



Dr. Roberto Osellame

Curriculum Vitae

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Roberto OSELLAME

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Research/Academic experience

- 2019 - Present **Director of Research** at the Institute for Photonics and Nanotechnologies – CNR
- **Head of the research group** on Femtosecond Laser Micromachining
<http://www.mi.ifn.cnr.it/research/Femtosecond-Laser-Micromachining>
- 2001 - Present **Contract Professor** of Physics at the Politecnico di Milano
- 2007 - 2019 **Senior Researcher** at the Institute for Photonics and Nanotechnologies – CNR
- 2001 - 2006 **Staff Researcher** at the Institute for Photonics and Nanotechnologies – CNR
- 2000 - 2001 **Post-Doctoral Fellow** at the Department of Physics – Politecnico di Milano

Education

- February 2000 **PhD in Physics** at Politecnico di Torino, Italy
Supervisor: Prof. Sandro De Silvestri; Grade: Outstanding
- July 1996 **Master degree (Laurea)** in Electronic Engineering at Politecnico di Milano, Italy
Advisor: Prof. Vera Russo; Grade: 100/100 cum laude

Awards and Honors

- 2018 **Fellow** of the Optical Society of America
- 2017 Recipient of an **ERC Advanced Grant** (project CAPABLE - grant no. 742745)
- 2015 **Senior Member** of the Optical Society of America
- 2012 **Italian Habilitation** as Full Professor in the topic 02/B1 – Experimental Physics of Matter
- 2008 **Regione Lombardia Prize ‘Ricerca.tissimi’** for the best 20 researchers in the field of Life Sciences
- 2005 **CNR Prize** for ‘results of particular excellence and strategic national and international relevance’
- 2000 **INFN (National Institute for the Physics of Matter) fellowship**
- 1997 **FIAT S.p.A. prize** for the best Laurea Thesis

Supervision of graduate students and postdoctoral fellows

- 2007 - Present 11 Postdocs, 5 currently
- 2005 - Present 12 PhD students, 3 currently
- 2005 - Present 30 Master students, 5 currently; >20 Bachelor students

Selected research project leadership

<i>Years</i>	<i>Role</i>	<i>Project</i>	<i>Funding</i>
2018-2021	Coordinator of CNR Unit	QuantERA ERANET Cofund 2017 Project HiPhoP	Total: 1 M€ CNR: 189 k€
2017-2022	Principal Investigator	ERC-2016-Advanced Grant: CAPABLE - Composite integrated photonic platform by femtosecond laser micromachining	Total: 2.3 M€ CNR: 1.8 M€
2017-2018	Coordinator of CNR Unit	Hosting of an Individual Marie-Curie fellowship H2020-MSCA-IF-2016: EXTREMELIGHT – Extreme environment resistant nanophotonics	CNR: 180 k€
2017-2018	Coordinator of CNR Unit	ERC-Proof of Concept: NICHOLDS - Nanoengineered three-dimensional substrate for stem cell expansion	Total: 150 k€ CNR: 40 k€
2016-2017	Coordinator of CNR Unit	ERC-Proof of Concept: 3D COUNT – 3D Integrated Single Photon Detectors	Total: 150 k€ CNR: 74 k€
2015-2018	Coordinator of CNR Unit	European Project H2020-ICT-2015-688510: TERABOARD – High density scalable optically interconnected Tb/s Board	Total: 4.2 M€ CNR: 206 k€
2015-2018	Coordinator of CNR Unit	European Project H2020-FETPROACT-2014-641039: QUCHIP – Quantum Simulation on a Photonic Chip	Total: 2.7 M€ CNR: 435 k€
2014-2015	Scientific Consultant	European Space Agency project Optodet-μ on the feasibility of lab-on-chip technology for space missions	
2013-2017	Coordinator of CNR Unit	European Project FP7-PEOPLE-2013-ITN-608062: PICQUE – Photonic Integrated Compound Quantum Encoding	Total: 4 M€ CNR: 500 k€
2013-2016	Coordinator of CNR Unit	European Project STREP-FP7-ICT-2011-600838: QWAD – Quantum Waveguides Application and Development	Total: 1.6 M€ CNR: 360 k€
2013-2014	Project Coordinator	National project Factory of the Future: PLUS – Plastic Lab-on-a-chip fabricated by Ultrafast laser Sources	Total: 700 k€ CNR: 262 k€
2011-2013	Project Coordinator	Cariplo Foundation project 2010: 3D microstructuring and functionalization of polymeric materials for scaffolds in regenerative medicine	Total: 237 k€ CNR: 83 k€
2010-2012	Coordinator of CNR Unit	National project PRIN 2009: Integrated optical circuits for quantum information	Total: 290 k€ CNR: 146 k€
2010-2012	Coordinator of CNR Unit	Industrial Research Contract with Saint-Gobain Recherche	
2010-2012	Principal Investigator	Regione Lombardia project (MAN-18): MINILAB - Micro and nano machining for the fabrication of innovative lab-on-a-chip	Total: 154 k€
2009-2012	Project Coordinator	European Project STREP-FP7-ICT-2007-224205: microFLUID microfabrication of polymeric lab-on-a-chip by ultrafast lasers with integrated optical detection	Total: 3.2 M€ CNR: 433 k€

