



**Università
degli Studi
di Palermo**

UIT Seminar 2025

“Thermofluid Dynamics and Nuclear Engineering - two intertwined stories”

Location: University of Palermo – Department of Engineering, Aula “Giuseppe Capito”
Viale delle Scienze, Building 7, 90128 Palermo, Italy

Date: 10 October 2025 h. 9.15-17.00

Organized by:

- Unione Italiana di Termofluidodinamica (UIT)
- Energy Section, Department of Engineering, University of Palermo

Purpose:

Nuclear engineering involves a unique combination of disciplines including neutronics, structural mechanics, material science, radiochemistry, dosimetry and radiation protection. Among these, thermofluid dynamics has always played a central role.

In the last eight decades, nuclear engineering and thermofluid dynamics have followed complementary, and often strictly intertwined, paths. Since the earliest days of the discipline, the development of new engineering concepts in nuclear reactor design has placed increasingly complex demands on our ability to investigate, model and predict new fluid flow and heat transfer phenomena. Conversely, our increasing insight and predictive capacity concerning fluid-related phenomena has made feasible design solutions that would have otherwise been impossible.

Examples that are now historical include the boiling crisis in power-controlled systems; the instability between boiling channels in parallel; the critical two-phase flow through orifices and piping; the natural convection in volumetrically heated pools and enclosures; the transfer of heat to liquid metals. Further examples, still in progress, are provided by innovative, Generation IV, fission reactors and by fusion reactor designs.

In the planned event, representatives from major Italian academic institutions doing research in nuclear technology are called to present recent results in their chosen research area, with a special focus on the thermofluid dynamics challenges associated with advanced nuclear technologies and innovative design solutions.

The event will offer an opportunity for a bird’s eye view of the current state of nuclear research in Italy as related to thermofluid dynamics.

People interested in attending this event are kindly requested to send an email to mariarosa.giardina@unipa.it, specifying whether attendance will be in person or in remote.

For further information and updates, please follow the UIT web page, www.uitonline.it.

The event can also be attended remotely through the following Microsoft Teams link:



**Click here to join the
meeting**

Microsoft Teams (manual access):

Meeting ID: 363 104 999 916 7; **Passcode:** FA2G7M3o



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Programme:

Morning session

9.15 – 9.45 Welcome addresses

Prof. Sara Rainieri – President of UIT (sara.rainieri@unipr.it)

Prof. Livan Fratini – Head of the Department Of Engineering (livan.fratini@unipa.it)

9.45 – 10.30 Introduction: Thermofluid Dynamics and Nuclear Engineering - two intertwined stories

Prof. Michele Ciofalo (honorary) – University of Palermo (michele.ciofalo@unipa.it)

10.30 – 11.00 Coffee break

11.00 – 11.45 TH modelling and validation for SMR and MSR systems and components

Prof. Marco Ricotti – Polytechnic of Milano (marco.ricotti@polimi.it)

11.45 – 12.30 An open source numerical platform for simulation of nuclear reactors

Prof. Sandro Manservigi – University of Bologna (sandro.manservigi@unibo.it)

12.30 – 13.15 The modeling of engineering problems in fusion reactors

Prof. Roberto Zanino – Polytechnic of Torino (roberto.zanino@polito.it)

13.15 – 14.30 Lunch break

Afternoon session

14.30 – 15.15 Thermal-hydraulic studies on innovative nuclear reactors in the shadow of the Pisa tower

Prof. Walter Ambrosini – University of Pisa (walter.ambrosini@unipi.it)

15.15 – 16.00 Magnetohydrodynamics in liquid metals

Prof. Gianfranco Caruso – Dr. Alessandro Tassone – University of Roma “La Sapienza” (gianfranco.caruso@uniroma.it)

16.00 – 16.45 Neutronics-thermofluid dynamics coupling in nuclear fusion-relevant systems at the University of Palermo

Prof. Pierluigi Chiovaro – University of Palermo (pierluigi.chiovaro@unipa.it)

16.45 – 17.00 Closing address

Prof. Sara Rainieri – President of UIT (sara.rainieri@unipr.it)

17.00 Closure of the proceedings

Participants are asked to limit their presentation to 35-40 minutes, thus allowing for a few minutes' floor discussion.