Indro Spinelli
Curriculum Vitae

General Information

Full Name	Indro Spinelli	**Date of Birth**	
Phone		**Place of Birth**	
Address		**Citizenship**	
E-mail	spinelli@di.uniroma1.it	**Languages**	Italian (native) English (fluent) Spanish (basic)
Site	https://spindro.github.io/		
Google Scholar	https://scholar.google.com/citations?user=0glmB_UAAAAJ		

Education

2017	BSc in Engineering in Computer Science, Department of Computer, Control and Management Engineering (DIAG) Sapienza University of Rome, Grade: 109/110 Thesis: PLVS: An Open-Source RBG-D and Stereo SLAM System
2017	Doctoral School TRADR EU FP7: Long-Term Human-Robot Teaming for Disaster Response
2019	MSc in Artificial Intellige and Robotics Department of Computer, Control and Management Engineering (DIAG) Sapienza University of Rome, Grade: 110 cum laude/110 Thesis: Graph Neural Networks for Missing Data Imputation
2023	PhD in Information and Communication Technologies Department of Information Engineering, Electronics and Telecommunications (DIET) Sapienza University of Rome Research: Graph Machine Learning, Fairness, Explainability Advisors: Profs. Aurelio Uncini and Simone Scardapane Examiners: Profs. Cesare Alippi (Polimi,USI) and Alessio Micheli (UniPi)
01/04/22-01/06/22	Visiting Scholar at the University of Tromsø (Norway) Host: Prof. Filippo Maria Bianchi, Department of Mathematics and Statistics

Career

05/04/23-Ongoing	Assistant professor / Ricercatore a Tempo Determinato di Tipo A Sapienza University of Rome Research: Generative AI for Virtual Humans, Representation Learning for Robotic Perception, Planning and Action, Trustworthy Hyperbolic Representation Learning Contact: Prof. Fabio Galasso

24/02/23-04/04/23	Postdoctoral Fellow INFN: Istituto Nazionale di Fisica Nucleare Research: Explainability and interpretability methods for Artificial Intelligence models for high energy physics PIs: Profs. Cecilia Voena and Simone Scardapane
15/11/22-23/02/23	Doctoral/Postdoctoral Fellow CINI: Consorzio Interuniversitario Nazionale per l'Informatica Research: Development of algorithms in Python for high-dimensional data analysis (audio and graphs), analysis of relevant metrics, deployment of developed models. Contact: Prof. Simone Scardapane

Research Contracts

01/12/22-01/02/23	Sapienza University of Rome / CINI: Consorzio Interuniversitario Nazionale per l'Informatica Development of speech processing algorithms using deep learning, with focus on self-supervised techniques
01/10/21-01/12/21	Sapienza University of Rome / DeepLab Development of speech processing algorithms using deep learning.
01/04/20-01/05/20	Sapienza University of Rome / EU Horizon 2020 SecondHands Implementation of Schmidt-EKF for 3D Visual-Inertial SLAM

Participations in Program Committee and Reviewing

Journal Editor	The Visual Computer Springer
Guest Editor	Algorithms MDPI, Special Issue Deep Learning for Anomaly Detection
Workshop Organizer	Beyond Euclidean: Hyperbolic & Hyperspherical Learning for Computer Vision, in conjunction with European Conference on Computer Vision (ECCV) 2024
Area Chair	International Conference on Image Analysis and Processing (ICIAP) 2025
Reviewer	Conferences: NeurIPS24, ICLR24, ECCV24, CVPR24, AISTATS23, AAAI23, Journals: IEEE TNNLS and TAI, Elsevier Neural Networks and Neurocomputing

Teaching

A.A. 2024/2025	Fundamentals of Data Science and Laboratory 6CFU MSc in Data Science Sapienza University of Rome
A.A. 2023/2024	Artificial Intelligence and Machine Learning Unit 1 6CFU BSc in Applied Computer Science and Artificial Intelligence Sapienza University of Rome

A.A. 2022/2023	Introduction to Computer Programming 3 CFU BSc in Management in Computer Science LUISS Guido Carli
A.A. 2022/2023	Artificial Intelligence and Machine Learning 3 CFU BSc in Management in Computer Science LUISS Guido Carli

Awards and Honours

2023	Winner of the Topological Deep Learning challenge organized by the workshop on Topology, Algebra, and Geometry in Machine Learning held in conjunction with the 40th International Conference on Machine Learning (ICML)
2018	Honours program Sapienza University of Rome (approx. 2k€)

Membership

2024-Ongoing	Member of the European Laboratory for Learning and Intelligent Systems (ELLIS)
2023-Ongoing	Member of the PhD of the Department of Computer Science PhD committee.