Selected organization of scientific meetings (2008-2017)

2017-2019	Chair of the Program Committee <i>Materials Processing with Lasers</i> at CLEO-Europe, Munich (Germany)
2017-2019	Co-Chair of the Photonics West Conference <i>Frontiers in Ultrafast Optics: Biomedical, Scientific, and Industrial Applications XVI</i> , San Francisco (USA)

- 2016 **Co-Chair of the Organizing Committee** for the International Conference *5th Micro and Nano Flows*, Milan (Italy)
- 2015 **Program Committee Member** for the conference CLEO-Europe on the topic *Materials Processing with Lasers*, Munich (Germany)
- 2014 **Chair** of the Scientific School on *Integrated Photonic Manipulation for Quantum Applications*, Varenna (Italy)
- 2010 - 2015 **Program Committee Member** for the Photonics West Conference *Laser-based Micro- and Nanoprocessing X*, San Francisco (USA)
- 2009 - 2013 **Program Committee Member** for the conference CLEO-Europe on the topic *Ultrafast Science and Technology*, Munich (Germany)
- 2008 **Member of the Local Organizing Committee** for the Conference *Ultrafast Phenomena XVI*, Stresa (Italy)

Teaching activities (2000-2018)

- 2015 - Present **Contract Professor** at the Politecnico di Milano teaching *Quantum Optics and Information* (2nd year, Master in Physical Engineering)
- 2008-2011 **Teaching Assistant** giving seminars in support to the course *Micro and Nano Optics* of the Politecnico di Milano (2nd year, Master in Physical Engineering)
- 2000 - 2014 **Contract Professor** at the Politecnico di Milano teaching courses of *Experimental Physics* (1st year, Bachelor in Engineering) – Overall 18 Semesters of teaching

Invited external examiner in PhD exams

- 2019 University of Bristol (UK)
- 2019 Università di Trento (Italy)
- 2018 RMIT Melbourne (Australia)
- 2016 University of Bristol (UK)
- 2016 Technical University Dresden (Germany)
- 2016 Università di Bari (Italy)
- 2014 Tampere University of Technology (Finland)
- 2014 Macquarie University, Sydney (Australia)
- 2013 University of Toronto (Canada)
- 2012 Politecnico di Milano (Italy)
- 2011 Universidad Autonoma de Madrid (Spain)
- 2010 Macquarie University, Sydney (Australia)
- 2008 University of Toronto (Canada)
- 2005 Université Jean Monnet, Saint Etienne (France)
- 2005 Universidad Autonoma de Madrid (Spain)

