



Giuseppe de Vito

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PERSONAL STATEMENT

Executive summary

I work as a type-A fixed-term researcher in psychobiology and physiological psychology at the University of Florence.

I studied Biology at the University of Pisa and at the prestigious *Scuola Normale Superiore* (sister college to the Paris-based *École Normale Supérieure*, it ranks first in E.U. and ninth in the world in the Per Capita Performance parameter of the "Academic Ranking of World Universities" 2020) and then licensed as a professional biologist.

I obtained a Ph.D. in Molecular Biophysics at Scuola Normale Superiore in collaboration with the Italian Institute of Technology at the National Enterprise for nanoScience and nanoTechnology in Pisa and successfully followed a second-level professional master programme in Advanced Biostatistics for clinical research at University of Padova.

I worked as Junior Specialist at the University of California-Irvine (USA, in the laboratory of Prof. Eric O. Potma), as a research collaborator at the Italian Institute of Technology in Pisa and as a research fellow at the European Laboratory for Non-linear Spectroscopy in Florence (in the laboratory of Prof. Francesco Saverio Pavone). Then, I worked as a researcher at National Institute of Optics of the Italian National Research Council, where I worked on the EU flagship project: "HBP – Human Brain Project", before moving to the University of Florence. There I worked on an ERC-funded project titled: "All-optical Brain-to-Brain behaviour and information transfer".

As of February 2023, I have co-authored 27 articles in good international peer-reviewed journals, of which I am first or co-first author of 8. I have also co-authored 6 conference proceedings, of which I am first or co-first author in 2. My publications were cited 498 times (Scopus) resulting in a h-index of 14 (Scopus). I received a grant from "Fondazione CR Firenze".

I have extensive multidisciplinary knowledge in biophysics, biostatistics, and psychobiology. I have much experience in research teams building and operating experimental optical microscopes, including cutting-edge microscopy applied to biological imaging such as coherent Raman imaging, light-sheet microscopy and non-linear microscopy. In addition, I have expertise in digital image analysis with custom-made low-level image processing software, and I am competent in several programming languages for scientific data analysis (including Python, R, and Perl) and data acquisition (LabVIEW-G).

EDUCATION AND TRAINING

Second-level professional master programme (Master universitario di secondo livello)

University of Padua [2 Dec 2016]

Address: Padua (Italy)

Field(s) of study: Advanced Biostatistics for Clinical Research

Final grade: Excellent – **Level in EQF:** EQF level 8

Ph.D. (Diploma di Perfezionamento-PhD, equivalent to Ph.D. ex lege 308/1986)

Scuola Normale Superiore [2010 – 3 Nov 2016]

Address: Pisa (Italy)

Field(s) of study: Molecular Biophysics

Final grade: 70/70, with full honours – **Level in EQF:** EQF level 8

Thesis: Label-free polarisation-resolved optical imaging of biological samples

Only three students were selected in my year for the Ph.D. course in Molecular Biophysics. The course was in collaboration with the Italian Institute of Technology.

Qualified as a professional Biologist (Abilitato all'esercizio della professione di Biologo)

University of Pisa [1 Jul 2012]

Address: Pisa (Italy)

Final grade: 190/200

Second-level professional master programme (Diploma di licenza, equivalent to Master universitario di secondo livello ex DL 76/2020)

Scuola Normale Superiore [2008 – 25 Jun 2012]

Address: Pisa (Italy)

Field(s) of study: Biological sciences

Final grade: 70/70 – Level in EQF: EQF level 8

The prestigious Scuola Normale Superiore is the sister college to the Paris-based École Normale Supérieure. The admission exam at the first year has an acceptance rate of about 5%. Only six undergraduate students from all of Italy were selected in my year for the Biology course. The Scuola Normale Superiore ranks first in E.U. and ninth in the world in the Per Capita Performance parameter of the "Academic Ranking of World Universities" 2020.

Master's Degree

University of Pisa [2008 – 29 Sep 2011]

Address: Pisa (Italy)

Field(s) of study: Biology Applied to Biomedicine

Final grade: 110/110, with full honours – Level in EQF: EQF level 7

Thesis: Experimental study of Terahertz radiation effects on cell membrane permeability

Thesis supervisor: Dr. Gian Michele Ratto. Curriculum: neurobiology.

First level diploma (Diploma di primo livello)

Scuola Normale Superiore [2005 – 16 Mar 2010]

Address: Pisa (Italy)

Field(s) of study: Biological sciences

Final grade: 8,93/10

Bachelor's degree

University of Pisa [2005 – 27 Sep 2009]

Address: Pisa (Italy)

Field(s) of study: Molecular Biology

Final grade: 110/110, with full honours – Level in EQF: EQF level 6

Thesis: Two-photons in vivo imaging of interictal activity in mouse visual cortex

Thesis supervisor: Dr. Gian Michele Ratto.

WORK EXPERIENCE

Type A fixed-term researcher (Ricercatore a tempo determinato di tipo A)

University of Florence [28 Feb 2019 – Current]

City: Florence

Country: Italy

Name of unit or department: Department of Neurosciences, Psychology, Drug Research and Child Health

Type A fixed-term researcher in psychobiology and physiological psychology.