Participation in Research Groups

2023-Ongoing	Perception and Intelligence Laboratory (PINlab) Sapienza University of Rome DI Participation in the international research collaborations:

- University of Darmstadt (Germany) on Large Language Model (LLMs) Augmented Reinforcement learning policies for robotics manipulation.
- Technion – Israel Institute of Technology (Israel) on In-scene retrieval augmented human motion generation.
- FBK and University of Padua (Italy) on Robotic social navigation in household environments.
- Télécom Paris (France) on Unsupervised Domain Adaptation for event-based vision.

2019-2023	Intelligent Signal Processing And MultiMedia (ISPAMM) laboratory Sapienza University of Rome DIET Participation in the international research collaborations:

- MUCCA Project CHIST-ERA-19-XAI-009. Explainable Machine Learning-based Artificial Intelligence (XAI)
- University of Oxford (England) on Topological Deep Learning.

2017-2018	Alcor Laboratory Sapienza University of Rome DIAG Participation in the international research projects: • TRADR: Long-Term Human-Robot Teaming for Disaster Response European research project funded by the EU FP7 programme • Second Hands a robot assistant for industrial environments project founded by the EU Horizon 2020 programme

Funding Information

2024-2026	Principal Investigator of Sapienza University of Rome Research Unit for the project *Intelligenza Artificiale in sistemi RAdar (IARA)* Innovation Grant awarded by the Future Artificial Intelligence Research Foundation (FAIR) PNRR MUR project. Grant Value: 275.415,00€

Advising

PhD Co-Advisor	XXXVIII Dottorato Nazionale in Intelligenza Artificiale with Prof. Galasso M. Pappa (Human-Centric Generative Modeling), S. D'Arrigo (Computer Vision for Human Security and Understanding)
Thesis Advisor	MSc in Data Science M. Candi (LLM-Based Fast Code Translation, KPMG), L. Mignella (GenAI for Business Strategy, BIP) BSc in Applied Computer Science and Artificial Intelligence L. Delle Vergini (Hyperbolic Unlearning), C. Bianchi (Hyperbolic Calibration) MSc Honours Program in Computer Science F. Palandra (Retrieval Augmented Human Motion Generation)

Selected Talks

2023	Trustworthy graph neural networks,*Learning on Graph Conference Meetup* Guest lecture in geometric deep learning, *Luiss*
2022	Fairness in graph neural networks, *Università della Svizzera Italiana* Graph and geometric deep learning, *Enel Third Global Data Meetup*
2021	Graph machine learning, *Roma Tre University*

Participation as a Presenter

2024	International Conference on Representation Learning (ICLR) European Conference on Computer Vision (ECCV)
2023	European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning (ESANN)

Research activities

Generative AI for Virtual Humans	My goal is to be able to control virtual humans in simulated environments to allow the safe training of human-robot interaction policies. In collaborating work with Prof. Galasso and scientists at the PINlab, we have worked towards high-fidelity generations considering the time at our disposal, and we are currently working towards the integration of the movements into 3D scenes where multiple actors are present by conditioning the generation on both textual descriptors and scene representations.
Representation Learning for Robotic Perception, Planning and Action	With this line of research, I aim to enhance robotic policies and planning capabilities by leveraging Large Language Models (LLMs) to provide "common knowledge", which can be used to derive social norms essential for safe interactions. With the PINLab, we studied the effect of distilling these norms directly from humans' trajectories and extrapolating patterns during the robot's deployment from its past actions. Now, we are working with TU Darmstadt on a dynamic memory of the past action to retain for in-context learning and provide a performance boost during deployment.
Trustworthy Hyperbolic Representation Learning	Hyperbolic representations offer two advantages: they perform effectively in lower-dimensional spaces and create a structured latent space where the distance from the center correlates with representation confidence. My ongoing research with the PINlab and undergraduate students focuses on exploring this confidence metric and its relationship to prediction confidence, aiming to enhance the trustworthiness of model predictions. Additionally, the efficiency of hyperbolic neural networks in lower dimensionality makes them particularly well-suited for deployment in robotic agents, where both compactness and reliability are crucial.

