International Artificial Intelligence Summer School – IAISS 2025

A Residential Summer School in AI & Generative AI for Science and Engineering

Riva del Sole Resort & SPA – Castiglione della Pescaia (Grosseto) Tuscany, Italy
21 – 25 September 2025
https://2025.iaiss.cc
iaiss@icas.cc
Schedule Ver. 1.5 (5 pages) – Sept 6

	Sun, 21 Sept	Mon, 22 Sept	Tue, 23 Sept	Wed, 24 Sept	Thu, 25 Sept
09:00 – 09:50	Yi Ma	Pierre Baldi	Floris Geerts	Michal Valko	Lucas Beyer
09:50 – 10:40	Sam Buchanan	Pierre Baldi	Floris Geerts	Michal Valko	Lucas Beyer
10:40 – 11:20	Coffee break	Coffee break	Coffee break	Michal Valko	Coffee break
11:20 – 12:10	Sam Buchanan	Pierre Baldi	Floris Geerts	Yuki Asano	Lucas Beyer
12:10 – 13:00	Sam Buchanan	Raniero Romagnoli	Panos Pardalos	Yuki Asano	Abigail See
13:00 – 15:00	Lunch	Lunch	Lunch	Lunch	Lunch
15:00 – 15:50	Druv Pai	Qing Qu	Mario Guarracino	Yuki Asano	Abigail See
15:50 – 16:40	Druv Pai	Qing Qu	Sven Giesselbach	Lucas Beyer	Abigail See
16:40 – 17:20	Coffee break	Qing Qu	Coffee break	Coffee break	Daniel Zügner
17:20 – 18:10	Druv Pai	Sven Giesselbach	Tom Kipf	Vicky Kalogeiton	Daniel Zügner
18:10 – 19:00	Yi Ma	Sven Giesselbach	Tom Kipf	Vicky Kalogeiton	Daniel Zügner
19:00 – 19:50	Yi Ma	free time	Tom Kipf	Vicky Kalogeiton	Poster Session
20:00	Dinner	Dinner	Dinner	Social Dinner*	Dinner

Lectures

Yuki Asano, *University of Technology Nuremberg, Germany*
Lecture 1/3 *"Self-supervised Learning 1"*
Lecture 2/3 *"Self-supervised Learning 2"*
Lecture 3/3 *"Vision-Language Learning"*

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"*

Lucas Beyer, *OpenAI, Zürich, Switzerland*
Lecture 1/4 *"Transformers Part 1"*
Lecture 2/4 *"Transformers Part 2"*
Lecture 3/4 *"Vision and VLMs Part 1"*
Lecture 4/4 *"Vision and VLMs Part 2"*

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 1/3 *"From Large Language Models to Reasoning Models"*
Lecture 2/3 *"Multi-Agent System"*
Lecture 3/3 *"Applications of Foundation Models"*

Vicky Kalogeiton, *École Polytechnique Paris, France*
Lecture 1/3 *"From GANs to Diffusion Models for Image Synthesis"*
Lecture 2/3 *"Control and Guidance in Diffusion Models"*
Lecture 3/3 *"Conditional Generation of Multimodal Data"*

Thomas Kipf, *Google DeepMind, USA*
Lecture 1/3 *"Introduction to Graph Neural Networks"*
Lecture 2/3 *"Graph Neural Networks for Physical Simulation"*
Lecture 3/3 *"Compositional World Models"*

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.

Abigail See, *Google DeepMind, London, UK*
Lecture 1/3 *"Detecting AI-Generated Text"*
Lecture 2/3 *"SynthID: a Watermark for LLM-Generated Text"*
Lecture 3/3 *"Neural Text Generation: History to Present"*

Michal Valko, *Meta Paris, France*
Lecture 1/3 *"Fundamental of RL for LLMs"*
Lecture 2/3 *"RL fine-tuning, then and now"*
Lecture 3/3 *"Advanced RL fine-tuning and metacognition"*

Daniel Zügner, *Microsoft Research Berlin, Germany*
Lecture 1/3 *"Introduction to Deep Generative Models"*
Lecture 2/3 *"Diffusion Models and Flow Matching"*
Lecture 3/3 *"Generative Models for Molecular Science"*

TUTORIAL SPEAKER:

Druv Pai, *University of California, Berkeley, USA*
Tutorial 1/3 "*Deep Representations via Unrolled Optimization*"
Tutorial 2/3 "*White-Box Deep Network Architectures via Compression and Optimization* "
Tutorial 3/3 "*Inference with Low-Dimensional Structures*"

LOD 2025 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"

IAISS DIRECTOR:

Giuseppe Nicosia, *University of Catania, Italy*

LOD Steering Committee:

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

LOD 2025 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*

LOD 2025 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*

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. In the program you will find the list of **accepted posters.** The **Poster Session** will be held on **Sept 25 @ 19:00 .** 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 September 5th.*

    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 Summer School 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.

