



1st Workshop on New Trends in Computational Learning & SciML

Dates: July 2 - 4, 2025

Venue: LUM – Libera Università Mediterranea "Giuseppe Degennaro", Casamassima (BA), Italy

GENERAL DESCRIPTION

The workshop aims to explore the latest innovations in the field of Computational Learning and its scientific applications (SciML), with a focus on Physics-Informed Neural Networks (PINN), optimal control, and engineering applications. The event will include plenary sessions, research contributions and hands-on workshops to encourage exchange between different research venues and students.

DETAILED PROGRAM

1ST DAY – WEDNESDAY JULY 2, 2025

Location: Aula Magna LUM

15:30 - 18:30 | **Introduction to Workshop**

15:30 - 16:00 | Registration

16:00 - 16:30 | Opening Remarks on “New Trends in Computational Learning”, by Organizers;

16:30 - 17:00 | Organizer Speaker - Dr. Silvia Licciardi (University of Palermo)
"Deep & Machine Learning. Applications in the Energy Field"

17:00 - 18:30 | Problem-Posing Session & Networking, brainstorming between speakers, researchers and students

20:30 - 23:00 | Welcome Dinner in Bari

2ND DAY – THURSDAY JULY 3, 2025

Location: Aula Magna LUM

09:30 - 11:00 | **Plenary Session 1**

- 09:30 - 10:00 | Invited Speaker – Prof. Salvatore Cuomo (University of Naples)
“Explainable Scientific Machine Learning: Theoretical and Practical Perspectives”
- 10:00 - 10:30 | Invited Speaker – Dr. Giovanni Pagano (University of Salerno)
“Step-by-step Discrete-Time Physics-Informed Neural Networks for Partial Differential Equations”
- 10:30 - 11:00 | Invited Speaker – Dr. Sabrina F. Pellegrino (Bari Polytechnic)
“Spectral Collocation Methods for Nonlocal Peridynamic Problems and Applications”
- 11:00 - 11:30 | Invited Speaker – Prof. Marina Popolizio (Bari Polytechnic)
“Fractional calculus in Network Theory”

11:30 - 12:00 | **Coffee Break (Group Picture)**

12:00 - 13:30 | **Plenary Session 2**

- 12:00 - 12:30 | Invited Speaker – Prof. Roberto Garrappa (University of Bari)
“Numerical Challenges and Advances in Variable-Order Fractional Differential Equations”
- 12:30 - 13:00 | Invited Speaker – Dr. Marco Berardi (CNR - IRSA Bari)
“Richards Equation and Optimal Irrigation”
- 13:00 - 13:30 | Invited Speaker – Dr. Luca Saluzzi (University of Rome)
“Exploiting Sparsity in Data-Driven Surrogate Models for High-Dimensional Feedback Control Problems”

13:30 - 15:00 | **Lunch**

15:00 - 18:00 | **Plenary Session 3**

- 15:00 - 15:30 | Invited Speaker – Prof. Giuseppe Fanizza (LUM)
“Energy cascade in a semilinear peridynamics model”
 - 15:30 - 16:00 | Invited Speaker – Dr. Fabio Difonzo (LUM)
“Innovative Numerical Methods for Diffusion Problems”
 - 16:00 - 16:30 | Invited Speaker – Dr. Mariateresa Bruni (CNR - IRSA Bari)
“Time series analysis and machine learning approaches for soil moisture prediction in precision irrigation”
 - 16:30 - 18:00 | Open Discussion - Q&A - Hands on
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3RD DAY – FRIDAY JULY 4, 2025

Location: Aula Magna LUM

09:30 - 12:00 | *Plenary Session 4*

- 09:30 - 10:00 | Invited Speaker – Dr. Angela Martiradonna (University of Foggia)
“From ecological threat to economic resource: Managing the blue crab invasion in Mediterranean wetlands”
- 10:00 - 10:30 | Invited Speaker – Dr. Laura Selicato (CNR - IRSA Bari)
“Bi-Level Optimization Strategies for Sparse and Interpretable Learning in NMF”
- 10:30 - 11:30 | Panel Discussion: Hands-On Results and Future Collaborations
- 11:30 - 12:00 | Closing Remarks – Dr. Vincenzo Schiano Di Cola, Organizer
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ORGANIZING COMMITTEE

- **Dr Vincenzo Schiano Di Cola** (CNR-IRSA Bari)
- **Dr. Silvia Licciardi** (University of Palermo)
- **Dr. Fabio Difonzo** (LUM)

SCIENTIFIC COMMITTEE

- **Prof. Salvatore Cuomo** (University of Napoli)
 - **Prof. Elisa Francomano** (University of Palermo)
 - **Dr. Marco Berardi** (CNR-IRSA Bari)
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LOGISTIC INFORMATION

Expected Attendees

- **Estimated number:** 50 participants;
- **Target:** Graduate students, Ph.D. students, postdocs, researchers;
- **Origin:** Italian universities and research centers, with focus on Puglia, Campania, Basilicata, Calabria, Marche, Abruzzo, Lazio, Sicilia.

Technical Details

- **Software:** Python, Julia, MATLAB;
- **Connectivity:** Wi-Fi for all participants to develop on personal devices.
- **Link al workshop:** <https://events.hifis.net/event/2812/>
- **Special Issue on AIMS ACSE** - <https://www.aims sciences.org/>

Catering

- **1 Welcome Dinner:** Wednesday July 2;

- **1 Coffee break:** Thursday July 3;
- **1 Lunch:** Thursday July 3;

SPONSOR

- **GNCS** - National Group of Scientific Calculus (€783,00 finanziamento approvato)
- **CNR** - National Research Council;
- **LUM** - Libera Università Mediterranea "Giuseppe Degennaro"
- **University of Palermo**

ORGANISATION CONTACTS

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ADDITIONAL NOTES and DISTINCTIVE FEATURES:

- The workshop is a natural follow-up to the "Intrusion" conference and aims at sharing related research among lecturers, researchers and students;
- Special attention is given to interdisciplinary collaborations and technology transfer
- Hands-on sessions are designed to foster the development of future collaborative projects and student engagement.
- Particular attention will be dedicated to applications of SciML, balance between theory and practice with dedicated workshops, targeted networking for young researchers.

