Daniele Ancora, Ph.D.

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Department of Physics
Rome, Italy

WORK EXPERIENCE

March 2019 – now	**Senior Post-Doc – Marie Curie Individual Fellowship** Department of Physics, Politecnico di Milano, Milan (Italy). Scientific Coordinator: **Prof. Antonio Pifferi**
January 2018 – February 2019	**Senior Post-Doc – Statistical Mechanics and Inference of Light in Random Media** Institute of Nanotechnology (NANOTEC), Consiglio Nazionale delle Ricerche (CNR) Rome (Italy). Supervisor: **Dr. Luca Leuzzi**
May 2017 – December 2018	**Post-Doc – Biomedical Optical Tomography** In vivo Imaging Lab (IVIL), Institute of Electronic Structure and Laser (IESL), *Foundation for Research and Technology – Hellas* (FORTH), Heraklion (Greece) Supervisor: **Dr. Giannis Zacharakis**
December 2016 – February 2017	**Secondment – University Carlos III de Madrid** BiiG Group, Dept. of Bioengineering and Aerospace Engineering, UC3M, Madrid (Spain) Supervisor: **Prof. Jorge Ripoll-Lorenzo**
March - May 2016	**Secondment – Politecnico di Milano** Diffuse Optical Spectroscopy (DOS) laboratory, Dept. of Physics, POLIMI, Milano (Italy) Supervisor: **Prof. Antonio Pifferi**
May 2014 – May 2017	**Marie Curie Initial Training Network (ITN) – Early-Stage Researcher (ESR)** In Vivo Imaging Lab (IVIL), Institute of Electronic Structure and Laser (IESL), *Foundation for Research and Technology – Hellas* (FORTH), Heraklion (Greece) Supervisors: **Dr. Giannis Zacharakis, Dr. Athanasios Zacharopoulos**

EDUCATION AND TRAINING

01 May 2014 – 22 May 2017 *(Formally released on 20 July 2018)*	**Doctor of Philosophy – Material Sciences** Dept. of Material Science and Technology, *University of Crete*, Heraklion (Greece) {Keywords} Biophysics, Optical Imaging, Biomedical Tomography, Monte Carlo Photon Propagation, Adaptive Optics, Phase Retrieval, Tissue Light Diffusion.

Supervisors: **Prof. Maria Kafesaki** (University of Crete)
Prof. Chrysoula Tsokga (Stanford University)
Prof. Jorge Ripoll-Lorenzo (Universidad Carlos III de Madrid)

01 February 2009 – 18 July 2013	Master's Degree – Physics *Final Grade: 110/110* Department of Physics, *University of Rome La Sapienza*, Rome (Italy) {Keywords} Soft Matter, Computational Physics, Molecular Dynamics, Monte Carlo Simulation, Parallel Computing Supervisor: **Prof. Cristiano De Michele** (University of Rome, La Sapienza)
01 September 2005 – 12 January 2009	Bachelor's Degree – Physics *Final Grade: 110/110* Department of Physics, *University of Rome La Sapienza*, Rome (Italy) {Keywords} Quantum Physics, Statistical Mechanics, Quantum Optics, Electromagnetism, Solid State Physics, Condensed Matter Supervisor: **Prof. Stefano Lupi** (University of Rome, La Sapienza)

RESEARCH ACTIVITIES

Principal Research Lines

Machine Learning and Statistical Inference for Image Reconstruction through disorder

Light Diffusion in Biological Media and Biomedical Imaging

Disordered Photonics and Optics in complex media

Interdisciplinary Project/Research

Scientific Expertise

Combined Experimental/Theoretical Scientific experience on:
- ✓ *Monte Carlo* simulations for photon propagation and thermodynamics
- ✓ *Molecular Dynamics* for soft matter interaction
- ✓ *Light Diffusion* and *Light Scattering* in biological and complex media
- ✓ *Adaptive Optics* for focusing in turbid biological media
- ✓ *Phase Retrieval* for optical imaging techniques
- ✓ *Computed Tomography* reconstruction for biomedical imaging
- ✓ Applied *Machine Learning* and *Statistical Inference* techniques
- ✓ Scientific *Parallel Programming* with GPU and CPU

