

Francesco Enrichi - Curriculum Vitae

Marie Curie Fellow, Vinnmer Fellow

Assistant Professor (RTD-B), tenure track for Associate Professor

Department of Engineering for Innovation Medicine – Section of Engineering and Physics
University of Verona, Italy



Researcher unique identifier (ORCID): orcid.org/0000-0002-3443-3707

Web page: <https://www.di.univr.it/?ent=persona&id=72118&lang=en>

Scholar webpage: https://scholar.google.it/citations?user=l_ViauoAAAAJ

SHORT SUMMARY

Francesco Enrichi is a Physicist, PhD in Materials Science, with more than 20 years of experience in research and technology transfer. He was a Vinnmer Marie Curie Fellow at the Luleå University of Technology (Sweden), Research Fellow at the Ca' Foscari University of Venice and at the Enrico Fermi Center in Rome, and Head of the Optical Characterization Laboratory in Veneto Nanotech, the Italian Cluster for Nanotechnologies. In 2019 he became 3rd level researcher (permanent), then promoted to 2nd level, at the Institute of Polar Sciences of the National Research Council (ISP-CNR) in Venice and since 2021 has held the role of Assistant Professor (RTD-B) at the Department of Engineering for Innovation Medicine at the University of Verona. Furthermore, he has the Italian Qualification (ASN) of full professor in various fields of Physics and Chemistry of Materials.

His research interests are mainly in the field of luminescent materials, from nanophosphors to glass-ceramic coatings, with applications in biosensors, lighting, solar cells, anti-counterfeiting and cultural heritage. In these fields he has published approximately 125 research articles and three book chapters (Scholar h-index=31, i10-index=73, citations=2555). Furthermore, invited by Elsevier, he edited a book on solar cells and new technologies and he is in the Editorial Board of some international journals, Editor of Special Issues and of two thematic sessions on nanomaterials for sustainable energy and glassy materials for photonics. In his career he presented a significant number of seminars around the world and numerous oral contributions (around 20 by invitation) at international conferences, and is regularly involved in Organizing Committees and Scientific Committees.

On the teaching side, he was responsible for many university courses in Italy and abroad, second level master's degrees and courses for businesses. He was co-supervisor of three doctoral theses and more than 20 Italian theses. He has been appointed twice to the chair of physics in secondary schools in Italy following a national exam.

He has participated in many international projects and industrial engagements. He has acted as an Invited Expert for the European Commission in the evaluation of project proposals (Marie Curie Fellowships, ERC Advanced Grants, COST Actions) and for the Italian Ministry of Research (MUR) for over 50 National proposals (FISR). He is registered in REPRISE (the register of expert evaluators for Italian research) and he is in the list of experts eligible for VQR.

Finally, he obtained an Italian patent and filed international requests in Europe, the USA, China and India on the "Light in Transparency" technology, founding in 2012 an innovative startup with high technological content, HELIV Group Srl, which deals with luminescent transparent surfaces with applications in lighting, communication and design.

EDUCATION

22-03-2005	Ph.D. in Materials Science (ottimo), Department of Physics, University of Padova, Italy <i>Investigation and modelling of the energy transfer between Si or Ag nanostructures and erbium ions for optical amplification</i> Supervisors: Prof. E. Borsella, P. Mazzoldi
29-03-1999	Master Degree in Physics (110/110 cum laude), Dep. of Physics, Univ. of Padova, Italy <i>Production and characterization of semi-insulating regions obtained by Fe ion implantation in n-doped indium phosphide</i> Supervisor: Prof. A. Gasparotto

ACTUAL POSITION

From 01/12/2019	Assistant Professor (RTD-B), tenure track for becoming Associate Professor, Dipartimento di Informatica (fino al 02/2023) e Dipartimento di Ingegneria per la Medicina di Innovazione, Sezione di Ingegneria e Fisica (dal 03/2023), Università degli Studi di Verona, Verona, Italia
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PREVIOUS POSITIONS

