



Ilario Gelmetti

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Date of document: 27/01/2020

v 1.4.0

8997958531ca3b812bac5b21a40f8182

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Summary of CV

This section describes briefly a summary of your career in science, academic and research; the main scientific and technological achievements and goals in your line of research in the medium -and long- term. It also includes other important aspects or peculiarities.

From 2007 to 2013, Dr. Gelmetti attended two university institutions: **University of Pisa** and the prestigious “ **Scuola Normale Superiore di Pisa**” focusing his studies on organic and materials chemistry. Both his bachelor and master degrees received the grade of 110 cum laude / 110.

In 2013 he moved to Milan for performing his master internship in the **Institute for Macromolecular Studies** (ISMAC) of the National Research Council of Italy (CNR). His work in ISMAC focused on the **synthesis of organic semiconductors in inert atmosphere** and their characterization using a plethora of techniques.

From 2015 to 2019 he moved to Tarragona for doing his PhD in the **Institute of Chemical Research of Catalonia** (ICIQ) and in the Department of Electrical Electronic Engineering and Automation of Universitat Rovira i Virgili under the supervision of **Prof. Emilio Palomares**. His PhD was financed by the excellence **grant “Severo Ochoa”**. His work in ICIQ focused on the **synthesis of inorganic and hybrid semiconductors, their deposition in thin films to form complete optoelectronic devices and the advanced characterization of both the materials and the complete devices**. During this period he gained **experience in the usage of various equipment and facilities for films fabrication** like: clean room, spin coater, high vacuum thermal evaporation, glove box, hotplates, spray pyrolysis; various films characterization techniques like: AFM, XRD, SEM, SEM-EDX, time resolved photoluminescence, transient absorbance, profilometry, optical microscopy, Kelvin probe force microscopy; and various electrical characterization techniques for full devices: oscilloscope monitoring of voltage during laser pulse perturbations, measurement of current-voltage characteristics, impedance spectroscopy. Additionally, during the PhD he developed and released software in Python for easy data acquisition (currently being used in 5 research institutions) and software in R for data analysis and report generation. His PhD received the evaluation of excellent cum laude with international mention.

Thanks to a collaboration with ICMAB-CSIC-UAB and IMDEA-Nanociencia, his work at ICIQ resulted in the publication of two articles, in both of which Dr. Gelmetti is the first author: one in the very high impact journal “ **Energy & Environmental Science**” and one in “ **ACS Applied Materials & Interfaces**”.

During his PhD, he moved to London for a three months stay in the **Department of Physics of the Imperial College London** under the supervision of **Prof. Jenny Nelson and Dr. Piers Barnes**. During this period he received training on the semiconductors physics, and he developed software in Matlab for numerical drift-diffusion modeling.



Thanks to a collaboration with University of Sheffield, CeNS-LMU München and Newcastle University, his work at Imperial College London resulted in the publication of another “**Energy & Environmental Science**” in which Dr. Gelmetti is **corresponding author**. The article received 21 citations in less than one year since publication.

General quality indicators of scientific research

This section describes briefly the main quality indicators of scientific production (periods of research activity, experience in supervising doctoral theses, total citations, articles in journals of the first quartile, H index...). It also includes other important aspects or peculiarities.

Dr. Ilario Gelmetti attended **University of Pisa** and the excellence university institution "**Scuola Normale Superiore di Pisa**" (at the year of graduation in 2013, respectively the first and the sixth best Italian universities according to Academic Ranking of World Universities, Shanghai Ranking). He did his PhD in **Institute of Chemical Research of Catalonia** with the excellence **Severo Ochoa grant**.

He published **4 articles** in Q1 peer-reviewed international journals from 2015 to current date, including **2 "Energy & Environmental Science"** very high impact articles. Remarkably, in one of these articles he is the first author while in the other he is **corresponding author**.

According to Scopus (accessed 21/01/2020), in the period 2015-2020 his work has received **44 citations** for an average of 8.8 citations/year.

Has delivered **5 oral presentations at international conferences**.

He has been **invited** by prof. Germà Garcia-Belmonte **to deliver a seminar in the Institute of Advanced Materials of the Universitat Jaume I** in Castelló de la Plana (Valencia, Spain).

