

Prof. Giulio Cerullo – Curriculum Vitae

PERSONAL DETAILS

Family name, First name: Cerullo, Giulio

Researcher unique identifiers: <https://orcid.org/0000-0002-9534-2702>,

Scopus ID: 24774986400

Date of birth: February 16, 1965

Nationality: Italian

URL for web site: <https://www.femtosecond.fisi.polimi.it/>



● EDUCATION

1988 Master's Degree, Electronic Engineering, Politecnico di Milano, Italy

● CURRENT POSITION

2011 – Full Professor, Physics Department, Politecnico di Milano, Italy

● PREVIOUS POSITIONS

1989 – 1991 R&D Engineer, Carl Baasel Lasertechnik GmbH, Germany

1991 – 1999 Assistant Professor, Physics Department, Politecnico di Milano, Italy

1999 – 2011 Associate Professor, Physics Department, Politecnico di Milano, Italy

RESEARCH ACHIEVEMENTS AND PEER RECOGNITION

Ten main research achievements

During his thirty years of scientific career, Giulio Cerullo (GC) has given seminal contributions to ultrafast optical science, along two distinct but strongly intertwined research lines: (i) the development of new tools for the generation of ultrashort light pulses with sub-10-fs duration; (ii) the application of such pulses to the investigation of primary photoinduced processes in (bio)- molecules, nanostructures and solids, occurring on the previously unexplored sub-100-fs timescale. He has recognized that Optical Parametric Amplifiers (OPAs), when designed to achieve group velocity matching between signal and idler waves, provide ultrabroad gain bandwidths, supporting the generation of light pulses with duration down to a few optical cycles [1]. GC has pioneered the **visible non-collinear OPA (NOPA)**, that allows the generation of ultra-broadband visible pulses, with duration down to 5 femtoseconds. Thanks to its simplicity and reliability, the visible NOPA has now become a workhorse in ultrafast spectroscopy, used in many research laboratories worldwide and enabling the spectroscopic investigation of a variety of systems of interest for solid-state physics, chemistry and biology. The concept of broadband phase matching has been then extended to other frequency ranges, from the near- to the mid-infrared, generating in all cases pulses with duration of the order of two cycles of the carrier wavelength. Recently, the **capability of few-optical-cycle pulse generation** has been pushed to the **ultraviolet**, which is a crucial spectral range for the study of biomolecules such as DNA and proteins [2]. Finally, one should also mention the development of optical schemes to extend the pulse bandwidth by the

coherent synthesis of ultra-broadband OPAs [3], to generate sub-cycle light pulses with controlled electric field profile.

The availability of multi-colour, few-optical-cycle pulses has enabled GC to build an ultrafast spectroscopy system with a **worldwide unique combination of short pulse duration and broad frequency tunability**. This setup has been used for the study of a variety of ultrafast processes in molecular and solid-state systems, focusing on the very early photoinduced coherent dynamics occurring on the sub-100-fs timescale, which is normally not accessible with the time resolution available in standard systems. This has resulted in a series of groundbreaking experiments on organic molecules and solids, among which we quote: real-time observation of the conical intersection dynamics underlying the **primary event of vision [4]**; tracking of the ultrafast electron transfer process in polymer-fullerene blends, which is the first step of solar energy conversion in **organic photovoltaic devices [5]**; study of **carrier dynamics in superconductors**, resolving the build-up of carrier interactions responsible for the superconducting glue [6]; observation of ultrafast relaxation processes in **graphene and other two-dimensional semiconductors**, highlighting the unique carrier-carrier scattering mechanisms promoted by two-dimensional quantum confinement [7].

GC has invented a birefringent interferometer, the **Translating-Wedge-based Identical pulses eNcoding System (TWINS) [8]**, with exceptional precision and stability, which has found a wide range of applications, from hyperspectral imaging to single-molecule excitation-emission spectroscopy. He has applied the TWINS to develop a broadband **two-dimensional electronic spectroscopy (2DES)** setup which is simple to operate and is being adopted in several research laboratories worldwide. The 2DES apparatus has been extensively applied to investigate ultrafast processes in organic materials, hybrid perovskites, two-dimensional semiconductors and semiconductor nanoparticles [9]. In recent years, GC gave seminal contributions to the **nonlinear optics with two-dimensional materials**, demonstrating gate-tunable third harmonic generation in graphene, an atomically thick OPA in a two-dimensional semiconductor and a pathway towards phase-matched frequency conversion in two-dimensional semiconductor [10].

