europass Curriculum vitae

PERSONAL INFORMATION

Valeria Cimini

ACADEMIC BACKGROUND

2017–2021 **PhD in Material Science, Nanotechnologies and Complex Systems, with Honors**

Roma Tre University

Thesis title: “New Methods of Data Analysis for Quantum Metrology”
Supervisor: Prof. Marco Barbieri

2014–2016 **Master of Physics**

University of Rome *Sapienza* – Final grade 110/110 cum laude

Thesis title: “Classical and quantum analysis of multiqubit entangled states”
Supervisor: Prof. Paolo Mataloni

2011–2014 **Bachelor of Physics**

University of Rome *Sapienza* – Final grade 110/110 cum laude

Thesis title: "Quantum teleportation"
Supervisor: Prof. Paolo Mataloni

2006–2011 **High School Diploma in Scientific Studies (PNI)**

Liceo *Aristotele*, Rome – Final grade 100/100

RESEARCH ACTIVITY

Feb 2023–Present **Postdoctoral Fellowship**

Quantum Information Lab, University of Rome *Sapienza* – PI: Prof. Fabio Sciarrino

Project: “Architettura fotonica ibrida per computazione e simulazione quantistica”

Feb 2021–Jan 2023 **Postdoctoral Researcher - ARC Fellow**

Amaldi Research Center, University of Rome *Sapienza* – PI: Prof. Fabio Sciarrino

Project: “Metrologia quantistica con variabili continue”

Sep–Dec 2019 **PhD Visiting Period**

Laboratorie Kastler Brossell, University of Paris *La Sorbonne*

Topic: Development of machine learning-based algorithms for detection of quantum features

Oct 2016–Sep 2017 **Research Activity**

Prof. Ronald Hanson’s Group, QuTech, University of Delft

Topic: Development of a multi-node quantum network using NV centers in diamond

TEACHING ACTIVITY

Mar–Jul 2019 **Teaching Assistant**

Physics course for Architecture, Prof. F. Bruni, Roma Tre University

Oct 2018–Jan 2019 **Teaching Assistant**

Physics course for Biology, Prof. C. Meneghini, Roma Tre University

Jan–Jun 2017

Teaching Assistant

Quantum Mechanics course for Physics, Prof. R. Hanson, TU Delft University

Advising Experience

Supervision of master's thesis and bachelor's thesis students in Quantum Information Lab, University of Rome *Sapienza* and Roma Tre University

SCHOLARSHIP AWARDS AND MEMBERSHIPS

2017–2021

PhD Scholarship

Funded by *Roma Tre* University

2011–2014

Tuition Fees Exemption for Excellent Students

Funded by *Sapienza* University of Rome

2021–2022

American Physical Society

Membership Type: Early Career

OUTREACH ACTIVITIES

Apr–May 2022

Organizing Committee Member

Italian Quantum Weeks of Rome, University of Rome *Sapienza*

2020–2021

Member of WIS3

Women in Stem Roma Tre, supporting networking activities for women in research

CONTRIBUTION TO RESEARCH PROJECTS

2021–2022

Amaldi Research Center

Funded by Ministero dell'Istruzione dell'Universita e della Ricerca, *Roma Tre* University

2020–2021

FET Open: STORMYTUNE (grant no. 899587)

Participation as PhD in New Quantum Optics Group, PI: Prof. M. Barbieri, *Roma Tre* University

COMMUNITY SERVICE

Referee for Peer-Reviewed Journals

Guest Editor for Peer-Reviewed Journals

– Special Issue: *The Interplay between Photonics and Machine Learning* (Photonics MDPI)

CONFERENCE PRESENTATIONS

Invited Talks

12 – 16 Sep 2022

IQIS2022

University of Palermo, Palermo, Italy

Talk Title: "Characterization of integrated multiphase sensors via Neural Networks"

10 Dec 2021

SPIE Event

Young Researcher in Photonics, University of Trento, Italy

Talk Title: "Introduction to quantum optical metrology and multiparameter estimation"

Contributed Talks, Posters, and Attendance

5 – 7 Oct 2022 **ICIQP 2022**

Technical University of Denmark DTU, Copenhagen, Denmark

Talk Title: "Machine learning for multiphase estimation with an integrated photonic quantum sensor"

14 – 18 Mar 2022 **APS March Meeting**

McCormick Place, Chicago, USA

Talk Title: "Experimental broad range Heisenberg scaling estimation in the non-asymptotic regime"

1 – 5 Nov 2021 **QIM VI**

Quantum Information and Measurement, Online Conference

Talk Title: "Single-photon calibration of an integrated multiarm interferometer via neural networks"

1 – 5 Mar 2021 **MLQ2021**

Machine Learning for Quantum, Online Conference

Talk Title: "Classification of multimode states through artificial neural networks"

3 – 6 Feb 2020 **FQST2020**

National Institute of Informatics, Tokyo, Japan

Talk Title: "Characterization of Quantum States by Neural Networks"