**Ilario Gelmetti**

Surname(s): **Gelmetti**
Name: **Ilario**
ORCID: **0000-0001-7115-1648**
ScopusID: **56586045400**
ResearcherID: **N-2415-2019**
Nationality: **Italy**
Country of birth: **Italy**
Aut. region/reg. of birth: **Veneto**
City of birth: **Verona**

Previous positions and activities

	Employing entity	Professional category	Start date
	Institute of Chemical Research of Catalonia	Predoc	12/01/2015

Employing entity: Institute of Chemical Research of Catalonia **Type of entity:** R&D Centre

Department: Department of Electrical Electronic Engineering and Automation, Universitat Rovira i Virgili

City employing entity: Tarragona, Catalonia, Spain

Professional category: Predoc

Start-End date: 12/01/2015 - 15/07/2019

Duration: 4 years - 6 months - 3 days

Type of contract: Grant-assisted student (pre or post-doctoral, others)



Education

University education

1st and 2nd cycle studies and pre-Bologna degrees

- 1** **University degree:** Higher degree
Name of qualification: Bachelor degree in Chemistry
City degree awarding entity: Pisa, Toscana, Italy
Degree awarding entity: Università di Pisa **Type of entity:** University
Date of qualification: 15/07/2010
Average mark: Excellent
Prize: Cum laude
Standardised degree: Yes **Date of homologation:** 13/09/2014
Foreign qualification: Laurea in Chimica
- 2** **University degree:** Higher degree
Name of qualification: Master degree in Chemistry
City degree awarding entity: Pisa, Toscana, Italy
Degree awarding entity: Università di Pisa **Type of entity:** University
Date of qualification: 15/10/2013
Average mark: Excellent
Prize: Cum laude
Standardised degree: Yes **Date of homologation:** 13/09/2014
Foreign qualification: Laurea magistrale in Chimica
- 3** **University degree:** Diploma di licenza
Name of qualification: Diploma di licenza in Chimica
City degree awarding entity: Pisa, Toscana, Italy
Degree awarding entity: Scuola Normale Superiore di Pisa **Type of entity:** University
Date of qualification: 18/12/2013
Standardised degree: No
Foreign qualification: Diploma di licenza in Chimica

Doctorates

Doctorate programme: Technologies for Nanosystems, Bioengineering and Energy
Degree awarding entity: Universitat Rovira i Virgili **Type of entity:** University
City degree awarding entity: Tarragona, Catalonia, Spain
Date of degree: 15/07/2019
European doctorate: Yes **Date of certificate:** 15/10/2019
Thesis title: Advanced Characterization and Modelling of Charge Transfer in Perovskite Solar Cells
Thesis director: Emilio Palomares Gil
Obtained qualification: Cum laude and international mention

Language skills

Language	Listening skills	Reading skills	Spoken interaction	Speaking skills	Writing skills
Catalan	C1	C1	B2	B2	B2
Spanish	C1	C1	C1	C1	C1
English	C1	C2	C1	C1	C1
Italian	C2	C2	C2	C2	C2

Scientific and technological experience

Scientific or technological activities

R&D projects funded through competitive calls of public or private entities

- Name of the project:** Grup de recerca en materials i dispositius optoelectrònics (AGAUR 2017)

Degree of contribution: Researcher

Entity where project took place: FUNDACIO PRIVADA INSTITUT CATALA D'INVESTIGACIO QUIMICA (ICIQ) **Type of entity:** R&D Centre

Name principal investigator (PI, Co-PI....): Emilio Palomares

Funding entity or bodies: AGAUR **Type of entity:** State agency

Name of the programme: Suport a la recerca SGR AGAUR

Code according to the funding entity: 2017SGR978

Start-End date: 01/01/2017 - 31/12/2020

Total amount: 44.480 €
- Name of the project:** Time resolved spectroscopic integral system (TAS)

Degree of contribution: Researcher

Entity where project took place: FUNDACIO PRIVADA INSTITUT CATALA D'INVESTIGACIO QUIMICA (ICIQ) **Type of entity:** R&D Centre

Name principal investigator (PI, Co-PI....): Emilio Palomares

Funding entity or bodies: MINECO **Type of entity:** State agency

Name of the programme: MICIU Equipamiento Científico-técnico

Code according to the funding entity: TAS EQC2018-005188-P

Start-End date: 01/01/2018 - 31/12/2019

Total amount: 127.923 €
- Name of the project:** Charge Transfer on hybrid photovoltaic devices: semiconductor nanocrystals/organic semiconductor molecule (FotoTransfer)

