



PERSONAL INFORMATION

Name and Surname	Sofia Barbieri
Place of birth	Pavia (PV) – Italy
Date of birth	21/09/1991
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CURRENT POSITION

[01/10/2015 – present] : PhD in Physics, University of Pavia

Ph.D Project:

The aim of my PhD Project is to study fundamental effects induced in living matter by different radiation qualities, to shed light on the mechanisms leading to damage induction. The impact of different radiations will be evaluated with respect to their detrimental action on the cell (DNA clustered damages and chemical oxidative stress induced by Reactive Oxygen Species).

Carbon ions and X-rays will be under investigation as chosen representative for high and low-LET radiation, respectively; moreover, the role of secondary radiation fields arising from the interactions between the primary beam particles and traversed matter will be studied in detail. In particular, the focus will be on the damages due to neutrons.

The foreseen results of this study are of interest for applications in different fields, ranging from space radiation to therapeutic purposes (radiation therapy).

Supervisor: Prof. Andrea Davide Ottolenghi

RESEARCH PROJECTS AND TASKS

[2016 - 2019] : PERSEO (Personal Radiation Shielding for intErplanetary MissiOns) project

[04/2015 – 09/2015] : TREND (Tracking damage at ions' track ends) - DoReMi

EDUCATION AND TRAINING

[22/05/2017 – 26/05/2017] : Selected for participation to the Microbeam Training Course, RARAF Facility, Columbia University (New York, USA)

[01/03/2017 – 31/08/2017] : Ph.D. Internship at the Center for Radiological Research (CRR), Columbia University Medical Center (New York, USA)

[06/06/2016 - 24/06/2016] : Selected for participation to the NASA Space Radiation Summer School, Brookhaven National Laboratory (New York, USA)

[04/10/2013 – 23/07/2015] : Master student in Bio- Medical Physics, University of Pavia

Master thesis title: In vitro 3D chondrosarcoma models: a radioresistance study after X-ray and carbon ion irradiation
 Final grade: **110/110, cum laude**
 Awards for academic merit: Best graduated student of the Physics Department for the A.Y. 14/15

[12/01/2015 – 12/06/2015]: Erasmus Traineeship Program by LARIA, GANIL (Caen, France)

[19/07/2014 - 12/09/2014]: Summer Student Program at GSI (Darmstadt, Germany)

Title of the Project: Non-invasive treatment of cardiac arrhythmias using scanned carbon ions and ECG-gating

[01/09/2010– 24/09/2013] : Bachelor of Physics, University of Pavia

Bachelor's thesis title: Energy dependence of neutron biological effectiveness: Monte Carlo characterization of the experimental setup for a pilot irradiation at PTB
 Final grade: **110/110**

[2005– 2010]: "T. Taramelli" Secondary School, focusing on Sciences, Pavia

Final grade: **100/100**
 Awards for academic merit: Certificate of Merit from Ministry of Education (18/01/2010)

PUBLICATIONS

- S.Barbieri, G.Baiocco, G.Babini, J.Morini, W.Friedland, M.Buonanno, V.Grilj, D.J.Brenner, A.Ottolenghi, "Modelling γ -H2AX foci induction to mimic limitations in the scoring technique", submitted
- J.Morini, G.Babini, S.Barbieri, G. Baiocco, M.Ciocca, G.B.Ivaldi, M.Liotta, S.Molinelli, P.Tabarelli de Fatis, A.Ottolenghi, "A comparison between X-rays and carbon ions irradiation in human neural stem cells", submitted.
- H.Rabus, S.Barbieri, G.Baiocco, A.Ottolenghi, U.Giesen, "Investigation into uncertainty contributions in foci-based assays", submitted.
- G.Baiocco, L.Bocchini, M.Giraud, S.Barbieri, L.Narici, C.Lobascio, A.Ottolenghi, Innovative solutions for personal radiation shielding in space, submitted.
- G.Baiocco, M.Giraud, L.Bocchini, S.Barbieri, I.Locantore, E.Brussolo, D.Giacosa, L.Meucci, S.Steffenino, A.Ballario, B.Barresi, R.Barresi, L.Ravagnolo, M.Benassai, L.Narici, A.Rizzo,

E.Carrubba, F.Carubia, G.Neri, M.Crisconio, S.Piccirillo, G.Valentini, S.Barbero, M.Giacchi, C.Lobascio, A. Ottolenghi, "A water-filled garment to protect astronauts during interplanetary missions tested on board the ISS", submitted.

