

PERSONAL INFORMATION

Name: Giorgia
Surname: Greco
Date of birth:
Place of birth:
Citizenship: Italian
Address (permanent): .
Telephone: mobile
E-mail: giorgia.greco@uniroma1.it
Spoken languages: Italian, English

ResearcherID: I-4837-2012
ORCID: <http://orcid.org/0000-0002-4612-5840>¹
URL Scholar: <http://scholar.google.it/citations?user=ssEheEEAAAAAJ>
Web-site: <https://sites.google.com/uniroma1.it/giorgiagreco-eng/home>

EDUCATION

NATIONAL SCIENTIFIC QUALIFICATION AS ASSOCIATE PROFESSOR IN STRUCTURE OF MATTER FIS/03 B2/01: 7th October 2022

Ph.D IN PHYSICS: 10th July 2010

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

- Ph.D Thesis Topic: Study of the atomic structure and morphology of the Pt₃Co nanocatalyst for Proton Exchange Membrane Fuel Cell (PEMFC)
- Advisor: Professor Andrea Di Cicco
- Area of Study: Characterization and analysis of the atomic structure of Pt₃Co 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

¹blue/bold hyperlink

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.

**EMPLOYMENT
HISTORY -
ACADEMIC
APPOINTMENTS**

Marie Skłodowska-Curie fellow (assegno di ricerca) 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) score 95.6%.

1st June 2021 - present²

Researcher at **ENEA (Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile) - research center Casaccia**. Permanent position (not belonging to MUR italian ministry)

1st September 2021 - unpaid leave

Staff Scientist (wissenschaftlicher mitarbeiter, posizione equipollente RTDA come da decreto dm 662 del 01-09-2016 in allegato) at in-house beamline ASAXS at BESSYII **Helmholtz Zentrum für Materialien und Energie, Institute for Nanospectroscopy**, Berlin, Germany. National project: **EMIL** (Energy Materials In-Situ Laboratory).

1st May 2016 - 30th October 2020

Post-doctoral position (assegno di ricerca) at CNR (Consiglio Nazionale delle Ricerche), Rome, Italy.

European project: BeforeHand

2nd November 2020 - 2nd December 2020

Post-doctoral position (assegno di ricerca) at **University of Roma Tre - Science Department**, Rome, Italy.

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

1st February 2014 - 30th January 2015

Post-doctoral position (assegno di ricerca) at **La Sapienza - Chemistry Department** - Scrosati Lab, Rome, Italy.

EU project: **APPLES** (Advanced, high Performance, Polymer Lithium batteries for Electrochemical Storage)

1st January – 31st 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 by Bayer AG.

1st March – 30th August 2011

**TEACHING
EXPERIENCE**

SummerLIB: summer school organized by CIVIS consortium at La Sapienza University, Chemistry Department

Seminar

17th July 2022

Lab classes

21st and 22th July 2022

Seminar at Humboldt University to Prof. Philipp Adelhelm group for PhDs students, Berlin, Germany

²3 months of amendment for try period in ENEA

22th June 2022

Masterclass MSCA seminar, audience PhD students and Post-docs at La Sapeinza Chemistry Department, Rome, Italy

20th June 2022

Wellchem seminar, audience high school students at La Sapeinza Chemistry Department, Rome, Italy

10th May 2022

Seminar for high school students entitled "REALSEI: the battery of the future" at Chemistry Department of La Sapienza, Rome, Italy

11th April 2022

Seminar for PhDs students to present REALSEI project at University of Camerino department of Physics invited by Prof. Angela Trapananti, Camerino, Italy

15th February 2022

Supervisor/co-supervisor of master thesis:

Giovanni Gammaitoni and Sara Coratti at La Sapienza, Chemistry Department, Rome, Italy **2022**

Lucien Fumagalli at HZB (Humboldt University, Physics Department), Berlin, Germany **2019**

Marko Perestjuk at HZB (Humboldt University, Physics Department), Berlin, Germany **2016**

Supervisor/co-supervisor of PhD thesis:

Valerio Lollobrigida at Roma Tre, Scienze Department, Rome, Italy **2015**

Hi-Yen Tran and Melanie Köentje ZSW, Ulm, Germany **2011**

ADDITIONAL
COMMENTS:

Two daughters, dates of birth: 10th January 2006 and 26th December 2020

Maternity leaving

1st December 2020– 1st June 2021

Disability assistance of a parent (disability 100%)

1st February 2015– 1st May 2016

RESEARCH
INTERESTS

Structure of matter, Sodium-ion batteries, carbon-based active materials, operando batteries characterization, XAS (X-ray Absorption Spectroscopy), SAXS/ASAXS (Small Angle Scattering and Anomalous SAXS), lithium and beyond-lithium ion batteries, catalysts, fuel cells, time resolved instrumentation development and electron optics.

AWARDS AND
HONORS

Award at HZB for the best internal project selected for ERC grant (2500 eu)
16th October 2019

Scholarship titled " Structure and morphology of nanocrystals Pt alloys for fuel cells" at University of Camerino (4000 eu)

1st March – 31th July 2010

CNISM Collaboration Fellowship (10000 eu)

1th February 2007 – 31th February 2010

FUNDING
INFORMATION

Grant as PI-principal investigator: Marie Skłodowska-Curie individual fellowship MSCA-IF-2020, project number 101029608 - 188000 euro

2020

Main Scientific Responsibilities:

La Sapienza University, Chemistry Department,

MSCA REALSEI project:

from June 2021 to now

- The scientific goal of the REALSEI research project is to apply and validate an experimental protocol to visualize the formation of the Solid Electrolyte Interphase (SEI) resolved in space and in real-time (operando) on the surface of Hard Carbon (HC) negative electrode in a Na⁺ ion battery (NIB), and correlate the bulk structure with the surface properties of the sample. To obtain this goal innovative space- and time-resolved operando experiments will be designed and implemented by exploiting X-ray advanced synchrotron techniques at BESSY II (Berlin, Germany).

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 November 2020

- SAXS instrument is designed for Anomalous Small Angle X-ray Scattering (ASAXS).

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 α source

Responsible scientist for electrochemical and physical characterization of lithium ion battery electrodes

March 2011 - December 2012

- LiNi_{0.5}Mn_{1.5}O₄, 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_{0.33}Co_{0.33}Mn_{0.33}O₂ (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 Impedence 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_xMPO₄ (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_4^- in aluminum/graphite battery by Small Angle Scattering.

*Responsible for Experiment ch2879: main proposer,
BM29*

June 2009

- Title: Pt_3Co /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 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 AlCl_4^- anion intercalation in aluminum/graphite battery, a new energy storage device, by white beam tomography.

TECHNICAL
EXPERIENCE

Materials

- Synthesis of activated carbons
- Electrolytes preparations
- Electrodes and full battery assembly

Instruments:

- SAXS/ASAXS and XAFS beamlines and lab-based instrumentation / set-ups developments for operando experiments,
- 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
13rd 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:

HU (Humboldt University, Chemistry Department), Berlin, Germany

Talk title "REALSEI project: an overview" **22th January 2023**

PTB (Physikalisch-Technische Bundesanstalt), Berlin, Germany

Talk title "REALSEI: operando set-up for sodium ion batteries" **15th October 2022**

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 AlCl_4^- anion" **15th September 2017**

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

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

ESRF (European Synchrotron Radiation Facilities), Grenoble, France

Talk title "Study of the Pt_3Co electrocatalysts atomic structure for application in Proton Exchange Membrane Fuel Cells" **31st January 2012**

SELECTED
PUBLICATIONS

Total Publications 22 from 2011, total citation: Google Scholar 545 citations h-index 11; Scopus 404 citations h-index 10.

