**Curriculum Vitae: Prof. Stefano Trillo**

Stefano Trillo has over 40-year experience in research, carried out in both top level research institutions and in the academia. He is widely recognized internationally as a leading scientist in the field of nonlinear physics with applications in nonlinear optics, photonics, and hydrodynamics, thanks to several seminal contributions in such areas. These encompass both pioneering experimental results and creative theoretical work, due to a quite unique capacity to conjugate experimental skills in the lab with the ability to use mathematical and numerical tools for achieving ground-breaking results in theory. He is author of about **580 publications** between peer-review journals, conference proceedings, books and invited book chapters, and has a vaste international experience with well established and long-standing collaborations in different countries. He is full professor at University of Ferrara, where he has grown (out of nothing) a group dedicated to optics and its applications, as well as physics of nonlinear waves.

**Personal data**:
nationality: italian; born in Rome (Italy), Dec. 20, 1957; Married with two daughters.
University address: Dept. of Engineering, University of Ferrara, Via Saragat 1, 44122 Ferrara (Italy);
email: stefano.trillo@unife.it; cell: +39-320-4350766

**Academic degrees**:
Laurea (110/110 cum laude) in Electrical Engineering (EE), 1982 ("Feasibility experiment of a FEL over the electron storage ring Adone", INFN, Frascati); PhD in Applied Electromagnetics, 1986 ("Instability, multistability, and stochastic phenomena in the nonlinear propagation in dielectric waveguides at optical frequencies"); both from University "La Sapienza", Rome, Italy.

**Employments & Qualifications:**
1982-1983: Research associate at INFN National Labs, Frascati (Italy)
1984-1986: Doctorate (first PhD program ever started in Italy)
1986-1998: Staff (senior researcher) at Fondazione Ugo Bordoni (research institution funded by the Italian Ministry of Communications), Rome, Italy.
1998-present: Full Professor (Associate 1998-2007) at University of Ferrara, Italy, SC 09/F1-Electromagnetic Fields (SSD ING-INF/02)

**ASN Qualification (other areas):**
2017-present: National Scientific Qualification (ASN) for Full Professor (1a fascia), settori concorsuali (SC):
SC 02/B1 – Fisica Sperimentale della Materia (SSD FIS/01-FIS/03);
SC 02/B2 – Fisica Teorica della Materia (SSD FIS/03).

**Senior academic responsabilities**
- Foundator and leader of the group in Optics and Electromagnetics in Ferrara (3 staff, postdocs, PhDs)
- Member of the technical and steering committee of IUSS (University Institute for Advanced Study)
- Director of PhD Program "Sciences of Engineering" (>30 PhD students), 2007-present
- Member of national commission for scientific habilitation in Electromagnetics 09/F1, 2012-2014

**Teaching experience:**
His teaching activity at the University of Ferrara encompassed different classes for graduated students in EE and PhD students: Electromagnetic Propagation, Optics, Guided Wave Structures, Nonlinear Optics, Applied Dynamical Systems, Nonlinear Waves. He has also been invited speaker in several national and international schools for PhD students and advanced studies. He is also promoter of PhD joint courses for physicists, engineerees and mathematicians.

**Research interests**
Electrons-light interactions and dynamics of free-electron lasers (1982-1984); Nonlinear mode coupling in fiber optics and its exploitation for all-optical control of signals; Frequency conversion and parametric instabilities; Temporal solitons in fibers; Ultrafast dynamics; Fiber lasers, mode-locking, and their dynamical behavior; Modeling of light-matter interactions from first principles; Structured light beams: linear and nonlinear (non-solitonic) localized wave-packets; Spatial solitons in waveguides and bulk media;

Mathematical theory of soliton phenomena and nonlinear waves; Photonic crystals, nanocavities, and photonic circuits; Nano-optics; Shock waves and dispersive hydrodynamics; Quantum statistics of photons; Bose-Einstein condensation; Dynamical systems and chaos. Pattern formation in dissipative systems. Optical turbulence.

