

8th Advanced Course on Data science & machine Learning – ACDL 2025

from Deep Learning to Generative Artificial Intelligence

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

9 – 13 June 2025

<https://acdl2025.icas.events/>

lod@icas.cc

Schedule Final Ver. (6 pages) May 13

	Mon, 9 June	Tue, 10 June	Wed, 11 June	Thu, 12 June	Fri, 13 June
09:00 – 09:50	S. Arora	S. Kambhampati	S. Dieleman	Free time	Oral Session
09:50 – 10:40	C. Gulcehre	Arora	S. Kambhampati		Poster Session
10:40 – 11:20	Coffee break	Coffee break	Coffee break		
11:20 – 12:10	S. Arora	B. Perozzi	J. Z. Leibo		
12:10 – 13:00	B. Perozzi	C. Gulcehre	V. Sciacca		F. Zanzotto
13:00 – 15:00	Lunch	Lunch	Lunch	Lunch	Lunch
15:00 – 15:50	P. Pardalos	Free time	S. Kambhampati	F. Buciuni, F. Wolenski	Lei Li
15:50 – 16:40	B. Perozzi		J. Z. Leibo	D. Perna, D. Preti	Lei Li
16:40 – 17:20	Coffee break		Coffee break	Coffee break	Coffee break
17:20 – 18:10	L. Tupikina		S. Dieleman	Tatsu Hashimoto	Lei Li
18:10 – 19:00	C. Gulcehre		S. Dieleman	Tatsu Hashimoto	Lei Li
19:00 – 19:50	L. Tupikina		J. Z. Leibo	Tatsu Hashimoto	Lei Li
20:00	Dinner	Dinner	Dinner	Dinner	Social Dinner*



8th Advanced Course on Data Science & Machine Learning

From Deep Learning to
Generative Artificial Intelligence

Directors

Giuseppe Nicosia / University of Catania, Italy

Panos Pardalos / University of Florida, USA

Tutorial Speakers

Francesco Buciuni, Federico Wolenski, Diego Perna & David Preti / Almwave Spa, Italy

Lecturers

Sanjeev Arora / Princeton University & Institute for Advanced Study, USA

Sander Dieleman / Google DeepMind, London, UK

Caglar Gulcehre / EPFL, Switzerland

Tatsu Hashimoto / Stanford University & Institute for Human-Centered Artificial Intelligence, USA

Subbarao Kambhampati / Arizona State University, USA

Joel Z. Leibo / Google DeepMind London & The Alan Turing Institute, UK

Lei Li / Language Technology Institute - Carnegie Mellon University, USA

Panos Pardalos / University of Florida, USA

Bryan Perozzi / Google Research, New York, USA

Raniero Romagnoli / Almwave, Italy

Liubov Tupikina / Bell Labs Paris, France

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Riva del Sole Resort & SPA - Tuscany - Italy
June 9-13, 2025

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Lectures

Sanjeev Arora, Princeton University & Institute for Advanced Study, USA

Lecture 1/3 “Just a stochastic parrot? How LLMs Learn, Reason, and Self-Improve”

Lecture 2/3 “A Skill-based view of LLM capabilities and their emergence”

Lecture 3/3 “LLM Metacognition: Eliciting and Leveraging LLMs’ “Thinking about Thinking” ”

Sander Dieleman, Google DeepMind London, UK

Lecture 1/3 “Diffusion models: Intuition and Perspectives”

Lecture 2/3 “Diffusion models: Guidance, Distillation and Advanced Topics”

Lecture 3/3 “How to Train Neural Nets Effectively”

Caglar Gulcehre, EPFL, Switzerland

Lecture 1/3 “Fine-Tuning Language Models”

Lecture 2/3 “Reinforcement Learning for Language Models”

Lecture 3/3 “Applications: Alignment for Safety and Reasoning for Scientific Discovery”

Tatsu Hashimoto, Stanford University & Institute for Human-Centered Artificial Intelligence, USA

Lecture 1/3 “Large Language Models I (Architecture)”

Lecture 2/3 “Large Language Models II (Systems)”

Lecture 3/3 “Large Language Models III (Scaling, Post-Training)”

Subbarao Kambhampati, Arizona State University, USA

Lecture 1/3 “Reasoning and Planning Abilities of the Large Language Models I”

Lecture 2/3 “Reasoning and Planning Abilities of the Large Language Models II”

Lecture 3/3 “Reasoning and Planning Abilities of the Large Language Models II”

Joel Z. Leibo, Google DeepMind London & The Alan Turing Institute, UK

Lecture 1/3 “Multi-Agent Deep Reinforcement Learning”

Lecture 2/3 “Cooperative AI”

Lecture 3/3 “Generative Agents”

Lei Li, Language Technology Institute - Carnegie Mellon University, USA

Lecture 1/5 “Scalable Post-Training Optimization for Large Language Models”

Lecture 2/5 “Scaling Strategic Reasoning for Large Language Models”

Lecture 3/5 “The Science of Evaluation for Large Language Models”

Lecture 4/5 “Accelerating Transformer Language Models on GPUs”

Lecture 5/5 “Real-time Simultaneous Translation of Unbounded Streaming Speech”

Panos Pardalos, University of Florida, USA

Lecture: “Introduction to Data Analytics for Networks – a Historical Perspective and Major Advances”