1. **G. Cerullo**, M. Nisoli, S. De Silvestri, Appl. Phys. Lett. **71**, 3616 (1997); **G. Cerullo**, M. Nisoli, S. Stagira, S. De Silvestri, Opt. Lett. **23**, 1283 (1998) ; **G. Cerullo** and S. De Silvestri, Rev. Sci. Instrum. **74**, 1 (2003) ; D Brida, ..., **G Cerullo**, J. Opt. **12**, 013001 (2010) ; C. Manzoni and **G. Cerullo**, J. Opt. **18**, 103501 (2016).
2. S.W. Huang, ..., **G. Cerullo** and F. Kaertner, Nat. Photon. **5**, 475-479 (2011) ; C. Manzoni, ..., **G. Cerullo**, and F.X. Kärtner, Laser Photonics Rev. **9**, 129-171 (2015) ; G.M. Rossi *et al.*, Nat. Photon. **14**, 629 (2020).
3. R Borrego Varillas, ..., **G. Cerullo**, and C. Manzoni, Opt. Lett. **39**, 3849-3852 (2014) ; R. Borrego-Varillas, ..., **G. Cerullo**, J. Am. Chem. Soc. **140**, 16087-16093 (2018) ; R. Borrego-Varillas, ..., **G. Cerullo**, Nat. Commun. **12**, 7285 (2021) ; V. Kumar Jaiswal, ..., **G. Cerullo**, and M. Garavelli, J. Am. Chem. Soc. **144**, 12884 (2022).

4. D. Polli, ..., **G. Cerullo**, *Nature* **467**, 440 (2010).
5. C.A. Rozzi *et al.*, *Nat Commun* **4**, 1602 (2013) ; G. Grancini, ..., **G. Cerullo** and G. Lanzani, *Nature Mater.* **12**, 29 (2013) ; S. M. Falke *et al.*, *Science* **344**, 1001 (2014).
6. C. Gadermaier *et al.*, *Phys. Rev. X* **4**, 011056 (2014) ; S. Dal Conte, ..., **G. Cerullo** and C. Giannetti, *Nat. Phys.* **11**, 421 (2015) ; S. Peli, ..., **G. Cerullo** and C. Giannetti, *Nat. Phys.* **13**, 806 (2017).
7. D. Brida, ..., **G. Cerullo** and M. Polini, *Nat. Commun.* **4**, 1987 (2013) ; K.-J. Tielrooij *et al.*, *Nat. Nanotechnol.* **13**, 41 (2018) ; E.A.A. Pogna, ..., **G. Cerullo** and K.-J. Tielrooij, *ACS Nano* **15**, 11285 (2021); E.A.A. Pogna, ..., **G. Cerullo**, *ACS Nano* **16**, 3613 (2022) ; E.A.A. Pogna, ..., **G. Cerullo** and D. Prezzi, *ACS Nano* **10**, 1182 (2016) ; Z. Wang *et al.*, *Nano Lett.* **18**, 6882-6891 (2018) ; C. Trovatiello, ..., **G. Cerullo** and S. Dal Conte, *Nat. Commun.* **11**, 5277 (2020) ; F. Gucci, ..., and **G. Cerullo**, *Nat. Photon.* in press (2026).
8. D. Brida, C. Manzoni, and **G. Cerullo**, *Opt. Lett.* **37**, 3027 (2012); A. Perri, ..., **G. Cerullo**, and C. Manzoni, *Opt. Express* **27**, 15956 (2019) ; E. Thyraug *et al.*, *Proc. Natl. Acad. Sci. USA* **116**, 4064 (2019) ; J. Réhault, M. Maiuri, A. Oriana, and **G. Cerullo**, *Rev. Sci. Instrum.* **85**, 123107 (2014).
9. A. De Sio *et al.*, *Nat. Commun.* **7**, 13742 (2016) ; J.M. Richter, ..., **G. Cerullo** and F. Deschler, *Nat. Commun.* **8**, 376 (2017) ; V.R. Policht, ..., **G. Cerullo**, *Nano Lett.* **21**, 4738 (2021). ; F.V.A. Camargo, ..., **G. Cerullo**, *Nano Lett.* **21**, 1461 (2021) ; T. Nagahara, ..., **G. Cerullo**, *Nano Lett.* **24**, 797 (2024).
10. O. Dogadov, C. Trovatiello, B. Yao, G. Soavi, **G. Cerullo**, *Laser Photonics Rev.* **16**, 2100726 (2022); G. Soavi *et al.*, *Nat. Nanotechnol.* **13**, 583-588 (2018); C. Trovatiello, ..., **G. Cerullo**, *Nat. Photon.* **15**, 6 (2021) ; X. Xu, ..., **G. Cerullo** and P.J. Schuck, *Nat. Photon.* **16**, 698 (2022) ; C. Trovatiello, ..., **G. Cerullo** and P.J. Schuck, *Nat. Photon.* **19**, 291 (2025).

