Erica Salvato, Assistant Professor (non tenure track)

Department of Engineering and Architecture, University of Trieste, Trieste, Italy.

📱 +39 3407005922

✉ erica.salvato@dia.units.it
ⓘD 0000-0003-3815-6652
🐦 @EricaSalvato1
🌐 https://ericasalvato.github.io/
in https://www.linkedin.com/in/erica-salvato-7b9a6712a/

Education

2018 – 2022	**Ph.D. Industrial and Information Engineering**, Department of Engineering and Architecture, University of Trieste, Italy. Thesis title: *Reinforcement Learning for Real World Dynamical Systems: Applications and Limitations.* Advisor: *Prof. Felice Andrea Pellegrino* Co-advisor: *Prof. Eric Medvet*
2015 – 2018	**M.Sc. Electrical and Systems Engineering**, Department of Engineering and Architecture, University of Trieste, Italy. Thesis title: *Reinforcement Learning for Robotics: a case study.* Advisor: *Prof. Felice Andrea Pellegrino* Co-advisor: *Dr. Gianfranco Fenu*
2009 – 2015	**B.Sc. Electronic Engineering**, Department of Engineering, University of Messina, Italy. Thesis title: *UDOO-based environmental monitoring system.* Advisor: *Prof. Nicola Donato* Co-advisor: *Dr. Jiaran Zhang*

Research statement

My research interests are focused on the development of model-free learning-based tools for the control of cybernetic systems. The increasing demand for autonomous systems underscores the necessity for approaches that empower machines to autonomously execute tasks without human intervention. Traditional control methods typically rely on a precise model of the process under control. However, constructing and identifying such models can be resource-intensive.

Control systems professionals are well aware that a substantial portion of the overall costs in advanced control projects is associated with the modeling process. Consequently, the automatic synthesis of control algorithms, complete with integrated validation and verification, stands out as a pivotal challenge in the field of control.

In the pursuit of addressing this challenge, my doctoral research specifically delved into reinforcement learning (RL) as a potent control tool for real-world dynamic systems. Real-world activities are inherently characterized by nonlinear dynamics, often involving diverse, interconnected, and interdependent processes influenced by unpredictable random factors. RL, as a model-free control technique, emerges as a well-suited solution for tackling such intricate problems, aligning with the broader spectrum of learning-based control approaches tailored for dynamic systems.

Keywords

Data Driven Control: Willems' Lemma based approaches - Reinforcement Learning - Model Free Control.

Automation and control systems: Model Predictive Control - Optimal control - Relatively Optimal Control - State observers.

Robotics: Robot Control - Robotics Simulators - Visual servoing - Hand guiding - Singularity Avoidance - Redundant Manipulators.

Research Positions

February 2023 – January 2026	**Assistant Professor (non-tenure track)**, Department of Engineering and Architecture, University of Trieste, Italy. Funded by *Interconnected Nord-Est Innovation Ecosystem (iNEST)* - PNRR M4C2 - CUP: J43C22000320006.
November 2021 – January 2023	**PostDoc Research Fellow**, Department of Engineering and Architecture, University of Trieste, Italy. Funded by grant no. 2017YKXYXJ: PRIN on *Monitoring and Control Underpinning the Energy-Aware Factory of the Future: Novel Methodologies and Industrial Validation.*
September 2022 – December 2022	**Visiting Researcher**, Department of Electrical and Electronic Engineering, Imperial College of London, United Kingdom.
November 2018 – October 2021	**Doctoral Research Fellow**, Department of Engineering and Architecture, University of Trieste, Italy. Funded by the Italian Ministry of University and Research (MIUR).
October 2017 – October 2018	**Master Thesis Internship**, Industrial Automation Lab, Department of Engineering and Architecture, University of Trieste, Italy.
October 2014 – July 2015	**Bachelor Thesis Internship**, Laboratory of electronics of sensors and transduction systems (LESST), Department of Engineering, University of Messina, Italy.

Teaching Activities

Courses

Since 2023/2024 A.Y.	**holder** of the course *Data-driven and Learning-based Control* (6 CFU, 1st year of the Curriculum *Robotics and Artificial Intelligence* of the Master degree in *Electronical and Computer Engineering*) of the University of Trieste.
	holder of a portion of the course *Simulation Intelligence and Learning for Autonomous Systems* (3 of 6 CFU, 2nd year of the Curriculum *Data Science and Artificial Intelligence for Industry and Cyber-Physical Systems* of the Master degree in *Data Science and Artificial Intelligence*) of the University of Trieste.