Selected editorial/review activities and membership of societies

- 2019 **Reviewer** of project proposals for the **European Research Council (ERC)**
- 2017-Present **Editorial Board Member** for the journal *Technologies* (MDPI publishing group)
- 2016-2017 **Guest Editor** for the **Special Issue** *Ultrafast Laser Fabrication for Lab-on-a-Chip* for the journal *Micromachines*
- 2016-Present **Editorial Board Member** for the journal *Scientific Reports* (Nature Publishing Group)
- 2016 **Reviewer** for the evaluation of a project proposal in the Discovery Program of the **Natural Sciences and Engineering Research Council of Canada - NSERC**
- 2016 **Reviewer** for the evaluation of a project proposal for the **Deutsche Forschungsgemeinschaft (German Research Foundation) - DFG**

2015	Reviewer for the evaluation of a project proposal (<i>Vici grant</i>) in the call <i>Innovational Research Incentives Scheme</i> of The Netherlands Organisation for Scientific Research - NWO
2014	Member of the European Physical Society
2012	Co-editor of the book "Femtosecond laser micromachining: fabrication of photonic and microfluidic devices in transparent materials", Springer, "Topics in Applied Physics" series, Vol. 123, Eds. R. Osellame, G. Cerullo, R. Ramponi
2008 - Present	Reviewer for the evaluation of a project proposal to be funded by the Canadian Institute for Photonic Innovations - CIPI
2002 - Present	Reviewer for scientific journals (including <i>Nature</i> , <i>Nature Nanotechnology</i> , <i>Nature Communications</i> , <i>Light Science and Applications</i> , <i>Physical Review Letters</i> , etc.)
2000 - Present	Membership of the Optical Society of America – Nominated Senior Member in 2015

Achievement track record

Roberto Osellame has been one of the pioneers of femtosecond laser micromachining of transparent materials. He gave a fundamental contribution to the technique by demonstrating the control of the waveguide cross-section by astigmatically shaping the writing beam. Subsequently, he demonstrated the quality of this microfabrication technology by achieving the **first waveguide laser directly written with femtosecond lasers**. He then exploited the possibility to combine waveguide writing with microchannel fabrication to develop lab-on-a-chip with integrated optical detection. Following this idea, he became the **Project Coordinator of a STREP European project**, named microFLUID, and of several national grants. For this activity, he received the **Ricerca.tissimi prize** from Regione Lombardia as one of the 20 best researchers in Life Sciences under 40 years. Taking advantage of the versatility of the laser technology, he then started to produce integrated photonic circuits for quantum applications. This activity, mainly performed in collaboration with Fabio Sciarrino, but also with other groups in Europe and Australia, had a major impact on the field, culminating in the award of an **ERC-Advanced Grant** in 2017. Among the different breakthroughs he achieved in this field, he managed to demonstrate the **first integrated photonic circuits capable to propagate and manipulate polarization-encoded qubits** and this opened the door to several applications in quantum simulation, quantum computing and quantum sensing, where he took full advantage of the three-dimensional capabilities of the technology to demonstrate innovative layouts and experiments. The importance of his research contribution is testified by the many papers on **high impact factor journals**, by the many **European projects** where he is involved and by his invited position as **Program Committee Chair** in two of the main International Conferences in the field of Lasers and Applications (namely, CLEO/Europe and Photonics West).

