The 11th International Conference on Machine Learning, Optimization, and Data Science – LOD 2025

5th Advanced Course on Artificial Intelligence & Neuroscience – ACAIN 2025

A Conference and a Course in a single Interdisciplinary Residential Event in the Era of Artificial Intelligence

Riva del Sole Resort & SPA – Castiglione della Pescaia (Grosseto) Tuscany, Italy
21 – 24 September 2025

https://lod2025.icas.events **https://acain2025.icas.events**
lod@icas.cc **acain@icas.cc**

Schedule Ver. 2.0 (8 pages) – September 15

	Sun, 21 Sept	Mon, 22 Sept	Tue, 23 Sept	Wed, 24 Sept
09:00 – 09:50	Yi Ma	Pierre Baldi	Floris Geerts	Oral Session 6
09:50 – 10:40	Sam Buchanan	Pierre Baldi	Floris Geerts	
10:40 – 11:20	Coffee break	Coffee break	Coffee break	Oral Session 7
11:20 – 12:10	Sam Buchanan	Pierre Baldi	Floris Geerts	
12:10 – 13:00	Sam Buchanan	Raniero Romagnoli	Panos Pardalos	
13:00 – 15:00	Lunch	Lunch	Lunch	Lunch
15:00 – 15:50	Oral Session 1	Qing Qu	Mario Guarracino	Oral Session 8
15:50 – 16:40		Qing Qu	Oral Session 4	
16:40 – 17:20	Coffee break	Qing Qu	Coffee break	Coffee break
17:20 – 18:10	Oral Session 2	Sven Giesselbach	Oral Session 5	Oral Session 9
18:10 – 19:00	Yi Ma	Sven Giesselbach		
19:00 – 19:50	Yi Ma	Oral Session 3		
20:00	Dinner	Dinner	Dinner	Social Dinner*

Steering Committee:
Giuseppe Nicosia, *University of Catania, Italy*
Panos Pardalos, *University of Florida, USA*

General Chairs:
Emanuele La Malfa, *University of Oxford, UK*
Renato Umeton, *Dana-Farber Cancer Institute, MIT & Harvard T.H. Chan School of Public Health, USA*

Program Chairs:
Sven Giesselbach, *T-Systems International, Germany*
Gabriele La Malfa, *King's College London, UK*
Giuseppe Nicosia, *University of Catania, Italy*
Varun Ojha, *Newcastle University, UK*
Panos Pardalos, *University of Florida, USA*

Keynote Speakers
Panos, Pardalos, *University of Florida, USA*
"Introduction to Data Analytics for Networks – a Historical Perspective and Major Advances"
Mario Guarracino, University of Cassino and Southern Lazio, Italy
"Embedding Nodes and Whole Graphs: A Statistical View on Learning from Networked Data"
Chair: Sven Giesselbach (Tue, 23 Sept 12:10–13:00 & 15:00–15:50, Conference Room: The Crown)

LECTURERS:
Pierre Baldi, *University of California, Irvine, CA, USA*
Sam Buchanan, *Toyota Technological Institute at Chicago, USA*
Floris Geerts, *University of Antwerp, Belgium*
Sven Giesselbach, *Fraunhofer Institute - IAIS, Germany & Telecom Systems*
Yi Ma, *University of California, Berkeley, USA*
Qing Qu, *University of Michigan, USA*
Raniero Romagnoli, *Almawave SpA, Italy*

Lectures

Pierre Baldi, *University of California, Irvine, CA, USA*
Lecture 1/3 *"The AI-driven Hospital of the Future"*
Lecture 2/3 *"Foundations of Attention Mechanisms and Transformers"*
Lecture 3/3 *"AI Safety: Challenges and Solutions"*

Sam Buchanan, *Toyota Technological Institute at Chicago, USA*
Lecture 1/3 "*Learning Low-Dimensional Linear and Independent Structures* "
Lecture 2/3 "*Pursuing General Low-Dimensional Structures via Denoising*"
Lecture 3/3 "*Pursuing General Low-Dimensional Structures via Compression*"

Floris Geerts, *University of Antwerp, Belgium*
Lecture 1/3 *"Foundations of GNN Expressiveness"*
Lecture 2/3 *"Beyond Standard GNNs: Increasing Expressiveness"*
Lecture 3/3 *"Expressiveness of GNNs in Practice"*

Sven Giesselbach, *Fraunhofer Institute - IAIS, Germany & Telecom Systems*
Lecture 1/2 *"From Large Language Models to Reasoning Models"*
Lecture 2/2 *"Multi-Agent System"*