Research activity: functional imaging of the nervous system, anatomical imaging and connectomic analysis. I worked on an ERC-funded project titled: "All-optical Brain-to-Brain behaviour and information transfer" (BrainBIT) till February 2022, after that I worked on the "Human brain optical mapping" project funded by "Fondazione Cassa di Risparmio di Firenze".

Teaching activity: "anatomy-physiological bases of psychic processes" for undergrad students, "Psychobiology and animal models" for Master students, "molecular imaging of animals and humans" for Ph.D. students and "Neurobiology and neuropharmacology fundamentals" for Ph.D. students.

Faculty member.

Researcher (Ricercatore)

National Institute of Optics - National Research Council [12 Feb 2017 – 30 May 2019]

City: Sesto Fiorentino

Country: Italy

Research activity: Realization of a system for three-dimensional optogenetic stimulation of the central nervous system. I was working on the EU flagship project: "HBP – Human Brain Project".

Research fellow (Borsista di ricerca)

European laboratory for non-linear spectroscopy [31 Aug 2016 – 9 Feb 2017]

City: Sesto Fiorentino

Country: Italy

Laboratory of Prof. Francesco Saverio Pavone.

Functional imaging of the zebrafish embryo brain. Project name: "TECHNICOLOR". Building of a new high-speed two-photon light-sheet microscope.

Research collaborator (Contrattista di ricerca)

Italian Institute of Technology, Centre for Nanotechnology Innovation [15 May 2016 – 14 Aug 2016]

City: Pisa

Country: Italy

Name of unit or department: Center for Nanotechnology Innovation

Observation with label-free techniques (multimodal non-linear microscopy and Coherent anti-Stokes Raman scattering) of nanoparticles in cell cultures.

Junior Specialist

University of California - Irvine [30 Apr 2015 – 30 Oct 2015]

City: Irvine CA

Country: United States

Name of unit or department: Department of Chemistry

Laboratory of Prof. Eric Olaf Potma.

I worked on a sum-frequency generation microscope for biological samples and on numerical simulations for polarization-resolved Coherent anti-Stokes Raman spectroscopy microscopy.

Ph.D. student

Scuola Normale Superiore and Italian Institute of Technology [31 Oct 2011 – 29 Apr 2016]

City: Pisa

Country: Italy

Name of unit or department: National Enterprise for nanoScience and nanoTechnology

Laboratory of Dr. Vincenzo Piazza.

Setting up a non-linear multimodal (polarization-resolved coherent anti-Stokes Raman spectroscopy, second harmonic generation, sum frequency generation, two-photon fluorescence) optical microscope for neurobiological applications and for the observation of nanoparticle internalization in cell cultures.

PUBLICATIONS AND GRANT

Synopsis of publications

As of February 2023, I have co-authored 27 articles in good international peer-reviewed journals, of which I am first or co-first author of 8. I have also co-authored 6 conference proceedings, of which I am first or co-first author in 2. My publications were cited 498 times (Scopus) resulting in a h-index of 14 (Scopus).

Grant

In 2020 I won a grant from "Fondazione CR Firenze" (value € 10,000) to implement the research project: "Study of the neuronal circuits involved in the escape response in zebrafish larvae by means of high spatial- and temporal-resolution volumetric imaging and simultaneous optogenetic stimulation".

HONOURS AND AWARDS

An Idea for Excellent Science

University of Florence [14 Dec 2020]

In 2020 I won the prize "An Idea for Excellent Science" (value € 2,500) assigned by University of Florence to award dissemination capacity and scientific ideas with innovation potential and social impact.

Journal cover page

Journal of Biophotonics [29 Mar 2017]

Cover page of March 2017 issue (volume 10, issue 3) of Journal of Biophotonics for the article: "RP-CARS reveals molecular spatial order anomalies in myelin of an animal model of Krabbe disease".

Link: <https://onlinelibrary.wiley.com/doi/10.1002/jbio.201770030>

TEACHING ACTIVITY

Psychobiology and animal models

[2022 – Current]

Course for Master students at University of Florence

Anatomical and physiological fundamentals of psychic processes

[2019 – Current]

Undergrad course at University of Florence, Italy

Molecular imaging in animals and humans

[2020 – Current]

Tuscany Ph.D. in Neuroscience, Italy

Neurobiology and Neuropharmacology fundamentals

[2020 – 2021]

Tuscany Ph.D. in Neuroscience, Italy

Optical imaging methods for the study of nervous system and of the neuro-psycho-biological bases of behavior

[2019]

Seminar cycle for the Tuscany Ph.D. in Neuroscience, Italy

Polarisation-resolved CARS imaging: from molecular orientation to anatomical structure

[2017]

Invited talk for the training school: "MOLECULE IN(ter)ACTION: from in vitro to zebrafish". Palermo in 2018.

Label-free polarisation-resolved optical imaging of biological samples

[2015]

Seminar for the seminar cycle in "Biophysical Sciences", organized by Scuola Normale Superiore (Pisa, Italy).

SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

Master's student

[2022]

Master's degree in Biology

Master's student

[2019 – 2021]

Master's degree in Psychology

PhD student

[2017 – Current]

European Laboratory for Non-Linear Spectroscopy, Italy

PhD student

[2014 – 2016]

NEST laboratory, Scuola Normale Superiore, Italy

Postgraduate fellow

[2013]

NEST laboratory, Italian Institute of Technology, Italy

WORKSHOPS AND SUMMER/WINTER SCHOOLS

Lightsheet microscopy Workshop.

[2017]

Geneva (Switzerland). Wyss Center and Zeiss.

MOLECULE IN(ter)ACTION: from in vitro to zebrafish training school

[2017]

Palermo (Italy). Advanced Technologies Network Center and University of Palermo.

Invited talk.

1st MicroCOR winter school on Chemical Imaging by Coherent Raman and nonlinear microscopy

[2013]

Les Houches (France). MicroCOR EU-COST action MP1102.

MicroCOR Workshop on New Frontiers in Nonlinear Raman Microscopy

[2013]

Heidelberg (Germany). MicroCOR EU-COST action MP1102.

4th Summer Workshop on Label-Free Spectroscopic Imaging

[2013]

West Lafayette (USA). Purdue University.

Zurich Center for Imaging Science and Technology summer school

[2011]

Zurich (Switzerland). ETH Zurich.

Final vote: 5.25/6.

6th Optoelectronics and Photonics Winter School

[2010]

Fai della Paganella (Italy). University of Trento and Bruno Kessler Foundation.

Gran Sasso-Princeton Physics Summer School

[2005]

Princeton (USA). Princeton University and Gran Sasso national laboratory.

REFEREE/REVIEWER

Biomedical Optics Express

11 reviews

Optics Express

7 reviews

Analytical Chemistry

2 review

Applied Optics

1 review

Molecules

1 review

Optik - International Journal for Light and Electron Optics

1 review

MAJOR COLLABORATIONS

Dr. Virgilio Mattoli and Dr. Gianni Ciofani

Multimodal and multiphoton imaging of cell-nanostructure interactions, Center for Materials Interfaces, Italian Institute of Technology, Italy.

Prof. Paola Marmioli

Polarization-resolved CARS microscopy and its application to study the ageing effects on nerves, Experimental Neurology Unit, University of Milan – Bicocca, Italy.

Prof. Vasan Venugopalan

Study of the effects of light scattering on CARS microscopy, Department of Biomedical Engineering, University of California – Irvine, California, U.S.A.

Dr. Caterina Bendotti

CARS imaging of nerves to study the immune response in a neurodegenerative disease model, Department of Neuroscience, Mario Negri Institute for Pharmacological Research, Italy.

Dr. Paola Berchiolla

Bayesian reanalysis of a breast cancer clinical trial, Department of Clinical and Biological Sciences, University of Turin, Italy.

Prof. Natascia Tiso

Two-photon light sheet imaging of physiological and pathological nervous activity in the zebrafish brain, Department of Biology, University of Padua, Italy.

Dr. Alberto Mazzoni

In-vivo stimulation of neurons with ultrasounds in a vertebrate brain, The BioRobotics Institute, Sant'Anna School of Advanced Studies, Italy.

VOLUNTARY WORK

Student representative in Academic Council of Scuola Normale Superiore (Pisa, Italy)

[2012 – 2014]

Supervision of an English to Italian translation project for a popular-science e-book

[2013]

"Primates in Biomedical Research"

English to Italian translation of popular-science contents on a internet blog

[2013]

Writing, translation and editing of several English and Italian Wikipedia articles

[2012 – 2018]

Tutor for university orientation courses for high-school students

[2011 – 2013]

Courses organized by Scuola Normale Superiore (Pisa, Italy) in San Miniato (Italy).

Seminars for high school students

[2011 – 2013]

Seminars on cytology or on optical microscopy. Scientific high-school "Raffaele Mattioli" (Vasto, Italy).

DIGITAL SKILLS

Certifications

- ECDL (European Computer Driving Licence, full)
- Official course: "LabVIEW core 1"

Excellent knowledge

- Programming in Python (also with NumPy module).
- Programming in LabVIEW (G): I completed the "LabVIEW core 1" course.
- R statistical programming language.
- ImageJ software for image analysis, including native macro language.
- Digital raster graphic and vectorial graphic manipulation.
- Linux operating system (both as user and administrator).
- Windows operating system (user).
- Documents and presentations writing in Latex language.
- Microsoft Office, Open Office and Libre Office.

Good knowledge

- Programming in Perl.
- Desktop publishing software.

Basic knowledge

- Programming in Pascal.
- Matlab (translating to NumPy).
- C++ (modifying the code).

LANGUAGE SKILLS

Mother tongue(s): **Italian**

Other language(s):

English

LISTENING C1 READING C1 WRITING C1

SPOKEN PRODUCTION C1 SPOKEN INTERACTION C1

French

LISTENING A2 READING A2 WRITING A1

SPOKEN PRODUCTION A2 SPOKEN INTERACTION A2