

**FORMATO EUROPEO  
PER IL CURRICULUM  
VITAE**



**INFORMAZIONI PERSONALI**

Nome	<b>VICIANI SILVIA</b>
Indirizzo	<b>CNR-INO (CONSIGLIO NAZIONALE DELLE RICERCHE - ISTITUTO NAZIONALE DI OTTICA) LARGO E. FERMI 6, 50125 FIRENZE WWW.INO.IT C/O CNR AREA DI RICERCA DI FIRENZE VIA MADONNA DEL PIANO, 10 50019 SESTO FIORENTINO (FIRENZE)</b>
Telefono	<b>055 522 6332 / 055 522 6202</b>
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Nazionalità	italiana
Data di nascita	28/01/1971

**ESPERIENZA LAVORATIVA**

- Date (da – a) **16/02/2009- presente**
- Nome e indirizzo del datore di lavoro **CNR-INO, Largo E. Fermi 6, 50125, Firenze (Italia)**
- Tipo di azienda o settore **Ente pubblico di ricerca.**
- Tipo di impiego **Ricercatore a Tempo Indeterminato (III livello professionale)**
- Principali mansioni e responsabilità **Attività di ricerca pura e applicata nel campo dell'Ottica, sviluppo tecnologico, PI ("principal investigator") in campagne di misura internazionali, partecipazione a progetti di ricerca nazionale e internazionali, coordinamento di progetti di ricerca nazionali, organizzazione di conferenze internazionali**
  
- Date (da – a) **02/08/2004 - 15/02/2009**
- Nome e indirizzo del datore di lavoro **CNR-INO, Largo E. Fermi 6, 50125, Firenze (Italia)**
- Tipo di azienda o settore **Ente pubblico di ricerca**
- Tipo di impiego **Ricercatore a Tempo Determinato (III livello professionale)**
- Principali mansioni e responsabilità **Attività di progettazione e realizzazione di sistemi ottici per applicazioni ambientali e loro impiego sul campo**
  
- Date (da – a) **01/05/2001 - 22/06/2004**
- Nome e indirizzo del datore di lavoro **CNR-INO, Largo E. Fermi 6, 50125, Firenze (Italia)**

- Tipo di azienda o settore
  - Tipo di impiego
- Principali mansioni e responsabilità

Ente pubblico di ricerca.

Assegno di Ricerca

Ricerca nel campo dell'Ottica Quantistica: generazione e manipolazione di stati non-classici di luce, entanglement, effetti non locali

- Date (da – a)

- Nome e indirizzo del datore di lavoro
  - Tipo di azienda o settore
    - Tipo di impiego
- Principali mansioni e responsabilità

**1/11/2000 - 30/04/2001**

LENS, Laboratorio Europeo di Spettroscopie Non-lineari, Via Nello Carrara 1, 50019 Sesto Fiorentino (Firenze), Italia

Laboratorio di Ricerca Europeo multidisciplinare.

Assegno di Ricerca

Calibrazione di un sistema di rivelazione con uno spettrometro nel lontano infrarosso (attività in parte sviluppata presso il NIST, National Institute of Standards and Technology, in Boulder, USA)

## ISTRUZIONE E FORMAZIONE

- Data

- Nome e tipo di istituto di istruzione o formazione
  - Principali materie / abilità professionali oggetto dello studio
    - Qualifica conseguita

**16/02/2001**

Università degli Studi di Firenze

Analisi del rumore e squeezing in laser a semiconduttore (Titolo della Tesi: *Rumore di ampiezza e di frequenza in dispositivi laser a semiconduttore*)

Dottorato di Ricerca in Fisica (PhD), XIII ciclo

- Data

- Nome e tipo di istituto di istruzione o formazione
  - Principali materie / abilità professionali oggetto dello studio
    - Qualifica conseguita
  - Livello nella classificazione nazionale (se pertinente)

**15/07/1997**

Università degli Studi di Firenze

Laser e spettroscopia nel lontano infrarosso (Titolo della Tesi: *Spettroscopia Faraday nel lontano infrarosso*)

**Laurea in Fisica**

110/110 e lode

## CAPACITÀ E COMPETENZE

### PERSONALI

Acquisite nel corso della vita e della carriera ma non necessariamente riconosciute da certificati e diplomi ufficiali.

MADRELINGUA

ITALIANO

ALTRE LINGUA

INGLESE

- Capacità di lettura
- Capacità di scrittura
- Capacità di espressione orale

BUONA

BUONA

BUONA

ATTIVITA' SCIENTIFICA IN CORSO

- Realization of airborne mid-infrared spectrometers for stratospheric measurements of trace gases (in particular Carbon Monoxide CO ) and its on-field employment onboard of a stratospheric aircraft during international campaigns: TROCCINOX-2 (Tropical Convection, Cirrus and Nitrogen Oxides Experiment) 2005 Brazil; SCOUT-O3 (Stratospheric-Climate Links with Emphasis on the Upper Troposphere and Lower Stratosphere) 2005 Australia; AMMA (African Monsoon Multidisciplinary Analysis) 2006 Burkina-Faso; RECONCILE (Reconciliation of essential process parameters for an enhanced predictability of arctic stratospheric ozone loss and its climate interactions) 2010 Sweden and Svalbard; STRATOCLIM (Stratospheric and upper tropospheric processes for better climate predictions) 2017 Nepal

- Development and realization of portable infrared and UV spectrometers for measurements of volcanic gas emissions (CO<sub>2</sub>, HF, H<sub>2</sub>O, SO<sub>2</sub>, HCl and HCl isotopic ratio)

- Development and realization of optical devices for environmental applications: concentration measurements of dioxins and furans via Infrared Quantum Cascade Laser Spectroscopy and monitoring measurements of dangerous gases (as CH<sub>4</sub>, H<sub>2</sub>S, HCl) via different Laser Techniques (Direct Absorption with Open Path and Multipass Cells, Cavity Ring Down Spectroscopy, Quartz Enhanced Photoacoustic Spectroscopy).

- Analysis and realization of optical simulators of transport in complex networks via fiber optic set-up (based on Fiber Bragg Gratings Resonators) and future prospects for new solar energy technologies.

- Collaboration for the organization of the international conference FLAIR (Field Laser Application in Industry and Research) in 2007, 2009, 2011, 2014 and 2016.