Seminars

25 January 2023	**Seminar Lecturer** on "Reinforcement Learning on Real-World Dynamical Systems" at the University of Trieste for the Master's Degree in "Data Science and Scientific Computing" coordinated by Prof. Luca Bortolussi, Department of Mathematics and Geoscience, University of Trieste, Italy.

19 December 2019	**Seminar Lecturer** on "An introduction to RL and the reality gap problem" at the University of Trieste for the "Machine Learning" class held by Prof. Eric Medvet, Department of Engineering and Architecture, University of Trieste, Italy.
16 October 2019	**Seminar Lecturer** on "Model Predictive Control of Glucose Concentration Based on Signal Temporal Logic Specifications with Unknown-Meals Occurrence" at the University of Trieste for the Master's Degree in "Data Science and Scientific Computing" coordinated by Prof. Luca Bortolussi, Department of Mathematics and Geoscience, University of Trieste, Italy.

Supervision and co-supervision

since 2022	Co-advisor for several master and undergraduate theses in the fields of my scientific activities.
since 2023	Supervisor of PhD students currently pursuing their theses:

- Debella Kaleab Yared

Co-supervisor of PhD students currently pursuing their theses:

- Demessie Henock Yared

Services

Since 2023	**Member of the Evaluation board** for the access to the Master degree in *"Data Science and Artificial Intelligence"*, Department of Mathematics, Informatics and Geosciences, University of Trieste, Italy.
Since 2021	**Member of Examination Panel** for the *"Fundamentals of automatic control"* class, Department of Engineering and Architecture, University of Trieste, Italy.

Scientific Training Activities

Courses and Schools Attended

13 – 17 July 2020	3-rd Advanced Course on Data Science & Machine Learning, Siena, Italy.
3 – 10 June 2020	Model Predictive Control course, held by Prof. Alberto Bemporad, IMT Lucca, Italy.
20 – 23 April 2020	Brain Computer Interface Spring School, g.tec (https://www.gtec.at/spring-school-2020/).
12 – 23 November 2018	Winter-school on Quantitative Systems Biology: Learning and Artificial at the International Center on Theoretical Physics Abdus Salam (ICTP), Trieste, Italy.
27 February – 3 March 2017	Winter-school on Power Electronics & Application at Infineon Technologies, Villach, Austria.

National and International Collaborations

since 2022	**University of Cyprus** (CY), KIOS Research and Innovation Centre of Excellence (CY) - Dr. Panayiotis Kolios

National Research Council (CNR) of Italy (IT), Information & Systems Engineering Group at IEIIT - Prof. Fabrizio D'Abbene

Imperial College of London (UK), Department of Electrical and Electronic Engineering - Dr. Hamed Rezaee.

University of Trento (IT), Department of Industrial Engineering - Dr. Giulia Giordano.

since 2021 **University of Udine** (IT), Department of Mathematical and Physical Sciences - Prof. Franco Blanchini.

Jozef Stefan Institute (SI), Department for Automation, Biocybernetics and Robotics - Dr. Andrej Gams

Ohio State University (US), Department of Electrical and Computer Engineering - Dr. Arnob Ghosh.

Glance Vision Technologies S.r.l. Trieste (IT) - Prof. Felice Andrea Pellegrino, Dr. Walter Vanzella.

since 2019 **Elettra Sincrotrone Trieste** (IT), Information Technology group - Eng. Marco Lonza, Dr. Giulio Gaio.

since 2018 **University of Trieste** (IT), Department of Engineering and Architecture - Prof. Eric Medvet.

Contribution to Research Grants

since February 2023   **PNRR iNEST (Interconnected North-Est Innovation Ecosystem) funded by the European Union Next-GenerationEU**: Piano Nazionale di Ripresa e Resilienza (PNRR) – Missione 4 Componente 2, Investimento 1.5 – D.D. 1058 23/06/2022, ECS_00000043.