11/2019 - 11/2021	Researcher, 3rd level, promoted to 2nd level, ISP-CNR (Institute of Polar Sciences – CNR) Venezia, Italy
01/2016 - 11/2021	Cultore della Materia SSD FIS/01 Department of Molecular Sciences and Nanosystems, Ca' Foscari University of Venice, Italy
09/2017 - 08/2020	Owner of the chair for teaching Physics in secondary schools after a national evaluation (L. 13/07/2015, n. 107), IIS Luzzatti, Venezia, Italy - <i>Suspended (aspettativa) for research</i>

04/2019 - 11/2019	Research Fellow (Assegnista di ricerca) in the field of functional coatings. Department of Molecular Sciences and Nanosystems, Ca' Foscari University of Venice, Italy
04/2016 - 12/2018	Research Fellow (Assegnista di ricerca) in the field of plasmonics, solar cells, rare earth doped spectral converting layers. Centro Studi e Ricerche Enrico Fermi, Roma, Italia.
07/2016 - 06/2018	Vinnmer Marie Curie Incoming Fellow: "Metal nanoparticles, nanoantennas and rare earth ions for energy harvesting in solar cells (Nano2solar)", Luleå University of Technology, Sweden
04/2012 - 09/2016	CNR-IFN Associated Researcher , Institute of Photonics & Nanotechnologies, Trento, Italy
09/2015 - 12/2016	Centro Fermi Associated Researcher , Centro Studi e Ricerche Enrico Fermi, Roma, Italy
06/2013 - 12/2015	Optics and Characterization Technology Unit Manager, Head of the Optics Laboratory, Senior Researcher (permanent position) , research on nanotechnologies and optical materials (nanoparticles, coatings) for biotechnology, lighting, cultural heritage, anticounterfeiting and solar, Veneto Nanotech research center, Venezia, Italy
01/2009 - 12/2013	Responsible for the Optics Laboratory, Senior Researcher (permanent position from 01/01/2012) , research on nanotechnologies and optical materials, CIVEN (Coordinamento Interuniversitario Veneto per le Nanotecnologie), Venezia, Italy
01/2006 - 05/2013	Consultant in technology transfer (various contracts) to industries/SMEs on coatings, films, optics and characterizations, Nanofab Scarl and Veneto Nanotech, Venezia, Italy
01/2007 - 12/2008	Contract Researcher (Co.Co.Pro.) on nanostructured materials and alloys, CIVEN (Coordinamento Interuniversitario Veneto per le Nanotecnologie), Venezia, Italy
11/2004 - 12/2006	Contract Researcher (Co.Co.Pro.) on protective and decorative nanostructured coatings, CIVEN (Coordinamento Interuniversitario Veneto per le Nanotecnologie), Venezia, Italy
11/2004 - 02/2005	Contract Researcher (Co.Co.Pro.) on the optical efficiency of samples for the EU project SINERGIA, INFM (National Institute for the Physics of Materials), Padova, Italy
03/2000 - 12/2001	Photolithography process Engineer , R&D Department, ST Microelectronics, Milano, Italy

SHORT EXPERIENCES AS VISITING SCIENTIST ABROAD

Numerous **short-term post-doctoral periods as a visiting scientist in foreign universities**:

- **Luleå University of Technology (Luleå, Svezia)**, group Prof. F. Akhtar (**2021**) and Prof. A. Vomiero (**2016, 2018**);
- **Chalmers University of Technology (Göteborg, Svezia)**, group Prof. M. Karlsson (**2018**);
- **Univ. of the Witwatersrand (Johannesburg, Sudafrica)**, Energy Group Prof. A. Quandt (**2016, 2017**);
- **Université Abdelmalek Essaâdi, Ecole Nationale des Sciences Appliquées ENSA, Laboratoire des Technologies Innovantes LTI (Tanger, Morocco)**, group Prof. A. Bouajaj (**2015, 2016**);
- **Nagano Techno Foundation**, several industries of the region, **Shinshu University**, groups Prof. Endo, Prof. Sato and Prof. Murakami, and **Yokohama City University (Giappone)**, group Prof. R. Micheletto (**2011**).