**Synthetic description of main achievements in research (1982-2024):**

- First absolute experimental demonstration of free-electron laser gain in a storage ring with undulator
- First observation of polarization instabilities in the evolution along standard as well as ad-hoc engineered silica optical fibers and its application to build all-optical devices
- Theory of Hamiltonian spatial chaos in the nonlinear mixing of modes in waveguides
- First prediction of pulse breaking-free switching based on temporal solitons in fibers
- First prediction of instabilities in passive cavities promoting optical frequency comb formation
- First detailed comparative study of discrete solitons in array of evanescently coupled waveguides
- First prediction and observation of modulational instability in second-harmonic generation
- Demonstration of group velocity mismatch compensation by means of resonance soliton excitation
- Full theory of gap-solitons and their stability in periodic media with different nonlinear response
- Exhaustive investigation of solitons, instability phenomena, and their applications in quadratic media
- Demonstration of the regenerative capability of 3WM over signals traveling along fiber optic links
- Opening of the field of nonlinear X waves (non-soliton 3D diffraction-free and dispersion-free wavepackets) along with the first absolute observation of their spontaneous formation
- Pioneering observation of dispersive wave-breaking in nonlocal media
- Theory and observation of soliton and shock radiation in slow-light Photonic Crystal waveguides
- Observation of different new solitonic regimes in hydrodynamics (water waves in tanks)
- First experimental demonstration of symmetry-breaking in Fermi-Pasta-Ulam recurrence
- First realization of Riemann problem in a photon superfluid (optical fiber)

**International Experience** He has spent several research stage abroad, main ones at ETH, Zurich (1985, 4 months); Optical Sciences Center, U. of Arizona (years 1986-87, 15 months); CREOL, Orlando, Florida (1991, 1 month) Washington State Univ., Pullman (1998, NATO grant, 1 month); U. of Bourgogne, France (1997, 1998, 1999, 2004, 2012, 5 months), U. of Lille (2015-2019, 6 months overall). He took part in international PhD juries in the US, UK, France, Belgium, Denmark, Australia. He has established several and long-standing international collaborations with most prestigious universities worldwide, which have led to > 100 papers in peer-review journals coauthored by >60 between junior and top scientists in different countries.

**Publication record** (see also ORCID https://orcid.org/0000-0001-9434-5971)

Author of >240 papers published in the top ranking peer-review journals (28 Phys. Rev. Lett., 2 Phys. Rev. X, 1 Nature Photonics, 2 Nature Comm., 1 PNAS, >35 Phys.Rev. A/E, >60 Opt. Lett.,...), 1 book (co-edited W.E. Torruellas), 21 invited book chapters; ~315 conference papers (~60 invited/plenary/keynote).

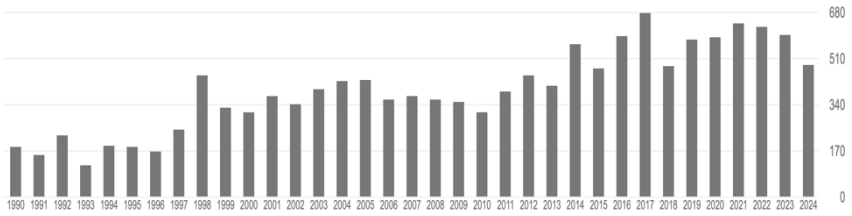
**Bibliometric indicators**

**H-index:** **64**(GoogleScholar); **54** (Scopus)

**number of citations**:

~**14 K** (GS); ~**11 K** (Scopus); citing papers >6K (Scopus); see histogram for cites/year (source: GS, 2024).

See full list for details




**Few selected papers (**last 15 years**;** citations GS)

1. C. Conti, N. Ghofraniha, G. Ruocco, S. Trillo, *Shocks in nonlocal media*, Phys. Rev. Lett. 99, 043903 (2007). **cited: >256**
2. J. Fatome, C. Finot, G. Millot, A. Armaroli, S. Trillo, *Observation of optical undular bores in multiple four-wave mixing*, Phys. Rev. X 4, 021022 (2014); paper with a Physics viewpoint in Phys. Rev. X and an editorial highlight in Nature Photonics. **cited: 128**
3. G. Xu, M. Conforti, A. Kudlinski, A. Mussot, S. Trillo, *Dispersive dam-break flow of a photon fluid*, Phys. Rev. Lett. 118, 254101 (2017). **cited: 92**
4. A. Mussot, C. Naveau, M. Conforti, A. Kudlinski, F. Copie, P. Szriftgiser, S. Trillo, *Fibre multiwave-*