Yi Ma, *University of California, Berkeley, USA*
Lecture 1/3 "*History and Principles of Intelligence*"
Lecture 2/3 "*Self-Consistent Learning of Low-Dimensional Structures*"
Lecture 3/3 "*Future Directions for Machine Intelligence"*

***Qing Qu**, University of Michigan, USA*
Lecture 1/3 "*Harnessing Low Dimensionality in Diffusion Models – Generalizability"*
Lecture 2/3 "*Harnessing Low Dimensionality in Diffusion Models – Controllability"*
Lecture 3/3 "*Harnessing Low Dimensionality in Diffusion Models – AI For Science"*

Raniero Romagnoli, *Almawave SpA, Italy*
Lecture TBA
Topics: Large Language Models, Generative AI, AI.

Useful Information

1. **Registration**: *Sept 20 @ 15:30 – 19:30* (in the foyer of the conference centre near The Crown conference room). Inside the Riva del Sole it is mandatory to wear the badge.

2. Conference Room: **The Crown** (in the conference centre of the Riva del Sole Resort & SPA, number 7 on the resort map).

3. **Very Important**: *during lessons and Q&A sessions, absolute silence is recommended, you must not make noise, you must not disturb the Lecturer during the lesson or while she/he is answering questions posed by the audience.*

4. **Group Photo:** *Sept 22 @ 13:00 Meeting point: terrace adjacent to the restaurant.*

5. **Resort Map** and **Castiglione della Pescaia Map**.

6. **Each presenter must bring their own laptop/tablet/device** (with an HDMI port) **to give the presentation**.

7. Participants who need to take an **exam/project/oral to have the 8 ECTS** credited are asked to email info@icas.cc and Prof. Nicosia giuseppe.nicosia.1@gmail.com ***Please read the FAQ section "ETCS Credits Recognition"***

8. Inside Riva del Sole Resort & SPA, **badges must be worn at all times**.

9. **For social dinner on the Sept 24, we advise everyone **to dress up** (jacket and tie, suit, etc.).*

10. **Certificates** will be given out on the last day of the course. To receive the certificate you must have at least 85% of class attendance (we have CNNs/Transformers to compute and infer attendance ;-).

11. One last thing do not forget bathing suits, sunscreen, and stay hydrated.

"But don't you see that the whole trouble lies here? In words, words. Each one of us has within him a whole world of things, each man of us his own special world. And how can we ever come to an understanding if I put in the words, I utter the sense and value of things as I see them; while you who listen to me must inevitably translate them according to the conception of things each one of you has within himself. We think we understand each other, but we never really do."

Luigi Pirandello, Six Characters in Search of an Author.

Oral Session 1, Sun Sept 21, 15:00 – 16:40. Conference Room: Da Vinci
Chair: Varun Ojha

15:00 – 15:15 Joan Salvà Soler & Günther Raidl, *"A Denoising Diffusion-Based Evolutionary Algorithm Framework Demonstrated on the Maximum Independent Set Problem"*

15:15 – 15:30 Oscar Araque, Lorenzo Gatti, Sergio Consoli & Kyriaki Kalimeri, *"LML: A Novel Lexicon for the Moral Foundation of Liberty"*

15:30 – 15:45 Hugh Adams, Srijoni Majumdar & Evangelos Pournaras,*"Fair Compromises in Participatory Budgeting: a Multi-Agent Deep Reinforcement Learning Approach"*

15:45 – 16:00 Reilly Pickard, Finn Wredenhagen, Julio DeJesus & Yuri Lawryshyn, *"Hedging American Put Options with Deep Reinforcement Learning"*

16:00 – 16:15 Lorenzo Bertolini, Valentin Comte, Mario Ceresa & Sergio Consoli, *"PreDA: Prefix-Based Dream Reports Annotation with Generative Language Models"*

16:15 – 16:30 Lorenz Wendlinger, Christian Braun, Abdullah Al Zubaer, Simon Alexander Nonn, Sarah Großkopf, Christofer Fellicious & Michael Granitzer, *"On the Suitability of pre-trained foundational LLMs for Analysis in German Legal Education"*

16:30 – 16:45 Daniel Sikar, Artur D'Avila Garcez & Tillman Weyde, *"Explorations of the Softmax Space: Knowing When the Neural Network Doesn't Know"*