Scientific collaborative network. Broad international network of collaborators in the fields of ultrafast optics and spectroscopy (many of whom are ERC grantees), among them (with number of joint papers): Uri Banin (The Hebrew University of Jerusalem, Israel): ultrafast spectroscopy of semiconductor nanostructures and nanohybrids (8); Roberto Bassi (Verona University, Italy): ultrafast processes in photosynthesis (6); Marco Garavelli (Bologna University, Italy): modelling of ultrafast processes in (bio)molecules (28); Andrea Ferrari (Cambridge University, UK): ultrafast spectroscopy of graphene and two-dimensional materials (21); Richard Friend (Cambridge University, UK): ultrafast spectroscopy of organic photovoltaic materials (6); Franz Kaertner (Center for Free Electron Laser Science, Hamburg, Germany): coherent pulse synthesis (9); Christoph Lienau (Oldenburg University, Germany): coherent processes in nanomaterials (14); Marie Paule Pileni (UPMC Paris, France): ultrafast spectroscopy of metal nanostructures (6).

PEER RECOGNITION

Awards

- 1995 – 1996 NATO Advanced Research Fellowship, Lawrence Berkeley Laboratory (Berkeley, U.S.A.)
- 2012 – 2017 Advanced Grant, European Research Council, project STRATUS
- Fellow, Optical Society of America, 2015, “For pioneering work on few-optical-cycle laser sources, for seminal achievements in ultrafast spectroscopy of organics, and for service to the optics community”.
- Fellow, European Physical Society, 2019, “for seminal contributions to the generation and applications of ultrashort light pulses and for services to the European physics community”.
- International Prize Luigi Tartufari of the Accademia Nazionale dei Lincei, 2022, for Physico-Chemical Sciences.
- Fellow (Socio Corrispondente), Accademia Nazionale dei Lincei, 2022.
- Quantum Electronics Prize of the European Physical Society, 2023 “for pioneering and outstanding contributions to the generation of few-cycle light pulses and for their application to the study of primary photoinduced processes in (bio)molecules and nanostructures”.
- Miller Professorship, University of California Berkeley, 2025.
- Fellow, the Italian Academy of Engineering (ITATEC), 2025.
- 2026-2032, Synergy Grant, European Research Council, project CONCERT (corresponding PI)
- Member, Academia Europaea, Section Physics, 2026.
- Raman Award for the Most Innovative Technological Development, 2026.

Invited/Keynote/Plenary presentations at international conferences: In the last 10 years I have presented > 50 Invited/Keynote/Plenary talks at international conferences, among which:

- 2013: Invited Talk, XVIth Time-Resolved Vibrational Spectroscopy Conference (Beppu, Japan)
- 2014: Invited Talk, International conference on Ultrafast Phenomena (Okinawa, Japan)
- 2015: Invited Talk, CLEO USA (San Jose, USA)
- 2015: Plenary Talk, Photonica 2015 (Belgrade, Serbia)
- 2016: Invited Talk, 12th European Conference on Atoms, Molecules and Photons (Frankfurt, Germany)
- 2016: Plenary Talk, 1st International Conference on Optics, Photonics and Materials (Nice, France)
- 2017: Plenary Talk, German Physical Society Spring Meeting (Mainz, Germany)
- 2018: Invited Talk, 256th ACS National Meeting (Boston, USA)
- 2018: Keynote Talk, 7th EuCheMS Chemistry Conference (Liverpool, U.K.)
- 2019: Keynote Talk, 10th International Conference on Metamaterials, Photonic Crystals and Plasmonics (Lisbon, Portugal)
- 2019: Keynote Talk, Advances in Optics and Photonics 2019 (Lisbon, Portugal)
- 2020: Plenary Talk, Photoptics (Malta)