*mixing combs reveal the broken symmetry of Fermi-Pasta-Ulam recurrence*, Nature Photonics 10, 303-308 (2018). **cited: 156**

5. A. Bendhamane, G. Xu, M. Conforti, A. Kudlinski, A. Mussot, and S. Trillo, *The piston Riemann problem in a photon superfluid***,** Nature Commun. 13, 3137 (2022). **cited: 12**

**Selected book & review papers**

1. Book: *Spatial solitons*, S. Trillo, W.E. Torruellas, eds. (Springer, 2001), pp. 1-454. **cited: >500**
2. Review paper: A.V. Buryak, P. Di Trapani, D. Skryabin, S. Trillo, *Optical solitons due to quadratic nonlinearities: from basic physics to futuristic applications*, Physics Reports 370, n. 2, pp. 63-235 (2002). **cited:~500, IF 22.76**

8. Review paper: A. Mussot, M. Conforti, S. Trillo, F. Copie, A. Kudlinski, *Modulation instability in dispersion oscillating fibers*, Adv. Opt. Photonics 10, 1-42 (2018); **cited: 70**

**Funding ID - research grants**

Major grants achieved:

- STREP project "Copernicus (Compact Otdm-wdm oPtical rEceiveRs based on photoNic crystal Integrated CircUitS), 2010-2012, theme ICT-2009.3.8 (Organic photonics and other disruptive photonics technologies); 8 EU partners coordinated by Thales, France; total budget 3 M€. http://www.eee.nott.ac.uk/copernicus
- PI (National Coordinator) of 3 national PRIN (national) projects: PRIN2022 (end 2025; UniFE & UniBS, budget 236 K€); PRIN2012 (end 2017; UniFE,UniTO,Sapienza,UniBS; budget 400 K€); PRIN2009 (end 2013; UniFE, UniAQ, UniBS, budget 360 K€), leading research activity in different aspects of nonlinear photonics and explore hydrodynamic analogies.
- Local PI (UniFE) in PRIN2020 (end 2025; with UniTO, Sapienza, UniBS); PRIN2005, PRIN2003, PRIN2000 (with UniPA, UniRM3, UniBS).
- Team leader regional project PROMINER (Progetto per le Micro e Nano Tecnologie in Emilia Romagna), 2008-2012. budget of the group 63 K€.
- Team leader, different local research themes, academic funding FAR (Fondo di Ateneo per la Ricerca), years 2008-2024, total budget ~65 K€.

**Organization of major international conferences and workshops**

He has an extensive experience in the organization of international events, including participations as TPC member at major conferences in optics: *CLEO Europe-EQEC*, IEEE-OSA, Munich, Germany, 2003, *Nonlinear Guided Waves and Their Applications*, OSA (Toronto 2004, Dresden 2005); *Nonlinear Photonics*, OSA (Quebec City, Canada, 2007; Karlsruhe, Germany, 2010; Colorado Spring, USA, 2012); CLEO-QELS Fundamental Science, OSA, San Jose, USA, 2012-2014; or as Subcomitee Chair at *Nonlinear Photonics*, OSA, (Quebec City, Canada, 2007; Karlsruhe, Germany, 2010; Colorado Spring, USA, 2012), ICONO, St. Petersburg, 2005. He has been the organizers of several minisymposia in math-oriented conferences (SIAM, NEEDS) and events such as Intern. Workshop on *Optical Solitons*, Varenna, 2002 (as Chair), or the Intern. School *Spatio-temporal complexity in nonlinear optics*, Centro A. Volta, Villa del Grumello, Como, 2015.

**International Awards**

Elected OSA Fellow, 2009, "*for pioneering contributions in solitons, instabilities, and nonlinear waves in various systems"*, Optical Society of America.

**Editorials Boards of International Journals**

Topical Editor, Optics Letters, OSA (1998-2004); Editorial board member, Photonics Research, OSA, 2013(launching year)-2018; Edit.Board member, Int. J. of Optics, Wiley, 2009-present.

Ferrara, september 2024

Prof. Stefano Trillo