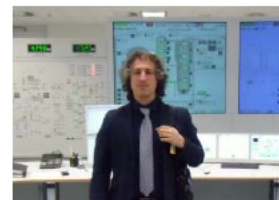




Europass Curriculum Vitae



Personal information

First name Surname **Alessandro DEL NEVO**
Address [REDACTED]
Telephone Office: +390534801130 [REDACTED]
Skype a.delnevo
E-mail alessandro.delnevo@enea.it; [REDACTED]
Nationality Italian
Date of birth [REDACTED]
Occupation field Nuclear Researcher

Work experience

Dates **Since December 2010**
Occupation or position held
[since Apr. 2024] **Head of Experimental Engineering Division (NUC-ING)**
<https://www.ricercanucleare.enea.it/en/the-department/experimental-engineering.html>
[Jan. 2020 – Mar. 2024] **Head of Design of Systems and Components Laboratory (FSN-ING-SIS)**
[July 2015 – Dec. 2019] **Head of Nuclear Design and Analysis Laboratory (FSN-ING-PAN)**
[Dec. 2010 – June 2015] **Researcher (UTIS-TCI)**

Main activities and responsibilities

Management responsibilities

1. [since Apr. 2024] **Responsible of Division @ ENEA.** Manager and Safety Manager of the about 50 researchers, technicians, administrative, including experimental halls, facilities, infrastructures, equipment and 3 laboratories.
2. [Since Nov. 2012] **Responsible for Public Procurement Procedures (RUP).**
3. [July 2015 – Mar. 2024] **Responsible of Laboratory @ ENEA.** Responsible of a research group (about 15 researchers and technicians). The Lab. is committed in national and international nuclear related projects, exploiting the experience of its staff 1) in systems and components design activities, 2) in the development and application of computer codes, 3) in the designs and executions of experimental activities.
4. [Since Jan. 2021] **Responsible of W-HYDRA platform project.** W-HYDRA (Wcll-HYDRAulic platform) includes the three experimental facilities: Water Loop, STEAM, and LIFUSS/Mod4. It is a medium-sized (large, considering the type) water facility connected to a PbLi loop, aimed at supporting the characterization and qualification of systems and components related to the WCLL BB of DEMO and the TBM of ITER. The facility will have the capacity to investigate the pulsed operation of the DEMO steam generator. It will represent the integral effect test facility for the water and PbLi circuits of the WCLL TBM of ITER, allowing the study of operational transients and accident sequences (including the PbLi/water reaction). Maximum power 3.1 MWth.

Project responsibilities and duties

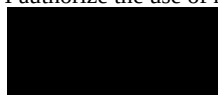
1. [Since Mar. 2024] **Member of the Project Board of FP9 EUROfusion Project.**
2. [since Jan. 2021] **ENEA Scientific Responsible of WP-BB (Breeding Blanket) in FP9 EUROfusion Project.**
3. [Jan. 2021 – Mar. 2024] **Deputy Project Leader of WP-BB (Breeding Blanket) in FP9 EUROfusion Project.** The WP-BB is aimed at developing a feasible and integrated design of the breeding blanket of DEMO and, at planning and implementing the R&D for both the breeding blanket of DEMO and the test blanket modules of ITER.



4. [Since Oct 2020] ENEA Scientific Responsible of H2020 PUMMA Project (GA 945022). *The project, supported by EERA JPNM, aims to define different options for Pu management in Generation-IV systems and to evaluate the impact on the entire fuel cycle, in addition to safety and performance aspects. The focus is on fuel properties and characterization of 45% Pu fuels through irradiation data, to extend the safety standards of this fuel composition as well as the fuel performance code.*
5. [2017-2022] ENEA Scientific Responsible of H2020 INSPYRE Project (GA 754329). **Leader of WP 6 – Deriving parameters and developing models for Fuel Performance Code.** *Activities: development of models and their implementation in TRANSURANUS code; validation activities using available MOX fuel Fast Reactor data is also done; and code to code benchmarking.*
6. [2014-2020] ENEA Scientific Responsible of WP-BoP (Balance of Plant) in H2020 EUROfusion Project (GA 633053). *Activities: 1) the pre-conceptual design and analysis of the water cooled balance of plant of DEMO; and 2) the experimental campaign in CIRCE-HERO facility to test the heat transfer performances of a prototypical heat exchanger/steam generator. Design activities involving CAD, FEM and Thermal-hydraulics analyses of the WCLL Balance of Plant of DEMO. Design (CAD, FEM and Thermal-hydraulics), fabrication and testing of the prototypical steam generator of the DCLL breeding blanket of DEMO and of the PbLi loop heat exchanger of the WCLL breeding blanket of DEMO.*
7. [2014-2020] WCLL Breeding Blanket Lead Engineer in H2020 EUROFUSION Project (GA 633053). *Coordination of a Team involving ENEA, 5 Universities, CREATE, CIEMAT, and 2 Industries. Activities: coordination of the design and analysis activities for the pre-conceptual design of the WCLL Breeding Blanket of DEMO. Design activities involving CAD, FEM and Thermal and Thermal-hydraulics analyses of the WCLL breeding blanket of DEMO.*