ATTIVITA' SCIENTIFICA  
PRECEDENTE

- Research activity in Quantum Optics concerning the generation and manipulation of non-classical field states and the study of entanglement and non-locality

- Spectroscopy techniques in the Terahertz region

- Analysis of noise and squeezing in semiconductor lasers

- Optical Coherence Tomography for ophthalmic applications

CAPACITÀ E COMPETENZE  
TECNICHE

Laser Spectroscopy Techniques - Laser sources - Development and realization of optical devices for environmental applications - Remote sensing and airborne instrumentations for atmospheric analysis - Quantum Optics

ALLEGATI

[ Lista delle pubblicazioni ]



## LIST OF PUBLICATIONS (JOURNALS):

1. "Disorder and dephasing as control knobs for light transport in optical fiber cavity networks"  
S. Viciani, S. Gherardini, M. Lima, M. Bellini and F. Caruso  
*Scientific Reports* **6**, 37791 - 1-11 (2016).
2. "Observation of Noise-Assisted Transport in an All-Optical Cavity-Based Network"  
S. Viciani, M. Lima, M. Bellini and F. Caruso  
*Physical Review Letters* **115**, 083601- 1-5 (2015).  
Selected as PRL Editors' Suggestion (<http://journals.aps.org/prl/abstract/10.1103/PhysRevLett.115.083601>)
3. "The impact of overshooting deep convection on local transport and mixing in the tropical upper troposphere/lower stratosphere (UTLS)"  
W. Frey, R. Schofield, P. Hoor, D. Kunkel, F. Ravegnani, A. Ulanovsky, S. Viciani, F. D'Amato, and T.P. Lane  
*Atmospheric Chemistry and Physics* **15**, 6467–6486 (2015).
4. "Note: An analyzer for field detection of H<sub>2</sub>S by using cavity ring-down at 1.57 μm"  
M. Siciliani de Cumis, S. Viciani, I. Galli, D. Mazzotti, F. Sorci, M. Severi, and F. D'Amato  
*Review Of Scientific Instruments* **86**, 056108-1 - 056108-3 (2015).
5. "A quartz-enhanced photoacoustic sensor for H<sub>2</sub>S trace-gas detection at 2.6 μm"  
S. Viciani, M. Siciliani de Cumis, S. Borri, P. Patimisco, A. Sampaolo, G. Scamarcio, P. De Natale, F. D'Amato, and V. Spagnolo  
*Applied Physics B* **119**, 21–27 (2015).
6. "A constant intensity technique to improve the performances of devices based on direct absorption spectroscopy"  
A. Montori, M. De Pas, M. Giuntini, M. Siciliani de Cumis, S. Viciani, and F. D'Amato  
*Opto-Electronics Review* **23**, 28-32 (2015).
7. "Tropical troposphere to stratosphere transport of carbon monoxide and long-lived trace species in the Chemical Lagrangian Model of the Stratosphere (CLAMS)"  
R. Pommrich, R. Müller, J.-U. Grooß, P. Konopka, F. Ploeger, B. Vogel, M. Tao, C. M. Hoppe, G. Günther, N. Spelten, L. Hoffmann, H.-C. Pumphrey, S. Viciani, F. D'Amato, C. M. Volk, P. Hoor, H. Schlager, and M. Riese  
*Geoscientific Model Development* **7**, 2895–2916 (2014).
8. "Widely-tunable mid-infrared fiber-coupled quartz-enhanced photoacoustic sensor for environmental monitoring"  
M. Siciliani de Cumis, S. Viciani, S. Borri, P. Patimisco, A. Sampaolo, G. Scamarcio, P. De Natale, F. D'Amato, and V. Spagnolo  
*Optics Express* **22**, 28222-28231 (2014).
9. "Characteristic vibrational frequencies of toxic polychlorinated dibenzo-dioxins and -furans "  
B. Patrizi, M. Siciliani de Cumis, S. Viciani, F. D'Amato, and P. Foggi  
*Journal of Hazardous Materials* **274**, 98-105 (2014).
10. "Reconciliation of essential process parameters for an enhanced predictability of Arctic stratospheric ozone loss and its climate interactions (RECONCILE): activities and results"  
M. von Hobe, S. Bekki, S. Borrmann, F. Cairo, F. D'Amato, A. Dörnbrack, A. Ebersoldt, M. Ebert, C. Emde, I. Engel, M. Ern\*, S. Genco, S. Griessbach, J.-U. Grooß, T. Gulde, G. Günther, E. Hösen, L. Hoffmann, V. Homonnai, C. R. Hoyle, I. S. A. Isaksen, D. R. Jackson, I. M. Jánosi, R. L. Jones, K. Kandler, C. Kalicinsky, A. Keil, S. M. Khaykin, F. Khosrawi, R. Kivi, J. Kuttippurath, J. C. Laube, F. Lefèvre, R. Lehmann, S. Ludmann, B. P. Luo, M. Marchand, J. Meyer, V. Mitev, S. Molleker, R. Müller, H. Oelhaf, F. Olschewski, Y. Orsolini, T. Peter, K. Pfeilsticker, C. Piesch, M. C. Pitts, L. R. Poole, F. D. Pope, F. Ravegnani, M. Rex, M. Riese, T. Röckmann, B. Rognerud, A. Roiger, C. Rolf, M. L. Santee, M. Scheibe, C. Schiller, H. Schlager, M. Siciliani de Cumis, N. Sitnikov, O. A. Søvdø, R. Spang, N. Spelten, F. Stordal, O. Sumińska-Ebersoldt, A. Ulanovsky, J. Ungermann, S. Viciani, C. M. Volk, M. vom Scheidt, P. von der Gathen, K. Walker, T. Wegner, R. Weigel, S. Weinbruch, G. Wetzell, F. G. Wienhold, I. Wohltmann, W. Woiwode, I. A. K. Young, V. Yushkov, B. Zobrist, and F. Stroh  
*Atmospheric Chemistry and Physics* **13**, 9233–9268 (2013).
11. "First quantitative measurements by IR spectroscopy of dioxins and furans by means of broadly tunable quantum cascade lasers"  
M. Siciliani de Cumis, F. D'Amato, S. Viciani, B. Patrizi, P. Foggi and C. L. Galea  
*Laser Physics* **23**, 025603-1 - 025603-5 (2013).
12. "Emission sources contributing to tropospheric ozone over Equatorial Africa during the summer monsoon"  
I. Bouarar, K. S. Law, M. Pham, C. Lioussé, H. Schlager, T. Hamburger, C. E. Reeves, J.-P. Cammas, P. Nédélec, S. Szopa, F. Ravegnani, S. Viciani, F. D'Amato, A. Ulanovsky, and A. Richter  
*Atmospheric Chemistry and Physics* **11**, 13395-13419 (2011).
13. "In situ observations of new particle formation in the tropical upper troposphere: the role of clouds and the nucleation mechanism"  
R. Weigel, S. Borrmann, J. Kazil, A. Minikin, A. Stohl, J. C. Wilson, J. M. Reeves, D. Kunkel, M. de Reus, W. Frey, E. R. Lovejoy, C. M. Volk, S. Viciani, F. D'Amato, C. Schiller, T. Peter, H. Schlager, F. Cairo, K. S. Law, G. N. Shur, G. V. Belyaev, and J. Curtius  
*Atmospheric Chemistry and Physics*, **11**, 9983–10010 (2011).
14. "Representation of tropical deep convection in atmospheric models – Part 2: Tracer transport"  
C. R. Hoyle, V. Maréchal, M. R. Russo, G. Allen, J. Arteta, C. Chemel, M. P. Chipperfield, F. D'Amato, O. Dessens, W. Feng, J. F. Hamilton, N. R. P. Harris, J. S. Hosking, A. C. Lewis, O. Morgenstern, T. Peter, J. A. Pyle, T. Reddman, N. A. D. Richards, P. J. Telford, W. Tian, S. Viciani, A. Volz-Thomas, O. Wild, X. Yang, and G. Zeng  
*Atmospheric Chemistry and Physics* **11**, 8103-8131 (2011).
15. "In-situ measurements of tropical cloud properties in the West African monsoon: upper tropospheric ice clouds, mesoscale convective system outflow, and subvisual cirrus"  
W. Frey, S. Borrmann, D. Kunkel, R. Weigel, M. de Reus, H. Schlager, A. Roiger, C. Voigt, P. Hoor, J. Curtius, M. Krämer, C. Schiller, C. M. Volk, C. D. Homan, F. Fierli, G. Di Donfrancesco, A. Ulanovsky, F. Ravegnani, N. M. Sitnikov, S. Viciani, F. D'Amato, G. N. Shur, G. V. Belyaev, K. S. Law, and F. Cairo  
*Atmospheric Chemistry and Physics* **11**, 5569-5590 (2011).