Grants and Awards

[2018] **Marie Skłodowska-Curie Actions (MSCA) - Individual Fellowship (IF)**
Project Number: 799230-HI-PHRET

[2016] **Student Travel Grant SPIE - Photonics West 2016** conference

[2014] **Marie Skłodowska-Curie Actions (MSCA) - Early Stage Researcher (ESR)**
Project Number: OILTEBIA-PITN-GA-2012-317526

[2013] Grant 100k-hours usage **HPC JUROPA,** Jülich Supercomputing Center, Jülich (Germany)

[2013] Grant 200k-hours usage Supercomputer **HPC FERMI**, Cineca, Bologna (Italy)

[2012] Grant 100k-hours usage Supercomputer **HPC MATRIX**, Caspur, Roma (Italy)

Peer-Reviewed Publications

[2020] *IEEE Transactions on Image Processing* (30, 1332-1341): **Ancora** and Bassi. "*Deconvolved Image Restoration From Auto-Correlations*."

[2020] *Scientific reports* (10(1), 1-10): Chincarini, Dalla Costa, Qiu, Spinelli, Cannas, Palestrini, Canali, Minero, Cozzi, Ferri, **Ancora**, De Pasquale, Vignola, Torricelli. "*Reliability of fNIRS for noninvasive monitoring of brain function and emotion in sheep*."

[2020] *APL - Photonics* (5(7), 071301): Colombo, Samaei, Lanka, **Ancora**, Pagliazzi, Durduran, Sawosz, Liebert, Pifferi. "*Coherent fluctuations in time-domain diffuse optics.*"

[2020] *Optics Letters* (45(8) 2191-2194): **Ancora**, Di Battista, Marcos Vidal, Avtzi, Zacharakis, Bassi. "*Hidden phase-retrieved fluorescence tomography.*"

[2018] *Biomedical Optics Express* (9(9) 4094): **Ancora**, Qiu, Zacharakis, Spinelli, Torricelli, Pifferi. "*Noninvasive optical estimation of CSF thickness for brain-atrophy monitoring.*"

[2018] *Optics Express* (26(12) 15594-15608): Di Battista, **Ancora,** Zacharakis, Ruocco, Leonetti. "*Hyperuniformity in amorphous speckle patterns*."

[2017] *Scientific Reports* (7, 11854): **Ancora,** Di Battista, Giasafaki, Psycharakis, Liapis, Ripoll, Zacharakis. "*Phase-Retrieved Tomography enables Mesoscopic imaging of Opaque Tumor Spheroids*."

[2017] *IEEE Transactions on Medical Imaging*, (36(5), pp.1086-1093): **Ancora,** Zacharopoulos, Ripoll, Zacharakis. "*Fluorescence Diffusion in the Presence of Optically Clear Tissues in a Mouse Head Model.*"

[2016] *Optica*, (3(11), pp.1237-1240): Di Battista, D., **Ancora,** Zhang, Lemonaki, Marakis, Liapis, Tzortzakis, Zacharakis. "*Tailored light sheets through opaque cylindrical lenses.*"

[2016] *Applied Physics Letters*, (109(12), pp.121110): Di Battista, A**ncora,** Leonetti, Zacharakis. "*Tailoring non-diffractive beams from amorphous light speckles.*"

[2015] *Soft matter* (11(15) pp.2934-2944). Nguyen, Battisti, **Ancora,** Sciortino, De Michele, "*Self-assembly of mesogenic bent-core DNA nanoduplexes.*"

Invited Publications

[2017] *Methods* (136(1) pp. 81-89): **Ancora,** Di Battista, Giasafaki, Psycharakis, Liapis, Ripoll, Zacharakis. "*Optical Projection Tomography via Phase Retrieval algorithms.*"