Technical responsibilities and duties

1. Responsible of Tasks in H2020 EUROfusion (GA 633053)
 - a) [2019-2020] Task SAE-5.1-T001. **SIMMER code application to ITER TBM design in WP-SAE.** *Activities: modelling the WCLL TBM of ITER and its ancillary systems, i.e. the Water Coolant System and PbLi loop; pioneering simulations of the “in-box-LOCA” transient using SIMMER-IV and RELAP5/Mod3.3 codes.*
 - b) [2018-2019] Tasks in PMI-7.1. **Design of TBM set and ancillary systems in WP-PMI.** *Activities in support of the WCLL Test Blanket System design: 1) identification of the requirements relevant for the WCLL BB of DEMO; 2) identification of the safety functions for selected postulated initiating events; 3) supporting the thermal-hydraulic design and analysis; 4) modelling the TBM, WCS, and PbLi loop using system codes.*
 - c) [2014-2020] Tasks in BB-5.4.2. **PbLi/water reaction in WP-BB.** *Activities: 1) design (CAD, FEM and Thermal-hydraulics) and fabrication of a separate effect test facility, named LIFUS5/Mod3B, for supporting the development of SIMMER-III and -IV codes and the coupling with RELAP5 code; 2) design and execution of the experimental campaign; 3) simulations using system codes, code’s coupling tools, and FEM tools.*
2. [Since Jan 2011] Responsible of Tasks in EC FP7 and H2020 projects
 - a) [2015-2018] H2020 SESAME (GA 654935). **Task 5.1 and 5.2: PHENIX and CIRCE-HERO benchmarks.** *Activities: 1) development of a RELAP5-3D nodalization of PHENIX fast reactor, simulation of an asymmetric transient, comparison of code results against experimental data and participation in the benchmark activity coordinated by CEA; 2) design of a transient test in CIRCE-HERO, simulating a total loss of flow, data analysis and interpretation, development of a RELAP5/Mod3 nodalization of CIRCE-HERO, coordination of an international benchmark.*
 - b) [2012-2018] FP7 MAXSIMA (GA 323312). **Task 4.2. SGTR Bubbles Characteristics.** *Activities: design (CAD, FEM and Thermal-hydraulics) and construction of an experiment (LIFUS5/Mod3A) aimed at investigating the detection of leak in HLM/water steam generator, execution of the experimental campaign, data analysis and interpretation.*
 - c) [2013-2015] FP7 LEADER (GA 249668). **Task 6.4. Assessment of damping pressure waves inside the SG.** *Activities: design (CAD, FEM and Thermal-hydraulics) and construction of a test section for LIFUS5/Mod2 facility aimed at characterizing of the pressure wave propagation in the steam generator of a HLM fast reactor, execution of the experimental campaign, data analysis and interpretation.*



Main activities and responsibilities

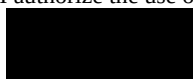
- d) [2011-2013] FP7 THINS (GA 249337). Task 4.2.2. HLM/Water interaction. Activities: design (CAD, FEM and Thermal-hydraulics) and construction of the facility LIFUS5/Mod2 aimed at investigating phenomena associated with the interaction between LBE and water and at validating computer codes' models.
3. [2012-2018] Responsible of Tasks in Italian MISE PAR 2012-2017 projects. Sample activities: advancement in modelling fast reactor MOX fuels, validation of TRANSURANUS code against experimental data, design of a test section of a prototypical steam generator for LFR fast reactor, design of an experimental facility of the leak detection in HLM fast reactors, coordination of CIRTEN activities for the development of best estimate numerical tools for LFR design and safety analysis, etc.
 4. [2011 – 2020] Responsible of LIFUS5 facility infrastructure.
 - a) [2015 – 2020] LIFUS5/Mod3 facility. Heavy liquid metals water interaction for nuclear fission, small leaks characterization and detection, instrumentation development in LBE, and fusion technologies, LOCA issues, code model development, code validation in PbLi.
 - b) [2011 – 2015] LIFUS5/Mod2 facility. Heavy liquid metals (LBE) water interaction for nuclear fission, STGR issue and code validation for HLM fast reactors (i.e. MYRRHA and LFR).
 5. [Sept 2012 – June 2016] Leader of the ENSTTI advanced courses in “Thermal-hydraulics” (2 editions: Sept. 2012 and May 2015 at C.R. Brasimone) and Lecturer of the ENSTTI advanced courses “Criticality Safety” (2 editions: May 2014 and May 2016 at Kaunas). INSC Programme 2011, project MC3.01/10, DG-DEVCO, Lot 2: Training and Tutoring for NRAs and their TSOs: Nuclear Safety Assessment and Inspection.
 6. Actively involved in EC FP7 ADRIANA and PELGRIMM projects; EFDA WP13-06-SYS project; Italian MISE PAR-2011 and PAR-2009 projects.

Participation in International Projects/Expert Groups

1. [2013-2017] EERA JPNM SP5 (Synthesis, irradiation and qualification of advanced fuels) and SP6 (Physical modelling and separate effect experiments for fuels).

Participations to International Projects (OECD and IAEA)

1. [since June 2023] OECD NEA International Standard Problem 52: Multiple Steam Generator Tube Rupture. Coordinator of the numerical part of the benchmark and Chief participant. The activity is aimed at assessing the thermal –hydraulic code capabilities in predicting a DEC-A scenario. This is pursued thanks the availability of the PKL III J5.1 run2 (MSGTR) experimental test data provided by Framatome GmbH, in the framework of the OECD/NEA ETHARINUS project. The commitment consists in promoting the benchmark; preparing the guidelines and the outlet specifications for conducting and collecting the numerical activities of the blind and the open phases; performing the simulation of the transient (blind and the open phases) with RELAP5/Mod3.3 code; preparing and issuing the two reports of the activities. The ISP-52 involves 25 participants from 15 different Countries.
2. [2012 – 2016] IAEA CRP EBR-II. Benchmark Analysis of EBR-II Shutdown Heat Removal Tests. Chief participant. Objective: to verify and to validate system and safety codes used in the analyses of liquid metal thermal hydraulics and neutronics phenomena in sodium cooled fast reactors. 19 organizations from 11 Member States participated. Activities: 3D model of EBR-II fast reactor using RELAP5-3D code; blind and open simulations of the SHRT-17 test.
3. [since 2012] OECD/NSC Working Party on Multi-scale Modeling of Fuels and Structural Materials for Nuclear Systems.
4. [2011 – 2013] OECD/NEA Halden Reactor Project (Fuel and Material part). Chief participant.



5. [2010 – 2012] IAEA ICSP MASLWR (*Evaluation of Advanced Thermohydraulic System Codes for Design and Safety Analysis of Integral Type Reactors*). International Collaborative Standard Problem on Integral PWR Design, Natural Circulation Flow Stability and Thermohydraulic Coupling of Primary System and Containment during Accidents. Chief participant. Objective: assessment of computer codes for reactor system design and safety analysis using experimental data from the Multi-application Small Light Water Reactor (MASLWR) design, installed at Oregon State University. 16 organizations from 7 Member States participated. Activities: development of a RELAP5/Mod3.3 nodalization of the MASLWR facility; blind and open simulations of two experimental tests.

