

Luca Marseglia PhD

Postdoctoral Researcher

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EXPERIENCE

Massachusetts Institute of Technology Postdoctoral Associate

Oct. 2013 - Present
Cambridge, MA - USA

- Led team in the project of fabrication and experimental characterization of integrated nanophotonic structures coupled to Silicon Vacancy color centers in diamond for single photon source application in **Integrated Quantum Computing**.
- Initiated and coordinated a collaboration between MIT and Sandia Labs to deterministically create single Silicon Vacancy color center in diamond, for **Integrated Quantum Computing** applications
Project: *Nano-Structures in diamond for integrated quantum computing*
- Collaborated with lab teams to develop techniques for high-resolution structures determination of single molecules at room temperature for better understanding biological phenomena and **drug discovery** application
- Responsible and directly involved in the process of building up two different confocal microscopes for **nano-scale magnetic resonance imaging** (MRI) of single molecule.
Project: *Single molecule MRI via NV centers in diamond*

Center for Nanoscale System - Harvard University Visiting Researcher

Oct. 2013 - Present
Cambridge, MA - USA

- Collaborated with researchers from Center for Nanoscale System (CNS - Harvard) to fabricate diamond integrated nanophotonic structures coupled to color centers in diamond for **integrated quantum computing** application
- Improved existing techniques for fabrication of nano-structures for **quantum photonics**
Project: *Nano-Structures in diamond for integrated quantum computing*

Institute of Quantum Optics, University of Ulm Postdoctoral Fellow

Sep. 2011 - Sep. 2013
Ulm, Germany

- Collaborated with different world-class teams (Stuttgart, Melbourne) to fabricate microstructures coupled to single Silicon Vacancy color center to create emitters of indistinguishable single photons for **Quantum Computing** applications.
Project: *Diamond based atomic nanotechnologies (DIAMANT)*

Center for Quantum Photonics at University of Bristol Ph.D. Student

Apr. 2007 - Aug. 2011
Bristol, UK

- Managed an international collaboration with world-class teams (Bristol, Stuttgart) in order to fabricate the first integrated microstructure coupled on demand to a single Nitrogen Vacancy color center in diamond for **quantum computing** and **quantum sensing** applications.
Project: *NanoEngineered Diamond for Quantum Information Technology (NEDQIT)*

Astronomical observatory of Trieste Software Engineer

Apr. 2005 - Apr. 2007
Trieste, Italy

- Developed JAVA-based web-services for **information extraction** from the astronomical database of the Galileo National Telescope for the Italian National Institute of Astrophysics.
Project: *Development of Astronomical database of Galileo National Telescope data*

Institute for Scientific and Technological Research,(IRST -FBK) Intern (M.Sc. Student)

Sep. 2003 - Dec. 2004
Trento, Italy

- Developed and optimized a system for the handling of temporal reference in written text for **natural language processing** applications.
Project: *Developing Multilingual Web-scale Language Technologies*

EDUCATION

Center for Quantum Photonics, University of Bristol 2007-2011
Ph.D., Electrical and Electronic Engineering Bristol, UK

- Dissertation: *Nano-structures coupled to optically active defects in diamond*

University of Naples - Federico II 1996-2004
M.S./B.S., Physics Naples, Italy

- Dissertation: *Development of models and techniques of automatic temporal reasoning for Question Answering - Chronos System*, (105/110)
- Intern (M.Sc. Student) at Center for Scientific and Technological Research, Fondazione Bruno Kessler (FBK), Trento Italy.
- Specialization in Cybernetics: Artificial Intelligence, Neural Networks, Game Theory.

TEACHING EXPERIENCES

Massachusetts Institute of Technology 2015
Kaufman Teaching Certificate Program Cambridge, USA

- Successfully attended the MIT Teaching and Learning Laboratory course for teaching

Institute of Quantum Optics, University of Ulm 2012
Quantum Optics Ulm, Germany

- Responsible for teaching and evaluated the [Quantum Optics course](#) for Master students in Physics
- Tutored and supervised written and oral examinations

JOURNAL PAPERS

As of May 2016 **Work cited 484 times, h-index of 9** (Google Scholar)