Oral Session 2, Sun Sept 21, 17:20 – 18:10. Conference Room: Da Vinci
Chair: Sven Giesselbach

17:20 – 17:35 Felix Grün, Muhammad Saif-Ur-Rehmann, Tobias Glasmachers & Ioannis Iossifidis, *"Invariance to Quantile Selection in Distributional Continuous Control"*

17:35 – 17:50 Johannes Varga, Günther Raidl & Tobias Rodemann, *"Learning to Predict User Replies in Interactive Job Scheduling"*

17:50 – 18:05 Ketcha Jarod, Carletti Timoteo & Giambagli Lorenzo, *"Convolution Neural Networks in the spectral domain"*

18:05 – 18:20 Mert Alagözlü, *"Incremental Learning and Reward Shaping Strategies for Deep Reinforcement Learning upon CVRP"*

Oral Session 3, Mon Sept 22, 19:00 – 20:00. Conference Room: Da Vinci
Chair: Sven Giesselbach
LOD Oral Presentation Only (No Proceedings)

19:00 – 19:15 Vera Kurkova & Marcello Sanguineti, *"Networks with Finite VC Dimension: Pro and Contra"*

19:15 – 19:30 Yavar Taheri Yeganeh, Mohsen A Jafari & Andrea Matta, *"Deep Active Inference Agents for Delayed and Long-Horizon Environments"*

19:30 – 19: 45 Hamid Mousavi & Jörg Lücke, *"Linear and Non-linear Generative Models for 'Zero-Shot' Image Denoising in the Limit of Few Photons"*

Oral Session 4, Tue Sept 23, 15:50 – 16:40. Conference Room: Da Vinci
Chair: Emanuele La Malfa

LOD Presentations via Zoom

15:50 – 16:05 Maria Tomasso & Apan Qasem, *"Time-Series Analysis of Agent-Based Models: Three Case Studies" ZOOM*

16:05 – 16:20 Vaishnavi Kukkala, Hema Sai Kaja, Sahithi Kantu & Khaled Sayed, *"Brain Tumor Detection Using Xception Network and Machine Learning Classifiers for Resource-Efficient Clinical Implementation" ZOOM*

16:20 – 16:35 Anahit Sargsyan, Hridoy Sankar Dutta & Jürgen Pfeffer, *"Half-life of Youtube News Videos: Diffusion Dynamics and Predictive Factors" ZOOM*

16:35 – 16:50 Vincenzo Miracula, Giovanni Giuffrida, Calogero Zarba &Massimo Brignoli, *"EQUA: An AI-Based Approach for Accessing Eurostat Open Data Through Natural Language Queries" ZOOM*

16:50 – 17:05 Soodeh Habibi, Efthyvoulos Drousiotis, Alessandro Varsi & Simon Maskell, *"Minimum Error Resampling" ZOOM*

17:05 – 17:20 Tarek Salhi & John Woodward, *"ZeroTune 2.0: Enhanced Meta-Parameter Selection and Optuna Integration for Zero-Shot Hyperparameter Optimisation" ZOOM*

Oral Session 5, Tue Sept 23 17:20 – 20:00. Conference Room: Da Vinci
Chair: Varun Ojha

17:20 – 17:35 Alex Robertson, Huizhi Liang & Judith Harrison, *"MemoryChat: Leveraging Large Language Models as Conversational Agents to Transform the Cognitive Assessment in Dementia Care"*

17:35 – 17:50 Sergio Consoli, Pietro Coletti, Peter Markov, Lia Orfei, Indaco Biazzo, Lea Schuh, Nicolas Stefanovitch, Lorenzo Bertolini, Mario Ceresa & Nikolaos I. Stilianakis*, "Semantic Services for Knowledge Graphs Exploration in Event-Based Epidemic Surveillance"*

17:50 – 18:05 Vedat Dogan, Barry O'Sullivan and Steven Prestwich, *"A Risk-Averse Approach for the Leader in Multi-objective Bilevel Optimization"*

18:05 – 18:20 Samuel García, Sergio Consoli, Lorenzo Bertolini, Mario Ceresa & Maribel Acosta*, "Assessing Large Language Models Reliability in Relation Extraction: An Analysis on Text Processing and Prompting"*

18:20 – 18:35 Ehsan Alyian, José Almeida, Steffen Limmer, Sérgio Ramos & João Soares, *"Adaptive Large Neighborhood Search for Optimal Clustering of Prosumers into Energy Communities"*