Tutoring

1. [2020 – 2022] EUROfusion Engineering Grant on “Design and Analysis of DEMO PHTS and BoP Components in relevant Operational States” (Pierdomenico Lorusso). Ref. EUROfusion Task Agreement AWP20-EEG-ENEA/Lorusso.
2. [2019 – 2021] EUROfusion Research Grant on “EUROfusion Engineering Grant on “TH Analysis of PbLi loops for the DEMO BB” (Marica Eboli). Ref. EUROfusion Task Agreement AWP19-ERG-ENEA/Eboli.
3. [2015 – 2018] EUROfusion Engineering Grant on “TH Analysis of PbLi loops for the DEMO BB” (Emanuela Martelli). Ref. EUROfusion Task Agreement AWP16-EEG-ENEA/Martelli.
4. 10 Ph.D. theses in nuclear related engineering fields.
5. 16 M.S. Eng. theses in Nuclear and Energy Engineering courses

Name and address of employer

**ENEA – Research Centre Brasimone
40032 Camugnano, Bologna, ITALY**

Type of business or sector

Research Institution of Italian Ministry of Economic Development

Dates

January 2003 – December 2010

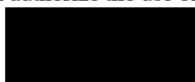
Occupation or position held

[Jan. 2007 – Dec. 2010] **Professional engineer / Researcher**
[Jan. 2004 – Dec. 2006] **Ph.D. Student**
[Jan. 2003 – Dec. 2003] **Professional engineer**

Main activities and responsibilities

Project responsibilities

1. [June 2007 – Dec 2010] Coordinator of the fuel pin mechanics activities and coordinator of fuel team (3 persons)
2. Coordinator of service and research activities with research institutions, TSO, and utilities devoted to design of experiments, code development and validation, safety analysis, licensing, BEPU.
 - a. [Jan 2007 – Dec 2010] Nucleoeléctrica Argentina S.A projects. FSAR and related support activities for the licensing of Atucha-2 Nuclear Power Plant. Coordinator of Tasks aimed at performing: 1) the containment analyses, 2) the PTS studies (TH and ANSYS FEM analyses), 3) the fuel pin performance modelling and analyses, 4) phenomena identification and demonstration of RELAP5-3D code validation in predicting phenomena relevant to safety, for licensing application, 5) contributing to Chapter 4 (core design) of Atucha-2 NPP FSAR.
 - b. [Sept 2005 – Dec 2008] EDF projects (i.e. Inherent Boron Dilution Issue in PWR and CATHARE2 validation). Two service contracts. System analyst in the framework of the first contract and coordinator of the activities in the second contract. Activities related the extension of the validation documentation of CATHARE2 v2.5 against boron dilution tests carried out in AREVA NP integral test facility PKL-III.
 - c. [Nov 2007 – Dec 2010] TRANSURANUS research agreements. Responsible of the activities related the validation of TRANSURANUS code against experimental data.



- d. [March 2006 – June 2006] IRSN project. *LBLOCA in PWR and BEPU activities*). Coordinator of the activities related the development of the CATAHRE2v2.5 nodalization of ZION NPP and simulation of the LBLOCA transient.
- e. [Feb 2005 – Feb 2008] EC TACIS 2.02/02 project. Validation of 3D models for Russian SYS-TH code. Design of experiments in GPNM facility installed at Hidropress, Podolsk.

Participations to International Projects (OECD and IAEA)

1. [2009 – 2010] IAEA ICSP MASLWR. Chief participant. See description above.
2. [2009 – 2010] OECD/CSNI SANDIA project. Experiments addressing the ignition issue of fuel waste in dry storage.
3. [2008 – 2010] US-NRC and OECD/NSC NUPEC PSBT project. *Sub-channel analysis of PWR core*. Simulations of subchannel tests performed in PSBT separate effect test facility installed in Japan, using 1D and 3D models of CATHARE2v2.5_1 code and a 1D model of CATHARE3 code.
4. [2008 – 2010] IAEA CRP FUMEX-III. Chief participant. Improvement of Computer Codes Used for Fuel Behaviour Simulation. It is aimed at improving the predictive capabilities of codes used in fuel behaviour modelling for extended burnup and under transient conditions.
5. [2008 – 2010] OECD/CSNI PKL-2. Design of experiments in KWU-SIEMENS PWR integral test facility and code validation addressing the inherent boron dilution issue and MSLB transients. Organization of an international benchmark.
6. [2005 – 2008] OECD/NEA BEMUSE phases 4, 5 e 6. Best Estimate Methods, Uncertainty and Sensitivity Evaluation based on LB-LOCA case of W-PWR.
7. [2005 – 2007] OECD/CSNI PKL. Design of experiments in KWU-SIEMENS PWR integral test facility (installed at AREVA NP, Erlangen) and code validation addressing the inherent boron dilution issue in mid loop operation and SBLOCA transients.
8. [2004 – 2006] OECD/NEA PSB-VVER. The PSB-VVER project is intended to provide the experimental data (PSB-VVER integral test facility installed at EREC, Electrogorsk) needed to allow full validation of the computer codes used in the thermal-hydraulic analysis of VVER-1000 reactors. Design of experiments and code validation activities using RELAP5/Mod3, RELAP5-3D and CATAHRE2V1.5B. Analyzed transients LB-LOCA, IB-LOCA, SB-LOCA, NC, PRISE.