16. **"Air mass origins influencing TTL chemical composition over West Africa during 2006 summer monsoon"**  
K.S. Law, F. Fierli, F. Cairo, H. Schlager, S. Borrmann, M. Streibel, E. Real, D. Kunkel, C. Schiller, F. Ravegnani, A. Ulanovsky, F. D'Amato, S. Viciani, and C.M. Volk  
*Atmospheric Chemistry and Physics* **10**, 10753-10770 (2010).
17. **"Aerosols in the tropical and subtropical UT/LS: in-situ measurements of submicron particle abundance and volatility"**  
S. Borrmann, D. Kunkel, R. Weigel, A. Minikin, T. Deshler, J. C. Wilson, J. Curtius, C. M. Volk, C. D. Homan, A. Ulanovsky, F. Ravegnani, S. Viciani, G. N. Shur, G. V. Belyaev, K. S. Law, and F. Cairo  
*Atmospheric Chemistry and Physics* **10**, 5573-5592 (2010).
18. **"Tracer measurements in the tropical tropopause layer during the AMMA/SCOUT-03 aircraft campaign"**  
C. D. Homan, C. M. Volk, A. C. Kuhn, A. Werner, J. Baehr, S. Viciani, A. Ulanovski, and F. Ravegnani  
*Atmospheric Chemistry and Physics* **10**, 3615-3627 (2010).
19. **"An introduction to the SCOUT-AMMA stratospheric aircraft, balloons and sondes campaign in West Africa, August 2006: rationale and roadmap"**  
Cairo F., J. P. Pommereau, K. S. Law, H. Schlager, A. Garnier, F. Fierli, M. Ern, M. Streibel, S. Arabas, S. Borrmann, J.J. Berthelot, C. Blom, T. Christensen, F. D'Amato, G. Di Donfrancesco, T. Deshler, A. Diedhiou, G. Durry, O. Engelsen, F. Goutail, N.R.P. Harris, E.R.T. Kerstel, S. Khaykin, P. Konopka, A. Kylling, N. Larsen, T. Lebel, X. Liu, A.R. MacKenzie, J. Nielsen, A. Oulanowski, D.J. Parker, J. Pelon, J. Polcher, J. A. Pyle, F. Ravegnani, E.D. Riviere, A.D. Robinson, T. Rockmann, C. Schiller, F. Simoes, L. Stefanutti, F. Stroh, L. Some, P. Siegmund, N. Sitnikov, J. P. Vernier, C.M. Volk, C. Voigt, M. von Hobe, S. Viciani, and V. Yushkov  
*Atmospheric Chemistry and Physics* **10**, 2237-2256 (2010).
20. **"NO<sub>x</sub> production by lightning in Hector: first airborne measurements during SCOUT-03/ACTIVE"**  
H. Huntrieser, H. Schlager, M. Lichtenstern, A. Roiger, P. Stock, A. Minikin, H. Höller, K. Schmidt, H.-D. Betz, G. Allen, S. Viciani, A. Ulanovsky, F. Ravegnani, and D. Brunner  
*Atmospheric Chemistry and Physics* **9**, 8377-8412 (2009).
21. **"A cryogenically operated laser diode spectrometer for airborne measurement of stratospheric trace gases"**  
S. Viciani, F. D'Amato, P. Mazzinghi, F. Castagnoli, G. Toci, and P. Werle  
*Applied Physics B* **90**, 581-592 (2008).
22. **"Contribution of mixing to the upward transport across the tropical tropopause layer (TTL)"**  
P. Konopka, G. Günther, R. Müller, F. H. S. dos Santos, C. Schiller, F. Ravegnani, A. Ulanovsky, H. Schlager, C. M. Volk, S. Viciani, L. L. Pan, D.-S. McKenna and M. Riese.  
*Atmospheric Chemistry and Physics* **7**, 3285-3308 (2007).
23. **"Non-classical field characterization by high-frequency, time-domain quantum homodyne tomography"**  
A. Zavatta, S. Viciani and M. Bellini  
*Laser Physics Letters* **3**, 3-16 (2006).
24. **"Single-photon excitation of a coherent state: catching the elementary step of stimulated light emission"**  
A. Zavatta, S. Viciani, and M. Bellini  
*Physical Review A* **72**, 023820-1 - 023820-9 (2005).
25. **"Tomographic reconstruction of the single-photon Fock state by high frequency homodyne detection"**  
A. Zavatta, S. Viciani, and M. Bellini  
*Physical Review A* **70**, 053821-1 - 053821-6 (2004).
26. **"Quantum to classical transition with single-photon-added coherent states of light"**  
A. Zavatta, S. Viciani, and M. Bellini  
*SCIENCE* **306**, 660-662 (2004).
27. **"Recurrent fourth-order interference dips and peaks with a comb-like two-photon entangled states"**  
A. Zavatta, S. Viciani, and M. Bellini  
*Physical Review A* **70**, 023806-1 - 023806-5 (2004).
28. **"Nonlocal modulations on the temporal and spectral profiles of an entangled photon pair"**  
S. Viciani, A. Zavatta and M. Bellini  
*Physical Review A* **69**, 053801-1 - 053801-9 (2004).
29. **"Nonlocal pulse shaping with entangled photon pairs"**  
M. Bellini, F. Marin, S. Viciani, A. Zavatta and F. T. Arecchi  
*Physical Review Letters* **90**, 043602-1 - 043602-4 (2003).
30. **"Lineshape of a Vertical Cavity Surface Emitting Laser"**  
S. Viciani, M. Gabrysch, F. Marin, F. Monti di Sopra, M. Moser, and K. Gulden  
*Optics Communications* **206**, 89-97 (2002).
31. **"Generation of tunable far-infrared radiation with a quantum cascade laser"**  
G. Gagliardi, S. Viciani, M. Inguscio, P. De Natale, C. Gmachl, F. Capasso, D.L. Sivco, J.N. Baillargeon, A.L. Hutchinson, and A.Y. Cho  
*Optics Letters* **27**, 521-523 (2002).
32. **"Tomographic reconstruction of a squeezed laser field: experiment and reconstruction algorithm"**  
A. Zavatta, S. Viciani, G. Giacomelli and F. Marin  
*Fortschritte der Physik* **49**, 967-972 (2001).



