

## PERSONAL INFORMATION Sergio Mingo Barba



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Gender Male | Date of birth 17/04/1996 | Nationality Spanish

**Keywords:** Monte Carlo simulation, Radiotherapy, Medical Physics.

## EDUCATION AND TRAINING

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October 2018 –  
September 2020

### Erasmus Mundus Joint Master Degree in Nuclear Physics

University of Catania (Italy), University of Caen (France) and University Complutense of Madrid (Spain)

<http://www.emm-nucphys.eu/>

**Final grade:** 9.3/10

**Internship:** “Simulating the  $\beta^+$  emitter productions in the body during a carbon therapy irradiation session” (Laboratoire de Physique Corpusculaire of Caen, France)

He developed a code in ROOT to simulate the production profiles of  $\beta^+$  emitters by carbon ions based on experimental cross-sections. The aim of the internship was to learn more about a method of dose delivery verification after a cancer treatment with ions using a PET image and Monte Carlo simulations. At the end of my internship, he compared the results obtained using his code with the results obtained using Geant4.

**Thesis:** “Monte Carlo simulation and dosimetric optimisation of the ELIMED laser-driven beamline” (Laboratori Nazionale del Sud of Catania, Italy)

The thesis was about the beam characterisation of ELIMED (a new installation placed in Prague devoted to the study of accelerating ions using high power lasers and its applications to medical physics). He performed some Geant4 simulations to optimize the transmission efficiency of the beamline as well as the dosimetric parameters at the irradiation point.

22 – 26 of July  
2019

### Summer course “Novel nuclear instrumentation”

CAEN Sys laboratories (Viareggio, Italy)

<https://www.caen.it/>

October 2014 –  
June 2018

### Bachelor Degree in Physics

University Complutense of Madrid (Spain)

<https://fisicas.ucm.es/>

**Final grade:** 8.87/10 (13 subjects passed with honours)

**Thesis:** The use of Monte Carlo method in Positron Emission Tomography (PET)

The aim of the thesis was to understand the applications of nuclear physics in medicine, especially the PET image, and the different errors that may occur during a PET scan and how the Monte Carlo simulations are used to reduce these errors.

## PERSONAL SKILLS

Mother tongue(s) Spanish

Other language(s)	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	B2	B2	B2	B2	B2
Cambridge First Certificate (overall score: 172) <b>Note:</b> Two years of master in English after the examination.					
Italian	B1	B1	B1	A2	A2
No official certification at the moment. <b>Note:</b> One year and a half living in Catania (Italy).					

Levels: A1/2: Basic user - B1/2: Independent user - C1/2 Proficient user  
Common European Framework of Reference for Languages

- Computer skills**
- Good programming skills in C++, ROOT, Geant4, Matlab, R, Python and Mapple.
  - Experience working in Linux.
  - Good command of Microsoft Office™ tools.

## ADDITIONAL INFORMATION

**Publications** Not available yet but planning to publish one or two papers related with his master thesis. If interested in reading the master thesis, please contact him by mail.

**Honours and awards**

- One of the third prizes in the Madrid local phase of the Physics Olympiad (2014).
- Silver medal (22<sup>nd</sup> place) and the special prize for the best resolution of the experimental test in the National Spanish Physics Olympiad held in A Coruña, in April 2014.

**References**

- Pablo Cirrone ([pablo.cirrone@lns.infn.it](mailto:pablo.cirrone@lns.infn.it)): Professor during the first year of the master, supervisor of the master thesis and researcher in the Medical Physics group of the Laboratori Nazionale del Sud (LNS) in Catania (Italy)
- Samuel Salvador ([salvador@lpccaen.in2p3.fr](mailto:salvador@lpccaen.in2p3.fr)): Supervisor of the master internship and researcher in the Industrial and Medical applications group of the Laboratoire de Physique Corpusculaire (LPC) in Caen (France).

## LONG BIO

Sergio Mingo is one of the Early Stage Researchers (ESR) selected in the Hyperboost project. He will carry out the ESR5: "Model-based Data Analysis of Radio-sensitization by Hyperthermia in Combination with Radiotherapy" in the ZHAW School of Engineering (Switzerland) under the supervision of Prof. Dr. Stephan Scheidegger.

Sergio received his bachelor in Physics by the University Complutense of Madrid (Spain) in 2018. While he was studying it, he developed an especial interest in medical and computational physics. Indeed, his bachelor thesis "*The use of Monte Carlo method in Positron Emission Tomography (PET)*" was related with both topics.

After he finished his bachelor, he was selected, out of around 200 applications, in the Erasmus Mundus Joint Master Degree Programme in Nuclear Physics, a master programme between Italy, France and Spain. He followed the application path of the master, which was especially focused on medical applications.

Finally, his master internship "*Simulating the  $\beta^+$  emitter productions in the body during a carbon therapy irradiation session*" at the Laboratoire de Physique Corpusculaire (LPC) in Caen (France) and his master thesis "*Monte Carlo simulation and dosimetric optimization of the ELIMED laser-driven beamline*" at the Laboratori Nazionale del Sud (LNS) in Catania (Italy) deserve an especial mention because, from them, he got experience in working in worldclass physic groups and I obtained many valuable skills.