

## PERSONAL INFORMATION

CIURLUINI CRISTIANO

## WORK EXPERIENCE

Feb.-Oct. 2018

**Sapienza University of Rome****Rome**

Term contract as researcher with Department of Astronautic, Electrical and Energy Engineering (DIAEE) of Sapienza University of Rome. Research activity focused on the preparation, validation and documentation of the thermal-hydraulic model of PHENIX reactor for the best estimate system code RELAP5 3-D.

Nov. 2021 - Oct. 2022

**Sapienza University of Rome****Rome**

Research fellowship with DIAEE of Sapienza University of Rome. Research activity focused on the thermal-hydraulic analysis of primary cooling systems related to fusion reactors, considering both operative conditions and accidental scenarios. The main goal was to support the design of the whole system, as well as of the main components.

## EDUCATION AND TRAINING

Nov. 2018 – Oct. 2021

**Sapienza University of Rome****Rome**

PhD in “Energy and Environment”. Research activity focuses on the design and thermal-hydraulic transient analysis of fission and fusion nuclear reactors of new generation. In particular, sodium and lead fast reactors, Fast Flux Test Facility (FFTF) and Advanced Lead Fast Reactor European Demonstrator (ALFRED), and nuclear fusion reactors, International Thermonuclear Experimental Reactor (ITER) and European DEMONstration Power Plant (EU-DEMO).

Oct. 2012 – Jan. 2018

**Sapienza University of Rome****Rome**

- Bachelor’s degree in Energy Engineering with the academic record of 110/110 cum laude, discussing the thesis “Confronto tra i principali modelli di simulazione del fenomeno di esplosione di gas”;

- Master's degree in Energy and Nuclear Engineering with the academic record of 110/110 cum laude, discussing the thesis "DEMO Primary Heat Transfer System and Balance of Plant: thermal hydraulic design and simulations using Relap-5 code".  
**Taken Exams:** Fluidodinamica 30/30 (Prof. Giovanni Paolo Romano); Principi di Fisica Atomica e Nucleare 28/30 (Prof. Stefano Atzeni); Fisica dei Plasmi 30/30 (Prof. Stefano Atzeni and Angelo Schiavi); Impianti Nucleari 30/30 cum laude (Prof. Gianfranco Caruso); Misure e Caratterizzazione dei Materiali Nucleari 29/30 (Prof. Romolo Remetti); Elementi di Impianti e Centrali Elettriche 30/30 (Prof. Fabio Massimo Gatta); Ingegneria del Nocciolo 30/30 cum laude (Prof. Renato Gatto and Augusto Gandini); Radioprotezione 30/30 cum laude (Prof. Romolo Remetti); Centrali Termiche 30/30 (Prof. Giovanni Molinari); Fluidodinamica Sperimentale 29/30 (Prof. Giovanni Paolo Romano); Macchine Elettriche 30/30 (Prof. Ezio Santini).

Sept. 2012 - Jul. 2017

**Collegio Universitario Lamaro Pozzani (Federazione Nazionale Cavalieri del Lavoro)**

**Rome**

This College, funded and financed by Federazione Nazionale Cavalieri del Lavoro, hosts excellent students selected with strict criteria. During the university career, they must additionally attend lectures on business, economics and corporate law. There are ten modules of lectures, each one followed by an exam. The entire course is named 'Corso di cultura per l'impresa Gaetano Marzotto'. English lectures are foreseen each year. Students can give also their contribution to the review 'Panorama per i giovani' writing articles about science, economics, education and university, politics, literature and philosophy.

- 'Corso di cultura per l'impresa Gaetano Marzotto: 'Ottimo cum Laude'.
- Article 'Start-up: la scelta vincente' published on Panorama per i giovani (vol. 3, Sept. - Dec. 2014).

Sept. 2007 - Jul. 2012

**Liceo Scientifico Galileo Galilei**

**Tarquinia (VT)**

Graduated with the record of 100/100 cum laude.

LANGUAGE SKILLS

Mother tongue Italian

Other languages

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	B2	C1	B2	B2	C1
French	B2	B2	B2	B2	B2

## DIGITAL SKILLS

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- Microsoft Office suite proficient user (word processor, spread sheet, presentation software)
- Proficient user of the best-estimate system thermal-hydraulic RELAP5 code series (RELAP5 Mod3.3 and RELAP5-3D). Five years of experience.
- MATLAB® proficient user. Five years of experience.
- Python starter user.