START-UP INITIATIVES

04/2012 - 12/2019 **Co-founder and shareholder**, HELIV group S.r.l. (innovative start-up), Venezia, Italy



QUALIFICATIONS

- **Italian Academic Qualifications (ASN) as Full Professor (prima fascia)** in **02/B1** (Experimental Physics of Materials) "ottimo" by all the examiners, from 26/07/2018; **03/B1** (Fundaments of Chemical Sciences and Inorganic Systems), from 7/08/2018; **03/B2** (Chemical Fundaments of Technologies), from 25/10/2018
- **Italian Academic Qualification (ASN) as Associate Professor (seconda fascia)** in **02/B1** (Experimental Physics of Materials), from 12/04/2017; **03/A2** (Models and Methods for Chemical Sciences), from 10/04/2017; **03/B1** (Fundaments of Chemical Sciences and Inorganic Systems), from 12/04/2017; **03/B2** (Chemical Fundaments of Technologies), from 25/10/2018.
- **Teaching qualification in Physics in Secondary Schools** (national exam), from 30/08/2001, **appointed of the chair for two times** (in 2001 and 2017)

TEACHING ACTIVITIES

From 2003 **owner of several courses and international seminars (more than 1000 hours)**: 5 university Ph.D. courses, 23 university degree courses, 1 university course as co-professor for the Luleå University of Technology (Sweden), 5 courses as contract professor at the Secondary Level International Master for Nanotechnologies, 16 lectures as contract professor for graduated people and company employees, 1 invited International Summer School lecture in India, 17 invited lectures & seminars in Italy, Japan, Morocco, Sweden, France, USA, 2 lectures for secondary school students.

SUPERVISOR ACTIVITY OF STUDENTS

From 2007 **supervisor and co-supervisor of 25 thesis** in optics and nanomaterials: **3 PhD thesis, 12 master thesis, 7 triennial thesis, 1 secondary level master thesis, 2 internships**. The PhD thesis are:

- "Nanoparticles and rare earth ions to improve the photovoltaic conversion efficiency of solar cells" Saloua Belmokhtar, **PhD in**

Materials Science, LTI, ENSA, Université Abdelmalek Essaâdi, Tanger (Morocco), from 2013 to 2016. **Final valuation: "very honorable with jury congratulations"**.

- "Photovoltaic technologies: from Dye-Sensitized to Perovskite Solar cell" Jessica Barichello, **PhD in Scienze Ambientali**, Università Ca' Foscari Venezia, from 2015 to 2018.
- "Luminescent zeolites for environment and sensing" Anna Safonova, **PhD in Nanomaterials and advanced technologies**, Università degli Studi di Verona, ongoing.

COMMISSIONS OF TRUST

Ongoing **Member of the Register of Expert Peer Reviewers for Italian Scientific Evaluation (REPRISE)**

From 2022 **Materials & Characterisation Group Committee Member of the Institute of Physics (IoP)**

2019-2023 **Energy-Group Committee Member of the Institute of Physics (IoP)**

03/2024 **Thesis degree evaluation commission member**, triennial degree in "Matematica Applicata" and master degree in "Mathematics" at Univ. of Verona

09/2023 **Evaluation commission member for the renewal of a research fellowship**, AdR3932/22, "Fabbricazione e caratterizzazione di celle solari a film sottili di $Cu_2ZnSn(S,Se)_4$, $Sb_2(S,Se)_3$ " FIS/01, Univ. of Verona, Dott.ssa Olavil Karayi.

10/2022 **Invited External Expert, member of Thesis committee** of Mr. Anthony Oliva Maputi, master student in Bio-Nano Material Science and Engineering, School of Engineering and Technology, Asian Institute of Technology (Thailand).

09/2022 **Invited member of the Jury for student award**. Photonics of Rare Earths (PRE) Conference.

07/2022 **Invited as External PhD Examiner** at Heriot Watt University of Edinburgh for the PhD Thesis entitled: "Recycling light for a cleaner future: infrared photon manipulation techniques for performance-enhancement of solar photovoltaic cells" of the student Joseph Gibbons.