November 2021 - January 2023   **Monitoring and Control Underpinning the Energy-Aware Factory of the Future: Novel Methodologies and Industrial Validation**: 2017 Program for Research Projects of National Interest (PRIN), Grant n°. 2017YKXYXJ.

2019   **Pattern Recognition Applied to Home Appliances**: CUP n° J96C18000410007 sponsored by Electrolux S.p.a.

Conference Speaker

International

2023   The 22nd World Congress of the International Federation of Automatic Control, Yokohama, Japan.
Model-free cable robot control.
21-st IEEE European Control Conference (ECC), Bucharest, Romania.
Data-driven dynamic relatively optimal control.

2022   20-th IEEE European Control Conference (ECC), London, United Kingdom.
Closed-loop control from data-driven open-loop optimal control trajectories.

2021   44-th International Convention on Information, Communication and Electronic Technology (MIPRO), Opatija, Croatia.
Characterization of modeling errors affecting performances of a robotics deep reinforcement learning controller in a sim-to-real transfer

2019   6-th International Conference on Control, Decision and Information Technologies (CoDIT), Paris, France.
Model predictive control of glucose concentration based on signal temporal logic specifications.

2015   International Conference on Applications in Electronics Pervading Industry (ApplePies), Environment and Society, University La Sapienza, Roma, Italy.
Udoo-based environmental monitoring system.

National

2023   Conference of the Italian Society of Lecturers and Researchers in Automatics (Automatica.it), Catania, Italy.
Model-Free Plant Tuning for Robust Position-Based Visual Servoing.

2022   Conference of the Italian Society of Lecturers and Researchers in Automatics (Automatica.it), Cagliari, Italy.
Data-driven dynamic relatively optimal control.

2021   Conference of the Italian Society of Lecturers and Researchers in Automatics (Automatica.it), Catania, Italy.
Control of a mixed autonomy signalised urban intersection: an action-delayed reinforcement learning approach.

2019   Conference of the Italian Society of Lecturers and Researchers in Automatics (Automatica.it), Ancona, Italy.
Model predictive control of glucose concentration based on signal temporal logic specifications with unknown-meals occurrence.

Services for Professional Societies

Associate editor

European Control Association (EUCA) Conference Editorial Board (since August 2023).

Session Co-Chair

Co-Chair of the session on *Switched and Hybrid Systems* held at the 2022 IEEE European Control Conference (ECC 2022).

Chair of the session on *Applications in control engineering at the Automatica.it conference.*

Organizer

Member of Operating Team at the 6th IEEE International Conference on Control Technology and Applications (CCTA 2022).

Member of the Program Committee

Didamatica (2020).

Member of the Technical Committee

Automatica.it (since 2023 `http://automatica2023.unict.it/`).

Reviewer

Systems & Control Letters

IFAC: Nonlinear Analysis: Hybrid Systems (NAHS)

IEEE/ASME Transactions on Mechatronics,

IEEE Access,

IEEE Control Systems Letters (L-CSS),

IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS),

IEEE International Conference on Development and Learning (ICDL),

IEEE Conference on Decision and Control (CDC),

European Control Conference (ECC),

American Control Conference (ACC),

IEEE Conference on Control Technology and Applications (CCTA).

Full Publications List

The full list of publications is available at `https://ericasalvato.github.io/publications/`

Skills

Languages	Italian (mother tongue), English (fluent).
Coding	MATLAB, Simulink, Python (Numpy, Gym, PyTorch), Julia, CoppeliaSim, Arduino IDE, R, LaTeX.

Bibliometric Information (up to January, 8, 2024)

Scopus
- Documents by author: 17,
- Total Citations: 100,
- h-index: 5,

Scopus author identifier: 57211158383
`https://www.scopus.com/authid/detail.uri?authorId=57211158383`

Google Scholar
- Documents by author: 18,
- Total Citations: 180,
- h-index: 5,

`https://scholar.google.com/citations?user=M5dI7usAAAAJ&hl=it`

Privacy

Autorizzo il trattamento dei dati personali contenuti nel mio curriculum vitae ai sensi del Decreto Legislativo 30 giugno 2003, n. 196 "Codice in materia di protezione dei dati personali", e del GDPR (Regolamento UE 2016/679) relativo alla protezione delle persone fisiche riguardo al trattamento dei dati personali.