Degree of contribution: Researcher **Type of entity:** R&D Centre

Entity where project took place: FUNDACIO
PRIVADA INSTITUT CATALA D'INVESTIGACIO
QUIMICA (ICIQ)

Name principal investigator (PI, Co-PI....): Emilio Palomares

Funding entity or bodies:

MINECO

Type of entity: State agency

Name of the programme: MINECO Proyectos I+D-Retos

Code according to the funding entity: Foto Transfer CTQ2016-80042-R(FEDER)

Start-End date: 30/12/2016 - 29/12/2019

Total amount: 166.980 €

Results

Technological results derived from specialized and transfer activities, not included in previous sections

- 1** **Description:** Software source publication: Impedance Spectroscopy simulation routines
Name of the principal Investigator (PI): Piers R. F. Barnes
Name of the Co-principal investigator (Co-PI): Phil Calado
Degree of contribution: Researcher
Collaborating entity or bodies:
Imperial College London **Type of entity:** University
City collaborating entity: London, Inner London, United Kingdom
Relevant results: <https://github.com/barnesgroupICL/Driftfusion/tree/2018-EIS>
- 2** **Description:** Software source publication: PyPV current-voltage data acquisition for solar cells
Name of the principal Investigator (PI): Emilio Palomares
Degree of contribution: Researcher
Collaborating entity or bodies:
The Institute of Chemical Research of Catalonia (ICIQ)
City collaborating entity: Tarragona, Catalonia, Spain
Relevant results: <https://github.com/ilario/PyPV>
- 3** **Description:** Software source publication: solar cell data analysis routines
Name of the principal Investigator (PI): Emilio Palomares
Degree of contribution: Researcher
Collaborating entity or bodies:
The Institute of Chemical Research of Catalonia **Type of entity:** R&D Centre
(ICIQ)
City collaborating entity: Tarragona, Catalonia, Spain
Relevant results: <https://github.com/ilario/photophysics-data-processing-R>

Scientific and technological activities

Scientific production

H index: 3

Date of application: 17/01/2020

Publications, scientific and technical documents

- 1** Ilario Gelmetti; Núria Fernández Montcada; Ana Pérez Rodríguez; Esther Barrena; Carmen Ocal; Inés García Benito; Agustín Molina Ontoria; Nazario Martín; Anton Vidal Ferran; Emilio Palomares. Energy Alignment and Recombination in Perovskite Solar Cells: Weighted Influence on the Open Circuit Voltage. Energy & Environmental Science. 12 - 4, pp. 1309 - 1316. Royal Society of Chemistry, 08/03/2019. ISSN 1754-5692

DOI: 10.1039/C9EE00528E

Type of production: Scientific paper

Position of signature: 1

Total no. authors: 10

Impact source: SCOPUS

Impact index in year of publication: 32.34

Position of publication: 1

Source of citations: SCOPUS

Format: Journal

Degree of contribution: Author or co-author of article in journal with external admissions assessment committee

Corresponding author: No

Category: Renewable Energy, Sustainability and the Environment

Journal in the top 25%: Yes

No. of journals in the cat.: 153

Citations: 8

Relevant results: As reported in the Authors' contributions in the paper, I prepared the solar cells, measured the current-voltage curves, carried out the CE and TPV experiments, interpreted the data and contributed to the article writing. The paper explains how various characteristics of the organic hole transport materials can affect the perovskite solar cell resulting voltage.

Relevant publication: Yes

- 2** Davide Moia; Ilario Gelmetti; Phil Calado; William Fisher; Michael Stringer; Onkar Game; Yinghong Hu; Paolo Docampo; David Lidzey; Emilio Palomares; Jenny Nelson; Piers R. F. Barnes. Ionic-to-electronic current amplification in hybrid perovskite solar cells: ionically gated transistor-interface circuit model explains hysteresis and impedance of mixed conducting devices. Energy & Environmental Science. 12 - 4, pp. 1296 - 1308. Royal Society of Chemistry, 06/03/2019. ISSN 1754-5692