13 – 15 Nov 2019 **GDR IQFA-X**

CNRS Headquarters, Paris, France

Talk Title: "Tracking enzymatic activity with quantum light"

29 Nov 2019 **PQC 2019**

University of Paris La Sorbonne, Paris, France

9 – 12 Sep 2019 **IQIS2019**

University of Milan Statale, Milan, Italy

Talk Title: "Tracking enzymatic activity with quantum light"

23 – 27 Jun 2019 **CLEO EU**

ICM Centre of the Munich Trade Fair Centre, Munich, Germany

Talk Title: "Use of optical quantum sensors to study chemical processes"

4 – 6 Apr 2019 **QIM V**

University of Rome Sapienza, Rome, Italy

Poster Title: "Towards real-time optical quantum sensors"

28 – 30 Sep 2018 **Trieste Next Academy**

Festival della Ricerca, Trieste, Italy

10 – 13 Jul 2018 **QCUMbER**
Conference and workshop, University of Oxford, United Kingdom

19 – 20 Jun 2017 **SpinNano Project Meeting with Industry**
Technical University of Delft, Delft, Netherlands
Talk Title: "Quantum networks with NV centers"

27 – 31 Mar 2017 **NanoFront Winter Retreat**
Kavli Institute Conference, Courchevel, France

17 – 18 Jan 2017 **Physics@Veldhoven**
Veldhoven, Netherlands

6 – 10 Jul 2015 **PIQUE**
University of Rome Sapienza, Rome, Italy

LIST OF PUBLICATIONS

[28] **V. Cimini**, M. Valeri, E. Polino, S. Piacentini, F. Ceccarelli, G. Corrielli, N. Spagnolo, R. Osellame, and F. Sciarrino. Deep reinforcement learning for quantum multiparameter estimation. Advanced Photonics 5 (1), 016005 (2023).

[27] M. Valeri*, **V. Cimini***, S. Piacentini, F. Ceccarelli, E. Polino, F. Hoch, G. Bizzarri, G. Corrielli, N. Spagnolo, R. Osellame, and F. Sciarrino. Experimental multiparameter quantum metrology in adaptive regime. Phys. Rev. Res. 5 (1), 013138 (2023).

[26] **V. Cimini**, E. Polino, F. Belliardo, F. Hoch, B. Piccirillo, N. Spagnolo, V. Giovannetti, and F. Sciarrino. Experimental metrology beyond the standard quantum limit for a wide resources range. npj Quantum Information, 9(1), 20 (2023).

[25] I. Gianani, I. Mastroserio, L. Buffoni, N. Bruno, L. Donati, **V. Cimini**, M. Barbieri, F. S. Cataliotti, and F. Caruso. Experimental quantum embedding for machine learning. Advanced Quantum Technologies 5, 8 (2022).

[24] F. Vernuccio, A. Bresci, **V. Cimini**, A. Giuseppi, G. Cerullo, D. Polli, and C. M. Valensise. Artificial Intelligence in Classical and Quantum Photonics. Laser & Photonics Reviews 16, 5 (2022).

[23] S.E. D'Aurelio, M. Valeri, E. Polino, **V. Cimini**, I. Gianani, M. Barbieri, G. Corrielli, A. Crespi, R. Osellame, F. Sciarrino, and N. Spagnolo. Experimental investigation of Bayesian bounds in multiparameter estimation. QST 7, 2 (2022).

[22] A. Chiuri, I. Gianani, **V. Cimini**, L. De Dominicis, M. G. Genoni and M. Barbieri, *Ghost imaging as loss estimation: Quantum versus classical schemes.* Phys. Rev. A 105, 013506 (2022).

[21] I. Gianani, F. Albarelli, A. Verna, **V. Cimini**, R. Demkowicz-Dobrzanski, and M. Barbieri, *Kramers–Kronig relations and precision limits in quantum phase estimation.* Optica 8, 1642-1645 (2021).

[20] **V. Cimini**, F. Albarelli, I. Gianani, and M. Barbieri. *Semiparametric estimation of the Hong-Ou-Mandel profile.* Phys. Rev. A 104, L061701, (2021).

[19] I. Gianani, F. Albarelli, **V. Cimini**, and M. Barbieri. *Experimental function estimation from quantum phase measurements.* Phys. Rev. A 103, 042602, (2021).

[18] **V. Cimini**, E. Polino, M. Valeri, I. Gianani N. Spagnolo, G. Corrielli, A. Crespi, R. Osellame, M. Barbieri, and F. Sciarrino. *Calibration of Multiparameter Sensors via Machine Learning at the Single-Photon Level.* Phys. Rev. Applied 15, 044003, (2021).

[17] **V. Cimini**, M. Barbieri, N. Treps, M. Walshaers, and V. Parigi. *Neural networks for detecting multimode Wigner-negativity.* Phys. Rev. Letters, 125, 160504, (2020) - corresponding author,

[16] I. Gianani, Y.S. Teo, **V. Cimini**, H. Jeong, G. Leuchs, M. Barbieri, and L.L. Sanchez-Soto. *Compressively certifying quantum measurements.* PRX Quantum, 1, 020307 (2020).