04/2022 **Evaluation commission member for a research fellowship**, AdR3932/22, "Fabbricazione e caratterizzazione di celle solari a film sottili di $Cu_2ZnSn(S,Se)_4$, $Sb_2(S,Se)_3$ " **FIS/01**, Univ. of Verona.

03/2022 **Graduation commission member**, triennial degree in "Matematica Applicata" at Univ. of Verona.

03/2022 **Graduation commission member**, master degree in "Mathematics" at University of Verona.

03/2021 **Alternate member of the evaluation commission** for the public recruitment competition n. 318.23 ISP CTER VE at the Institute of Polar Sciences of the Italian National Research Council CNR.

07/2020 **In the list of the eligible members of Italian GEV – Area 2 Fisica 02/B1 – FIS/01** for the evaluation of the quality of research (**VQR 2015-2019**). Delibera n° 135 del 23/07/2020 – ALL. 1

05/2020 **Italian Ministry for University & Research (MUR) Expert Evaluator**: D.D. 562 of 05/05/2020 Fondo Integrativo Speciale per la Ricerca (**FISR 2020**) – **Evaluator of 52 project proposals**

11/2019 **EU Commission role of Rapporteur** for the evaluation of the call OC-2019-1 (**COST Actions**)

11/2019 **EU Commission Expert Evaluator**: call OC-2019-1 (**COST Actions**)

04/2018 Invited to be part of the **Jury of Doctorate in Science and Engineering** of Ms. Saloua Belmokhtar at the **National School of Applied Sciences of Tangier (Morocco)**

12/2016 **EU Commission Expert Evaluator**: call ERC-2016-ADG (**ERC Advanced Grant**)

09/2014 **EU Commission Expert Evaluator**: call FP7-PEOPLE-2013-IIF (**Marie Curie International Incoming Fellowship**)

ACADEMIC BODIES (FROM 2021)

Dal 03/2023 **Membro del Consiglio di Dipartimento**, Dipartimento di Ingegneria per la Medicina di Innovazione, Università di Verona

Dal 06/2022 **Membro del Scientific Board of the PhD in Nanosciences and Advanced Technologies**, Dipartimento di Diagnostica e Sanità Pubblica, Università di Verona

12/2021 – 02/2023 **Membro del Consiglio di Dipartimento**, Dipartimento di Informatica, Università di Verona

TEACHING COLLEGES (FROM 2021)

AA 2023-2024 **Mathematics and Data Science** – Dipartimento di Informatica
Innovation and sustainability in the industrial production of food – Dip. Biotecnologie
Human Centered Medical System Engineering – Dip. Ingegneria per la Medicina di Innovazione

AA 2022-2023 **Mathematics and Data Science** – Dipartimento di Informatica
Computer Science – Dipartimento di Informatica
Innovation and sustainability in the industrial production of food – Dip. Biotecnologie

AA 2021-2022 **Mathematics and Data Science** – Dipartimento di Informatica
Computer Science – Dipartimento di Informatica

RESPONSIBILITIES AND PARTICIPATIONS IN RESEARCH PROJECTS

Large experience in the planning & preparation of project proposals (also as **promotor and coordinator**) and in the participation to collaborative projects (**more than 20 projects** at Regional, National and International level). Among them:

2023-2024 **SUNSHINE – SUStainable Nanoparticles Synthesis for Hlgh performing eNergy and Environmental processes**
Ricerca di Base Università di Verona.
Project leader - Project total budget: 26'000 euro

2016-2018 **Metal nanoparticles, nanoantennas and rare earth ions for energy harvesting in solar cells (Nano2solar)**
Vinnmer Marie Curie Incoming Fellowship project funded by Vinnova (Swedish Governmental Innovation Agency) within the European Union “Mobility for Growth” programme. Project N. 2016-02011.
Project leader - Project total budget: about 330'000 euro; VINNOVA contribution: about 180'000 euro.