Technical activities in Projects

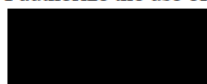
1. [Jan 2008 - Dec 2010] Contributing to Chapter 15 of Final Safety Analysis Report of Atucha-2 NPP.
2. Safety analyst in charge of performing safety analyses of the nuclear power plants and expert of SYS-TH codes
 - a. Nucleoeléctrica Argentina S.A projects. Optimization of the set point actuation of the hydro-accumulators of Atucha-2 NPP.
 - b. EC TACIS 2.03/97 project. Design of experiments in VVER-1000 integral test facility and code validation. Codes: RELAP5/Mod3.3, RELAP5-3D, and CATHARE2. Accident Management procedures for Balakovo NPP Unit #3.
 - c. AUSTRIA PN7 project. Severe accident analyses of SBO, SBLOCA, PRISE transients in Temelin NPP Unit #1 NPP using RELAP5/SCDAP code.
 - d. Collaboration Westinghouse-BNFL and UNiversity of Pisa on IRIS Project.
 - i. Development of a RELAP5/Mod3.3 model of W-IRIS containment and analyses of selected LOCA accident scenarios.
 - ii. Investigation of static and dynamic instabilities of IRIS helical coils steam generator.

Nuclear training activities

1. [2010] TECHNIP spa on fundamentals of nuclear engineering. Duration: 40 hours lectures in two weeks. Participants: about 30 attendees.



	[2009] EC Lithuania's State Nuclear Power Safety Inspectorate (VATESI) on safety analysis and fuel pin mechanics. <i>Duration: 8 hours lectures in one week. Participants: about 15 attendees.</i> [2008] Nuclear Power Institute of China (NPIC) on safety analysis, licensing, natural circulation, experimental campaigns in integral test facilities, inherent boron dilution issue, SYS-TH codes, fuel pin mechanics codes. <i>Duration: 20 hours lectures in one week. Participants: about 20 attendees.</i> [2006 – 2007] 3D SUNCOP courses: RELAP5 code instructor (Barcelona, Buenos Aires, Collage Station TX). <i>Duration: 15 hours hands-on training in one week, each course. Participants: about 15 attendees, each course.</i> <u>Tutoring</u> 3 Ph.D. theses in Nuclear Safety course 3 M.S.Eng. and B.Eng. in Nuclear Engineering
name and address of employer	University of Pisa. Lungarno Antonio Pacinotti, 43 56126 Pisa
Type of business or sector	Research and Education
Dates	February 2002 – August 2002
Occupation or position held	Internship
Main activities and responsibilities	Framework Master Thesis. Preparation of Ch. 15 of the <i>Preliminary Safety Analysis Report</i> (P-SAR) of IRIS reactor design. The objectives were fulfilled: 1) Contributions in developing the RELAP5 model of W-IRIS. 2) Identification of the accident sequences to be analyzed for preparing the P-SAR of W-IRIS. 3) Simulations and analyses of three accident sequences belonging to LOFAs.
Name and address of employer	WESTINGHOUSE-BNFL Science and Technology Department, Pittsburgh, PA, USA
Type of business or sector	Industry
Education and training	
Date	2007
Title of qualification awarded	Title of <u>DOTTORE DI RICERCA IN SICUREZZA NUCLEARE</u> (Equivalent to Ph.D. in Nuclear Safety) Thesis “ <i>Best Estimate Codes Uncertainty Evaluation in the Nuclear Technology: Implementation and Development of CIAU Methodology to CATHARE 2 Code</i> ”
Principal subjects	Development of a tool for uncertainty evaluation of SYS-TH code results. Validation activities of SYS-TH codes REALP5/Mod3.3 and CATHARE2.
Name and type of organisation providing education	University of Pisa
Date	2003
Title of qualification awarded	Professional Engineer Qualification Professional Engineer Register of La Spezia (since 2006)
Name and type of organisation providing education	University of Pisa.
Date	2002



Title of qualification awarded	Title of <u>DOTTORE IN INGEGNERIA NUCLEARE</u> “old Laurea” (Equivalent to <i>MS in Nuclear Engineering</i>) – (106 / 110) Thesis: “ <i>IRIS Reactor Thermal-Hydraulic Behaviour by RELAP5 Code</i> ”																																							
Principal subjects	Supporting the development of a system code nodalization for steady state and transient analyses. Analyses of selected transients and accidents aimed at PSAR preparation																																							
Name and type of organisation providing education	University of Pisa																																							
Personal skills and competences																																								
Mother tongue	Italian (A2)																																							
Other language	English (E)																																							
Self-assessment																																								
European level (*)																																								
Language	<table><tr><th colspan="4">Understanding</th><th colspan="4">Speaking</th><th colspan="2">Writing</th></tr><tr><th colspan="2">Listening</th><th colspan="2">Reading</th><th colspan="2">Spoken interaction</th><th colspan="2">Spoken production</th><th colspan="2"></th></tr><tr><td></td><td>B2</td><td></td><td>B2</td><td></td><td>B2</td><td></td><td>B2</td><td></td><td>B2</td></tr></table>										Understanding				Speaking				Writing		Listening		Reading		Spoken interaction		Spoken production					B2		B2		B2		B2		B2
Understanding				Speaking				Writing																																
Listening		Reading		Spoken interaction		Spoken production																																		
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	(*) <i>Common European Framework of Reference for Languages</i>																																							
Computer skills and competences	<u>Operative Systems</u> : Windows and Linux <u>Office Tools</u> : Word, Excel, PowerPoint, Project <u>Engineering tools</u> : AutoCAD (sufficient), CATIA v5 (sufficient), Inventor (sufficient), SAP2000 Non-linear (sufficient), ANSYS FEM (sufficient); ANSYS CFD (basic); MATLAB (basic) <u>Codes</u> : RELAP5/Mod3 (US-NRC) (expert), RELAP5-3D© (US-INL) (expert), CATHARE2 (F) (expert), SCDAP (US-ISS) (expert), TRANSURANUS (good) <u>Programming Language</u> : Fortran (good).																																							
Other information	• <u>Since 2019, National Academic Qualification as Associate Professor</u>, sector 09/C2, Thermal Physics and Nuclear Engineering. • Registered with the Order of Engineers of La Spezia since April 28, 2006 (No. 1197). • Licensed to energetic certification of buildings and registered in the list of Liguria region from June 2010. • Member of the Editorial Staff of the Journal Science and Technology of Nuclear Installations (Jan. 2008 up to Dec. 2010). • Member of the Organizing Committee in <i>8th International Seminar on Horizontal Steam Generators</i>, Gidropress, Podolsk, Russia Federation, May 19-21, 2010. • Guest Editor of the special issue <i>Integral Test Facilities and Thermal-Hydraulic System Codes in Nuclear Safety Analysis</i>, in Science and Technology of Nuclear Installations, Volume 2012, ISSN: 1687-6075. • Guest Editor of the special issue <i>Thermal-Hydraulics in Nuclear Fusion Technology: R&D and Applications</i>, in Energies, ISSN: 1996-1073, ISBN 978-3-0365-3032-1. • Guest Editor of the special issue <i>Water Coolant Lithium Lead Breeding Blanket and Test Blanket Module: Design and R&D Activities in 2022</i>, in Energies, ISSN: 1996-1073. • [2021 - 2023] Topic Editor of Energies, MDPI, ISSN: 1996-1073. • Contributing to the Editorial Staff of the Special Issue SOFT-30, Fusion Engineering and Design, Vol. 146, Sept. 2019.																																							