DOI: 10.1039/C8EE02362J

Type of production: Scientific paper

Position of signature: 2

Total no. authors: 12

Impact source: SCOPUS

Impact index in year of publication: 32.34

Position of publication: 1

Source of citations: SCOPUS

Format: Journal

Degree of contribution: Author or co-author of article in journal with external admissions assessment committee

Corresponding author: Yes

Category: Renewable Energy, Sustainability and the Environment

Journal in the top 25%: Yes

No. of journals in the cat.: 153

Citations: 21

Relevant results: Me and the first author (Davide Moia) are marked as "These authors contributed equally to this study". As can be seen in the article's Authors' contributions, I. G., D. M. and P. B. initiated the project; I. G.

performed the simulations and participated in preparation of the manuscript drafted by P. B., D. M., I. G. and P. C. The paper enables the perovskite solar cells community to employ the powerful and accessible impedance spectroscopy technique providing a meaningful equivalent electrical circuit.

Relevant publication: Yes

- 3** Ilario Gelmetti; Lydia Cabau; Núria Fernández Montcada; Emilio Palomares. Selective Organic Contacts for Methyl Ammonium Lead Iodide (MAPI) Perovskite Solar Cells: Influence of Layer Thickness on Carriers Extraction and Carriers Lifetime. ACS Applied Materials & Interfaces. 9 - 26, pp. 21599 - 21605. American Chemical Society, 16/06/2017. ISSN 1944-8244

DOI: 10.1021/acsami.7b06638

Type of production: Scientific paper

Position of signature: 1

Total no. authors: 4

Impact source: SCOPUS

Impact index in year of publication: 8.69

Position of publication: 24

Source of citations: SCOPUS

Format: Journal

Degree of contribution: Author or co-author of article in journal with external admissions assessment committee

Corresponding author: No

Category: General Materials Science

Journal in the top 25%: Yes

No. of journals in the cat.: 438

Citations: 12

Relevant results: I fabricated and measured the solar cells. The paper indicates how to understand the charges' accumulation location inside a perovskite solar cell.

- 4** Silvia Destri; Luisa Barba; Ilario Gelmetti; Lorenzo Di Bari; William Porzio. Inverse Chirality Probe in Poly(3-alkylthiophene) Derivative. Macromolecular Chemistry and Physics. 216 - 7, pp. 801 - 807. Wiley, 02/02/2015. ISSN 1022-1352

DOI: 10.1002/macp.201400606

Type of production: Scientific paper

Position of signature: 3

Total no. authors: 5

Impact source: SCOPUS

Impact index in year of publication: 2.33

Position of publication: 32

Source of citations: SCOPUS

Format: Journal

Degree of contribution: Author or co-author of article in journal with external admissions assessment committee

Corresponding author: No

Category: Polymers and Plastics

Journal in the top 25%: Yes

No. of journals in the cat.: 147

Citations: 3

Relevant results: I designed and synthesized the material, I performed all the molecular characterization and the absorbance and cyclic dichroism in solution and in solid. This study shows how a chiral conducting polymer organizes supramolecularly in solid state.

Relevant publication: No

Works submitted to national or international conferences

- 1** **Title of the work:** Perovskite solar cells impedance spectroscopy explained via 1D time dependent drift-diffusion modelling
Name of the conference: NanoBio Conference 2018
Type of event: Conference
Type of participation: Participatory - oral communication
City of event: Heraklion, Greece
Date of event: 27/09/2018
Organising entity: Hellenic Mediterranean University