2014-2015 **Nanoparticles and rare earth ions to improve the photovoltaic conversion efficiency of thin film solar cells**
Bilateral Project CNR-CNRST Italy – Morocco, in the framework of the Italy – Morocco scientific collaboration.
Italian Coordinator, Project value: 4'000 euro

PUBLICATIONS

N. publications: 127

Scholar citations: 2555 (H-index: 31)

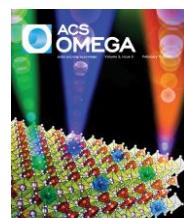
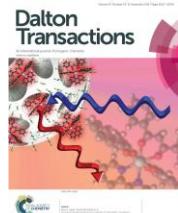
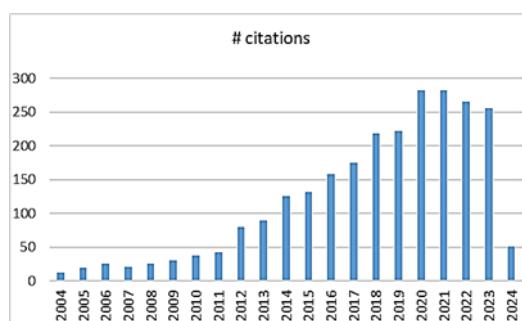
Scopus citations: 2082 (H-index: 27)

ISI-WoS citations: 1906 (H-index: 26)

- 97 papers in international journals (2 cover pictures, 1 Europhysics Highlight)
- 26 papers in conference proceedings
- 3 book chapters (author) and 1 book (editor)

Scholar link: https://scholar.google.it/citations?hl=it&user=1_ViauoAAAAJ&view_op=list_works

Pdf files: https://www.dropbox.com/sh/xzcutfjgxus9wi/AAA2I_d1LVQLLveFmiFaex3Na?dl=0



EDITORIAL RESPONSIBILITIES

2024/on **CO-EDITOR** of the topic “Glassy materials based microdevices” by MDPI

2020/on **EDITORIAL BOARD MEMBER** of the journal “**Applied Nano**” by MDPI

2019/on **EDITORIAL BOARD MEMBER** “Optics and Lasers” division of the journal “**Applied Sciences**” by MDPI

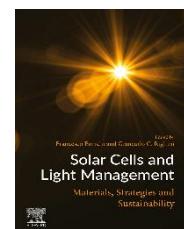
2021/23 **EDITOR-IN-CHIEF** of the topic “Nanomaterials for Sustainable Energy Applications” by MDPI

2020/21 **EDITOR** of the **special issue**: “Metal Oxides in Energy Technologies” **Applied Sciences, MDPI**

2020 **EDITOR** of the **special issue**: “Rare-Earth-Based Composite & Nanostructured Materials” **Materials, MDPI**

2019/20 **EDITOR** of the **special issue**: “Materials & Optical Strategies for Solar Cells” **Applied Sciences, MDPI**

2018/19 **EDITOR invited by Elsevier of the BOOK** “Solar cells and light management: materials, strategies and sustainability”, published in October 2019, ISBN: 9780081027622; DOI: 10.1016/C2017-0-04229-5



REVIEWER ACTIVITY FOR INTERNATIONAL JOURNALS

Referee for the following international journals: Annals of the New York Academy of Sciences, Ceramics International, Chemical Physics Letters, European Physics Journal Plus, Heliyon, Journal of Alloys and Compounds, Journal of Fluorescence, Journal of Luminescence, Journal of Materials Chemistry C, Journal of Nanoparticle Research, Journal of Physical Chemistry, Material Chemistry and Physics, Materials for Renewable and Sustainable Energy, Materials Letters, Material Science and Engineering B, Microelectronics Engineering, Micromachines, MRS Advances, Nano Energy, Nanomaterials, Optical Engineering, Optical Materials, Optical Materials Express, Optics Express, Optik, Physica B, Physics Procedia, Solar Energy.

CONFERENCE ORGANIZATION AND SCIENTIFIC COMMITTEES

2019-24 **Organizing Committee of the last 6 editions of the S17 Symposium** “Advanced Ceramic Materials and Processing for Photonics and Energy”, from **ICACC 2019** to **ICACC2024**.

