

Born in [REDACTED]

Laurea cum laude in Nuclear Engineering, Politecnico di Torino, 1980.

Nuclear Engineering Master "G. Agnelli", Laurea cum laude, Politecnico di Torino, 1982.

PhD in Energetics (I Cycle), Politecnico di Torino, 1987 with research projects on Energy Systems and Nuclear Reactor Physics. 1987 to date: Associate Professor (confirmed in 1991) of the Engineering Faculty (at present Engineering and Architecture School) of the University of Bologna. From 1987 charged of courses in Nuclear Reactor Physics for the College in Nuclear Engineering (Applied Neutronics, Nuclear Physics, Fission and Fusion Nuclear Reactor Physics, Advanced Nuclear Reactors) and, from 2005, for the College in Energy Engineering (Plasma Physics and Nuclear Reactor Physics, Radiation Protection). From 2001 to 2013 member of the Council of the PhD in Nuclear and Energy Engineering and Environmental Control of the University of Bologna. From 2019 member of the Council of the PhD in Mechanics and Advanced Engineering Sciences (DIMSAI) of the University of Bologna.

Present affiliation: University of Bologna, Industrial Engineering Department, Montecuccolino Laboratory.

Researches on the modelization of Neutron Transport in Nuclear Reactors, Nuclear Reactor Dynamics, Particle Transport, Computational Methods, basic Plasma Physics and Complex System Dynamics, Pulsed Power Plasma Devices (Plasma Focus) for particle and radiation beam production for medical application.

Head of the PF (Plasma Focus) Laboratory of Montecuccolino Laboratory.

Member of INFN, IAIA (International Association for Impact Assessment, member of the Scientific Council of the Italian Section); past member of AAAS, CNISM and of AIN (Associazione Italiana Nucleare, member of the Scientific Council).

Scientific consultant services and educational activities in partnership with several Companies and scientific institutions.

From 2010, University of Bologna delegate in the Directive Council of the CIRTEN (Consorzio Interuniversitario per la Ricerca Tecnologica Nucleare) Consortium.

Liaison Officer of the Nuclear Energy Agency (OECD/NEA) for UniBo.

Research projects:

- Development of methods and codes for the analysis of the environmental impact of accidental releases of radioactive contaminants with application to nuclear power and fuel cycle plant decommissioning activities.
- Development of deterministic and Monte Carlo models for the core design of nuclear reactors. In partnership with UCB (University of California at Berkeley), CEA (Commissariat à l'Energie Atomique, Centre de Cadarache), INL (Idaho National Laboratory), ENEA and in the framework of European Research Projects (EFIT and ELSY with ENEA, LEADER as UniBo) and national ones (Accordo di Programma Ministero dello Sviluppo Economico - ENEA, "Ricerca di Sistema Elettrico - Nuovo Nucleare da Fissione")
- From 2004 to 2013, chair and scientific referee of the research carried out in the framework of the "Study of Plasma Focus Devices Medical Applications in Cancer Diagnosis and Therapy" Project of the Alma Mater s.r.l. of Fondazione Alma Mater Project for the study of radioisotopes production for PET and

particle beams for IORT applications. First inventor in several national and international related Patents.

- From the Academic Year 2008/09 to 2011/12 Academic Director of the second level Master in Design and Management of Advanced Nuclear Systems of the University of Bologna.

- From 2010 to 2012, associated to the IEO (Istituto Europeo di Oncologia) research project, with AIRC (Associazione Italiana per la Ricerca sul Cancro) financial support, for the analysis of the effectiveness with respect to IORT applications of Plasma Focus devices (AIRC Grant Reference Code Project n. 10559 "Analysis of characteristics of Plasma Focus beams: its future oncological applications", PI Roberto Orecchia).

- From 2010 to 2012 Chair of the Italy-Japan Scientific Cooperation Project of the Italian Foreign Affairs Department (Progetti di Grande Rilevanza, PGR00079) for "PROMETHEUS Research Laboratory for proton, ion and coherent X radiation, based on laser-plasma interaction. Laser injector formation requirements for post-acceleration".

- From 2012 to 2015, scientific referee of the research program UniBo (Fondazione Alma Mater)-CEA (Centre de Cadarache) on the Jules Horowitz high flux reactor.

- From 2017 to date, scientific collaboration with the IEO (Istituto Europeo di Oncologia) for the study of possible application of the Plasma Focus technology as flash radiation source for radiobiology studies and clinical applications.