Bibliometric data

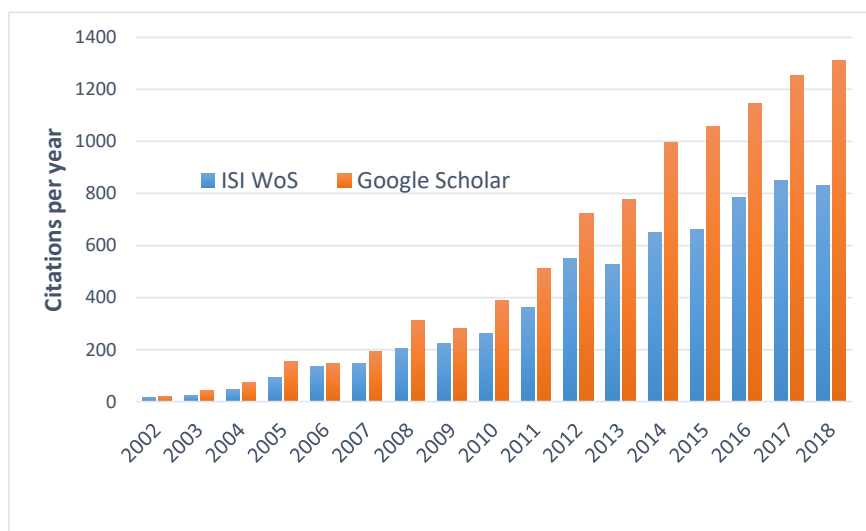
h-index:

Web of Science = **47**
 Researcher ID: E-6076-2012

Google Scholar = **55**
 User ID: 7Ub9SvwAAAAJ

Total number of citations:

>**6700** in ISI Web of Science
 >**10000** in Google Scholar



~190 publications on ISI scientific journals:

19 papers in **high impact factor journals** of **Nature and Science publishing groups** (1 *Nature*, 1 *Nature Nanotechnology*, 5 *Nature Photonics*, 2 *Science Advances*, 8 *Nature Communications*, 2 *Light: Science & Applications*) – 7 as lead author and 11 as CNR group leader.

23 in other **high impact factor journals**: 7 in *Phys. Rev. Lett.*, 1 in *Phys. Rev. X*, 1 in *Laser Photon. Rev.*, 1 in *Adv. Func. Mat.*, 3 in *Optica*, 1 in *ACS Appl. Mater. Interfaces*, 1 in *ACS Photonics*, 8 in *Lab Chip* – 14 as lead author and 7 as CNR group leader.

Selected invited presentations at international conferences (overall >50)

- 2019 Quantum Information and Measurement V, Rome (Italy)
- 2018 Photonics Asia, Beijing (China)
- 2018 Physics of Cancer (PoC2018), Leipzig (Germany)
- 2018 Progress in Laser Modifications of Materials (PULMM2018), Telluride (USA)
- 2018 Laser Precision Micorfabrication (LPM2018), Edinburgh (UK)
- 2018 Lab on a chip and Microfluidics Europe, Rotterdam (the Netherlands) - **Keynote**
- 2017 Asia Communications and Photonics Conference (ACP2017), Guangzhou (China)
- 2017 International Conference on Integrated Quantum Photonics, Rome (Italy)
- 2017 7th EOS Topical Meeting on Optical Microsystems (OμS'17), Capri (Italy)
- 2017 8th International Conference on Metamaterials, Photonic Crystals and Plasmonics (META'17), Seoul (South Korea)
- 2017 Frontiers in Materials Processing Applications, Research and Technology (FiMPART 2017), Bordeaux (France)
- 2017 Scientific School on Architectures for Quantum Photonic, Nice (France) – **Tutorial Lecture**
- 2016 9th Italian Quantum Information Science Conference (IQIS2016), Rome (Italy)
- 2016 Progress in Ultrafast Modifications of Materials (PULMM2016), Neuchatel (Switzerland), June 2016
- 2015 Advanced Solid State Lasers Conference (ASSL2015), Berlin (Germany) – **Plenary Talk**
- 2015 Conference on Laser Ablation (COLA2015), Cairns (Australia)
- 2015 School on Integrated quantum photonics applications: from simulation to sensing, Roma (Italy)
- 2015 7th International Congress on Laser Advanced Materials Processing - LAMP2015, Fukuoka (Japan)
- 2014 4th Micro and Nano Flows Conference, London (UK)
- 2014 SPIE Photonics West, San Francisco (California-USA)
- 2013 CLEO Pacific Rim (Symposium on 'Biochip fabrication by femtosecond laser'), Kyoto (Japan)
- 2013 2nd EOS Conference on Optofluidics, Munich (Germany)
- 2013 Progress in Ultrafast Laser Modifications of Materials, Cargèse, Corsica (France)
- 2012 Frontiers in Optics, Rochester (New York-USA)
- 2012 SPIE Photonics West, San Francisco (California-USA)
- 2011 CLEO Pacific Rim 2011, Sydney (Australia)
- 2011 BioPhotonics 2011, Parma (Italy)
- 2010 IEEE Photonics Society Annual Meeting, Denver (USA)
- 2010 11th International Symposium on Laser Precision Microfabrication – LPM 2010, Stuttgart (Germany)
- 2010 International symposium on non-oxide and new optical glasses (ISNOG), Ningbo (China), June 2010