- **Member of the Technical Program Committee (TPC) and/or Session Organizer (SO)** at International Conferences
 - NURETH-15, Pisa, Italy, May 12-17, 2013 **SO** of
 - “Integral testing” session
 - NURETH-19, Virtual meeting, Mar 06-11, 2019 **TPC** member and **SO** of
 - “Thermal Hydraulics System Code Analysis” and “Thermal Hydraulics for Fusion” sessions
- **Technical seminars** delivered under request at
 - Westinghouse Energy Centre (Pittsburgh, USA) related to inherent boron dilution and mixing processes and to validation of thermal-hydraulic system codes (5 October 2007)
 - AREVA NP (Lion, France) related to uncertainty evaluation, licensing and validation of thermal-hydraulic system codes (19 September 2007).
 - VKI (Chaussee de Waterloo, France) related to Steam Generator issue in Heavy Liquid Metal Nuclear Reactors (26 November 2013).
 - ASIPP (Hefei, China) related to WCLL Breeding Blanket conceptual design (19 July 2016).
 - JSC “NIKIET” (Moscow, Russia) related to HLM Pool transient experimental investigation (4 October 2016).
- **Invited Lecturer** at 2nd Annual Conference of CFETR Integrated Engineering Design and Fusion Reactor Design Symposium, Yellow Mountain, Anhui, China, Sept. 24-28, 2019.
- **Chairman** at the following International Conferences
 - 8th International Seminar on Horizontal Steam Generators, Gidropress, Podolsk, Russia Federation, May 19-21, 2010 (1 session).
 - 15th International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-15), Pisa, Italy, May 12-17, 2013 (1 session).
 - 4th International Conference on Heavy Liquid Metal Coolant, Obnisk, Russia Federation, Sept 23-27, 2013 (1 session).
 - 5th International Conference on Nuclear and Renewable Energy Resources (NURER2016), Hefei, Anhui, China, Sept 18-21, 2016 (1 session).
 - 18th International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-18), Portland, USA, Aug 18-23, 2019 (3 sessions).
 - NuFuel-MMSNF 2019 Workshop, PSI, Villingen, Switzerland, Nov 4-7, 2019 (1 session).
 - 19th International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-19), Virtual meeting, Mar 06-11, 2019 (5 sessions).
 - 20th International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-20), Washington DC, USA, August 20–25, 2023 (1 session).
 - 5th International Symposium on Fusion Nuclear Technology (ISFNT-15), Las Palmas de Gran Canaria, Spain, Sept. 10-15, 2023 (1 session).
- **Invited Keynote Lecturer** at 20th International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-20), Washington DC, August 20–25, 2023. Title “*Thermal-hydraulics of WCLL Breeding Blanket: R&D and applications*”
- **Freelance contract** with EC for the preparation of two papers in international journals reporting selected results of EC TACIS 2.03/97 and TACIS 2.02/02.



Military service

March 2000 – February 2001

Italian Navy Force. Headquarters: “Centro Addestramento Reclute”, MARICENTRO – LA SPEZIA

Publications

Author/Co.-author of:

- 2 Editorial
- 136 publications in International Journals
- 111 papers in peer-reviewed Int. Conf.
- 9 Contributions in published Content book, International Technical Report (e.g. IAEA, NEA)
- > 300 research reports

List is available in a separate file

Marica EBOLI

INFORMAZIONI PERSONALI

Indirizzo [REDACTED]
Telefono +39 0534801243
E-mail marica.eboli@enea.it; [REDACTED]
Nazionalità Italiana
Data di nascita [REDACTED]

ESPERIENZA PROFESSIONALE

1 Apr. 2024 – in corso **Responsabile del laboratorio** di Progettazione e Sperimentazione Termoidraulica (PST) della divisione NUC-ING (Det. n. 112/2024/DIRGEN).

ENEA NUC-ING CR Brasimone

Località Brasimone, 40032, Camugnano (BO)

Coordinamento delle attività nel campo della termoidraulica nel settore dell'ingegneria nucleare, con particolare riguardo alla fusione nucleare. Coordinamento per progettazione, realizzazione ed esercizio di infrastrutture sperimentali e sezioni di prova per attività di ricerca e sviluppo, analisi dei dati sperimentali e comprensione dei fenomeni termoidraulici. Coordinamento delle attività di simulazioni numeriche multi-fluido/multi-fase in condizioni operative ed incidentali.

1 Feb. 2019 – in corso **Ricercatore**

ENEA FSN-ING CR Brasimone

Località Brasimone, 40032, Camugnano (BO)

Ingegnere termoidraulico e sperimentista. Supporto alla progettazione e alla sicurezza del blanket ad acqua WCLL (Water Cooled Lithium Lead) e del BoP (Balance of Plant) del reattore a fusione DEMO nell'ambito dei progetti EUROfusion.

