PERSONAL INFORMATION Lorenzo Melchiorri

WORK EXPERIENCE

2023 - 2025 ### Fellow Researcher

Sapienza University of Rome - Nuclear Energy Research Group (N.E.R.G.)

The experience as a fellow researcher has been focused on supporting the depart-ment activities. Code development for tritium diffusion, CFD calculations for magnetohydrodynamic flows and two-phase compressible flows have been the main tasks accomplished.

22/23 - 23/24 ### Teaching Assistant

Sapienza University of Rome - Engineering Thermofluids

Teaching assistant of the course Engineering Thermofluids, which belongs to the Energy Engineering Master (English curriculum) at Sapienza. I was primarily responsible for the course site and studying material. Furthermore, I've assisted the students during the Laboratory experimental activities.

2019 - 2020 ### Fellow Researcher

Sapienza University of Rome - Nuclear Energy Research Group (N.E.R.G.)

The one-year experience as a fellow researcher has been focused on developing a set of subroutines that could extend RELAP5 capabilities. Liquid metals magnetohydrodynamic fundamentals and programming basis have been the main topics studied during the activity.

EDUCATION AND TRAINING

2020 - 2023 ### Ph. D. in Energy & Environment

Sapienza University of Rome - Rome, Italy

Passed with *Excellent*. *Thesis*: Development of a System Magneto-Thermal-Hydraulics code for the modelling of nuclear fusion reactor.

2015 - 2018 ### Master Degree in Energy Engineering - Nuclear curriculum

Sapienza University of Rome - Rome, Italy

Passed with **110/110**. *Thesis*: Numerical characterization of a magnetohydrdynamic liquid metal flow through an electroconductive orifice.

2012 - 2015 ### Bachelor Degree in Energy Engineering

Sapienza University of Rome - Rome, Italy

Passed with **96/110**. *Thesis*: Neutronic flux measurement on Thermic column of TRIGA RC-1 reactor (ENEA). Preliminary analysis of materials (Indium) activation.

PERSONAL SKILLS

Mother tongue   Italian

Other languages

UNDERSTANDING		SPEAKING		WRITING
Listening	Reading	Spoken interaction	Spoken production	
C1	C2	B2	C1	C2

English row above.

Levels: A1 and A2: Basic user – B1 and B2: Independent user – C1 and C2: Proficient user
Common European Framework of Reference for Languages

Computer skills
- Microsoft Office package - Proficient User
- Latex - Independent User
- MATLAB - Independent User
- Fortran - Independent User
- Linux/BASH - Independent User
- ANSYS CFX - Independent User
- OpenFOAM - Basic User

REFERENCES

[1] Lorenzo Melchiorri, Simone Siriano, and Alessandro Tassone. "RELAP5/Mod3.3 MHD module development and validation: WCLL-TBM mock-up model". In: *Fusion Engineering and Design* 202 (2024).

[2] Simone Siriano, Lorenzo Melchiorri, Sonia Pignatiello, and Alessandro Tassone. "A multi-region and a multiphase MHD OpenFOAM solver for fusion reactor analysis". In: *Fusion Engineering and Design* 200 (2024).

[3] Gaetano Bongiovì, Ilenia Catanzaro, Pietro Alessandro Di Maio, Salvatore Giambrone, Alberto Gioè, Pietro Arena, and Lorenzo Melchiorri. "Exploratory Thermo-Mechanical Assessment of the Bottom Cap Region of the EU DEMO Water-Cooled Lead Lithium Central Outboard Blanket Segment". In: *Applied Sciences (Switzerland)* 13.17 (2023).

[4] Pietro Arena, Gaetano Bongiovì, Ilenia Catanzaro, Cristiano Ciurluini, Aldo Collaku, Alessandro Del Nevo, Pietro Alessandro Di Maio, Matteo D'Onorio, Fabio Giannetti, Vito Imbriani, Pietro Maccari, Lorenzo Melchiorri, Fabio Moro, Rocco Mozzillo, Simone Noce, Laura Savoldi, Simone Siriano, Alessandro Tassone, and Marco Utili. "Design and Integration of the EU-DEMO Water-Cooled Lead Lithium Breeding Blanket". In: *Energies* 16.4 (2023).

[5] Marica Eboli, Pietro Arena, Nicolò Badodi, Antonio Cammi, Cristiano Ciurluini, Vittorio Cossu, Nicola Forgione, Francesco Galleni, Fabio Giannetti, Bruno Gonfiotti, Daniele Martelli, Lorenzo Melchiorri, Carmine Risi, Alessandro Tassone, and Alessandro Del Nevo. "PbLi/Water Reaction: Experimental Campaign and Modeling Advancements in WPBB EUROfusion Project". In: *Energies* 16.23 (2023).

[6] Alessandro Tassone, Lorenzo Melchiorri, and Simone Siriano. "Magnetohydraulic flow in a rectangular channel filled with stream-wise obstacles". In: *Fusion Engineering and Design* 197 (2023).

[7] Lorenzo Melchiorri, Alessandro Tassone, and Gianfranco Caruso. "Three-dimensional MHD flow in moderate change ratio orifice". In: *Journal of Physics: Conference Series* 2177.1 (2022).

[8] L. Melchiorri, V. Narcisi, C. Ciurluini, F. Giannetti, G. Caruso, and A. Tassone. "Preliminary MHD pressure drop analysis for the prototypical WCLL TBM with RELAP5/MOD3.3". In: *Fusion Engineering and Design* 176 (2022).

[9] Lorenzo Melchiorri, Vincenzo Narcisi, Fabio Giannetti, Gianfranco Caruso, and Alessandro Tassone. "Development of a RELAP5/MOD3.3 module for MHD pressure drop analysis in liquid metals loops: Verification and validation". In: *Energies* 14.17 (2021).

[10] Vincenzo Narcisi, Lorenzo Melchiorri, and Fabio Giannetti. "Improvements of RE-LAP5/Mod3.3 heat transfer capabilities for simulation of in-pool passive power removal systems". In: *Annals of Nuclear Energy* 160 (2021).

[11] Vincenzo Narcisi, Lorenzo Melchiorri, Fabio Giannetti, and Gianfranco Caruso. "Assessment of relap5-3d for application on in-pool passive power removal systems". In: *Proceedings of the 30th European Safety and Reliability Conference and the 15th Probabilistic Safety Assessment and Management Conference* (2020), pp. 1135–1142.