- **L. Marseglia**, K. Saha, A. Ajoy, T. Schröder, D. Englund, T. Teraji, J. Isoya, F. Jelezko, R. Walsworth, J. L. Pacheco, D. L. Perry, E. S. Bielejec, P. Cappellaro. *A bright nanowire single photon source* **To be submitted to Nature Nanotechnology**
- A. Ajoy, Y.-X. Liu, U. Bissbort, K. Saha, **L. Marseglia**, M. D. Lukin, R. L. Walsworth, P. Cappellaro. *Towards a spin radar with NV centers in diamond.* **in preparation**
- A. Ajoy, Y.-X. Liu, K. Saha, **L. Marseglia**, J.-C. Jaskula, U. Bissbort, P. Cappellaro. *Quantum Interpolation for High Resolution Sensing.* **Submitted to Science, (under review)**
- L. J. Rogers, K. D. Jahnke, T. Teraji, **L. Marseglia**, C. Muller, B. Naydenov, H. Schauffert, C. Kranz, J. Isoya, L. P. McGuinness, F. Jelezko. *Multiple intrinsically identical single-photon emitters in the solid state.* **Nature Communications** **5,5739** (2014)
- J. Scheuer, X. Kong, R. S. Said, J. Chen, A. Kurz, **L. Marseglia**, J. Du, P. R. Hemmer, S. Montangero, T. Calarco, B. Naydenov, F. Jelezko. *Precise ultra fast single qubit control using optimal control pulses.* **New Journal of Physics** **16**, 093022 (2014)
- J. E. Kennard, J. P. Hadden, **L. Marseglia**, I. Aharonovich, S. Castelletto, B. R. Patton, A. Politi, J. C. F. Matthews, A. G. Sinclair, B. C. Gibson, S. Prawer, J. G. Rarity, J. L. O'Brien. *On Chip Manipulation of Single Photons from a Diamond Defect.* **Physical Review Letters**, **111**, 213603 (2013)
- D. Wildanger, B. R. Patton, H. Schill, **L. Marseglia**, J. P. Hadden, S. Knauer, A. Schönle, J. G. Rarity, J. L. O'Brien, S. W. Hell, J. M. Smith. *Solid Immersion Facilitates Fluorescence Microscopy with Nanometer Resolution and Sub-Ångström Emitter Localization.* **Advanced Materials**, **22**, 44 (2012)
- **L. Marseglia**, J. P. Hadden, A. C. Stanley-Clarke, J. P. Harrison, B. R. Patton, Y. -L. D. Ho, B. Naydenov, F. Jelezko, J. Meijer, P. Dolan, J. M. Smith, J. G. Rarity, J. L. O'Brien. *Nano-fabricated solid immersion lenses registered to single emitters in diamond.* **Applied Physics Letters**, **98** 133107 (2011)

- S. Castelletto, J. P. Harrison, **L. Marseglia**, A. C. Stanley-Clarke, B. C. Gibson, B. Fairchild, M. P. Hiscocks, K. Genesan, S. T. Huntington, F. Ladouceur, F. Jelezko, J. Wrachtrup, A. D. Greentree, S. Praver, J. L. O'Brien, J. G. Rarity. *Diamond-based structures to collect and guide light*. **New Journal of Physics**, 13, pp 025020 (2011).
- J. P. Hadden, J. P. Harrison, A. C. Stanley-Clarke, **L. Marseglia**, Y. -L. D. Ho, B. R. Patton, J. L. O'Brien, J. G. Rarity. *Strongly enhanced photon collection from diamond defect centres under micro-fabricated integrated solid immersion lenses*. **Applied Physics Letters**, 97 241901 (2010).
- A. B. Young, C. Hu, **L. Marseglia**, J. P. Harrison, J. L. O'Brien, J. G. Rarity. *Cavity enhanced spin measurement of the ground state spin of an NV center in diamond*. **New Journal of Physics**, 11, (pp. 1-9) (2009).
- R. Smareglia, P. Manzato, C. Gheller, U. Becciani, V. Manna, **L. Marseglia**, F. Pasian, G. Taffoni. *Integration of Theoretical Data in the Virtual Observatory*. **Astronomical Data Analysis Software and Systems XVI**, vol.376, p.587 (2007).
- M. Negri, **L. Marseglia**. *Recognition and Normalization of Time Expressions: ITC-irst at TERN 2004*. **Technical report** (2004).