- J.Morini, G.Babini, S.Barbieri, G.Baiocco, G.B.Ivaldi, M.Liotta, P.Tabarelli de Fatis, A.Ottolenghi "X-rays irradiation of Caco-2 cell line co-cultured with Peripheral Blood Mononuclear Cells", Journal of Visualized Experiments, 2018.
- G.Baiocco, S.Barbieri, G.Babini, J.Morini, W.Friedland, P.Kundrát, E.Schmitt, M.Puchalska, U.Giesen, R.Nolte, A.Ottolenghi, "At the physics-biology interface: the neutron affair", Radiation Protection Dosimetry, 2017.
- G.Baiocco, M.Vuolo, S.Barbieri, L.Bocchini, M.Giraud, T.Gheysens, C.Lobascio, A.Ottolenghi, "Exploring innovative radiation shielding approaches in space: a material and design study for a wearable radiation protection spacesuit", Life Sciences in Space Research, 2017.
- W.Friedland, E.Schmitt, P.Kundrát, G.Baiocco, S.Barbieri, A.Ottolenghi, "Comprehensive track-structure based evaluation of DNA damage by light ions from radiotherapy relevant energies down to stopping", Scientific Reports, 2017.
- J.Morini, G. Babini, S.Barbieri, G.Baiocco, A.Ottolenghi, "The interplay between radioresistant Caco-2 cells and the immune system increases epithelial layer permeability and alters signaling protein spectrum", Frontiers in Immunology, 2017.
- G.Baiocco, S.Barbieri, G.Babini, J.Morini, D.Alloni, W.Friedland, P.Kundrát, E.Schmitt, M.Puchalska, L.Sihver, A.Ottolenghi, "An ab initio approach to trace back the origin of neutron biological effectiveness as a function of energy", Scientific Reports, 2016.
- D.H.Hamdi, S.Barbieri, F.Chevalier, J.E.Groetz, F.Legendre, M.Demoor, P.Galera, J.L.Lefaix, Y.Saintigny, "In vitro engineering of human 3D chondrosarcoma: a preclinical model relevant for investigations of radiation quality impact", BMC Cancer, 2015.

INVITED TALKS

- [22/09/2016] : invited talk about "Physical and radiobiological bases of hadron biological effectiveness, and its dependence on ion type and energy", Hadrontherapy school funded by CNAO, FranceHADRON and the University of Lyon, CNAO, Pavia, Italy.

CONTRIBUTION TO WORKSHOPS AND CONFERENCES

- S.Barbieri, G.Baiocco, G.Babini, J.Morini, W.Friedland, M.Buonanno, D.J.Brenner, A.Ottolenghi, "Track-structure based simulation of the observer for the scoring of radiation-induced DNA damage foci", EURADOS Annual Meeting 2018, Lisbon, Portugal, February 2018.
- S.Barbieri, G.Babini, G.Baiocco, J.Morini, W.Friedland, M.Buonanno, D.J.Brenner, A.Ottolenghi, "Mechanistic study of low- and high-LET radiation induced DNA damages: benchmarking Monte Carlo simulations with experimental results", MICROS Microdosimetry Symposium 2017, Venice, Italy, November 2017.
- A.Ottolenghi, G.Babini, G.Baiocco, S.Barbieri, J.Morini, "What roles for track structure and microdosimetry in the era of omics, systems biology and holistic approaches?", MICROS Microdosimetry Symposium 2017, Venice, Italy, November 2017.
- J.Morini, G.Babini, G.Baiocco, S.Barbieri, M.Ciocca, G.B.Ivaldi, M.Liotta, S.Molinelli, P.Tabarelli de Fatis, A.Ottolenghi, "A comparison between X-ray and carbon ion irradiation in human neural stem cells", MICROS Microdosimetry Symposium 2017, Venice, Italy, November 2017.