## INTERNSHIPS

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Jul. 2017

**Research Center of ENEA Brasimone****Camugnano  
(BO)**

Internship in Fusion reactor design and simulation with RELAP5 code

## PUBLISHED PEER REVIEWED PAPERS

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1. E. Martelli et al., Thermal-hydraulic modeling and analyses of the water-cooled EU DEMO using RELAP5 system code, Fusion Eng. Des., 146, 2019, 1121-1125. <https://doi.org/10.1016/j.fusengdes.2019.02.021>.
2. C. Ciurluini et al., Thermal-hydraulic modeling and analysis of the Water Cooling System for the ITER Test Blanket Module. Fusion Eng. Des. 158, 2020, 111709. <https://doi.org/10.1016/j.fusengdes.2020.111709>.
3. C. Ciurluini et al., Preliminary neutron kinetic – thermal-hydraulic coupled analysis of the ALFRED reactor using PHISICS/RELAP5-3D. J. Phys. Conf. Ser. 1599, 2020, 012023. <https://doi.org/10.1088/1742-6596/1599/1/012023>.
4. C. Ciurluini et al., Analysis of the thermal-hydraulic behavior of the EU-DEMO WCLL Breeding Blanket cooling systems during a Loss Of Flow Accident. Fusion Eng. Des., 164, 2021, 112206. <https://doi.org/10.1016/j.fusengdes.2020.112206>.
5. A. Tincani et al., Conceptual design of the main Ancillary Systems of the ITER Water Cooled Lithium Lead Test Blanket System. Fusion Eng. Des. 167, 2021, 112345. <https://doi.org/10.1016/j.fusengdes.2021.112345>.
6. C. Ciurluini et al., Study of the EU-DEMO WCLL Breeding Blanket Primary Cooling Circuits Thermal-Hydraulic Performances during Transients Belonging to LOFA Category. Energies, 14(6), 2021, 1541. <https://doi.org/10.3390/en14061541>.
7. C. Ciurluini et al., Conceptual design overview of the ITER WCLL Water Cooling System and supporting thermal-hydraulic analysis. Fusion Eng. Des. 171, 2021, 112598. <https://doi.org/10.1016/j.fusengdes.2021.112598>.
8. V. Narcisi et al., Thermal-hydraulic transient analysis of the FFTF LOFWOS Test #13. Nucl. Eng. Des. 383, 2021, 111405. <https://doi.org/10.1016/j.nucengdes.2021.111405>.

9. L. Melchiorri et al., Preliminary MHD pressure drop analysis for the prototypical WCLL TBM with RELAP5/MOD3.3. *Fusion Eng. Des.* 176, 2022, 113048. <https://doi.org/10.1016/j.fusengdes.2022.113048>.
10. I. Moscato et al., Tokamak cooling systems and power conversion system options. *Fusion Eng. Des.* 178, 2022, 113093. <https://doi.org/10.1016/j.fusengdes.2022.113093>.
11. L. Barucca et al., Maturation of critical technologies for the DEMO balance of plant systems. *Fusion Eng. Des.* 179, 2022, 113096. <https://doi.org/10.1016/j.fusengdes.2022.113096>.
12. F. Galli et al., Evaluation of the thermal-hydraulic performances of a once-through steam generator in nuclear fusion applications. *J. Phys. Conf. Ser.* 2177, 2022, 012017. <https://doi.org/10.1088/1742-6596/2177/1/012017>.
13. M. Molinari et al., Transient analysis of OSU-MASLWR with RELAP5. *J. Phys. Conf. Ser.* 2177, 2022, 012018. <https://doi.org/10.1088/1742-6596/2177/1/012018>.
14. V. Narcisi et al., Analysis of EU-DEMO WCLL Power Conversion System in Two Relevant Balance of Plant Configurations: Direct Coupling with Auxiliary Boiler and Indirect Coupling. *Sustainability* 14(10), 2022, 5779. <https://doi.org/10.3390/su14105779>.

## ATTENDED CONFERENCES

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2022, Sept. 18-23	32 <sup>nd</sup> Symposium on Fusion Technology (SOFT), Dubrovnik (Croatia).
2022, Mar. 06-11	19 <sup>th</sup> International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-19), Virtual Meeting.
2021, Jun. 21-22	38 <sup>th</sup> UIT International Conference, 100% online.
2020, Sept. 20-25	31 <sup>st</sup> Symposium on Fusion Technology (SOFT), Virtual Edition.
2019, Sept. 22-27	14 <sup>th</sup> International Symposium on Fusion Nuclear Technology, Budapest (Hungary).
2019, Jun. 24-26	37 <sup>th</sup> UIT Heat Transfer Conference, Padova (Italy).

## INTERNATIONAL PROJECTS

Horizon 2020  
2018-2020

One of the main goal of the Horizon 2020 European (EU) research programme is the completion of the ITER fusion test facility followed by the construction of a demonstration fusion power plant (DEMO) which needs to be able to produce significant amounts of electricity by 2050. European Commission has developed a partnership with a consortium of fusion laboratories from all EU Member States and Switzerland, named EUROfusion Consortium. The signatory for Italy is ENEA. Among the ENEA linked third parties there is the DIAEE of Sapienza University of Rome, where I worked since beginning of 2018. EUROfusion research activities are articulated in different Working Packages (WP), each one addressing a specific technological issue emerging from the design of the overall fusion reactor. In particular, I gave my contribution in the following WPs:

- Work Package (WP) Plant Level System Engineering, Design Integration and Physics Integration.
- Work Package Balance of Plant.
- Work Package Breeding Blanket.

In the framework of these WPs, I performed sizing activities and thermal-hydraulic simulations to support the pre-conceptual and conceptual design of ITER Water-Cooled Lithium Lead (WCLL) Test Blanket System and EU- DEMO WCLL Breeding Blanket and Balance of Plant.

IAEA CRP I32011  
2018-ongoing

An International Atomic Energy Agency (IAEA) Coordinate Research Project is a network of national research institutions which collaborate within an operational framework for research with a similar and well defined global or regional problem focus which is relevant to nuclear technology. As a part of the DIAEE research team I participated to the CRP I32011. It deals with a benchmark analysis involving the simulation of a Loss of Flow Without Scram test performed at the American Fast Flux Test Facility reactor. FFTF was a loop-type sodium fast reactor prototype. Research institutions from all over the world participate to the benchmark exercise. The main goal of this research activity is the coupling between neutron-kinetic and thermal-hydraulic codes for the developing of a full-integrated tool to investigate safety-relevant accidental scenarios characterizing these fission reactors of new generation.

Horizon Europe  
2021-today

Horizon Europe programme continues the research activities started with the previous Horizon 2020 programme. The main goal is the prosecution of the European roadmap towards the production of electricity from fusion energy source. I gave my contribution in the following WPs:

- Work Package Balance of Plant.
- Work Package Breeding Blanket.

In the framework of these WPs, I performed sizing activities and thermal-hydraulic simulations to support the conceptual design of EU- DEMO WCLL Breeding Blanket and Balance of Plant, with related components.