33. "3.6 MHz linewidth 1.55  $\mu\text{m}$  Monomode Vertical-Cavity Surface-Emitting laser"  
P. Signoret, F. Marin, S. Viciani, G. Belleville, M. Myara, J.P. Tourrenc, B. Orsal, A. Plais, F. Gaborit, and J. Jacquet  
*IEEE Photonics Technology Letters*, 13, 269-271 (2001).
34. "Magnetic-field effects on molecular transitions in the far-infrared region: prospects for more-sensitive spectrometers"  
S. Viciani, P. De Natale, L. Gianfrani, and M. Inguscio  
*Journal of the Optical Society of America B* 16, 301-307 (1999).
35. "Noise characterization of a coherent tunable far infrared spectrometer"  
S. Viciani, F. Marin, and P. De Natale  
*Review of Scientific Instruments* 69, 372-376 (1998).
36. "Spectroscopic observation of the Faraday effect in the far infrared"  
P. De Natale, L. Gianfrani, S. Viciani and M. Inguscio  
*Optics Letters* 22, 1896-1898 (1997).

## SPIE PROCEEDINGS

1. "Quartz-Enhanced Photoacoustic sensors for H<sub>2</sub>S trace gas detection"  
V. Spagnolo, P. Patimisco, A. Sampaolo, R. Pennetta, M. Siciliani de Cumis, S. Viciani, S. Borri, P. De Natale, F. D'Amato, M. S. Vitiello, and G. Scamarcio  
*SPIE Photonics West - OPTO (Optoelectronic Devices and Materials) - Quantum Sensing and Nanophotonic Devices XII*  
San Francisco, California, USA 7-12 February 2015.  
*Proceedings of SPIE* - Volume 9370, 93700Y (2015).  
("Quantum Sensing And Nanophotonic Devices XII", M. Razeghi, E. Tournie, GJ Brown Editors, 2015, DOI: 10.1117/12.2078929).
2. "Characterization of the HCl-HBr-HI gas absorption cell for GIANO-TNG"  
F. D'Amato, S. Viciani, E. Oliva, L. Origlia, and I. Mochi  
*SPIE Astronomical Instrumentation*  
Marseille, France, 23 - 28 June 2008  
*Proceedings of SPIE* - Volume 7014, 70143V-1 - 70143V-8 (2008).  
("Ground-based and Airborne Instrumentation for Astronomy II", Ian S. McLean, Mark M. Casali Editors, 2008, DOI:10.1117/12.788231)
3. "Catching the elementary step of excitation of a coherent light state by a single photon "  
M. Bellini, A. Zavatta, and S. Viciani  
*SPIE Symposium on Optics and Photonics*  
San Diego, USA 31 July - 4 August 2005.  
*Proceedings of SPIE* - Volume 5893, 58930V-1 - 58930V-9 (2005).  
("Quantum Communications and Quantum Imaging III", Ronald E. Meyers, Yanhua Shih Editors, 2005, DOI:10.1117/12.614366 )
4. " From quantum to classical: watching a single photon become a wave "  
M. Bellini, A. Zavatta, and S. Viciani  
*SPIE Symposium on Optics and Photonics*  
San Diego, USA 31 July - 4 August 2005  
*Proceedings of SPIE* - Volume 5866, 278-286 (2005).  
("The Nature of Light: What Is a Photon?", Chandrasekhar Roychoudhuri, Katherine Creath Editors, 2005, DOI:10.1117/12.614374)
5. "Frequency noise and lineshape of VCSELs"  
S. Viciani and F. Marin  
*Photonics West, Optoelectronics 2001*,  
San Jose, California, USA 20-26 January 2001  
*Proceedings of SPIE* - Volume 4286, 109-118 (2001).  
("Vertical-Cavity Surface-Emitting Lasers V", Kent D. Choquette, Chun Lei Editors, 2001, DOI:10.1117/12.424796)

## CHAPTERS in BOOKS

1. "From Quantum to Classical: Watching a Single Photon Become a Wave"  
M. Bellini, A. Zavatta, and S. Viciani  
Chapter in : C. Roychoudhuri, A.F. Kracklauer, K. Creath (Eds.) "The Nature of Light: What Is A Photon?", chap. 23, 349-361, *Editor* CRC Press, (New York, USA, 2008).  
ISBN: 1420044249
2. "Tunable Diode Laser Absorption Spectroscopy"  
P. Werle, F. D'Amato and S. Viciani  
Chapter in: M. Lackner (Ed.) "Lasers in Chemistry: Probing and Influencing Matter ", Volume 1, chap. 9, pag 255-276, *Editor* Wiley-VCH, (Weinheim, Germany, 2008).  
ISBN 978-3-527-31997-8

## **BOOKS - PROCEEDINGS**

1. "Towards a robust estimate of the global lightning nitrogen oxides source rate and its error bound"  
U. Schumann, C. Kurz, H. Schlager, H. Huntrieser, L. Emmons, L. Labrador, E. Meijer, A. Ulanovsky, and S. Viciani.  
ESA – ESRIN (European Space Research INstitute): Atmospheric Science Conference (Oral Presentation)  
Frascati (Roma), Italy 8-12 May 2006.  
**Conference Proceeding**  
in H. Lacoste "Proceedings of the First Atmospheric Science Conference", *Editor* ESA SP-628 European Space Agency (Noordwijk, The Netherlands, 2006).  
ISBN 92-9092-939-1
2. "Tunable diode laser spectrometers (TDLS'S) as airborne in-situ sensors for stratospheric trace gases"  
F. D'Amato, P. Mazzinghi, S. Viciani, and P. W. Werle  
*11<sup>th</sup> Conferenza Annuale dell'Associazione Italiana Sensori e Microsistemi AISEM 2006 (Invited – Session 1: Sensori Chimici -I)*.  
Lecce, Italy 8-10 February 2006.  
**Conference Proceeding**  
in "Proceedings of the 11th Italian Conference : Sensors and Microsystems" pag. 1-5, *Editor* World Scientific (New Jersey, USA, 2008).  
ISBN-13 978-981-279-338-6  
ISBN-10 981-279-338-0
3. "FLAIR - Field Laser Applications in Industry and Research"  
P.W. Werle, P. Mazzinghi, F. D'Amato, and S. Viciani  
*International Conference on Laser Applications to Chemical, Security and Environmental Analysis LACSEA 2006 (Invited)*  
Incline Village, USA, 5-9 February 2006  
**Technical Digest**  
in "Laser Applications to Chemical, Security and Environmental Analysis 2006 - Technical Digest", *Editor*  
The Optical Society of America (Washington, DC, USA, 2006)  
ISBN: 1-55752-799-7
4. "Generation and tomographic analysis of novel quantum light states"  
A. Zavatta, S. Viciani, V. Parigi and M. Bellini  
*Conference on Laser and Electro-Optics Europe– European Quantum Electronics Conference CLEO/Europe – EQEC 2005 (Oral Presentation EG1-2-MON)*.  
Munich, Germany 12-17 June 2005.  
**IEEE Conference Proceeding**  
in "European Quantum Electronics Conference EQEC 2005" (p. 250), *Editor* IEEE (New York, 2005).  
ISBN: 0-7803-8973-5
5. "Selective Control of Fourth-Order Interferences by means of Comb-Like Two-Photon Entangled States"  
A. Zavatta, S. Viciani, and M. Bellini  
*The Seventh International Conference on Quantum Communication, Measurements and Computing QCMC/2004 (Poster session)*.  
Glasgow, Great Britain 25-28 July 2004.  
**Conference Proceeding**  
in "Quantum Communication, Measurement and Computing - AIP Conference Proceedings" Volume 734, pp. 277-280, *Editor* American Institute of Physics AIP (Melville, New York, USA, 2004).  
ISBN 0-7354-0216-7
6. "Lineshape and frequency noise of a Vertical Cavity Surface Emitting Laser"  
S. Viciani, and F. Marin  
*Conference on Laser and Electro-Optics Europe CLEO/EUROPE (Poster Session CWF88)*.  
Nice, France 10-15 September 2000.  
**IEEE Conference Proceeding**  
in "Lasers and Electro-Optics Europe, 2000. Conference Digest" (p. 1). *Editor* IEEE (New York, USA, 2000).  
ISBN: 0-7803-6319-1



