



## PERSONAL INFORMATION

*Address (office):* Piazzale Aldo Moro 5, Rome, Italy

*E-mail:* [giorgia.greco@uniroma1.it](mailto:giorgia.greco@uniroma1.it)

*ResearcherID:* I-4837-2012

*ORCID:* <http://orcid.org/0000-0002-4612-5840><sup>1</sup>

*URL Scholar:* <http://scholar.google.it/citations?user=ssEheEEAAAJ>

## CITIZENSHIP

Italian

## CURRENT POSITIONS

Marie Skłodowska-Curie fellow at **La Sapienza - Chemistry Department**. Principal investigator of REALSEI project (opeRando chEmical spAce- and time-resoLved quantification of Solid Electrolyte Interphase in hard carbon anode for sustainable sodium-ion batteries)

**1<sup>st</sup> June 2021 - present**

## EMPLOYMENT HISTORY

**Helmholtz Zentrum für Materialien und Energie, Institute for Nanospectroscopy**, Berlin, Germany. Staff Scientist at in-house beamline ASAXS at BESSYII National project: **EMIL** (Energy Materials In-Situ Laboratory).

**1<sup>st</sup> May 2016 - November 2020**

**University of Roma Tre - Science Department**, Rome, Italy.

Post-doctoral position on electron spectrometer development for Free Electron Laser based photoemission experiments

National project: **EX-PRO-REL** (EXcitation PROCesses and RELaxation in condensed matter and nanostructures).

**1<sup>st</sup> February 2014 - 30<sup>th</sup> January 2015**

**La Sapienza - Chemistry Department - Scrosati Lab**, Rome, Italy.

Post-doctoral position for physical and electrochemical characterization of cathodes materials for lithium ion batteries. EU project: **APPLES** (Advanced, high Performance, Polymer Lithium batteries for Electrochemical Storage)

**1<sup>st</sup> January – 31<sup>st</sup> December 2012**

## OTHER ABROAD EXPERIENCE

**Zentrum für Sonnenenergie und Wasserstoff-Forschung - ZSW**, Ulm, Germany.

Post-doctoral position in field of lithium ion batteries research, project commissioned

---

<sup>1</sup>blue/bold hyperlink

by Bayer AG.  
**1<sup>st</sup> March – 30<sup>th</sup> August 2011**

ADDITIONAL COMMENTS: Maternity leaving  
**1<sup>st</sup> December 2020– 1<sup>st</sup> June 2021** Disability assistance of a parent (disability 100%)  
**1<sup>st</sup> February 2015– 1<sup>st</sup> May 2016**

RESEARCH INTERESTS: Structure of matter, nanotechnologies, structural material characterization, XAS (X-ray Absorption Spectroscopy), SAXS/ASAXS (Small Angle Scattering and Anomalous SAXS), clean and renewable energies, lithium and beyond-lithium ion batteries, catalysis, fuel cells, time resolved instrumentation development and electron optics.

EDUCATION **Ph.D IN PHYSICS:** 10<sup>th</sup> July 2010

**University of Camerino**, Camerino, Italy (from 2007 to 2010)

- Ph.D Thesis Topic: Study of the atomic structure and morphology of the Pt<sub>3</sub>Co nanocatalyst for Proton Exchange Membrane Fuel Cell (PEMFC)
- Advisor: Professor Andrea Di Cicco
- Area of Study: Characterization and analysis of the atomic structure of Pt<sub>3</sub>Co nanocrystalline systems and their changes as a function of alloy preparation and operando condition as a catalyst in PEMFC by X-ray Absorption Spectroscopy.

**MASTER DEGREE IN PHYSICS (101/110):** 25 May 2006

**University of Rome ‘La Sapienza’**, Rome, Italy (from 2001 to 2005)

- Thesis Topic: Fano-Feshbach’s shape resonance and superconductivity
- Advisor: Professor Antonio Bianconi
- Area of Study: Hypothetical superconductor behavior of materials formed by carbon nanotubes and cuprate superconductors with a particular superlattice

**POSTGRADUATE SCHOOL:** 10-21 September 2007

**SILS** (Società Italiana di Luce di Sincrotrone) School, Treste, Italy.

- IX school on Synchrotron Radiation: Fundamental, Methods and Applications. The School gives a general overview of the characteristics and potential of Synchrotron Radiation to graduated students and young researchers interested in its use.