2024 **Internat. Scientific Committee of PRE24** “Photoluminescence of Rare Earths”, Trento, Italy, 13-15 May 2024.

2020 **International Program Committee of Photoptics 2020** “8th International Conference on Photonics, Optics and Laser Technology”, Valletta, Malta, 27-29 February 2020.

2018 **Conf. Committee of Advanced Energy Material Congress (AEMC 2018)**, Stockholm, Sweden, March 2018.

2017 **International Program Committee of LIMES 2017** “1st Int. Workshop on Light Management for Efficient Solar Cells”, **Photoptics 2017**, Porto, Portugal, February 2017 (cancelled).

2010-14 Support to the organization of **five editions** of the International Conference **Nanotech Italy**, which was organized every year by Veneto Nanotech in Venice.

PRESENTATIONS AT INTERNATIONAL CONFERENCES

Co-author of **35 posters**, I personally presented **41 oral contributions at international conferences**, of which **20 invited**. **Chairman** during sessions of 5 international conferences.

PATENTS

Co-inventor of a **granted Italian patent** (ITVE2011A000074, Patent N.: 0001408631) & international patent filings in Europe, USA, China, India, *not granted and abandoned* (PCT/IB2012/056318, EP20120808485, USA 14 / 357.414, CN201280066911, 4293/CHENP/2014 A)

AWARDS

13/03/2006 **“Premio Regionale Veneto per l’Innovazione”**, Regional Prize for Innovation for my PhD Thesis.

23/09/2011 Awarded at fourth position at “**StartCup Veneto 2011**” with the business idea “HELV”.

11/11/2011 Finalist at the business plan competition “**Nanochallenge 2011**” with the idea “Surflight”.

18/11/2011 Second position at the “**Premio Nazionale Innovazione 2011**” with the idea “HELV”.

31/10/2012 Finalist at the business plan competition “**Nanochallenge 2012**” with the idea “HELV”.

01/05/2018 Elected as **Member of the Institute of Physics (MInstP)**.

March 2019 Elected as **Member of the Energy-Group Committee of the Institute of Physics**.

MEMBER OF SCIENTIFIC SOCIETIES

From 2005 to 2018 Member of SPIE – the Intl. Soc. for Optics and Photonics (with some interruptions)

From 2011 onward Member of SIF – the Italian Society of Physics

2013, 2016-17, 2024 Member of SIOF – the Italian Society of Optics and Photonics

2013, 2016-17, 2024 Member of EOS – the European Optical Society

From 2017 onward Member of ACerS – the American Ceramic Society

From 2018 onward Member of IOP – Institute of Physics

NETWORK OF COLLABORATIONS

Extended network of collaborations both in research and in the industrial sector, attested by several publications, projects and common activities. Hereafter the main ones.

Research institutions: Ca’ Foscari University (Venice, Italy), University of Padua (Padua, Italy), Centro Fermi (Rome, Italy), CNR-IFN (Trento, Italy), CNR-IFAC (Florence, Italy), University of the Witwatersrand (Johannesburg, South Africa), Luleå University of Technology (Luleå, Sweden), Chalmers University of Technology (Goteborg, Sweden), Université Abdelmalek Essaâdi, Ecole Nationale des Sciences Appliquées ENSA e CNRS (Tanger, Morocco), INRS-EMT & Univ. du Québec (Varennes, Canada), altre....

Industrial sector: Heliv Group Srl (innovative SME, co-founded in 2012, Venice, Italy), Global Display Solutions Srl. (multi-national with headquarter in Vicenza, Italy), Meridionale Impianti Spa (multi-national located in Caponago and Catania, Italy), Hikari Srl (Verona, Italy), Hangar Srl (Verona, Italy), Luce in Veneto and the RIR *Venetian Smart Lighting* (cluster of more than 50 companies mainly located in the Veneto Region, Italy), Certottica Scrl (Belluno, Italy), Nadir Tech (Venice, Italy), ECOR-International Spa (Vicenza, Italy), others....