# CURRICULUM VITAE

FORMATO EUROPEO/EUROPEAN FORMAT

## INFORMAZIONI PERSONALI/ PERSONAL INFORMATION

Nome, Cognome/Name, Surname	Guido Toci
Telefono/Telephone	+39-055-5225315
Fax	+39-055-5225305
E-mail	guido.toci@ino.it, guido.toci@cnr.it
Nazionalità/Nationality	Italy

## ESPERIENZA PROFESSIONALE /WORK EXPERIENCE

Since 28/11/2013	Researcher at the National Institute of Optics of the National Research Council, INO-CNR
Since 14/07/2001 to 28/11/2013	Researcher at the Institute of Applied Physics "Nello Carrara" of the National Research Council, IFAC-CNR
Nome e indirizzo del datore di lavoro / Name and address of employer	National Research Council - CNR - P.le Aldo Moro 7, 00185 Roma, Italy
Settore di attività / Type of sector	Research and development
Funzione / Position held	Researcher
Principali mansioni / Main activities	Research; Scientific management of research project

## ISTRUZIONE E FORMAZIONE / EDUCATION AND TRAINING

22/10/1996	Dottorato di ricerca (equivalent to Ph.D) in Physics
Nome e tipo d'istituto di istruzione o formazione / Name and type of organisation providing education and training	Università degli Studi di Firenze , Italy
Principali materie e competenze professionali apprese / Principal subjects occupational skills covered	Thesis title: "Effetti Ottici non lineari del secondo ordine in cascata in condizioni non stazionarie" (Cascaded second order nonlinear optical effects in nonstationary conditions). Principal subjects: nonlinear optical effects, ultrafast laser optics
Certificato o diploma ottenuto /Title of qualification awarded	Dottorato di Ricerca (equivalent to Ph. D.)
30/01/1991	Laurea in Physics
Nome e tipo d'istituto di istruzione o formazione / Name and type of organisation providing education and training	Università degli Studi di Firenze , Italy
Certificato o diploma ottenuto /Title of qualification awarded	Laurea
Livello nella classificazione nazionale / Level in National classification	110 cum laude/110

## ATTIVITA' DI RICERCA / RESEARCH ACTIVITIES

Attuali campi di ricerca / Research sectors	<ol style="list-style-type: none"><li>1. New Solid State Laser with active media based on innovative crystals and ceramics</li><li>2. Development of laser and optical devices for aerospace applications</li><li>3. Industrial applications of lasers</li></ol>
Recenti attività scientifiche/ Recent Scientific Activities.	<p>2016-2017 Participation to the European Project EuPRAXIA "European Plasma Research Accelerator with eXcellence in Applications" for the development of novel high energy laser devices for plasma excitation and particle acceleration.</p> <p>2015-2017 Scientific responsible of the INO activities for the national project CEMILAP, for the development and characterization of laser ceramics with Yb:YAG, Yb:Lu2O3 and Yb:Sc2O3 composition.</p> <p>2015 Scientific responsible of the INO activities for the "Progetto Premiale" "Metrology of environmental parameters" funded by the Ministry of Research.</p> <p>Scientific coordinator for the Italian part Scientific Agreement Cooperation between the CNR and the AVCR (Czech Republic) 2013-2015, " Influenza della composizione e dei difetti sulle proprietà di ceramiche trasparenti e monocristalli per applicazioni laser e scintillatori / Influence of composition and defects on the properties of transparent ceramics and crystals for laser and scintillator applications"</p> <p>Scientific coordinator of the project "Capacità Tecnologica ed Operativa della Toscana per l'Utilizzo dello Spazio" (CTOTUS), finanziato dalla Regione Toscana, from 1/5/2011 to 31/08/2012. The project partnership is composed by 3 research Institutes (IFAC-CNR, INO-CNR, LENS), a Large Enterprise, (Selex Galileo, Finmeccanica Group) and a small Enterprise (FLYBY s.r.l.). Scientific targets of the project are: development of new laser devices and technologies for space applications; development of new optical instruments for Earth observation from satellites; development of new data analysis procedures</p> <p>Partecipant to the Scientific Agreement Cooperation between the CNR and the AVCR (Czech Republic) 2004-2011 <i>Nuovi materiali scintillatori e per laser a stato solido- New materials for scintillators and solid state lasers</i></p> <p>From 2007 to 2010: participation to the national project <i>Smart Reflex</i>, funded by Ministero Università e Ricerca, for the development of a monitoring device based on plasma spectroscopy for laser welding processes in automotive industry, in</p>



cooperation with FIAT S.p.A.

2008 Participation to the CNR project RSTL (Ricerca Spontanea a Tema Libero) id.959 entitled "Nuovi promettenti mezzi attivi drogati ad Ytterbio per laser tunabili nel vicino infrarosso" coordinated by IFAC-CNR, for study of Yb-doped solid state laser materials and development of laser prototypes.

5  
2  
Publicazioni  
negli ultimi 4  
anni/ Books and  
Articles in the last  
4 years