7. Obviously*, we recommend bringing your work laptop*.

8. 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"***

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

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

11. **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 ;-).

12. 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.

Poster Sessions

Sept 25 @ 19:00 Poster Session (Da Vinci Conf Room, 1st floor of the Congress Centre, number 6 on the resort map).

"Extreme-Edge AI: Scalable Intelligence Under Tight Platform Constraints"
Philip Wiese, ETH Zurich, Switzerland

"Learning traffic flows: Graph Neural Networks for Metamodelling Traffic Assignment"
Oskar Bohn Lassen, The Technical University of Denmark, Denmark

"CogniLoad: A Synthetic Natural Language Reasoning Benchmark With Tunable Length, Intrinsic Difficulty, and Distractor Density", Daniel Kaiser, The Arctic University of Norway - UiT, Norway

"Reconfigurable edge accelerator with 3D stacked logic and memory for deep neural network processing"
Jakub Jastrzebski, Politecnico di Milano, Italy

"Evaluation of clustering methods for LLM uncertainty measurements, based on semantic entropy"
Jan Tobolewski, Gdasku University of Technology, Poland

"Guess or Recall? Training CNNs to Classify and Localize Memorization in LLMs"
Jérémie Dentan, Ecole Polytechnique, France

"HUGNet: A Unified Graph-Based Framework for Histogenomic Inference from Whole-Slide Images"
Susu Hu, National Center for Tumor Disease Dredsen, Germany

"Hybrid Dataset Construction and Generative Texture Modeling for Composite Guitar Finishing"
Lukasz Popek, Politechnika Warszawska Instytut Radioelektroniki i Technik Multimedialnych, Poland

"Building Trustworthy-by-Design LLMs in Practice through Case Studies"
Sezer Kutluk, Scuola Normale Superiore, Italy

"I-GLIDE: Input Groups for Latent Health Indicators in Degradation Estimation"
Lucas Thil, Ecole Polytechnique, France

"Long Story Short? Disentangling Compositionality and Long-Caption Understanding in VLMs"
Israfel Salazar Reyes, University of Copenhagen, Denmark

"Operationalising Responsible AI Innovation in the Logistics Sector"
Paula Reyero-Lobo, Manchester Metropolitan University, United Kingdom

"Predicting unknown viral hosts with Dynamic Positive-Unlabeled learning"
Gabriele Pignalberi, Sapienza University of Rome, Italy

"Prevent, Detect, React: A Human-Centered Perspective on Hallucinations in LLMs"
Leon Hannig, University of Duisburg-Essen, Germany

"Score-based diffusion models for lattice field theory"
ThomasRanner, Vienna University of Technology, Austria

"SUPREME: A Reproducible Distributed Multi-GPU Framework for Standardizing Machine Unlearning Evaluation"
Petros Andreou, Loughborough University, United Kingdom

"When Cars Listen Too: The Secret to Safer Driving"
Katerina Vinciguerra, Parma University, Italy

"Temporal Explainable AI Models for Surgery Evaluation"
Haadia Amjad, TU Dresden, Germany

"Unveiling Decision-Making in LLMs for Text Classification : Extraction of influential and interpretable concepts with Sparse Autoencoders", Mathis Le Bail, Ecole Polytechnique LIX, France

"Real-world Post-hoc Explanations with ILLUME"
Martino Ciaperoni, Scuola Normale Superiore , Italy

"Pruning and Clustering-Based Token Reduction for Faster Visual Language Models"
Mohamed Dhouib, Ecole Polytechnique, France

"Environment-Aware Hybrid Modeling for Fall Prevention in Elderly Individuals"
Rozhin Fani, University of Genoa/ Free university of Bolzano, Italy

"Development of ANN models for constitutive multiphase flow relationships in porous media accounting for hysteresis"
Mohammadsajjad Zeynolabedini, University of Stavanger, Norway

"PrithviWxC Foundation Model Validation on Weather Downscaling for Cross Domain Learning"
Gabriele Padovani, University of Trento, Italy

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