- S.Barbieri, M. Buonanno, G. Baiocco, G. Babini, J. Morini, W.Friedland, D.Brenner, A.Ottolenghi, "Kinetics of γ -H2AX foci formation in cancer cells exposed to radiation of different LET", RRS Annual Meeting, Cancun, Mexico, October 2017.
- S.Barbieri, G.Babini, G.Baiocco, J.Morini, W. Friefland, M.Buonanno, A. Ottolenghi, "Track-structure simulation of γ -H2AX foci and comparison with experimental results: unravelling the role of radiation quality", ERRS Annual Meeting, Essen, Germany, September 2017.
- A. Ottolenghi, G. Babini, G. Baiocco, S. Barbieri, J. Morini, "From track structure to systems biology: How many roads must a man walk down ...", ERRS, Essen, Germany, September 2017.
- G. Baiocco, on behalf of the PERSEO collaboration, "The PERSEO Project - PERsonal Radiation Shielding for intErplanetary missiOns", WRMISS, Turin, Italy, September 2017.
- W.Friedland, E.Schmitt, P.Kundrát, A.Ottolenghi, G.Baiocco, S.Barbieri, D.Alloni, M.Dingfelder, "Modelling DNA damage at light ions' track ends", Radiation Research Society Annual Meeting, Hawaii, USA, October 2016.
- W.Friedland, E.Schmitt, P.Kundrát, A.Ottolenghi, G.Baiocco, S.Barbieri, D.Alloni, M.Dingfelder, "Simulations tracking DNA damage along ion tracks", Biological Radiation Research - GBS2016, Erlangen, Germany, September 2016.
- G. Baiocco, S. Barbieri, G. Babini, J. Morini, D. Alloni, W. Friedland, P. Kundrát, E. Schmitt, M. Puchalska, L. Sihver, A. Ottolenghi, "An ab-initio approach to trace back the physical origin of neutron biological effectiveness as a function of energy", Radiation Protection Week, Oxford, UK, September 2016.
- G.Baiocco, D.Alloni, G.Babini, S.Barbieri, J.Morini, A.Ottolenghi, "I neutroni secondari in terapia con particelle cariche e la loro efficacia biologica", Corso Residenziale IEO: "Aggiornamenti in FSA", IEO, Milan, Italy, June 2016.
- G.Baiocco, S.Barbieri, G.Babini, J.Morini, D.Alloni, W.Friedland, P.Kundrát, E.Schmitt, M.Puchalska, L.Sihver, A.Ottolenghi, "Neutron induced DNA damage using transport and track structure calculations", EURADOS Annual Meeting - AM2016, Milan, Italy, February 2016.
- A.Ottolenghi, G.Baiocco, S.Barbieri, "PERSEO WP1: Introduzione generale e obiettivi del progetto", PERSEO pre kick-off meeting, Turin, Italy, January 2016.
- G.Baiocco, S.Barbieri, A.Ottolenghi "PERSEO WP2: Analisi Monte Carlo", PERSEO pre kick-off meeting, Turin, Italy, January 2016.
- G.Baiocco, S.Barbieri, G.Babini, J.Morini, D.Alloni, W.Friedland, P.Kundrát, E.Schmitt, M.Puchalska, L.Sihver, A.Ottolenghi, "Neutron biological effectiveness as a function of energy with transport and track structure calculations", DoReMi's final meeting, Budapest, Hungary, December 2015.
- W.Friedland, P.Kundrát, E.Schmitt, G.Baiocco, S.Barbieri, D.Alloni, A.Ottolenghi, "TREND - TRacking damage at ion track ENds - Task 5.6 ad-hoc extension", DoReMi's final meeting, Budapest, Hungary, December 8, 2015.
- Giorgio Baiocco, on behalf of ANDANTE partner UniPv, "ANDANTE project - Task 2.3: Monte Carlo simulations ", ANDANTE final meeting, 30 November 2015, Pavia, Italy.
- A.Ottolenghi, G.Baiocco, M.Siragusa, D.Alloni, G.Babini, S.Barbieri, J.Morini, Proposal for an organisation of the task on "dosimetry", including track structure and links with radiobiology. Crosscutting support to improved knowledge on tritium management in Fission&Fusion facilities. International Workshop, Bruxelles, 8-9 October 2015.
- Y.Saintigny, D.Hamdi, S.Barbieri, F.Chevalier, J.L.Lefaix, "In vitro engineering of human 3D models of cartilage and chondrosarcoma for hadronbiology ", ICRR, Kyoto, Japan, May 2015.

- Y.Saintigny, D.Hamdi, S.Barbieri, F.Chevalier, J.L.Lefaix, "In vitro engineering of human 3D models of cartilage and chondrosarcoma for hadronbiology", Workshop on "Ion beam interactions with matter", Caen, France, 13 May 2015.

ADDITIONAL INFORMATION

Grants and awards

- [February 2018]: Winner of Financial Support to attend the 42nd COSPAR General Assembly in Pasadena, Los Angeles, USA.
- [13/08/2017]: Winner of Young Investigator Financial Support by the 17th International Symposium on Microdosimetry to attend the MICROS2017 conference in Venice, Italy.
- [10/07/2017]: Winner of Young Investigator Travel Award by the European Radiation Research Society to attend the ERRS Annual Meeting in Essen, Germany.
- [13/01/2017]: Winner of the Mobility grant for the financing of Ph.D. research activities at Columbia University (New York, USA).
- [02/07/2016]: Winner of Award as: Best graduated student of the Physics Department for the Academic Year 2014/2015.
- [01/01/2015- 04/04/2015] : Winner of the Erasmus+ grant for the financing of the Erasmus Internship in LARIA-CIMAP-GANIL (France).

Membership

- [2017-today] : member of the Radiation Research Society (RRS).
- [2017-today] : member of the European Radiation Research Society (ERRS).
- [2013 - 2015] : member of the Italian Physics Society (SIF).

Teaching experiences

- [11/2017 – 01/2018] : in the framework of the course of "Medical Physics" for the Faculty of Medicine and Surgery, I held a series of lectures on topics regarding Fluid Dynamics, Surface Tension, Physics of the Membranes and Thermodynamics.
- [2015 – 2018] : Tutoring and teaching activities for students of the Faculty of Medicine and Surgery, University of Pavia, Pavia, Italy.
- [27/05/2016] : in the framework of the CONCERT course "Modelling radiation effects from initial physical events", I held a lecture on "Space Radiation Risk Assessment and Countermeasures".

Pavia, February 17, 2018