BOOK CHAPTERS

- **L. Marseglia**. *Fabrication of Photonic Crystal coupled to NV center in diamond with Focus Ion Beam*. **Advances in Photonic Crystals Advances in Photonic Crystals**. ISBN 978-953-51-0954-9, InTech, (2013).
- **L. Marseglia**. *Photonic Crystal coupled to NV center in diamond*. **Photonic Crystals - Innovative Systems, Lasers and Waveguides**, ISBN 978-953-51-0416-2, InTech, (2012).

REVIEW

- Peer Review for **Applied Physics Letter** 2015 - Present
- Peer Review for **Optics Express** 2015 - Present

CONFERENCES (SELECTED LIST)

- **L. Marseglia et al.** *A bright nanowire single photon source* **CLEO2016: Laser science to Photonic applications**, San Jose, California, USA. 5-10 June, 2016.
- **L. Marseglia et al.** *Tailoring the diamond: Nano fabricated structures coupled to Silicon-Vacancy Centres in diamond*. **NanoMRI 2015, The 5th Nanoscale Magnetic Resonance Imaging (NanoMRI) Conference**, Waterloo - Canada. 27-31 July, 2015.
- **L. Marseglia et al.** *Tailoring the Diamond: micro/nano - structures coupled to colour centres on the diamond*. **Photon 14, the UK's premier conference on optic and photonics**, London - UK. 1-4 September, 2014.
- **L. Marseglia et al.** *Tailoring the Diamond: Microwave structures surrounding nano-fabricated solid immersion lenses registered to single emitters in diamond on demand*. **DPG Regensburg13, Deutsche Physikalische Gesellschaft - Spring Meeting**, Regensburg - Germany, 10 - 15 March, 2013.
- **L. Marseglia et al.** *Nano-fabricated solid immersion lenses registered to single emitters in diamond*. **Photon 12, the UK's premier conference on optic and photonics**, Durham - UK, 3-6 September, 2012.
- **L. Marseglia et al.** *Precise micro-fabrication of structures to enhance photon collection from diamond color centers*. **CLEO11: Laser science to photonic applications**, Baltimore - USA 1-6 May, 2011
- **L. Marseglia et al.** *Diamond Structures coupled to Nitrogen Vacancy centre on demand*. **QCMC 2010, The Tenth International Conference on Quantum Communication, Measurement and Computation - University of Queensland**, Brisbane - Australia 19 - 23 July, 2010.

TECHNICAL STRENGTHS

Optics	Confocal laser scanning microscopy, Single-photon measurements
Nanotechnology	Reactive Ion Etching, Focus Ion beam etching, Photo-Lithography, Electro beam Lithography, Metal evaporation, Electro-chemical Plating, clean rooms and safety procedures, dry and wet etch, Acid cleaning procedures, Atomic Force Microscopy
Computer Science	JAVA, Web Services (JAVA), Apache-Tomcat, Servlet, ANDROID, Perl, Lisp, Pascal, MatLab, Lab-view,
Spoken Languages	Italian (Native speaker), English (fluent), Spanish (fluent)

SOFTWARE DEVELOPED

- JAVA-based web-services for information extraction from astronomical database (**2005**)
- System for handling temporal reference in written text for natural language processing applications (**2004**)
- Lisp interpreter. (**2003**)
- **Connect 4 game**. (Software developed with search trees using MiniMax and Alpha-Beta pruning algorithms) (**2002**)

AWARDS

- The manuscript *Applied Physics Letters*, 98 133107, (2011) - (**L. Marseglia** et al.) awarded as an editor's suggestion in the **Virtual Journal of Nanoscale Science & Technology**, **23, 14 (2011)**
- **Second place at Time Expression Recognition and Normalization competition (TERN - 2004)** *Automatic Content Extraction 2004 Evaluation (ACE04)* at **National Institute for Standards and Technology (NIST)** with **Chronos System** developed during Intern-(M.Sc.) project (2004). comment: this system won over the one proposed by IBM.

REFERENCES

- Prof. Paola Cappellaro pcappell@mit.edu
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Royal Academy of Engineering Chair in Emerging Technologies.
Director of the Centre for Quantum Photonics at the University of Bristol.
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