1. **(01/01/2024 – in corso) Task Coordinator della task BoP-T-02.02**
Responsabile dell'upgrade della facility STEAM e delle relative campagne sperimentali ad alta potenza nell'ambito del working package Balance of Plant Horizon Europe FP9
2. **(01/01/2021-in corso) Responsabile scientifico di Progetto per ENEA** del working package BoP (Balance of Plant) nell'ambito di EUROfusion Horizon Europe FP9 (Det. n.031/2022/FSN).
3. **(01/01/2021-in corso) WCLL BOP R&D Lead Engineer.** Ingegnere capo per la ricerca e sviluppo del Balance of Plant del breeding blanket WCLL di DEMO nell'ambito del working package Balance of Plant del progetto EUROfusion Horizon Europe FP9.
4. **(01/01/2021-in corso) Task Coordinator della task BoP-T-02.01**
Responsabile del design della facility STEAM e delle relative campagne sperimentali a bassa potenza per lo studio di fattibilità di un generatore a tubi dritti a funzionamento pulsato nell'ambito del working package Balance of Plant Horizon Europe FP9.

5. **(01/01/2021-in corso) Responsabile della progettazione della facility LIFUS5/Mod4 e delle relative campagne sperimentali** (Task BB-S.04.02 EUROfusion Horizon Europe FP9) per la simulazione di transitori incidentali di in-box LOCA del WCLL breeding blanket in facility integrali.
6. **(01/02/2019-30/06/2020) Responsabile della progettazione della facility LIFUS5/Mod3 e della esecuzione di due campagne sperimentali** relative all'interazione PbLi/acqua conseguente alla rottura di un tubo di refrigerazione ad acqua nel breeding blanket WCLL. (Tasks BB-5.4.2, SAE-2.3 and SAE-2.5 nell'ambito del progetto EUROfusion Horizon 2020 FP8)
7. **(01/01/2021-in corso) Task Coordinator della task SAE-T.01.01** EUROfusion Horizon Europe FP9 per l'esecuzione della nuova campagna sperimentale su LIFUS5/Mod3 relativa all'interazione PbLi/acqua.
8. **01/01/2021-in corso)** Team player nella progettazione della piattaforma W-HYDRA e della facility Water Loop che verranno installate al CR ENEA Brasimone nell'ambito del progetto EUROfusion Horizon Europe.
9. **(01/02/2019-in corso)** Simulazioni numeriche con i codici SIMMER e RELAP per la validazione del modello chimico di interazione PbLi e acqua mediante dati sperimentali ottenuti dalle campagne sperimentali sulle facility LIFUS5/Mod3 e LIFUS5/Mod4.
10. **(01/02/2019-in corso)** Team player nella progettazione del WCLL breeding blanket nell'ambito dei progetti EUROfusion Horizon 2020 FP8 e Horizon Europe FP9.
11. **(01/03/2019-28/02/2021) Vincitrice del Researcher Grant EUROfusion “Development of a multi-fluid and multi-field numerical tool for the modelling of WCLL BB water cooling and PbLi systems”.** L'obiettivo dell'attività di ricerca è stato quello di sviluppare uno strumento numerico computazionale per le analisi deterministiche di sicurezza dello scenario incidentale di in-box LOCA nel WCLL breeding blanket. Il primo step è stato quello di investigare i fenomeni connessi all'interazione tra i fluidi PbLi e acqua, con focus sui processi termodinamici e chimici che avvengono durante l'interazione, mediante test sperimentali eseguiti sulla facility LIFUS5/Mod3. Contemporaneamente sono state eseguite analisi numeriche sviluppando uno strumento di accoppiamento tra codici, in particolare tra il codice SIMMER e il codice RELAP5/Mod3.3, in grado di simulare il transitorio incidentale.

1 Nov. 2016 **Assegno di Ricerca** “*Supporting activities on thermo-hydraulics and safety*
31 Gen. 2019 *of Gen. IV Nuclear Power Plants*”

Università di Pisa – ENEA CR Brasimone

Largo Lucio Lazzarino 2, 56122 Pisa – Località Brasimone, Camugnano (BO), 40032

1. Responsabile della progettazione e dell'esecuzione della campagna sperimentale sulla facility LIFUS5/Mod3 per il progetto MAXSIMA EURATOM-FP7 Task 4.2 dal titolo: “*SGTR Bubble Characteristics*”, in particolare per caratterizzare sperimentalmente il rateo di perdita

dalle cricche che si generano nei tubi in pressione degli scambiatori di calore dei reattori di IV generazione.

2. Coinvolta nella Task WPBoP-3.1.3 EUROfusion Horizon 2020 FP8 per la progettazione di un Balance of Plant con impianto di accumulo integrato al WCLL BB per il reattore DEMO.
3. Coinvolta nella Task WPBoP-4.1.1 in supporto alla progettazione di uno scambiatore di calore a PbLi e per l'esecuzione della campagna sperimentale.

1 Nov. 2013 **Borsa di dottorato ministeriale**

31 Ott. 2016

Università di Pisa – ENEA CR Brasimone

Largo Lucio Lazzarino 2, 56122 Pisa – Località Brasimone, Camugnano (BO), 40032

1. Implementazione del modello di reazione chimica tra Piombo-Litio e acqua nel codice SIMMER.
2. Verifica e validazione del modello implementato mediante test sperimentali di BLAST e LIFUS5.
3. Code assessment e valutazione dell'accuratezza.
4. Coinvolta nella progettazione della facility LIFUS5/Mod3 nell'ambito del progetto EUROfusion Horizon 2020 FP8 (Task WPBB-5.4.2 "*PbLi-Water Reaction*" e Task WPSAE) per lo studio dell'interazione PbLi/acqua conseguente alla rottura di un tubo di refrigerazione ad acqua nel breeding blanket WCLL.
5. Analisi numeriche di pre-test effettuate con i codici SIMMER e RELAP5/Mod3.3 in supporto alla progettazione della facility LIFUS5/Mod3.
6. Coinvolta nella Task 6.4 del progetto LEADER EURATOM-FP7 intitolato "*HLM/water interaction*" per l'esecuzione della campagna sperimentale nella facility LIFUS5/Mod2 con focus sullo studio dello scenario incidentale di rottura del tubo di uno scambiatore di calore (Steam Generator Tube Rupture - SGTR) nella configurazione del generatore di vapore a spirale del reattore ELFR (European Lead Fast Reactor).