AWARDS Scholarship titled “ Structure and morphology of nanocrystals Pt alloys for fuel cells” at University of Camerino. **1<sup>th</sup> March – 31<sup>th</sup> July 2010**

CNISM Collaboration Fellowship. **1<sup>th</sup> February 2007 – 31<sup>th</sup> February 2010**

COMPUTING SKILLS: Programming: FORTRAN, UNIX shell scripting, HTML, C++

Applications: T<sub>E</sub>X, L<sub>A</sub>T<sub>E</sub>X, Microsoft Office, and other common packages for Windows and Linux platforms

Software for physics analysis and their applications, such as SASfit, GNXAS, GNPLOT, SIMION, FIT2D, ImageJ, fityk, Powder Cell, Ball and Stick, ATOMS, MATLAB, MATHEMATICA, MAUD.

Operating Systems: Linux and UNIX variants, latest version of Microsoft Windows.

### Main Scientific Responsibilities:

#### Helmholtz Zentrum Berlin (HZB) für Materialien und Energie gmbh,

*One of the main responsible scientist for Small Angle X-ray Scattering instrumentation at PTB beamline at BESSY II: scientific scheduling, data acquisition and analysis*  
**from May 2016 to present**

- The SAXS instrument is designed for Anomalous Small Angle X-ray Scattering (ASAXS) and also for Grazing Incidence SAXS (GISAXS). A combination of both techniques is possible.

#### Roma Tre laboratories,

*Responsible scientist for Time Of Flight analyzer (TOF):  
prototype development and tests.*  
**November 2014 to January 2015**

- The TOF prototype mainly consist of a High Vacuum (HV) chamber containing hemispherical electrodes that reproduce a central electric field. The electrons fly in this field on elliptical trajectories and so are delayed. The TOF analyzer performances was first simulated by electron trajectories tracking (SIMION program) and than compared with the experimental signal.

#### Scrosati Lab and ZSW Electrochemical Laboratories:

*Scientist co-responsible for an X-ray diffractometer Rigaku Xray Ultima+ diffractometer equipped with a Cu K $\alpha$  source*

*Responsible scientist for electrochemical and physical characterization of lithium ion battery electrodes*  
**March 2011 - December 2012**

- LiNi<sub>0.5</sub>Mn<sub>1.5</sub>O<sub>4</sub>, active material for positive electrodes was comprehensively characterized by means of Scanning and Transmission Electron Microscopy (SEM and TEM), X-Ray Diffraction (XRD) and Extended X-ray Absorption Fine Structure (EXAFS) measurements and analysis.
- Carbon nanotubes (CNTs) as conductive agent for electrodes in Li-ion batteries were investigated. LiNi<sub>0.33</sub>Co<sub>0.33</sub>Mn<sub>0.33</sub>O<sub>2</sub> (NCM) was chosen as the active material for positive electrodes.
- The electrochemical performances of the electrodes were studied by galvanostatic techniques, cyclic voltammetry and Electrochemical Impedance Spectroscopy (EIS).

### Experiments:

#### ELETTRA, Science Park, Basovizza (TS), Italy

*Responsible for Exp 20115110: main proposer,  
Beamline 1.11 XAFS*  
**February 2012**

- Title: Atomic and electronic structure at high temperature of phospho-olivines Li<sub>x</sub>MPO<sub>4</sub> (M = Fe, Mn - x = 0.2, 0.5, 0.7) probed by XAS.

#### ESRF (European Synchrotron Radiation Facility), Grenoble, France

*Responsible for Experiment ch-5269: main proposer,  
BM26*  
**December 2017**

- Title: In-operando investigation of AlCl<sub>4</sub><sup>-</sup> in aluminum/graphite battery by Small Angle Scattering.

*Responsible for Experiment ch2879: main proposer,  
BM29*  
**June 2009**

- Title: Pt<sub>3</sub>Co/Vulcan fuel cell catalyst investigated by in-operando X-ray absorption spectroscopy

## **BESSY II**, Berlin, Germany

*Responsible for Experiment 181-06808EF@1.1-P:7T-MPW-EDDI: main proposer,*  
**07-13 May 2018**

- Title: Comparison of In-situ white beam tomography of  $\text{AlCl}_4^-$  anion intercalation in different Graphite based electrode: High ordered Graphite and Natural Graphite

*Responsible for Experiment 172-05995EF@1.1-P:7T-MPW-EDDI: main proposer,*  
**04-10 September 2017**

- Title: In-operando investigation of  $\text{AlCl}_4^-$  anion intercalation in aluminum/graphite battery, a new energy storage device, by white beam tomography.