Patents

1. M. T. Raimondi, G. Cerullo, R. Osellame, A. Remuzzi, "Synthetic niche matrices for stem cell culture," Italian patent IT2015UB03414 in 2015, PCT extension WO2017037108
2. A. Bassi, F. Bragheri, P. Paiè, R. Osellame, "Optofluidic device," Italian patent IT2015UB03920 in 2015, PCT extension WO2017055290

3. R. Osellame, A. Crespi, G. Corrielli, F. Sciarrino, “Method for realizing an optical waveguide in a substrate by means of a femtosecond laser,” Italian patent IT2013MI00631 in 2013, PCT extension WO2014170872
4. A. Crespi, P. Mataloni, R. Ramponi, L. Sansoni, F. Sciarrino, G. Vallone, R. Osellame, “An integrated optics logic gate for polarization-encoded quantum qubits and a method for the production and use thereof,” Italian patent IT2011PD00140 in 2011, PCT extension WO2012150568
5. G. Cerullo, R. Osellame, “Apparato per la fabbricazione di dispositivi fotonici con impulsi laser ultrabrevi e relativo metodo di fabbricazione”, Italian patent MI2002A001717 in 2002
6. R. Osellame, R. Ramponi, M. Marangoni, “Reconfigurable optical device for wavelength division multiplexing networks,” Italian Patent IT2001MI00539 in 2001, PCT extension WO02073305

List of 15 selected publications in peer-reviewed journals

Legenda: WoS = Web of Science (Core collection); GS = Google Scholar

1. **Two-Particle Bosonic-Fermionic Quantum Walk via Integrated Photonics**
L. Sansoni, F. Sciarrino, G. Vallone, P. Mataloni, A. Crespi, R. Ramponi, R. Osellame
Physical Review Letters **108**, 010502 (2012)
Impact Factor: 8.46
Citazioni WoS: 295
Citazioni GS: 457
2. **Integrated multimode interferometers with arbitrary designs for photonic boson sampling**
A. Crespi, R. Osellame, R. Ramponi, D.J. Brod, E.F. Galvao, N. Spagnolo, C. Vitelli, E. Majorino, P. Mataloni, F. Sciarrino
Nature Photonics **7**, 545-549 (2013)
Impact Factor: 37.85
Citazioni WoS: 298
Citazioni GS: 475
3. **Anderson localization of entangled photons in an integrated quantum walk**
A. Crespi, R. Osellame, R. Ramponi, V. Giovannetti, R. Fazio, L. Sansoni, F. De Nicola, F. Sciarrino, P. Mataloni
Nature Photonics **7**, 322-328 (2013)
Impact Factor: 37.85
Citazioni WoS: 193
Citazioni GS: 287
4. **Femtosecond writing of active optical waveguides with astigmatically shaped beams**
R. Osellame, S. Taccheo, M. Marangoni, R. Ramponi, P. Laporta, D. Polli, S. De Silvestri, G. Cerullo
Journal of the Optical Society of America B **20**, 1559-1567 (2003)
Impact Factor: 1.84
Citazioni WoS: 258
Citazioni GS: 377
5. **Polarization Entangled State Measurement on a Chip**
L. Sansoni, F. Sciarrino, G. Vallone, P. Mataloni, A. Crespi, R. Ramponi, R. Osellame
Physical Review Letters **105**, 200503 (2010)
Impact Factor: 8.46