Metrics	Google Scholar	Scopus	General	
Journals	9	9	**Period of reference**	01/09/20-20/08/24
Conferences	3	1	**Journal Editor**	1
Workshops	3	2	**Area Chair**	1
Book chapters	1	1	**PI-Foundings**	275.415,00€
Preprints	5	0	**PhD Students**	2
Total Citations	597	280	**Undergrad. Students**	5
Average Citations	28.4	21.5	**Courses**	4
Hirsch (H) index	7	6	**Total Impact Factor**	63
Normalized H-index*	1.4	1.2	**Normalized IF***	12.6

*Divided by the academic seniority from MSc graduation (5 years).

20/08/24

Selected Publications (12) *Pages refers to the file "pubblicazioni.pdf"*

Length-Aware Motion Synthesis via Latent Diffusion
Alessio Sampieri, Alessio Palma, **Indro Spinelli,** Fabio Galasso
In Proc. of the European Conference on Computer Vision (ECCV) 2024
CORE rank: A* - Citations: 0 (Scopus) 0 (Google Scholar)
Pages 1-16

From latent graph to latent topology inference: Differentiable cell complex module
Claudio Battiloro*, **Indro Spinelli***, Lev Telyatnikov, Michael Bronstein, Simone Scardapane, Paolo Di Lorenzo
In Proc of the International Conference on Representation Learning (ICLR) 2024
CORE rank: A* - Citations: 1 (Scopus) 11 (Google Scholar)
Pages 17-38

ICML 2023 Topological Deep Learning Challenge: Design and Results
Matilde Papillon, **Indro Spinelli** et al.
In Proc. of 2nd Annual Workshop on Topology, Algebra, and Geometry in Machine Learning (TAG-ML)
Citations: 1 (Scopus) 11 (Google Scholar)
Pages 39-44

Interpreting Black-Box Models: A Review on Explainable Artificial Intelligence
Vikas Hassija, Vinay Chamola, Atmesh Mahapatra, Abhinandan Singal, Divyansh Goel, Kaizhu Huang, Simone Scardapane, **Indro Spinelli**, Mufti Mahmud, Amir Hussain
Cognitive Computation Elsevier 2024
IF 4.3; Q1 (WOS) - Citations 88 (Scopus) 174 (Google Scholar)
Pages 45-74

Machine un-learning: an overview of techniques, applications, and future directions,
Siva Sai, Uday Mittal, Vinay Chamola, Kaizhu Huang, **Indro Spinelli**, Simone Scardapane, Zhiyuan Tan, Amir Hussain
Cognitive Computation Elsevier 2024
IF 4.3; Q1 (WOS) - Citations 0 (Scopus) 3 (Google Scholar)
Pages 75-99

Drop Edges and Adapt: a Fairness Enforcing Fine-tuning for Graph Neural Networks
Indro Spinelli, Riccardo Bianchini, Simone Scardapane
Neural Networks Elsevier 2023
IF 6; Quartile Q1 (WOS) - Citations: 1 (Scopus) 3 (Google Scholar)
Pages 100-108

Reidentification of objecs from aerial photos with hybrid Siamese neural networks
Alessio Devoto, **Indro Spinelli**, Francesca Murabito, Fabrizio Chiovoloni, Riccardo Musmeci, Simone Scardapane
IEEE Transactions on Industrial Informatics 2023
IF 11.7; Quartile Q1 (WOS) - Citations: 2 (Scopus) 11 (Google Scholar)
Pages 109-117

A Meta-Learning Approach for Training Explainable Graph Neural Networks
Indro Spinelli, Simone Scardapane, Aurelio Uncini
IEEE Transactions on Neural Networks and Learning Systems 2022
IF 10.2; Quartile Q1(WOS) - Citations: 7 (Scopus) 22 (Google Scholar)
Pages 118-126

Fairdrop: Biased edge dropout for enhancing fairness in graph representation learning

Indro Spinelli, Simone Scardapane, Amir Hussain, Aurelio Uncini

IEEE Transactions on Artificial Intelligence 2021

IF 7.3; Quartile Q1 (Resurcify) - Citations: 32 (Scopus) 106 (Google Scholar)

