models on Self-organized Controllers*

2005-2011 Dip. Eng. Production Engineering - Democritus University of Thrace, GR

Thesis: *System modeling and pattern recognition using Hebbian Learning*

Research Projects

2025 - Principles of Learning from Unstructured Human-Robot Interactions

Funding: UK-RAS NetworkPlus
Role: Co-Principal Investigator
Duties: Research mentoring and supervision

2024 - Machine learning modeling and control of a greenhouse environment for production optimization

Funding: EPSRC Centre for Doctoral Training in Agri-Food Robotics: AgriFoRwArdS
Role: Principal Investigator
Duties: Research mentoring and supervision

2022 - Robot learning of strawberry harvesting from demonstrations

Funding: EPSRC Centre for Doctoral Training in Agri-Food Robotics: AgriFoRwArdS
Role: Principal Investigator
Duties: Research mentoring and supervision

2020 - 2021 SAHR – Modeling human learning skills for robot learning

Funding: EU ERC Advanced Grant
Role: Researcher
Duties: Learning latent spaces of dynamical systems from demonstrations

2019 -2020 SecondHands – Learning how to support human in industrial maintenance scenario

Funding: EU H2020
Role: Researcher
Duties: Learning latent spaces of dynamical systems from demonstrations

2018 -2019 Cogimon – Cognitive Interaction in Motion.

Funding: EU H2020
Role: Researcher
Duties: Learning latent spaces of dynamical systems

2017 -2018 FlexRoP – Flexible, assistive robot for the customized production.

Funding: FFG (Austria)
Role: Researcher
Duties: Learning from demonstration, Motion verification and optimization

2018 -2018 IMAGINE – Robots Understanding Their Actions by Imagining Their Effects

Funding: EU H2020
Role: Researcher
Duties: Optimization of actions via reinforcement learning

2013 -2017 STAMINA – Sustainable and Reliable Robotics for Part Handling in Manufacturing Automation

Funding: EU-FP7
Role: Researcher
Duties: Dynamics Model learning for control

Teaching & Supervision:

Courses:

2021- Advanced Robotics
M.Sc. in Robotics and Autonomous Systems
Credits: 15 – Students: 25
University of Lincoln, UK

2021- Autonomous Mobile Robots
B.Sc. in Computer Science et.al.
Credits: 15 – Students: 25
University of Lincoln, UK

2021- Programming Fundamentals
B.Sc. in Computer Science et.al.
Credits: 15 – Students: 200
University of Lincoln, UK

2018-2020 Applied Machine Learning
M.Sc. in Robotics et.al.
ECTS: 4 – Students: 250
EPFL, Switzerland

2018 Machine Learning Programming
M.Sc. in Robotics et.al.
ECTS: 2 – Students: 100
EPFL, Switzerland

2017 Autonomous & Intelligent Systems
B.Sc. Computer Science
ECTS: 2 – Students: 30
University of Innsbruck, Austria

Guest Lectures:

2020 Gaussian Processes for Regression, Classification and Dimensionality Reduction
M.Sc. Robotics – EPFL, Switzerland

2017 Odometry for Intelligent Robots
B.Sc. Computer Science – University of Innsbruck, Austria

2015 - 2016 Introduction to Data Mining & Machine Learning
M.Sc Global System Design – Aalborg University, Denmark

2016 Programming Universal Robots with URmat
M.Sc. Global Systems Design – Aalborg University, Denmark

2015 Introduction to Matlab
M.Sc Global System Design – Aalborg University, Denmark

Supervision:

2024 – Emmanuel Soumo, Ph.D. Project
University of Lincoln

2022 – Emlyn Williams, Ph.D. Project
University of Lincoln

2014 – Multiple Students' B.Sc and M.Sc Theses,
University of Lincoln, EPFL, Aalborg University

Publications

Journals

[J1] Harish Ravichandar, Athanasios S. Polydoros, Sonia Chernova, and Aude Billard. Robot learning from demonstration: A review of recent advances. *Annual Review of Control, Robotics, and Autonomous Systems*, page In Press, 2019.

[J2] Athanasios S Polydoros and Lazaros Nalpantidis. Survey of model-based reinforcement learning: Applications on robotics. *Journal of Intelligent & Robotic Systems*, 86(2):153–173, 2017.

[J3] George A Papakostas, Dimitris E Koulouriotis, Athanasios S Polydoros, and Vassilios D Tourassis. Towards hebbian learning of fuzzy cognitive maps in pattern classification problems. *Expert Systems with Applications*, 39(12):10620–10629, 2012.

Conferences & Workshops

[C4] Liyou Zhou, Oleg Sinavski, and Athanasios Polydoros. Robotic learning in your backyard: A neural simulator from open source components. In *2024 Eighth IEEE International Conference on Robotic Computing (IRC)*, pages 131–138. IEEE, 2024.