- 2** **Title of the work:** Simulating the impedance spectroscopy of an hybrid perovskite solar cells via time-dependent 1D drift-diffusion model
Name of the conference: Graduate Students Meeting on Electronics Engineering
Type of event: Conference
Type of participation: Participatory - oral communication
City of event: Tarragona, Spain
Date of event: 28/06/2018
Organising entity: Universitat Rovira i Virgili
Type of entity: University
City organizing entity: Tarragona, Spain
- 3** **Title of the work:** Simulating Impedance Spectroscopy of Perovskite-based Devices via Time-Dependent 1D Drift-Diffusion Model
Name of the conference: Invited talk at Institute of Advanced Materials, University Jaume I (INAM-UJI)
Type of event: Invited seminar
Type of participation: Participatory - invited/keynote talk
City of event: Castello, Valencian Community, Spain
Date of event: 26/06/2018
Organising entity: Institute of Advanced Materials, University Jaume I (INAM-UJI)
City organizing entity: Castello, Valencian Community, Spain
- 4** **Title of the work:** The Relevance of the Energy Alignment Shift in Organic Semiconductor/Perovskite Interface: Influence in the Open Circuit Voltage
Name of the conference: Stability of Emerging Photo-voltaics Conference (SEPV18)
Type of event: Conference
Type of participation: Participatory - oral communication
City of event: Barcelona, Catalonia, Spain
Date of event: 20/02/2018
Organising entity: Stable Next-Generation Photovoltaics COST action
Ilario Gelmetti.
- 5** **Title of the work:** Quasi-Fermi Energy Shift for Hole Transport Material in Perovskite Solar Cells
Name of the conference: International Conference on Hybrid and Organic Photo-voltaics (HOPV17)
Type of event: Conference
Type of participation: Participatory - poster
City of event: Lausanne, Switzerland
Date of event: 22/05/2017
Organising entity: nanoGe
City organizing entity: Valencia, Valencian Community, Spain
Ilario Gelmetti.
- 6** **Title of the work:** Photophysical characterization of charge transfer and recombination in hybrid lead halide perovskite solar cells
Name of the conference: Workshop on Flexible Electronics
Type of event: Workshop
Type of participation: Participatory - oral communication
City of event: Tarragona, Catalonia, Spain
Date of event: 29/06/2016
Organising entity: Universitat Rovira i Virgili
Type of entity: University
City organizing entity: Tarragona, Catalonia, Spain



- 7** **Title of the work:** How to make efficient perovskite solar cells and charge transfer reactions in perovskite solar cell
Name of the conference: International Krutyn Summer School on Advanced Perovskite, Hybrid and Thin-film Photovoltaics
Type of event: School **Geographical area:** European Union
Type of participation: Participatory - Plenary session
City of event: Krutyn, Poland
Date of event: 14/06/2016
Organising entity: The Institute of Physical Chemistry of the Polish Academy of Sciences
Ilario Gelmetti.

Other achievements

Stays in public or private R&D centres

- 1** **Entity:** Imperial College London **Type of entity:** University
Faculty, institute or centre: Department of Physics
City of entity: London, Inner London, United Kingdom
Primary (UNESCO code): 221125 - Semiconductors
Start-End date: 22/09/2017 - 22/12/2017 **Duration:** 3 months - 2 days
Funding entity: Spanish Ministry of Science and Innovation
City funding entity: Spain
Name of programme: Severo Ochoa Mobility Grant
Goals of the stay: Doctorate
Provable tasks: One article, contributed code.
Acquired skills developed: Numerical modelling; Matlab coding
Relevant results: One high impact article; published simulation code
Identify key words: Physics - Soft condensed matter
- 2** **Entity:** Institute for Macromolecular Studies (ISMAC), **Type of entity:** Public Research Body
CNR
Faculty, institute or centre: Group Destri
City of entity: Milan, Lombardia, Italy
Primary (UNESCO code): 230408 - Macromolecules
Secondary (UNESCO code): 230700 - Physical chemistry
Start-End date: 01/01/2012 - 01/06/2013 **Duration:** 1 year
Goals of the stay: Master thesis internship
Provable tasks: One article, master thesis
Acquired skills developed: Monomers and polymers synthesis, molecular characterization
Relevant results: <https://onlinelibrary.wiley.com/doi/full/10.1002/macp.201400606>



Obtained grants and scholarships

- 1** **Name of the grant:** Google Summer of Code
Aims: Load-correlated distributed bandwidth analysis for LibreMesh networks
Awarding entity: Google **Type of entity:** Business
Conferral date: 27/05/2019 **Duration:** 3 months
End date: 26/08/2019

- 2** **Name of the grant:** Predoctoral training grants for Centres/Units of Excellence "Severo Ochoa"
City awarding entity: Spain
Aims: Pre-doctoral
Awarding entity: Spanish Ministry of Science and Innovation
Amount of the grant: 82.400 €
Conferral date: 12/01/2015 **Duration:** 4 years
End date: 11/01/2019
Entity where activity was carried out: The Institute of Chemical Research of Catalonia (ICIQ)
Faculty, institute or centre: Group Palomares