18:35 – 18:50 Atefeh Gooran Orimi, Tarek El Ouni, Rayen Hamlaoui, Marco Jordine, Chrisitan Backe, Veit Briken & Roland Lachmayer, *"Synthetic Field Data Generation Using Deep Generative Models"*

18:50 – 19:05 Simon Hakenes & Tobias Glasmachers, *"Deep Reinforcement Learning Based Navigation with Macro Actions and Topological Maps"*

19:05 – 19:20 Hurdson Araujo, Theophile Mounier, Ehsan Aliyan, Sergio Ramos, Hector Quintian Pardo, Ruben Romero & Joao Soares*, "Contracted Power Optimization for Industrial Energy Consumers in Spain"*

19:20 – 19:35 Mickael Basson & Philippe Preux, *"Improving Diffusion Models for the Traveling Salesman Problem (TSP) by Leveraging the Structure of the Solution Space"*

19:35 – 19:50 Emmanuel Osei-Brefo, Manish Bhardwaj, Huizhy Liang, Yong Zhang, Sharon Scott & Zahid Qayyum, *"KMagent: A Multi-agent Large Language Model-Based Knowledge Management Platform for Product Innovation"*

19:50 – 20:05 Valerio Bellandi & Stefano Siccardi, *"From Text to Event Graphs: Exploring NLP and LLM Methods for Event Extraction"*

Oral Session 6, Wed Sept 24 9:00 – 11:45. Conference Room: Da Vinci
Chair: Varun Ojha

09:00 – 09:15 Carlos Fernández & Stephan Clémençon, *"Anomaly Detection based on Markov Data: A Statistical Depth Approach"*

09:15 – 09:30 Laurenz Tomandl, Maria Bresich, Günther Raidl, Yi Mei, Steffen Limmer & Tobias Rodemann, *"A Reinforcement Learning Guided Large Neighborhood Search for the Dynamic Electric Autonomous Dial-a-Ride Problem"*

09:30 – 09:45 Linus Ekstrøm, Takafumi Hosogi, Xavier Bonet-Monroig, Hao Wang, Sebastian Schmitt & Thomas Bäck, *"Improving Quantum Multi-Objective Optimization with Archiving and Substitution"*

09:45 – 10:00 Akasha-Leonie Kessel, Sven Groppe, Dominik Röpert & Jinghua Groppe, *"AI-Supported Analysis and Classification of Digitized Botanical Collections"*

10:00 – 10:15 T.Y. Emmy Lai, Héctor Allende-Cid, Sven Giesselbach & Stefan Rüping, *"Towards Multi-Agent Systems in Requirements Engineering: A Proof-of-Concept Study Using Large Language Models"*

10:15 – 10:30 Frédéric Dambreville & Sidonie Lefebvre*, "Optimizing Permutation-invariant Criterion with Law-Smooth Cross-Entropy Method: Application to Spectral Band Selection for Anomaly Detection"*

10:30 – 10:45 Mahdi Mohammadigohari, Giuseppe Di Fatta, Giuseppe Nicosia and Panos M Pardalos, *"On the Koopman-Based Generalization Bounds for Multi-task Deep Learning"*

Oral Session 7, Wed Sept 24 11:45 – 13:00. Conference Room: Da Vinci
Chair: Emanuele La Malfa

LOD Presentations via Zoom

10:45 – 11:00 Sally Ismail, Margarita Anastassova, Mehdi Boukallel, Christian Bolzmacher & Mehdi Ammi, *"Leveraging spectrogram-based pre-trained models for cross-dataset speaker-independent dysarthria severity classification" ZOOM*

11:00 – 11:15 Jean-David Collard & Erick Stattner*, "Deep Reinforcement Learning for Collaborative Parking Search Optimization" ZOOM*

11:15 – 11:30 Efthyvoulos Drousiotis, Soodeh Habibi, Alessandro Varsi, Simon Maskell & Paul Spirakis, *"Hyperparameter Optimization for Bayesian Decision Trees" ZOOM*

11:30 – 11:45 Giacomo Savazzi, Eugenio Lomurno, Cristian Sbrolli, Agnese Chiatti & Matteo Matteucci, *"Neuro-Symbolic Scene Graph Conditioning for Synthetic Image Dataset Generation" ZOOM*

11:45 – 12:00 Vanni Zavarella, Lorenzo Bertolini, Sergio Consoli, Gianni Fenu, Diego Reforgiato Recupero & Alessandro Zani*, "An Interactive Dashboard for Exploring Patient-Reported Drug-Condition Relations" ZOOM*