I selected the following publications:

1. G. Greco*, G. A. Elia, D. Hermida-Merino, R. Hahn, S. Raoux, A Direct Real-Time Observation of Anion Intercalation in Graphite Process and Its Fully Reversibility by SAXS/WAXS Techniques, Small Methods - impact factor 15.6, Volume 7, Issue 6, pages 2201633, 2023
2. G. A. Elia*, G. Greco*, P. H. Kamm, F. García-Moreno, S. Raoux, R. Hahn, Simultaneous X-ray diffraction and tomography operando investigation of aluminum/graphite batteries, Advanced Functional Materials - impact factor 20, Volume 30, Issue 43, 2020 CITED BY 28
3. A. Siebert, X. Dou, R. Garcia-Diez, D. Buchholz, R. Félix, E. Handick, G. Greco, I. Hasa, R. G. Wilks, S. Passerini, M Bär, Monitoring the sodiation mechanism of anatase TiO_2 nanoparticles-based electrodes for sodium-ion batteries by operando XANES measurements, ACS Applied Energy Materials - impact factor 7, Volume 4, Issue 1, pag. 164, 2020 CITED BY 7
4. G. Greco*, S. Passerini, Sodium Induced Morphological Changes of Carbon Coated TiO_2 Anatase Nanoparticles - High-Performance Materials for Na-Ion Batteries, MRS Advances, DOI: 10.1557/adv.2020.259 vol 1-9, 2020 CITED BY 7
5. G. Greco*, K. Mazziio, E. Gericke, R. Wendt, M. Krumrey, X. Do, S. Passerini*, Structural study of carbon-coated TiO_2 anatase nanoparticles as high-performance anode materials for Na-ion batteries, ACS Applied Energy Materials - impact factor 7
DOI: 10.1021/acsaem.9b01101 vol 2, issue 10, pag 7142-7151, 2019; CITED BY 14
6. G. Greco*, D. Tatchev, A. Hoell, M. Krumrey, S. Raoux, R. Hahn, G.A. Elia*, Influence of the electrode nano/microstructure on the electrochemical properties of graphite in aluminum batteries, Journal of Material Chem. A - impact factor 10.7
DOI: 10.1039/C8TA08319C vol 6, pag 22673-22680, 2018;
CITED BY 22

*Corresponding author

7. G. A. Elia, I. Hasa, G. Greco, T. Diemant, K. Marquardt, K. Hoeppe, A. Hoell, S. Passerini, R. Hahn, Insights into the reversibility of the aluminum graphite battery, *Journal of Material Chem. A* - impact factor 10.07 - DOI: 10.1039/C7TA01018D, vol 5, issue 20 pag. 9682-9690, 2017;
CITED BY 114
8. G. Greco*, A. Verna, F. Offi and G. Stefani Space-Charge effect on electron time of flight analyzer for high energy photoemission spectroscopy, *J. of Elect. Spect. and rel. phen.* - impact factor 1.4 - DOI: 10.1016/j.elspec.2016.09.004, vol 212, pp 86-93, 2016;
CITED BY 5
9. A. Verna, G. Greco, V. Lollobrigida, F. Offi and G. Stefani. Space-Charge effect in high energy photoemission, *J. of Elect. Spect. and rel. phen.*, impact factor 1.4, vol 209, pp 14-25, 2016;
CITED BY 27
10. V. Lollobrigida, G. Greco, Simeone, F. Offi, A. Verna, and Stefani, Time-of-flight (TOF) spectrometers for high-energy photoelectron spectroscopy, *J. of Elect. Spect. and rel. phen.* - impact factor 1.4 - DOI: 10.1016/j.elspec.2016.03.001, vol 205, pp 98-105, November 2015;
CITED BY 8
11. F. M. Vitucci, A. Paolone, O. Palumbo, G. Greco, L. Lombardo, M Köntje, S. Brutti, A. Latini, S. Panero, Structural changes induced by thermal treatments in the spinel $\text{LiMn}_{1.5}\text{Ni}_{0.5}\text{O}_4$, *Journal of the American Ceramic Society* - impact factor 3 - DOI: 10.1111/jace.14166, vol. 99, issue 5, pp 1815-1822, 2016;
CITED BY 13
12. Nano-Electrochemistry: Electrochemical Synthesis Methods, Properties and Characterization Techniques, Other Authors and G Greco*, editor: Springer, ISBN 978-3-319-15265-3; November 2015 CITED BY 41