- 2020: Keynote Talk, METANANO 2020 (Tbilisi, Georgia, virtual conference)
- 2021: Plenary Talk, EOSAM 2021 (Rome, Italy)
- 2022: Plenary Talk, Italian Photochemistry Meeting (Ferrara, Italy)
- 2023: Plenary Talk, XVII Iberian Joint Meeting on Atomic and Molecular Physics (Coimbra, Portugal)
- 2024: Invited Talk, Coherent Multidimensional Spectroscopy Conference (CMDs) (York, U.K.)
- 2024: Plenary Talk, International Conference on Raman Spectroscopy (ICORS), Rome, Italy
- 2024: Keynote Talk, Optica Digital Holography and three-dimensional imaging Topical Meeting (Paestum, Italy)
- 2024: Keynote Talk, METAFUN 2024 (Palermo, Italy)
- 2024: Keynote Talk, XXXVIII Panhellenic Conference on Solid State Physics and Materials Science (Ioannina, Greece)
- 2024: Keynote Talk, RamanFest 2024 (Paris, France)
- 2024: Keynote Talk, I²DM (Abu Dhabi, UAE)
- 2025: Keynote Talk, International Conference on Ultrafast Science and Quantum Sensing (USQS2025, Sanya, China)
- 2025: Plenary Talk, Light Conference 2025 (Changchun, China).
- 2026: Tutorial Talk, EOSAM 2026 (Tampere, Finland)
- 2006: Plenary Talk, NANOP (Rome, Italy)

Organisation of International conferences. In the last 20 years I have been heavily involved in the organizing committees of international conferences in the field of lasers and ultrafast optical spectroscopy.

- *CLEO Europe 2005, 2007* Subcommittee member “Ultrafast Optics, Electrooptics and Applications”.
- *Ultrafast Phenomena 2006, 2008, 2010* member of the Program Committee.
- *Photonics Europe 2006, 2008* member of the Subcommittee “Solid-State Lasers and Amplifiers”.
- *Ultrafast Optics 2007, 2009* member of the Steering Committee.
- *CLEO US 2008, 2009, 2010* Subcommittee member “Ultrafast Optics, Electrooptics and Applications”.
- *1st EOS Topical Meeting on Lasers, 2009*, member of the Program Committee.
- *CLEO Europe-EQEC 2011-2013*, Sub-committee chair, “Ultrafast Phenomena and Frequency Combs”.
- *Ultrafast Optics 2013*, Program Chair.
- *CLEO Europe-EQEC 2015*, Program Chair.
- *Ultrafast Phenomena 2016*, Program Chair.
- *CLEO Europe-EQEC 2017*, General Chair.

- *International Conference on Raman Spectroscopy (ICORS) 2016, 2018*, Steering Committee Member.
- *Ultrafast Phenomena 2018*, General Chair.
- *CLEO Europe-EQEC 2019 and 2021*, Chair of the Steering Committee.
- *ICORS 2022*, Program Chair.
- *Ultrafast Optics 2023, 2025* Program Committee member
- *ICORS 2024*, General Chair.

Editorial Boards

- 2006 – 2012 Associate Editor, Optics Letters, The Optical Society (Ultrafast Phenomena)
- 2010 – Editorial Advisory Board Member, Journal of Raman Spectroscopy, Wiley
- 2012 – Advisory Editorial Board Member, Chemical Physics, Elsevier
- 2014 – Editorial Advisory Board Member, Laser & Photonics Reviews, Wiley
- 2016 – 2022 Associate Editor, Optica, The Optical Society
- 2016 – Editorial Board, Scientific Reports, Nature Publishing Group (Condensed Matter Physics)
- 2018 – Editorial Board, Applied Sciences, MDPI, Optics and Lasers
- 2020 – Editor in Chief, International Journal of Optics, Wiley
- 2022 – Editorial Advisory Board Member, Advanced Physics Research (Wiley)
- 2022 – Associate Editor, Ultrafast Science (SPJ)
- 2023 – Associate Editor, Science Advances (American Association for the Advancement of Science)
- 2023 – Editorial Advisory Board Member, the Journal of Physical Chemistry (ACS)
- 2024 – Editor in Chief, Applied Sciences, MDPI
- 2026 – Editorial Board Member, Light: Science&Applications

International Review Panels

- 2009 German Science Foundation (DFG) Priority Programme 1391 Ultrafast Nanooptics
- 2013 Remote Reviewer, Physics Department, Shanghai Jiao Tong University (China), DFG Priority Programme 1391 Ultrafast Nanooptics
- 2015 DFG Priority Programme QUTIF ("Quantum Dynamics in Tailored Intense Fields")
- 2017, 2019, 2021, 2023 European Research Council, Advanced Grants, PE4 Panel Member
- 2018, 2020, 2024 DFG E11- Clusters of Excellence in the areas of Energy Research and Functional Interfaces, DFG Priority Programme "Quantum Dynamics in Tailored Intense Fields", DFG Collaborative Research Center "Non-equilibrium dynamics of condensed matter in the time domain"
- 2020, 2021, 2022 Chair, Review Panel, Independent Research Fund Denmark, Optics Photonics and Electronics

- 2023 Member, Review Panel, Methusalem Initiative (Belgium)
- 2026 Panel Member, Swiss National Science Foundation (SNSF), Physics

Teaching activity in Academia.