[C5] Emlyn Williams and Athanasios Polydoros. Pretrained visual representations in reinforcement learning. In *Annual Conference Towards Autonomous Robotic Systems*, pages 60–71. Springer, 2024.

[C6] Jordi Spranger, Roxana Buzatoiu, Athanasios Polydoros, Lazaros Nalpantidis, and Evangelos Boukas. Human-machine interface for remote training of robot tasks. In *2018 IEEE International Conference on Imaging Systems and Techniques (IST)*, pages 1–5. IEEE, 2018.

[C7] Athanasios S Polydoros, Evangelos Boukas, and Lazaros Nalpantidis. Online multi-target learning of inverse dynamics models for computed-torque control of compliant manipulators. In *Intelligent Robots and Systems (IROS), 2017 IEEE/RSJ International Conference on*, pages 4716–4722. IEEE, 2017.

[C8] Evangelos Boukas, Athanasios S Polydoros, Gianfranco Visentin, Lazaros Nalpantidis, and Antonios Gasteratos. Global localization for future space exploration rovers. In *International Conference on Computer Vision Systems*, pages 86–98. Springer, 2017.

[C9] Athanasios S Polydoros and Lazaros Nalpantidis. A reservoir computing approach for learning forward dynamics of industrial manipulators. In *Intelligent Robots and Systems (IROS), 2016 IEEE/RSJ International Conference on*, pages 612–618. IEEE, 2016.

[C10] Athanasios S Polydoros, Bjarne Grossmann, Francisco Rovida, Lazaros Nalpantidis, and Volker Kruger. Accurate and versatile automation of industrial kitting operations with SkiROS,. In *17th Conference Towards Autonomous Robotic Systems (TAROS), (Sheffield, UK)*, 2016.

[C11] Athanasios S Polydoros, Lazaros Nalpantidis, and Volker Kruger. Real-time deep learning of robotic manipulator inverse dynamics. In *Intelligent Robots and Systems (IROS), 2015 IEEE/RSJ International Conference on*, pages 3442–3448. IEEE, 2015.

[C12] Athanasios S Polydoros, Lazaros Nalpantidis, and Volker Krüger. Advantages and limitations of reservoir computing on model learning for robot control. In *2nd International Workshop on Machine Learning for Planning and Control, IROS Hamburg*, 2015.

[C13] Athanasios Polydoros, Lazaros Nalpantidis, and Volker Krüger. Towards an intelligent robotic manipulator for industrial object-placing tasks. In *International Workshop on Intelligent Robot Assistants*, 2014.

[C14] Athanasios S Polydoros, Lazaros Nalpantidis, and Volker Krüger. A roadmap towards intelligent and autonomous object manipulation for assembly tasks. In *International workshop on Autonomous Grasping and Manipulation, ICRA*, 2014.

[C15] Smith C Simon, Athanasios S Polydoros, and J M Herrmann. Internal models for self-organized robotic behavior. In *Seventh International Workshop on Guided Self-Organization*. University of Freiburg, Germany, 2014.

[C16] George A Papakostas, Athanasios S Polydoros, Dimitris E Koulouriotis, and Vasileios D Tourassis. Training fuzzy cognitive maps by using hebbian learning algorithms: a comparative study. In *Fuzzy Systems (FUZZ), 2011 IEEE International Conference on*, pages 851–858. IEEE, 2011.

Book Chapters

[B17] Francesco Rovida, Matthew Crosby, Dirk Holz, Athanasios S Polydoros, Bjarne Großmann, Ronald PA Petrick, and Volker Krüger. SkiROS—a skill-based robot control platform on top of ROS. In *Robot Operating System (ROS)*, pages 121–160. Springer, 2017.

[B18] GA Papakostas, AS Polydoros, DE Koulouriotis, and VD Tourassis. Evolutionary feature subset selection for pattern recognition applications. INTECH Open Access Publisher, 2011.

Theses

[T19] Athanasios S. Polydoros. *"Online Learning of Industrial Manipulators' Dynamics Models.* Ph.d. dissertation, 2017.

[T20] Athanasios S. Polydoros. *Effect of Internal Models on Homeokinetic Controlled Autonomous Robots, M.Sc. Thesis.* M.sc. thesis, 2013.

[T21] Athanasios S. Polydoros. *Learning Fuzzy Cognitive Maps by Using Hebbian Learning Algorithms in System Modeling and Pattern Recognition.* B.sc thesis, 2011.

Reviewer

Journals:

IEEE Robotics and Automation Letters (RAL)
Autonomous Robots (AURO)
Engineering Applications of Artificial Intelligence
Electronics Letters (IET)
Big Data

Conferences:

IEEE International Conference on Intelligent Robotics and Systems (IROS)
IEEE International Conference on Robotics and Automation (ICRA)
Conference on Robot Learning (CoRL)

Referees

Available on request