Citations WoS: 151

Citations GS: 225

- 6. Femtosecond laser microstructuring: an enabling tool for optofluidic lab-on-chips**
R. Osellame, H.J.W.M. Hoekstra, G. Cerullo, M. Pollnau
Laser & Photonics Reviews **5**, 442-463 (2011)
Impact Factor: 8.43
Citations WoS: 152
Citations GS: 201
- 7. Integrated photonic quantum gates for polarization qubits**
A. Crespi, R. Ramponi, R. Osellame, L. Sansoni, I. Bongioanni, F. Sciarrino, G. Vallone, and P. Mataloni
Nature Communications **2**, 566 (2011)
Impact Factor: 12.12
Citations WoS: 148
Citations GS: 237
- 8. Experimental validation of photonic boson sampling**
N. Spagnolo, C. Vitelli, M. Bentivegna, D.J. Brod, A. Crespi, F. Flamini, S. Giacomini, G. Milani, R. Ramponi, P. Mataloni, R. Osellame, E.F. Galvao, F. Sciarrino
Nature Photonics **8**, 615-620 (2014)
Impact Factor: 37.85
Citations WoS: 116
Citations GS: 194
- 9. Three-dimensional Mach-Zehnder interferometer in a microfluidic chip for spatially-resolved label-free detection**
A. Crespi, Y. Gu, B. Ngamsom, H.J.W.M. Hoekstra, C. Dongre, M. Pollnau, R. Ramponi, H.H. van den Vlekkert, P. Watts, G. Cerullo, R. Osellame
Lab on a Chip **10**, 1167-1173 (2010)
Impact Factor: 6.05
Citations WoS: 126
Citations GS: 163
- 10. General Rules for Bosonic Bunching in Multimode Interferometers**
N. Spagnolo, C. Vitelli, L. Sansoni, E. Maiorino, P. Mataloni, F. Sciarrino, D.J. Brod, E.F. Galvao, A. Crespi, R. Ramponi, R. Osellame
Physical Review Letters **111**, 130503 (2013)
Impact Factor: 8.46
Citations WoS: 42
Citations GS: 59
- 11. Photonic Realization of the Quantum Rabi Model**
A. Crespi, S. Longhi, R. Osellame
Physical Review Letters **108**, 163601 (2012)
Impact Factor: 8.46
Citations WoS: 85
Citations GS: 98

12. Fractional Bloch oscillations in photonic lattices

G. Corrielli, A. Crespi, G. Della Valle, S. Longhi, R. Osellame

Nature Communications **4**, 1555 (2013)

Impact Factor: 12.12

Citations WoS: 58

Citations GS: 79

13. Surface properties of femtosecond laser ablated PMMA

C. De Marco, S. M. Eaton, R. Suriano, S. Turri, M. Levi, R. Ramponi, G. Cerullo, R. Osellame

ACS Applied Materials & Interfaces **2**, 2377-2384 (2010)

Impact Factor: 7.50

Citations WoS: 64

Citations GS: 82

14. Rotated waveplates in integrated waveguide optics

G. Corrielli, A. Crespi, R. Geremia, R. Ramponi, L. Sansoni, A. Santinelli, P. Mataloni, F. Sciarrino, R. Osellame

Nature Communications **5**, 4249 (2014)

Impact Factor: 12.12

Citations WoS: 48

Citations GS: 73

15. Three-photon bosonic coalescence in an integrated tritter

N. Spagnolo, C. Vitelli, L. Aparo, P. Mataloni, F. Sciarrino, A. Crespi, R. Ramponi, R. Osellame

Nature Communications **4**, 1606 (2013)

Impact Factor: 12.12

Citations WoS: 66

Citations GS: 104