1 Gen. 2013 **Borsa di studio e approfondimento:** "*Simulation and modeling of fuel*

31 Ott. 2013 *dispersion in the coolant of MYRRHA reactor*"

Dipartimento Di Ingegneria Civile e Industriale (DICI) – Università di Pisa
Largo Lucio Lazzarino 2, 56122 Pisa

1. Partecipazione al progetto EURATOM FP7 SEARCH e ai relativi meeting tecnici internazionali.
2. Realizzazione del modello tridimensionale del reattore MYRRHA con il codice SIMMER-IV.
3. Analisi termo-idraulica in condizioni stazionarie per verificare la correttezza del modello.
4. Analisi di dispersione del fuel nel circuito primario del reattore MYRRHA.
5. Analisi di sensitività su parametri chiave che influenzano i fenomeni di dispersione del fuel nel circuito primario (i.e. posizione del rilascio,

dimensione delle particelle di fuel, densità relativa tra MOX e LBE).

ISTRUZIONE E FORMAZIONE

27 Giugno 2017 **Dottorato di Ricerca** in Ingegneria Industriale curriculum Nucleare E Sicurezza Industriale (ottimo)

Tesi: “*Safety Investigation Of In-Box LOCA For Demo Reactor: Experiments And Analyses*”

Università di Pisa

L’attività di ricerca è stata svolta presso il laboratorio ENEA FSN-ING-PAN del Dipartimento Fusione e Tecnologie per la Sicurezza Nucleare (FSN) del C.R. ENEA Brasimone, nell’ambito del programma europeo per la realizzazione del reattore a fusione DEMO coordinato dal consorzio EUROfusion (WPBB e WPSAE del progetto EUROfusion Horizon 2020 FP8). Obiettivo del lavoro di dottorato è stato investigare l’incidente di perdita del refrigerante nel modulo del breeding blanket ad acqua (WCLL in-box LOCA) con particolare riguardo ai fenomeni rilevanti per la sicurezza.

La tesi di dottorato si è quindi focalizzata su un duplice obiettivo: 1) sviluppare un codice numerico qualificato per le analisi di sicurezza deterministiche del WCLL-BB in-box LOCA, anche in supporto alla progettazione del breeding blanket e dei sistemi ad esso connessi, 2) validare tale codice numerico su dati sperimentali disponibili in letteratura, o forniti dalla campagna sperimentale su LIFUS5/Mod3, specificatamente progettata allo scopo della validazione del codice.

20 Febbraio 2014 **Abilitazione** all'esercizio della Professione di Ingegnere Industriale

Università di Pisa

10 Dicembre 2012 **Dottore Magistrale In Ingegneria Nucleare E Della Sicurezza Industriale** (110 / 110)

Tesi: “*Thermal Hydraulic Analysis of Postulated Accidents in a HLM Cooled Fast Reactor*”

Università di Pisa

La tesi è stata svolta presso il Dipartimento di Ingegneria Civile e Industriale (DICI) dell’Università di Pisa nell’ambito del progetto EURATOM FP7 SEARCH. La tesi rappresenta un contributo allo sviluppo e alla qualifica di codici e metodi termoidraulici di sistema per l’analisi di sicurezza di reattori di IV Generazione refrigerati a metallo liquido. Obiettivo dell’attività è stato analizzare possibili scenari incidentali nei reattori veloci refrigerati a metallo liquido pesante (i.e. reattore MYRRHA-FASTEF). Il codice SIMMER-III è stato usato per lo sviluppo del modello numerico del reattore, e sono state effettuate analisi in stazionario per verificare la correttezza di tale modello. Infine sono stati analizzati possibili transitori incidentali (Design Basis Accident DBA e Design Extension Condition Accident DEC) al fine di garantire un sufficiente livello di sicurezza del reattore, esaminando anche l’influenza della densità del MOX sulla dispersione del fuel nel circuito primario.

01 Dicembre 2008 **Dottore In Ingegneria Della Sicurezza Industriale E Nucleare**

Tesi: “*ECART Analyses of Dry Confinement Bypass Transients for the ITER Plant*”

Università di Pisa

La tesi è stata svolta presso il Dipartimento di Ingegneria Meccanica, Nucleare e della Produzione (DIMNP) dell’Università di Pisa. L’obiettivo della tesi è stato investigare possibili transitori di bypass (piccole e grandi rotture) del sistema di confinamento del reattore ITER mediante codice di calcolo ECART, in particolare focalizzandosi sulla quantificazione del rischio radiologico in caso di rilascio di Trizio.

COMPETENZE PROFESSIONALI

- Esperienza di tutoring a studenti di Laurea Magistrale e di Dottorato
- Esperienza a lavorare in team (con tecnici, ricercatori, studenti, fornitori, ingegneri)
- Gestione progetti, responsabile scientifico di progetto e task coordinator.
- Progettazione di impianti nucleari a fusione e fissione acquisite grazie all’esperienza sulle facility sperimentali LIFUS5/Mod2 e LIFUS5/Mod3 presso ENEA Brasimone.
- Progettazione, analisi termoidraulica e analisi di sicurezza di impianti a fusione e fissione
- Uso e Sviluppo di codici termoidraulici di sistema/coarse mesh grid (SIMMER-III e SIMMER-IV) per l’analisi termofluidodinamica e di sicurezza
- Conoscenza della strumentazione di processo (termocoppie, trasduttori di pressione, flussimetri, misuratori di livello, estensimetri, cavi scaldanti)
- Attività sperimentale su infrastrutture, facility, laboratori (attualmente responsabile delle facility LIFUS5/Mod3, STEAM, LIFUS5/Mod4 in ENEA CR Brasimone)

Autore di più di 40 articoli indicizzati su riviste internazionali e oltre 700 citazioni inerenti ad analisi termoidrauliche in ambito fissione e fusione, sviluppo e calcoli numerici di validazione codici, attività sperimentali su interazione acqua/metalli pesanti.