Articles on peer-reviewed scientific journals (last ten years):

- Udroi I., Sgura A., Chendi A., Lasagni L., Bertolini M., Fioroni F., Piccagli V., Moramarco A., Romano M. G., Fontana L., D'Alessio D., Bruzzaniti V., Rosi A., Grande S., Palma A., Giliberti C., Iori M., Piergallini L., Sumini M., Isolan L., Cucchi G., Compagnone G., Strigari L. (2020). DNA damage in lens epithelial cells exposed to occupationally-relevant X-ray doses and role in cataract formation. *SCIENTIFIC REPORTS*, vol. 10, p. 1-15, ISSN: 2045-2322, doi: 10.1038/s41598-020-78383-2
- Laghi D., Fabbri M., Isolan L., Pampin R., Sumini M., Portone A., Trkov A. (2020). JADE, a new software tool for nuclear fusion data libraries verification & validation. *FUSION ENGINEERING AND DESIGN*, vol. 161, p. 1-8, ISSN: 0920-3796, doi: 10.1016/j.fusengdes.2020.112075
- Isolan L., Sumini M. (2020). Magnetic quadrupole simulations for focusing the electron beams emitted by a plasma focus device. *RADIATION PHYSICS AND CHEMISTRY*, vol. 174, p. 1-8, ISSN: 0969-806X, doi: 10.1016/j.radphyschem.2020.108970
- Isolan L., Teodori F., Mariotti F., Jafari S., Bradley D., Sumini M. (2020). Sensitivity analysis via adjoint Monte Carlo calculations of plasma focus irradiation of micro-silica beads in phantoms. *RADIATION PHYSICS AND CHEMISTRY*, vol. 176, p. 1-12, ISSN: 0969-806X, doi: 10.1016/j.radphyschem.2020.109017
- Sumini M., Isolan L., Cremonesi M., Garibaldi C. (2019). A Plasma Focus device as ultra-high dose rate pulsed radiation source. Part I: Primary electron beam characterization. *RADIATION PHYSICS AND CHEMISTRY*, vol. 162, p. 1-11, ISSN: 0969-806X, doi: 10.1016/j.radphyschem.2019.02.027

- Sumini M., Isolan L., Cremonesi M., Garibaldi C. (2019). A Plasma Focus device as ultra-high dose rate pulsed radiation source. Part II: X-ray pulses characterization. *RADIATION PHYSICS AND CHEMISTRY*, vol. 164, p. 108360-1-108360-8, ISSN: 0969-806X, doi: 10.1016/j.radphyschem.2019.108360
- Isolan L., De Pietri M., Iori M., Botti A., Cagni E., Sumini M. (2019). Analysis of the bias induced by voxel and unstructured mesh Monte Carlo models for the MCNP6 code in orthovoltage applications. *RADIATION EFFECTS AND DEFECTS IN SOLIDS*, vol. 174, p. 365-379, ISSN: 1042-0150, doi: 10.1080/10420150.2019.1596104
- Isolan, L., Sumini, M., Teodori, F., Bradley, D., Jafari, S., Mariotti, F., Buontempo, F. (2019). Dosimetric analysis and experimental setup design for in-vivo irradiation with a Plasma Focus device. *RADIATION PHYSICS AND CHEMISTRY*, vol. 155, p. 17-21, ISSN: 0969-806X, doi: 10.1016/j.radphyschem.2018.06.025
- Buontempo, Francesca, Orsini, Ester, Zironi, Isabella, Isolan, Lorenzo, Cappellini, Alessandra, Rapino, Stefania, Tartari, Agostino, Mostacci, Domiziano, Cucchi, Giorgio, Martelli, Alberto Maria, Sumini, Marco, Castellani, Gastone (2018). Enhancing radiosensitivity of melanoma cells through very high dose rate pulses released by a plasma focus device. *PLOS ONE*, vol. 13, p. e0199312-1, ISSN: 1932-6203, doi: 10.1371/journal.pone.0199312
- Dioni, Luca, Gressier, Vincent, Nardin, Gaëlle, Jacqmin, Robert, Stout, Brian, Sumini, Marco (2018). Tests of a solution-grown stilbene scintillator in mono-energetic neutron beams of 565 keV and 5 MeV. *NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH. SECTION A, ACCELERATORS, SPECTROMETERS, DETECTORS AND ASSOCIATED EQUIPMENT*, vol. 880, p. 210-215, ISSN: 0168-9002, doi: 10.1016/j.nima.2017.06.048
- Sumini, Marco, Isolan, Lorenzo, Cucchi, Giorgio, Sghedoni, R., Iori, Mauro (2017). A Monte Carlo model for photoneutron generation by a medical LINAC. *RADIATION PHYSICS AND CHEMISTRY*, vol. 140, p. 345-348, ISSN: 0969-806X, doi: 10.1016/j.radphyschem.2017.01.016
- Sumini, Marco, Mostacci, Domiziano, Tartari, Agostino, Mazza, Alessandro, Cucchi, Giorgio, Isolan, Lorenzo, Buontempo, Francesca, Zironi, Isabella, Castellani, Gastone (2017). Dose-current discharge correlation analysis in a Mather type Plasma Focus device for medical applications. *RADIATION PHYSICS AND CHEMISTRY*, vol. 140, p. 452-457, ISSN: 0969-806X, doi: 10.1016/j.radphyschem.2017.03.022
- Terranova, Nicholas, Serot, O., Archier, P., De Saint Jean, C., Sumini, Marco (2017). Fission yield covariance matrices for the main neutron-induced fissioning systems contained in the JEFF-3.1.1 library. *ANNALS OF NUCLEAR ENERGY*, vol. 109, p. 469-489, ISSN: 0306-4549, doi: 10.1016/j.anucene.2017.05.052
- Battistoni, Paolo, Tarabelli, D., Ferry, L., Gonnier, C., Manservigi, Sandro, Sumini, Marco (2017). Thermal-hydraulic analysis of the LORELEI test design by means of CATHARE2 V2.5. *NUCLEAR ENGINEERING AND DESIGN*, vol. 322, p. 397-411, ISSN: 0029-5493, doi: 10.1016/j.nucengdes.2017.07.004