2015 Distinguished Lecturer, Nanjing University (China)

2017 Guest Professor, Abbe School of Photonics, Jena University (Germany)

2020 Guest Professor, EPFL PhD school (Switzerland), virtual lectures

In the last 10 years I have given numerous lectures at international summer schools, among which:

- Winter School on Exciton Dynamics in Natural and Man Made Systems (2013, Ein Gedi, Israel);
- Heraeus-Seminar, “Modern Concepts of Continuous Wave and pulsed High Power Lasers” (2013, Bad Honnef, Germany);
- Materials Challenges in Devices for Fuel Solar Production and Employment (2014, Trieste, Italy);
- 7th EPS-QEOD Europhoton Conference Summer School (2016, Vienna, Austria);
- Workshop on Spectroscopy and Dynamics of Photoinduced Electronic Excitations (2017, Trieste, Italy);
- International school on Plasmonics and Nano-Optics (2018, Cetraro, Italy);
- International school on nonlinear vibrational spectromicroscopy (Rome, Italy, 2020, virtual school);
- International Summer School on Plasmonics (2021, Paris, France);
- CUI: Advanced Imaging of Matter Summer School (2022, Halberstadt, Germany);
- Quantum Dynamics and Spectroscopy of Materials and Biosystems (2023, Les Houches, France);
- Experimental Methods in Ultrafast Science (2024, Zurich, Switzerland);
- Spectroscopy&Electrochemistry Summer School (Jesolo, Italy, 2024);
- International Summer School on Plasmonics (2025, Paris, France).

Member of Advisory Committees.

- 2012 – 2018 Laser Advisory Committee (LAC), European XFEL (Hamburg, Germany)
- 2014 – 2018 Scientific Committee, LENS (Florence, Italy)
- 2017 – 2024 Scientific Advisory Board, MBI (Berlin, Germany)
- 2017 – 2022 Chair, Quantum Electronics and Optics Division (QEOD), European Physical Society
- 2020 – 2025 International Advisory Board, Nanoscience Center, University of Jyväskylä, Finland
- 2023 – 2027 Member, Scientific Council, Department of Physical Sciences and Technologies of Matter, CNR (Italy)

- 2025 – ... Member, Directive Council, European Laboratory of Nonlinear Spectroscopy (LENS, Florence, Italy)

ADDITIONAL INFORMATION

Publications and H-index (data taken from Scopus). Over my whole career, I have published >600 papers, which have attracted over 39000 citations, corresponding to an H-index of 97 (Scopus). According to Google Scholar, my total number of citations is 53325 (H-index: 115).

Contributions to the early careers of excellent researchers. Most of my PhD students decided to pursue a scientific career after the thesis, and work in prestigious research institutions worldwide, and **six won ERC grants**. Among the young scientists whom I mentored: 1) Dario Polli, Full Professor, Politecnico di Milano, ERC grantee; 2) Cristian Manzoni, Research Director, IFN-CNR, Italy; 3) Michele Celebrano, Associate Professor, Politecnico di Milano; 4) Giovanni Cirimi, Beamline Scientist, FLASH Free Electron Laser, Hamburg, Germany; 5) Daniele Brida, Full Professor, University of Luxembourg, ERC grantee; 6) Giulia Grancini, Associate Professor, Università di Pavia, Italy, ERC grantee; 7) Margherita Maiuri, Associate Professor, Politecnico di Milano, Italy, ERC grantee; 8) Giancarlo Soavi, Junior Professor, Jena University, Germany; 9) Rocio Borrego Varillas, Senior Researcher, IFN-CNR, Italy; 10) Franco Valduga de Almeida Camargo, Researcher, IFN-CNR, Italy, ERC grantee; 11) Eva Pogna, Senior Researcher, IFN-CNR, Italy, ERC grantee; 12) Soumen Ghosh, Assistant Professor, Indian Institute of Science, India; 13) Chiara Trovatiello, MSCA Global Fellow, Columbia University, USA.

Other contributions to the research community. I have always been focused on translating my scientific discoveries into technological innovations. I am the co-inventor of ten patents in the field of optics and spectroscopy and of five more submitted patent applications. I am the co-founder of two spin-off companies:

- NIREOS s.r.l. (<https://www.nireos.com/>), with the mission to commercialize an innovative interferometer, the TWINS, for applications to microscopy and imaging;
- Cambridge Raman Imaging (CRI) Ltd. (<https://www.cambridgeramanimaging.com/>) with the mission to commercialize a coherent Raman microscopy system for chemometric tissue imaging and tumor diagnosis.

Milano, September 29, 2026



Prof. Giulio Cerullo