- 1) A Pirri, G Toci, J Li, T Xie, Y Pan, V Babin, A Beitlerova, M Nikl, M Vannini, *High efficiency laser action in mildly doped Yb:LuYAG ceramics*, Opt. Mater. 73, 312-318, 2017
- 2) VV Osipov, RN Maksimov, VA Shitov, KE Lukyashin, G Toci, M Vannini, *Fabrication, optical properties and laser outputs of Nd: YAG ceramics based on laser ablated and pre-calcined powders*, Opt. Mater. 71, 45-49, 2016
- 3) G. Toci, A. Pirri, W. Ryba-Romanowski, M. Berkowski, M. Vannini, *Spectroscopy and CW first laser operation of Yb-doped Gd<sub>3</sub>(Al<sub>0.5</sub>Ga<sub>0.5</sub>)<sub>5</sub>O<sub>12</sub> crystal*, Opt. Mater. Express 7 (1), 170-178
- 4) J. Hostaša, A. Piancastelli, G. Toci, M. Vannini, V. Biasini, *Transparent layered YAG ceramics with structured Yb doping produced via tape casting*, Opt. Mater., 65, 21-27, 2017
- 5) A Lapucci, M Vannini, M Ciofini, A Pirri, M Nikl, J Li, L Esposito, V Biasini, J Hostasa, T Goto, G Boulon, R Maksimov, L Gizzi, L Labate, G Toci *Design and characterization of Yb and Nd doped transparent ceramics for high power laser applications: recent advancements*. In XXI Int. Symp.on High Power Laser Systems and Applications (pp. 102540E-102540E). ISOP, 2017
- 6) A Pirri, G.Toci, J Li, T Xie, Y Pan, V Babin, A Beitlerova, M Nikl, M Vannini, *Spectroscopic and laser characterization of Yb<sub>0.15</sub>(Lu<sub>x</sub>Y<sub>1-x</sub>)<sub>3</sub>Al<sub>5</sub>O<sub>12</sub> ceramics with different Lu/Y balance*, Opt. Express 24 (16), 17832-17842 (2016)
- 7) G.Toci, A Pirri, J Li, T Xie, Y Pan, V Babin, A Beitlerova, M Nikl, M Vannini, *First laser emission of Yb<sub>0.15</sub>(Lu<sub>0.5</sub> Y<sub>0.5</sub>)<sub>3</sub>Al<sub>5</sub>O<sub>12</sub> ceramics*, Opt.Express 24 (9), 9611-9616, 2016
- 8) G. Toci ; A. Pirri ; J. Li ; T. Xie ; Y. Pan, M. Nikl ; V. Babin ; A. Beitlerová ; M. Vannini, *First laser operation and spectroscopic characterization of mixed garnet Yb:LuYAG ceramics* , Proc. SPIE 9726, Solid State Lasers XXV: Technology and Devices, 97261N, 2016
- 9) J. Hostasa ; L. Esposito ; V. Biasini ; A. Piancastelli ; M. Vannini ; G. Toci, *Layered Yb:YAG ceramics produced by two different methods: processing, characterization and comparison*, Proc. SPIE 9726, Solid State Lasers XXV: Technology and Devices, 97261M, 2016
- 10) G. Toci, A. Lapucci, M. Ciofini, L. Esposito, J. Hostasa, L. Gizzi, L. Labate, P. Ferrara, A. Pirri, M. Vannini, *Laser and optical properties of Yb:YAG ceramics with layered doping distribution: design, characterization and evaluation of different production processes*, Proc. SPIE 9726, Solid State Lasers XXV: Technology and Devices, 97261P, 2016
- 11) G. Toci, A. Pirri, A. Beitlerova, Y. Shoji, A. Yoshikawa, J. Hybler, M. Nikl, M. Vannini, *Characterization of the lasing properties of a 5% Yb doped Lu<sub>2</sub>SiO<sub>5</sub> crystal along its three principal dielectric axes*, Opt. Express 23, 13210, 2015
- 12) G. Toci ; A. Lapucci ; M. Ciofini ; L. Esposito ; J. Hostaša, A. Piancastelli ; L. A. Gizzi ; L. Labate ; P. Ferrara ; A. Pirri ; M. Vannini *Graded Yb:YAG ceramic structures: design, fabrication and characterization of the laser performances*, Proc. SPIE 9513, High-Power, High-Energy, and High-Intensity Laser Technology II, 95130R, 2015
- 13) G. Toci ; A. Pirri ; A. Beitlerova ; Y. Shoji ; A. Yoshikawa, J. Hybler ; M. Nikl ; M. Vannini *Yb:Lu<sub>2</sub>SiO<sub>5</sub> crystal : characterization of the laser emission along the three dielectric axes*, Proc. SPIE 9513, High-Power, High-Energy, and High-Intensity Laser Technology II, 95130O, 2015
- 14) S. Matteoli, G. Corsini, M. Diani, G. Cecchi, G. Toci, *Automated Underwater Object Recognition by Means of Fluorescence LIDAR*, IEEE trans. geosci. remote sens., 53, 375-393, 2015
- 15) G. Toci, M. Vannini, M. Ciofini, A. Lapucci, A. Pirri, A. Ito, T. Goto, A. Yoshikawa, A. Ikesue, G. Alombert-Goget, Y. Guyot, G. Boulon, *Nd<sup>3+</sup>-doped Lu<sub>2</sub>O<sub>3</sub> transparent sesquioxide ceramics elaborated by the Spark Plasma Sintering (SPS) method. Part 2: First laser output results and comparison with Nd<sup>3+</sup>-doped Lu<sub>2</sub>O<sub>3</sub> and Nd<sup>3+</sup>-Y<sub>2</sub>O<sub>3</sub> ceramics elaborated by a conventional method,* Opt. Mater. 41, 12-16, 2014
- 16) J. Hostaša, L. Esposito, A. Malchère, T. Epicier, A. Pirri, M. Vannini, G. Toci, E. Cavalli, A. Yoshikawa, M. Guzik, G. Alombert-Goget, Y. Guyot, G. Boulon, *Polycrystalline Yb<sup>3+</sup>-Er<sup>3+</sup>-co-doped YAG: Fabrication, TEM-EDX characterization, spectroscopic properties, and comparison with the single crystal*, J. Mater. Res., 29, 2288-2296, 2014
- 17) A. Pirri, M. Vannini, V. Babin, M. Nikl and G. Toci, *A comparison of the laser performance of Yb<sup>3+</sup>:LuAG crystals with different doping levels*, J. Phys.: Conf. Ser. 497 012009, 2014
- 18) A. Pirri, G. Toci, M. Ciofini, A. Lapucci, L. A. Gizzi, L. Labate, L. Esposito, J. Hostaša and M. Vannini, *Thermal lens measurements in Yb-doped YAG, LuAG, Lu<sub>2</sub>O<sub>3</sub>, Sc<sub>2</sub>O<sub>3</sub> ceramic lasers*, J. Phys.: Conf. Ser. 497 012013, 2014
- 19) P. Ferrara, M. Ciofini, L. Esposito, J. Hostaša, L. Labate, A. Lapucci, A. Pirri, G. Toci, M. Vannini, L.A. Gizzi, *3-D numerical simulation of Yb: YAG active slabs with longitudinal doping gradient for thermal load effects assessment*, Opt. Express, 22, 5, pp. 5375-5386, 2014
- 20) A. Pirri, G. Toci, M. Nikl, V. Babin, and M. Vannini, *Experimental evidence of a nonlinear loss mechanism in highly doped Yb:LuAG crystal*, Opt. Express, 22, 4, pp. 4038-4049, 2014

Brevetti recenti/  
recent patents

G.Toci, R. Pini, (2011) - Method For Detecting Flaws In The Process For The Continuous Laser Welding Of Metallic Portions, application n. WO2011IB53767 20110829 and US Patent 9,505,086

ULTERIORI  
INFORMAZIONI /  
ADDITIONAL  
INFORMATION

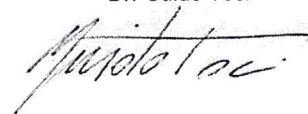
**Attività didattiche/ Teaching records**

-Academic year 2008-2011 : Teacher at the Specialization School in Medical Physics of the University of Florence, for the course "Physics of radiation" (8 hours)

-Physics thesis advisor for Dr. A. Nofri for the academic year 2009-2010, title "Misura della vita media della transizione laser dell'Yb<sup>3+</sup> in matrici cristalline e ceramiche ad alto drogaggio", at the Department of Physics of the University of Florence