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- Canzone, Giuseppe, Lo Frano, Rosa, Sumini, Marco, Troiani, Francesco (2016). Dismantling of the graphite pile of Latina NPP: Characterization and handling/removal equipment for single brick or multi-bricks. *PROGRESS IN NUCLEAR ENERGY*, vol. 93, p. 146-154, ISSN: 0149-1970, doi: 10.1016/j.pnucene.2016.08.010
- Isolan, Lorenzo, Sumini, Marco, Cucchi, Giorgio, Iori, Mauro, Sghedoni, Roberto (2016). Monte Carlo benchmark of the experimental evaluation of the activation processes in an electron linear accelerator for radiotherapy applications. *RADIATION EFFECTS AND DEFECTS IN SOLIDS*, vol. 171, p. 808-817, ISSN: 1042-0150, doi: 10.1080/10420150.2016.1266358
- Console Camprini, P, SUMINI, MARCO, Artioli, C., Gonnier, C., Pouchin, B., Sireta, P., Bourdon, S. (2016). Power transient analysis of fuel-loaded reflector experimental devices in Jules Horowitz Material Testing Reactor. *ANNALS OF NUCLEAR ENERGY*, vol. 94, p. 541-554, ISSN: 0306-4549, doi: 10.1016/j.anucene.2016.04.028
- Sumini, Marco, Previti, Alberto, Galassi, D., Ceccolini, E., Rocchi, F., Mostacci, Domiziano, Tartari, A., Pasi, F., Facoetti, A., Mazzini, G., Nano, R., Virelli, Angela, Zironi, Isabella, Castellani, Gastone, Cucchi, G., Orecchia, R. (2015). Analysis and characterization of the X-ray beam produced by a PF device for radiotherapy applications. *X-RAY SPECTROMETRY*, vol. 44, p. 289-295, ISSN: 0049-8246, doi: 10.1002/xrs.2621
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- E. Ceccolini, P. Ferrari, D. M. Castelluccio, Mostacci, Domiziano, Sumini, Marco (2013). The effect of scattering by water on the irradiation of cell cultures for the dosimetric characterization of a new prototype of IORT (Intra-Operative Radiation Therapy) device: Monte Carlo simulation and

- experimental validation. HEALTH PHYSICS, vol. 105, p. 374-378, ISSN: 0017-9078, doi: 10.1097/HP.0b013e318295733f
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  - E. Ceccolini, F. Rocchi, Mostacci, Domiziano, Sumini, Marco, A. Tartari, F. Mariotti (2012). EBT2 dosimetry of x-rays produced by the electron beam from a Plasma Focus for medical applications. JOURNAL OF APPLIED PHYSICS, vol. 112, p. 054901-1-054901-5, ISSN: 0021-8979, doi: 10.1063/1.4748179
  - E. Ceccolini, F. Rocchi, Mostacci, Domiziano, Sumini, Marco, A. Tartari (2012). Monte Carlo simulation of the dose deposited into GAFCHROMIC® film by X-rays produced by the electron beam of PFMA-3. RADIATION MEASUREMENTS, vol. 47, p. 1000-1004, ISSN: 1350-4487, doi: 10.1016/j.radmeas.2012.07.010
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