Pages 127-137

Adaptive propagation graph convolutional network

Indro Spinelli, Simone Scardapane, Aurelio Uncini

IEEE Transactions on Neural Networks and Learning Systems   2021

IF 10.2; Quartile Q1 (WOS) - Citations: 44 (Scopus) 86 (Google Scholar)

Pages 138-143

Distributed Training of Graph Convolutional Networks

Simone Scardapane, **Indro Spinelli**, Paolo Di Lorenzo

IEEE Transactions on Signal and Information Processing over Networks 2020

IF 3; Quartile Q2 (WOS) - Citations: 17 (Scopus) 34 (Google Scholar)

Pages 144-157

Missing data imputation with adversarially-trained graph convolutional networks

Indro Spinelli, Simone Scardapane, Aurelio Uncini

Neural Networks Elsevier 2020

IF 6; Quartile Q1 (WOS) - Citations: 84 (Scopus) 138 (Google Scholar)

Pages 158-169

All Publications

PhD Thesis

Towards Trustworthy Graph Neural Networks 2023

Conferences

Length-Aware Motion Synthesis via Latent Diffusion
Alessio Sampieri, Alessio Palma, **Indro Spinelli,** Fabio Galasso
To appear In Proc. of the European Conference on Computer Vision (ECCV) 2024

OVOSE: Open-Vocabulary Semantic Segmentation in Event-Based Cameras
Muhammad Rameez Ur Rahman, Jhony H. Giraldo, Indro Spinelli, Stéphane Lathuilière, Fabio Galasso
To appear In Proc. of the International Conference on Pattern Recognition (ICPR) 2024

From latent graph to latent topology inference: Differentiable cell complex module
Claudio Battiloro*, **Indro Spinelli***, Lev Telyatnikov, Michael Bronstein, Simone Scardapane, Paolo Di Lorenzo
In Proc. of the International Conference on Representation Learning (ICLR) 2024

Combining Stochastic Explainers and Subgraph Neural Networks can Increase Expressivity and Interpretability
Indro Spinelli, Michele Guerra, Filippo Maria Bianchi, Simone Scardapane
In Proc. of European Symposium on Artificial Neural Networks, Computational Intelligence and
Machine Learning (ESANN) 2023

Workshops

ICML 2023 Topological Deep Learning Challenge: Design and Results
Matilde Papillon, **Indro Spinelli** et al.
In Proc. of 2nd Annual Workshop on Topology, Algebra, and Geometry in Machine Learning (TAG-ML)

Explainability in subgraphs-enhanced Graph Neural Networks
Michele Guerra, **Indro Spinelli,** Simone Scardapane, Filippo Maria Bianchi
In Proc. of the Northern Lights Deep Learning Workshop NLDL 2023

ArcheoWeedNet: Weed Classification in the Parco archeologico del Colosseo
Gaetano Saurio, Marco Muscas, **Indro Spinelli,** Valerio Rughetti, Irma Della Giovampaola, Simone Scardapane
In Proc. of the International Conference on Image Analysis and Processing Workshops, ICIAP 2023

Journals

Interpreting Black-Box Models: A Review on Explainable Artificial Intelligence
Vikas Hassija, Vinay Chamola, Atmesh Mahapatra, Abhinandan Singal, Divyansh Goel, Kaizhu Huang, Simone Scardapane, **Indro Spinelli**, Mufti Mahmud, Amir Hussain
Cognitive Computation Elsevier 2024

Machine un-learning: an overview of techniques, applications, and future directions,
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IEEE Transactions on Industrial Informatics 2023

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IEEE Transactions on Neural Networks and Learning Systems 2022

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IEEE Transactions on Artificial Intelligence 2021

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Indro Spinelli, Simone Scardapane, Aurelio Uncini
IEEE Transactions on Neural Networks and Learning Systems   2021

Distributed Training of Graph Convolutional Networks
Simone Scardapane, **Indro Spinelli**, Paolo Di Lorenzo
IEEE Transactions on Signal and Information Processing over Networks 2020

Missing data imputation with adversarially-trained graph convolutional networks
Indro Spinelli, Simone Scardapane, Aurelio Uncini
Neural Networks Elsevier 2020

Book Chapters

Efficient data augmentation using graph imputation neural networks
Indro Spinelli, Simone Scardapane, Michele Scarpiniti, Aurelio Uncini
Progresses in Artificial Intelligence and Neural Systems 2020