

# 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](mailto:lod@icas.cc)

Schedule Ver. 2.0 (4 pages) – May 26

	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	<b>Free time</b>	Poster Session 1
09:50 – 10:40	C. Gulcehre	Arora	S. Kambhampati		Coffee break
10:40 – 11:20	Coffee break	Coffee break	Coffee break		
11:20 – 12:10	S. Arora	B. Perozzi	J. Z. Leibo		Poster Session 2
12:10 – 13:00	B. Perozzi	C. Gulcehre	R. Romagnoli		
13:00 – 15:00	Lunch	Lunch	Lunch	Lunch	Lunch
15:00 – 15:50	P. Pardalos	<b>Free time</b>	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	Pause
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*



## 8<sup>th</sup> 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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**8th Advanced Course on Data science & machine Learning – ACDL 2025**  
**June 9-13 @ Riva del Sole Resort & SPA**

**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”

**Raniero Romagnoli, Almapave, Italy**

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

**Liubov Tupikina, Bell Labs Paris, France**

Lecture “On some Challenges of Embeddings Theory”

**Tutorial Speakers:**

**Francesco Buciuni, F. Wolenski, D. Perna, D. Preti, Almapave, Italy**

## 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 posters**. The **Poster Session 1** will be held on **Fri, June 13 @ 9:00-10:40**, **Poster Session 2** will be held on **Fri, 13 June @ 11:20-13:00**. The two Poster Sessions 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 [acd1@icas.cc](mailto:acd1@icas.cc) and Prof. Nicosia [giuseppe.nicosia.1@gmail.com](mailto: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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**Sander Dieleman, Google DeepMind London, UK**

**Caglar Gulcehre, EPFL, Switzerland**

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

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### **Directors:**

**Giuseppe Nicosia, University of Catania, Italy**

**Panos Pardalos, University of Florida, USA**

## Poster Sessions

**Friday, 13 June @ 9:00-10:40 Poster Session 1** (Da Vinci Conf Room, 1st floor of the Congress Centre, number 6 on the resort map).

**Friday, 13 June @ 11:20-13:00 Poster Session 2** (Da Vinci Conf Room, 1st floor of the Congress Centre, number 6 on the resort map).

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

Italo Calvino