12:00 – 12:15 Batul Mankada & Sanatan Sukhija, *"TRANSFORM-X: Transfer via Feature Correspondence" ZOOM*

12:15 – 12:30 Stephan Clémençon, Florian Lamalle & Anne Sabourin, *"Predictive Learning in Survival Analysis by Empirical Maximization of Harrell's Concordance Index" ZOOM*

12:30 – 12:45 Stephan Lehmler, Muhammad Saif-Ur-Rehman, Tobias Glasmachers & Ioannis Iossifidis, *"Distributional properties of ReLU-activations in Artificial Neural Networks that learn by memorization" ZOOM*

12:45 – 13:00 Nicholas Malott, Anurag Yadav & Philip Wilsey, *"Incremental Critical Cells for Homology Characterization" ZOOM*

Oral Session 8, Wed Sept 24 15:00 – 16:40. Conference Room: Da Vinci
Chair: Emanuele La Malfa

15:00 – 15:15 Larbi Kharroubi, Hichem Maaref & Vincent Vigneron, *"Automatic Rule-Tuning of a Sugeno FIS using the mini-JEAN Architecture for Inverted Pendulum Control" ZOOM*

15:15 – 15:30 Gabriele Romano, Selene Perazzini & Giorgio Gnecco*, "Filling gaps in motion capture data: A comparison of three statistical methods" ZOOM*

15:30 – 15:45 Brian D. Bernhardt, Chiara Marciano & Mario Rosario Guarracino, *"GraphSAGEnES: A Graph Neural Network Designed for Graphs with Low Feature Discriminability" ZOOM*

15:45 – 16:00 Bhaskar Dhariyal, Heitor Ganzeli, Krzysztof Maslak and Dinesh Wijekoon, *"Real or not? A Practitioner's Perspective on Unsupervised Multivariate Time Series Anomaly Detection in Cloud Systems" ZOOM*

16:00 – 16:15 Janina Lütke Stockdiek, Britta Grimme, Marie Griesbach & Christian Grimme, *"Out of Order: On the Importance of Word Positions in Explaining Text Classification" ZOOM*

16:15 – 16:30 Kexin Zheng, Thomy Phan, Sven Koenig & T. K. Satish Kumar, *"A FastMap-Based Encoder-Decoder Architecture and Its Applications" ZOOM*

Oral Session 9, Wed Sept 24 17:20 – 20:00. Conference Room: Da Vinci
Chair: Varun Ojha & Emanuele La Malfa

17:20 – 17:35 Amaury Capmas-Pernet, Christian Musso, Frédéric Dambreville, David-Tomline Michel & Matthieu Valla, *"Physics-informed machine learning for reconstruction of wind turbulence with wind lida"*

17:35 – 17:50 Tom Maus, Asma Atamna & Tobias Glasmachers, *"Leveraging Genetic Algorithms for Efficient Demonstration Generation in Real-World Reinforcement Learning Environments"*

17:50 – 18:05 Maria Bresich, Günther Raidl, Caspian Coleman, Pascal Welke & Steffen Limmer, *"Search Space Reduction Through Machine Learning for the Electric Autonomous Dial-A-Ride Problem"*

18:05 – 18:20 Emmanuel Charleson Dapaah & Jens Grabowski, *"Empirical Evidence for Data-Centric AI: A Comparative Study of Data Complexity and Hyperparameter Effects"*

18:20 – 18:35 Jan Pijálek, Karel Vlk & Ondřej Bojar, *"MEEDAV: A Synchronous Web Viewer for EEG, Eye-Tracking and Speech Data"*

18:35 – 18:50 Sahar Qaadan, Yasmin Alhendawy, Abdullah Ahmed, Aiman Alshare, Alexander Popp & Benedikt Schmuelling, *"Interpretable PINNs for SOH Estimation in LFP Batteries"*

18:50 – 19:05 Aline Xavier Fidêncio, Felix Grün, Christian Klaes & Ioannis Iossifidis*, "Performance boundaries for brain-computer interfaces using error-related potentials and reinforcement learning"*

19:05 – 19:20 Mahdi Mohammadigohari, Giuseppe Di Fatta, Giuseppe Nicosia & Panos M Pardalos, *"Operator-Based Generalization Bound for Deep Learning: Insights on Multi-Task Learning with Norm Constrained"*

"Those who have an eye find what they are looking for even with their eyes closed"
Italo Calvino