### SIMULATION AND DATA ANALYSIS

Extensive software experience:

All data obtained in the experiments listed in the 'Professional Experience' section were analyzed entirely by Giorgia Greco as listed below:

**GNXAS** PACKAGE experience:

- Multiple-edge EXAFS analysis of active materials.

FORTRAN77:

- Simulation of random chemical disorder in a alloy with cubic structure: the program simulates a binary alloy with a cubic structure with varying degrees of chemical disorder and relates the degree of disorder with the partial first neighbor signals coordination numbers.

IMAGEJ:

- Analysis of high resolution TEM images and their Fourier Transform analysis.

POWDER CELL AND MAUD:

- Reconstruction and study of complex structures such as for example  $\text{LiMn}_{1.5}\text{Ni}_{0.5}\text{O}_4$  spinel. Simulation of XRD pattern theoretical signal.

**SIMION**:

- SIMION Version 8.1 were used to simulate the electron trajectories and optimize the lenses for two prototypes of spherical and linear Time Of Flight (TOF) analyser.

### HARDWARE EXPERIENCE

Instrumentation and Control:

- SAXS/ASAXS instrument,
- Time of flight analyzer,
- X-ray diffraction analysis and measurement acquisition,
- EXAFS analysis and measurements acquisition,
- Scanning and Transmission Electron Microscope analysis,
- Electrochemical cell assembly: galvanostatic techniques and cyclic voltammetry.

### INVITATIONS

Invited speaker:

ENM Bangkok Meeting (Energy Materials and Nanotechnology), Bangkok, Thailand  
**13<sup>rd</sup> November 2015**

Invitation to contribute in Nano-Electrochemistry book:

Nano-Electrochemistry: Electrochemical Synthesis Methods, Properties and Characterization Techniques - Springer  
editor Abdel Salam Hamdy Makhlouf **2015**

Invited seminar:

**HIU** (Helmholtz Institute Ulm), Ulm, Germany

Talk title "Anomalous Small Angle X-Ray Scattering combined with X-Ray Absorption Spectroscopy: full characterization of pyrolytic graphite intercalated with  $\text{AlCl}_4^-$  anion" **15<sup>th</sup> September 2017**

**EPFL** (Ecole Polytechnique Federale de Lausanne), Lausanne, Switzerland

Talk title "Numerical simulation for Space-Charge effect in Photoemission experiments with ultrashort sources" **22<sup>nd</sup> October 2015**

**ESRF** (European Synchrotron Radiation Facilities), Grenoble, France

Talk title "Study of the  $\text{Pt}_3\text{Co}$  electrocatalysts atomic structure for application in Proton Exchange Membrane Fuel Cells" **31<sup>st</sup> January 2012**

#### CONFERENCES

Dr. Greco provided more than 20 selected oral and poster contributions to international workshops and conferences, including European XFEL and DESY Workshops in Hamburg and:

#### **2019 MRS Fall Meeting & Exhibit**

International Conference of the Materials Research Society (MRS), Boston, Massachusetts, US - *speaker*; **1-6 December 2019**

#### **IAPE'19**

International Conference on Innovative Applied Energy, Oxford, UK - *speaker*; **14-16 March 2019**

#### ENM Bangkok Meeting

International meeting on Energy Materials and Nanotechnology, Bangkok, Thailand - *invited speaker*; **10-13 November 2015**

#### **FisMat2015**

CNISM Italian National Conference on Condensed Matter Physics, Palermo, Italy - *speaker*; **2 October 2015**

#### European XFEL Workshop

SILS Italian Synchrotron Radiation Society Congress, Bologna (BO), Italy - *poster session*; **3-4 July 2014**

#### BIOMATCH

1th International Conference on technological innovation on Nano and Bio technologies, Rieti (RM), Italy - *speaker*; **13-14 May 2011**

#### **FNMA09:**

6th Workshop on Functional and Nanostructured Materials Sulmona (AQ), Italy - *poster session* **27-30 September 2009**

PROFESSIONAL  
ACTIVITIES

**XAFS14:**

14th International Conference on X-ray Absorption Fine Structure, Camerino (MC), Italy - *help in the organization; poster session;* **26-31 July 2009**

**STRIPES06:**

The International Conference on Quantum Phenomena in Complex Matter, of the series on Stripes and High Tc Superconductivity, Rome, Italy - *help in the organization; poster session;* **17-22 December 2006**