[15] **V. Cimini**, I. Gianani, M.F. Sacchi, C. Macchiavello, and M. Barbieri. *Experimental witnessing of the quantum channel capacity in the presence of correlated noise.* Phys. Rev. A, 102, 052404 (2020).

[14] I. Gianani, D. Farina, M. Barbieri, **V. Cimini**, V. Cavina, and V. Giovannetti. *Discrimination of thermal baths by single qubit probes.* Phys. Rev. Research, 2, 033497 (2020).

[13] **V. Cimini**, S. Gherardini, M. Barbieri, I. Gianani, M. Sbroscia, L. Buffoni, M. Paternostro, and F. Caruso. *Experimental characterization of the energetics of quantum logic gates.* npj Quantum Information, 6(1), 1-8 (2020) - Press release AGI, *Il costo energetico di un computer quantistico? Rispondono i fotoni.*

[12] F. Saltarelli*, **V. Cimini***, A. Tacchella, A. Zaccaria, and M. Cristelli. *Is Export a Probe for Domestic Production?* Frontiers in Physics 8,180 (2020).

[11] **V. Cimini**, M. G. Genoni, I. Gianani, N. Spagnolo, F. Sciarrino, and M. Barbieri. *Diagnosing imperfections in quantum sensors via generalized Cramér-Rao Bounds.* Phys. Rev. Applied, 13 (2), 024048, (2020) - corresponding author

[10] **V. Cimini**, I. Gianani, F. Piacentini, I. Degiovanni, and M. Barbieri. *Anomalous values, Fisher information, and contextuality, in generalized quantum measurements.* Quantum Science and Technology, 5, 2, 025007, (2020).

[9] **V. Cimini**, I. Gianani, N. Spagnolo, F. Leccese, F. Sciarrino, and M. Barbieri. *Calibration of quantum sensors by neural networks.* Phys. Rev. Letters, 123, 230502, (2019).

[8] **V. Cimini**, M. Mellini, G. Ramponi, M. Sbroscia, L. Leoni, M. Barbieri, and I. Gianani. *Adaptive Tracking of Enzymatic Reactions with Quantum Light.* Optics Express, 27, 35245, (2019) - Selected as Editor's Pick - Press release OSA and ANSA. *Dalla fisica quantistica i sensori che esplorano le cellule*; *Quantum Light Improves Sensitivity of Biological Measurements*; *Quantum Optics Meets Enzyme Biology*.

[7] **V. Cimini**, I. Gianani, M. Sbroscia, J. Sperling, and M. Barbieri. *Measuring Coherence of Quantum Measurements.* Phys. Rev. Research 1, 033020 (2019).

[6] **V. Cimini**, I. Gianani, L. Ruggiero, T. Gasperi, M. Sbroscia, E. Roccia, D. Tofani, F. Bruni, M. A. Ricci, and M. Barbieri. *Quantum sensors for dynamical tracking of chemical processes.* Phys.Rev. A 99, 053817 (2019).

[5] M. A. Ciampini, A. Geraldi, **V. Cimini**, C. Macchiavello, J. E. Sipe, M. Liscidini, and P. Mataloni. *Stimulated emission tomography: beyond polarization.* Opt. Lett. 44, 41-44 (2019).

[4] E. Roccia, **V. Cimini**, M. Sbroscia, I. Gianani, L. Ruggiero, L. Mancino, M. G. Genoni, M. A. Ricci, and M. Barbieri. *Multiparameter approach to quantum phase estimation with limited visibility.* Optica 5, 1171-1176 (2018).

[3] M. Sbroscia, I. Gianani, E. Roccia, **V. Cimini**, L. Mancino, P. Aloe, and M. Barbieri. *Assessing frequency correlation through a distinguishability measurement.* Opt. Lett. 43, 4045-4048 (2018).

[2] L. Mancino, M. Sbroscia, E. Roccia, I. Gianani, **V. Cimini**, M. Paternostro and M. Barbieri. *Information-reality complementarity in photonic weak measurements.* Phys. Rev. A 97, 062108 (2018).

[1] M. A. Ciampini, C. Vigliar, **V. Cimini**, S. Paesani, F. Sciarrino, A. Crespi, G. Corrielli, R. Osellame, P. Mataloni, M. Paternostro, and M. Barbieri. *Experimental nonlocality-based network diagnostics of multipartite entangled states.* Scientific Reports, 7, 17122 (2017).

Autorizzo il trattamento dei miei dati personali ai sensi del Decreto Legislativo 196/2003, coordinato con il Decreto Legislativo 101/2018, e dell'art. 13 del GDPR (Regolamento UE 2016/679) ai fini della pubblicazione in Trasparenza Ateneo - Sapienza come da normativa vigente