Firenze, 18/12/2017

Dr. Guido Toci



# CURRICULUM VITAE

FORMATO EUROPEO/EUROPEAN FORMAT

## INFORMAZIONI PERSONALI/ PERSONAL INFORMATION

Nome, Cognome/Name, Surname	<b>Barbara Patrizi</b>
Indirizzo/Address	Via Fra' Bartolommeo, 20 - 50132 Firenze
Via, numero civico, c.a.p., città, nazione/ House number, street name, postcode, city, country	Italy
Telefono/Telephone	+39-0555225341 room B138
Fax	
E-mail	<a href="mailto:barbara.patrizi@ino.it">barbara.patrizi@ino.it</a> , <a href="mailto:patrizi@lens.unifi.it">patrizi@lens.unifi.it</a>
Sito web/Website	
Nazionalità/Nationality	Italian
Luogo e data di nascita/ Place and Date of birth	Anagni (FR), 05/02/1981

## ESPERIENZA PROFESSIONALE /WORK EXPERIENCE

Se dipendente CNR indicare:

**N. MATRICOLA 17134**  
QUALIFICA RESEARCHER  
LIVELLO III

In ordine di data /Dates (from – to)

Nome e indirizzo del datore di lavoro / Name  
and address of employer

Tipo o settore di attività / Type of business or  
sector

Funzione o posto occupato / Occupation or  
position held

Principali mansioni e responsabilità / Main  
activities and responsibilities

30/12/2017

CNR, Istituto Nazionale di Ottica, Largo Enrico Fermi 6, 50125 Firenze, Italy

Scientific Research : Laser and Optics, Physical Chemistry, Biophysics

Researcher

In ordine di data /Dates (from – to)

Nome e indirizzo del datore di lavoro / Name  
and address of employer

Tipo o settore di attività / Type of business or  
sector

Funzione o posto occupato / Occupation or  
position held

Principali mansioni e responsabilità / Main  
activities and responsibilities

02/11/2016-29/12/2016

INO-CNR, via Madonna del Piano, 10, 50019- Sesto Fiorentino (Firenze)

Scientific Research

PostDoc fellowship

*"Caratterizzazione di parametri ambientali, con particolare attenzione alle interazioni biologiche, mediante metodologie di spettroscopia avanzata"*

Nome e indirizzo del datore di lavoro / Name  
and address of employer

Tipo o settore di attività / Type of business or  
sector

Funzione o posto occupato / Occupation or  
position held

Principali mansioni e responsabilità / Main  
activities and responsibilities

01/11/2015-31/10/2016

Università di Firenze, Dipartimento di Chimica "Ugo Schiff" Via della Lastruccia, 3-13 50019 Sesto Fiorentino (FI)

Scientific Research

PostDoc fellowship

Characterization of A. *fulgidus* ferritin by ultrafast time-resolved and stationary spectroscopic techniques for the development of micro-reactors and biosensors.



<p>Nome e indirizzo del datore di lavoro / Name and address of employer</p> <p>Tipo o settore di attività / Type of business or sector</p> <p>Funzione o posto occupato / Occupation or position held</p> <p>Principali mansion e responsabilità / Main activities and responsibilities</p>	<p>01/09/2014-31/08/2015</p> <p>Università di Firenze, Dipartimento di Biologia, Via Madonna del Piano, 6 - 50019 Sesto Fiorentino (FI)</p> <p>Scientific Research PostDoc fellowship</p> <p>Advanced optical methods for tissues differentiation studies; Molecular biology techniques (cloning, PCR, RNA expression, cellular culture) Experience in confocal microscopy and TEM microscopy.</p>
<p>Nome e indirizzo del datore di lavoro / Name and address of employer</p> <p>Tipo o settore di attività / Type of business or sector</p> <p>Funzione o posto occupato / Occupation or position held</p> <p>Principali mansion e responsabilità / Main activities and responsibilities</p>	<p>02/04/2013-01/04/2014</p> <p>Istituto Nazionale di Ottica - INO - UOS Sesto Fiorentino, Via Nello Carrara, 1 50019 Sesto Fiorentino (FI)</p> <p>Scientific Research PostDoc fellowship</p> <p>Charge transfer characterization in organic photosensitizers adsorbed on semiconductor nanoparticles, in the frame of Project EFOR (Energy from renewable sources); Stationary and time-resolved spectroscopic techniques.</p>
<p>Nome e indirizzo del datore di lavoro / Name and address of employer</p> <p>Tipo o settore di attività / Type of business or sector</p> <p>Funzione o posto occupato / Occupation or position held</p> <p>Principali mansion e responsabilità / Main activities and responsibilities</p>	<p>20/06/2012-19/06/2013</p> <p>Istituto Nazionale di Ottica - INO - UOS Sesto Fiorentino, Via Nello Carrara, 1 50019 Sesto Fiorentino (FI)</p> <p>Scientific Research PostDoc fellowship</p> <p>"Studio Fotofisico" Contratto ENI n. 3500023215, sul tema: "Fotovoltaico organico per concentratori solari" Photophysical characterization by time-resolved fluorescence and transient absorption spectroscopies of organic dyes such as 4,7-dithien-2-yl-2,1,3-benzothiadiazole and its derivatives for the realization of solar concentrators; Photophysical characterization by transient absorption spectroscopy of new light-harvesting systems based on virus template in which the chromophores network geometry allows the coherent energy transport with an efficiency comparable to natural antenna complexes (research in cooperation with MIT and Istituto Eni Donegani published on <i>Nature Materials</i>); Photophysical characterization by transient absorption spectroscopy of the natural photosensitizer hypericin alone and conjugated to the protein apomyoglobin as carrier; The project has been performed in cooperation with IIT (Italian Institute of Technology) and University of Parma.</p>
<p>Nome e indirizzo del datore di lavoro / Name and address of employer</p> <p>Tipo o settore di attività / Type of business or sector</p> <p>Funzione o posto occupato / Occupation or position held</p> <p>Principali mansion e responsabilità / Main activities and responsibilities</p>	<p>01/05/2010-30/04/2012</p> <p>LENS-European Laboratory for Non-Linear Spectroscopy, Via Nello Carrara, 1-Sesto Fiorentino (FI)</p> <p>Scientific Research Temporary Project</p> <p>Project "SIMPAS - Innovative Measurement Systems for the Protection of Environment and Health"; Dressing of the entire chemical laboratory equipments, development of an apparatus for the detection of dioxins from incineration plants using MIR QCL lasers in the ranges 1205-1310 and 1335-1590 cm.<sup>-1</sup></p>
<p>Nome e indirizzo del datore di lavoro / Name and address of employer</p> <p>Tipo o settore di attività / Type of business or sector</p> <p>Funzione o posto occupato / Occupation or position held</p> <p>Principali mansion e responsabilità / Main activities and responsibilities</p>	<p>Consorzio Interuniversitario Nazionale per la Scienza e Tecnologia dei Materiali - Via G. Giusti, 9 - Firenze</p> <p>Scientific Research Fellowship holder</p> <p>"MOLSPINQ"- Molecular Spin Clusters for Quantum Information Processes" Consorzio Interuniversitario Nazionale per la Scienza e Tecnologia dei Materiali - Via G. Giusti, 9 - Firenze</p>

ISTRUZIONE E FORMAZIONE / EDUCATION AND  
TRAINING

2010-2013

In ordine di data /Dates (from – to)

Nome e tipo d'istituto di istruzione o formazione / Name and type of organisation providing education and training

Principali materie e competenze professionali apprese / Principal subjects occupational skills covered

LENS-European Laboratory for Non Linear Spectroscopy

International Ph.D. in Atomic and Molecular Spectroscopy, with experimental thesis: "Dissociation and Geminate Recombination of CO in Truncated Hemoglobins Probed by Ultrafast Infrared Spectroscopy;"

During the PhD I exploited ultrafast time-resolved spectroscopic techniques to study structural dynamics in proteins. The principal spectroscopic techniques I have employed are Transient Absorption Spectroscopy (TAS), Time-Resolved Infrared Spectroscopy (TRIR), FT-IR Spectroscopy, UV-Visible Spectroscopy.