<https://www.scopus.com/authid/detail.uri?authorId=56421982600>

Italiano (lingua madre), Inglese (Livello Europeo B2)

Ai sensi e per gli effetti degli articoli 46 e 47 e consapevole delle sanzioni penali previste dall'articolo 76 del d.P.R. 28 dicembre 2000, n. 445 nelle ipotesi di falsità in atti e dichiarazioni mendaci, dichiaro che le informazioni riportate nel presente curriculum vitae, redatto in formato europeo, corrispondono a verità. Autorizzo il trattamento dei dati personali presenti nel CV ai sensi del D.Lgs. 2018/101 e del GDPR (Regolamento UE 2016/679).

Camugnano, 20 Gennaio 2025



Ranieri MARINARI

PERSONAL INFORMATION

Telephone +39 0534-801114

E-mail ranieri.marinari@enea.it

Nationality Italian

Gender Male

Date of birth



WORK EXPERIENCE

1 Nov 2023 - ongoing **Researcher**

ENEA NUC-ING-PST, CR Brasimone

Località Brasimone, 40032, Camugnano (BO)

Thermo-hydraulic and experimentalist engineering in support of the design and safety analysis of the WCLL (Water Cooled Lithium Lead) TBS (Test Blanket System) and BB (Breeding Blanket) and BoP (Balance of Plant) of the DEMO fusion nuclear plant in the framework of the EUROfusion Consortium in the European DEMO Programme.

1. **WCLL Lead Engineer**. Responsible for the design of WCLL BB concept.

2. **Team coordinator** in the design of the W-HYDRA platform in ENEA CR Brasimone under the framework of Horizon Europe FP9.

Thermo-hydraulic and numerical CFD code expert in support of the design of the Ion Cyclotron Resonance heating antenna for the Divertor Tokamak Test facility in Frascati

1. Active participant in the ICRH work package of the **DTT project**

2. CFD and FEM analyses for the design of the cooling system for the ICRH antenna

1 Jun. 2020 **EUROfusion Research Grant**

31 Oct. 2023

ENEA FSN-ING CR Brasimone

Località Brasimone, 40032, Camugnano (BO)

Thermo-hydraulic and experimentalist engineering in support of the **design** and **safety analysis** of the IFMIF-DONES lithium loop.

1. Safety analysis on the corrosion behavior of liquid lithium with eurofer97 and AISI316.

2. Design of an experimental loop for the assessment of different lithium cold trap design.

3. Numerical and CFD analysis in support of the upgrade of a resistivity meter for measuring lithium impurity content.

Design and build-up of a rotating target for a D-T ion source inside an Italian project (SORGENTINA-RF) to be used to produce radiopharmaceutical drugs

1 Nov. 2016 **Ministerial Research Grant**

31 Ott. 2019

Università di Pisa – ENEA CR Brasimone

Largo Lucio Lazzarino 2, 56122 Pisa – Località Brasimone, Camugnano (BO), 40032

1. CFD design of mock-up and facility in EU and China for the development of GEN IV LFRs
2. Design and post test analyses on the flow blockage phenomenon inside LFR reactors.
3. Experimental campaign on different Lead bismuth facilities (CIRCE and NACIE-UP).
4. Actively involved in the SESAME H2020 EU project for the development of GEN IV reactors.

1 Feb. 2015 **Research fellowship:**

31 Oct. 2016

Dipartimento Di Ingegneria Civile e Industriale (DICI) – University of Pisa
Largo Lucio Lazzarino 2, 56122 Pisa

1. Design of LBE cooled fuel bundles for experimental facilities in Italy (CIRCE facility) and China (CLEAR facility)

STUDIES AND ACADEMIC CAREER

18 February 2020 **Ph. D in Industrial Engineering** (curriculum Nuclear and Industrial Safety)

Thesis: *“Numerical and experimental study of thermal-hydraulics and flow-blockage phenomena in heavy liquid metal cooled bundles”*

University of Pisa

The Ph.D. research activity was conducted at ENEA C.R. Brasimone in the international framework of the H2020 SESAME project.

The research activity was mainly focused on the numerical and experimental study of heavy liquid metal cooled bundles operated at ENEA Brasimone RC or in different research centres. The Ph.D. activity was also focused on the internal flow blockage and its main consequences in Heavy liquid metal grid spaced bundles with experimental activities carried out on the NACIE-UP loop equipped with an appropriate test section (designed and commissioned during the Ph.D. activity). During the research activity I worked in several international projects focused on the design of experimental installation in the field of LFR technology, in particular for the

design of the fuel bundle simulator to be installed in a pool-type experimental facility in China (CLEARM1x).

20 Febbraio 2014 **Industrial Engineer Qualification Exam**

University of Pisa

10 November 2011 **Master Degree in Nuclear Engineering and Industrial Safety**

University of Pisa

PROFESSIONAL SKILLS

Good experience in team working (students, researchers and technicians, external contractors, engineering)

Excellent experience in the design of experimental facilities (both for fusion and fission applications) in the field of Heavy Liquid Metal (HLM) technology acquired at ENEA CR BRASIMONE and China on *CIRCE*, *NACIE-UP*, *KYLIN-II*, *CLEAR-S* and *CLEAR-MIX* facilities.

Excellent experience in the design, thermohydraulic analysis and safety analysis of nuclear power plant (for fusion and fission applications)

User-experienced in the use of thermo-hydraulic system/coarse mesh grid codes (*ANSYS CFX*) for thermo-fluid dynamics and safety analysis

Excellent knowledge of process instrumentation (thermocouples, pressure transducers, flow meters, level gauges, strain gauges, heating cables)

Excellent ability to work on experimental infrastructures, facilities, laboratories

Author of more than 50 research reports; 12 papers in peer-reviewed Int. Conf., more than 30 publications in indexed International Journals and over 370 citations related to fission and fusion thermohydraulic analysis, development and numerical simulations for code validation, experimental activities on heavy liquid metal/water interaction.

<https://www.scopus.com/authid/detail.uri?authorId=57130966100>

Italian (mother tongue), English (European Level B2)

Camugnano, 06th February 2025

Sign

