



# 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

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## 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 - 11:00 | *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. Luciano Lopez** (University of Bari) - President
  - **Prof. Salvatore Cuomo** (University of Napoli) - Component
  - **Prof. Elisa Francomano** (University of Palermo) - Component
  - **Dr. Marco Berardi** (CNR-IRSA Bari) - Component
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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;

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## SPONSOR

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

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## 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.