I focused my research on the understanding of recombination dynamics of CO in a particular class of bacterial hemoglobins called truncated hemoglobins (trHbs), using this gaseous ligand as a probe of heme pocket structural changes in native and mutated proteins. In particular TRIR spectroscopy provided unique information about the influence of structural and electrostatic properties of the distal heme pocket on ligand dissociation and rebinding, while TAS spectroscopy allowed obtaining information on the electronic state of heme moiety after laser-induced ligand dissociation.

Certificato o diploma ottenuto /Title of qualification awarded

International Ph.D

Livello nella classificazione nazionale o internazionale / Level in National classification

2006-2009

In ordine di data /Dates (from – to)

Nome e tipo d'istituto di istruzione o formazione / Name and type of organisation providing education and training

Università degli Studi di Perugia-Italy

Principali materie e competenze professionali apprese / Principal subjects occupational skills covered

Master Degree in Molecular and Biomedical Sciences  
110/110\*cum laude"

Experimental thesis, title: "Interaction of Nanoparticles with Biological Systems",

Certificato o diploma ottenuto /Title of qualification awarded

Master degree in Biology

Livello nella classificazione nazionale o internazionale / Level in National classification

#### ATTIVITA' DI RICERCA / RESEARCH ACTIVITIES

Attuali campi di ricerca / Research sectors

Characterization of organic dyes for applications in LED technology;  
Study of new phosphors for lighting without rare earth to avoid dependence from China;  
Characterization of Yb<sup>3+</sup>, Tm<sup>3+</sup>, Er<sup>3+</sup>, Sm<sup>3+</sup>, doped hosts as active media in the NIR and in the visible spectrum (e.g. around 600nm).

Recenti attività scientifiche/ Recent Scientific Activities.

Characterization of *A. fulgidus* ferritin by ultrafast time-resolved and stationary spectroscopic techniques for the development of micro-reactors and biosensors.  
Characterization of CO recombination dynamics in the cold-adapted truncated hemoglobin from *P. haloplanktis* TAC125 by ultrafast transient absorption spectroscopy.

Pubblicazioni/ Books and Articles

1. P.A., Walker,...B. Patrizi, et al." Horizon 2020 EuPRAXIA design study" Journal of Physics: Conf. Series 874, 2017, 012029.

2. Iagatti, A.; Patrizi, B.; Basagni, A.; Marcelli, A.; Alessi, A.; Zanardi, S.; Fusco, R.; Salvalaggio, M.; Bussotti, L.; Foggi, P., Photophysical properties and excited state dynamics of 4,7-dithien-2-yl-2,1,3-benzothiadiazole. *Physical Chemistry Chemical Physics* 2017, 19 (21), 13604-13613.

3. H. Park, N. Heldman, P. Reberntrost, L. Abbondanza, A. Iagatti, A. Alessi, B. Patrizi, M. Salvalaggio, L. Bussotti, M. Mohseni, F. Caruso, H. C. Johnsen, R. Fusco, Paolo Foggi, P. F. Scudo, S. Lloyd, and A. M. Belcher, "Enhanced Energy Transport in Genetically Engineered Excitonic Networks", *Nature Materials*, 2016, 15, 211-216, doi:10.1038/nmat4448.

4. P. Delcanale, F. Pennacchietti, G. Maestrini, B. Rodríguez-Amigo, P. Bianchini, A. Diaspro, A. Iagatti, B. Patrizi, P. Foggi, M. Agut, S. Abbruzzetti, S. Nonell and C. Viappiani, "Subdiffraction localization of a nanostructured photosensitizer in bacterial cells", *Scientific Reports* 5, Article number: 15564 (2015), doi:10.1038/srep15564.

5. B. Patrizi, M. Di Donato, A. Lapini, A. Marcelli, M. Lima, R. Righini, P. Foggi, N. Sciamanna, A. Boffi, "The role of local structure and dynamics of small ligands migration in proteins: a time-resolved IR study of a mutated truncated hemoprotein from *Thermobifida fusca*", *The Journal of Physical Chemistry B*, 2014, 118, 31, 9209-9217.

6. B. Patrizi, M. Siciliani de Cumis, S. Viciani, F. D'Amato and P. Foggi, "Characteristic Vibrational Frequencies of Toxic Polychlorinated Dibenzo-Dioxins and -Furans", *Journal of Hazardous Materials*, 2014, 274, 98-105.

7. M. Siciliani de Cumis, F. D'Amato, S. Viciani, B. Patrizi, P. Foggi and C.L. Galea "First quantitative measurements by IR spectroscopy of dioxins and furans by means of broadly tunable quantum cascade lasers", 2013 *Laser Physics*, 23 025603.



8. A. Lapini, M. Di Donato, B.Patrizi, A. Marcelli, M. Lima, R.Righini, P.Foggi, N. Sciamanna, A Boffi "Carbon Monoxide Recombination Dynamics in Truncated Hemoglobins Studied with Visible-Pump MidIR-Probe Spectroscopy", *The Journal of Physical Chemistry B*, 2012, 116, 8753-8761.

Scuole e congressi/ training and conferences

- Workshop "Enlight", Energia Solare e Fotosintesi (16 Giugno 2016) Stazione Leopolda-Pisa.
- 2012-Summer School of Ultrafast Laser Science and Applications (SSCS), Menorca, Spain.
- Summer School of Ultrafast Laser Science and Applications (SSCS), Menorca, Spain (2012, 10-15 June), "Carbon Monoxide Recombination Dynamics in two Truncated Hemoglobins from *Bacillus subtilis* and *Thermobifida fusca*", oral presentation;
- Workshop "Structural and Unstructural Biology of Viral Proteins" at CERM (Magnetic Resonance Centre-University of Florence, 2012, 24-26 January);
- FEMTO 10-The Madrid Conference on Femtochemistry at Universidad Complutense of Madrid (2011, 10-15 July), "Carbon monoxide photodissociation dynamics in two truncated hemoglobins from *Bacillus subtilis* and *Thermobifida fusca*", poster presentation;
- TRVS XV: the 15<sup>th</sup> conference on Time-resolved Vibrational Spectroscopy at Centro Stefano Francini at Monte Verità, Ascona, Switzerland, June 19-24 2011, "Time resolved infrared study of the recombination dynamics of the carbon monoxide complex of *Bacillus subtilis* truncated hemoglobin", poster presentation.
- 2010-Course of Lab View Core 1, LENS-University of Florence.

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INFORMATIVA E CONSENSO

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( barrare la casella)

Sì, acconsento