Bryan Perozzi, Google Research, New York, USA

Lecture 1/3 “Learning on Graphs: The Essentials”

Lecture 2/3 “Challenges of using Graph Neural Networks”

Lecture 3/3 “Graph Reasoning with Large Language Models”

Vincenzo Sciacca, Almayave, Italy

Talk: “Enterprise AI in Practice: Challenges, Requirements, and Use Cases”

Liubov Tupikina, Bell Labs Paris, France

Talks: “On some Challenges of Embeddings Theory”

Fabio Zanzotto, University of Rome Tor Vergata, Italy

Talk: “Memorization or Generalization? Exploring Transformer-based Large Language Models and introducing the MeMo perspective”

Tutorial Speakers: Francesco Buciuni, F. Wolenski, D. Perna, D. Preti, Almayave, Italy

“LLM Training in Practice: The Velvet Experience”

Useful Information

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

Registration: *June 8 @ 16:30 – 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.

Group Photo: *Monday June 9 @ 13:00 Meeting point: terrace adjacent to the restaurant.*

Certificates will be given out on the last day of the course.

* For the *social dinner on the 13th*, we advise everyone **to dress up** (jacket and tie, suit, etc.).

1. **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.*
2. **Resort Map, Castiglione della Pescaia Map,** and **ACDL 2025 Poster.**
3. In the program you will find the list of **accepted abstracts**. The **Oral Session** will be held on **Fri, June 13 @ 9:00-10:40**, the **Poster Session** will be held on **Fri, 13 June @ 11:20-13:00**. The Poster Session will be held in the **Da Vinci Conference Room** (first floor of the Congress Centre, number 6 on the resort map). *Those who have problems and cannot make the poster, please send us an email now, deadline by June 3rd.*
 - a. We recommend preparing and printing a poster of **size B0** (1000 × 1414 mm or 39.4 × 55.7 inches) in VERTICAL orientation on the board (avoid landscape orientation). If for some reason the B0 size is not possible, then use the A0 size (841 mm x 1189 mm, or 33.1 inches x 46.8 inches).
 - b. **It is not possible to print posters at the course venue. When you arrive at the course venue the posters must already be printed.**
 - c. The Conference Organisers will provide all necessary supplies for mounting the posters (tape, etc).
 - d. *The poster boards will be ready each morning from 08:45.* All presenters are asked to hang their posters as soon as possible in the same morning of their assigned poster session. This way all delegates will be able to study them ahead of the poster session and come prepared with specific questions. Presenters are also asked to remove their posters at the end of the session. Any poster left unmanned on its poster boards after the poster session will be removed.
4. Obviously, *we recommend bringing your work laptop/tablet.*
5. Participants who need to take an **exam/project/oral to have the 8 ECTS** credited are asked to email acdl@icas.cc and Prof. Nicosia giuseppe.nicosia.1@gmail.com **Please read the FAQ section “ETCS Credits Recognition”**
6. Inside Riva del Sole, **badges must be worn at all times.**
7. *For dinner on the 13th, we advise everyone to dress up (jacket and tie, suit, etc.).*
8. **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 ;-).
9. 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.

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Oral Session

Friday, 13 June @ 9:00-10:40 Oral Session

“HoloMoCap: A Low-Cost Augmented Reality Motion Capture Application for HoloLens”

Silvia Zaccardi, Vrije Universiteit Brussel, Belgium

“A Combined Reinforcement Learning and Optimization framework for Agricultural Drone Routing”

Francesco Paolo Saccomanno, Università della Calabria, Italy

“Bridging Machine Learning and Particle Physics with Event Tokenization and Next-Token Prediction for Anomaly Detection at the LHC”, Ambre Visive, Nikhef - University of Amsterdam, The Netherlands

“Flexibility-conditioned protein structure design with flow matching”

Vsevolod Viliuga, Stockholm University & SciLifeLab, Sweden

“Hypergraph Motifs Representation Learning”

Valerio Di Pasquale, Università degli Studi di Salerno, Italy

“InfoClus: Informative Clustering of High-dimensional Data Embeddings”

Fuyin Lai, Ghent University, Belgium

“Quantum-inspired Embeddings Projection and Similarity Metrics for Representation Learning”

Maximilian Kiefer-Emmanouilidis, RPTU Kaiserslautern-Landau, Germany

“Spatio-temporal trends in plant biodiversity from opportunistic data: navigating through biases with machine learning”

Raphaël BENERRADI, INRIA, France

“Towards a curriculum for neural networks to simulate symbolic arithmetic”

Samuel Lozano Iglesias, Universidad Complutense de Madrid, Spain

“Biomechanical Impact of Neuromusculoskeletal Impairments on Wheelchair Propulsion in Daily Tasks”

Seyedeh Hiva Houshyar Yazdian, Vrije Universiteit Brussel, Belgium

Poster Session

Friday, 13 June @ 11:20-13:00 Poster Session (Da Vinci Conf Room, 1st floor of the Congress Centre, number 6 on the resort map).

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“Biomechanical Impact of Neuromusculoskeletal Impairments on Wheelchair Propulsion in Daily Tasks”

Seyedeh Hiva Houshyar Yazdian, Vrije Universiteit Brussel, Belgium

“Study of the impact of inter-case features for Next Activity Prediction”

Chiara Gobbi, Università Politecnica delle Marche, Italy

“Those who have an eye find what they are looking for even with their eyes closed”

Italo Calvino