[2017] *Biotechnology Journal* (11(3) pp.1700419-1): Rieckher, Psycharakis, **Ancora,** Liapis, Zacharopoulos, Ripoll, Tavernarakis, Zacharakis. "*Demonstrating improved multiscale imaging capabilities of light sheet microscopy in the quantification of fluorescence dynamics.*"

Proceedings	[2021] ***Proc. of SPIE*** (in publication): **Ancora,** Valentini, Pifferi, Bassi. *"Auto-correlation for multi-view deconvolved reconstruction in light sheet microscopy."*

[2021] ***Proc. of SPIE*** (in publication): **Ancora,** Di Battista, Marcos-Vidal, Avtzi, Zacharakis, Bassi. *"Hidden projection tomography via phase retrieval algorithm."*

[2021] ***Proc. of SPIE*** (in publication): Colombo, Samaei, Lanka, **Ancora**, Pagliazzi, Durduran, Sawosz, Liebert, Pifferi. *"Speckle fluctuations in time-domain diffuse optics."*

[2020] ***Proc. of OSA*** (pp. JW5A): **Ancora**, Di Battista, Marcos-Vidal, Avtzi, Zacharakis, Bassi. *"Phase retrieval for hidden tomography reconstruction."*

[2018] ***Proc. of SPIE*** (10573, pp.970015): Marcos-Vidal, **Ancora,** Zacharakis, Vaquero, Ripoll. *"Projection tomography in the NIR-IIa window: challenges, advantages, and comparison with classical optical approach."*

[2017] ***Proc. of SPIE*** (10074, pp.100741E): **Ancora,** Di Battista, Giasafaki, Psycharakis, Liapis, Zacharopoulos, Zacharakis. *"Optical projection tomography via phase retrieval algorithms for hidden three-dimensional imaging."*

[2016] ***Proc. of SPIE*** (9700, pp.970015), **Ancora,** Zacharopoulos, Ripoll, Zacharakis. *"The role of cerebral spinal fluid in light propagation through the mouse head: Improving fluorescence tomography with Monte Carlo modelling."*

[2016] ***Proc. of SPIE*** (9717, pp.971719), Di Battista, **Ancora,** Zhang, Lemonaki, Avtzi, Tzortzakis, Leonetti, Zacharakis., *"Structured adaptive focusing through scattering media."*

[2016] ***Proc. of SPIE*** (9718, pp.97181B), **Ancora,** Di Battista, Giasafaki, Psycharakis, Liapis, Zacharopoulos, Zacharakis. *"Phase-retrieved optical projection tomography for 3D imaging through scattering layers."*

[2015] ***European Conference on Biomedical Optics, OSA*** (9541, pp.95410E). Di Battista, **Ancora,** Avtzi, Leonetti, Zacharakis. *"Spatial frequencies selection for speckle grain reduction through semi-transparent media."*

[2015] ***European Conference on Biomedical Optics, OSA*** (9541, pp.95380G). **Ancora,** Zacharopoulos, Ripoll, Zacharakis. *"Light propagation through weakly scattering media. A study of Monte Carlo vs. Diffusion Theory with application to Neuroimaging."*

Ph.D. Thesis	[2017] ***arXiv e-Print*** (1706.09409): **Ancora.** *"Light propagation in Extreme Conditions - The role of optically clear tissues and scattering layers in optical biomedical imaging."*

TRAINING & DISSEMINATION

Interviews, Events and Divulgation	[Oct. 2018] **MEETmeTONIGHT (Researchers' Night)**: Faccia a faccia con la ricerca. EU corner - Giardini Indro Montanelli, Milano (Italy). <u>Event Page</u>.

[Oct. 2018] **Physics World** (Research Update News): "Non-invasive NIR imaging tracks brain shrinkage", <u>Link to the Article</u>.

[Sept. 2018] **LOC Parisi70** (Local Organizing Committee): "Disordered serendipity: a glassy path to discovery." La Sapienza University of Rome, Department of Physics. <u>Link</u>.

[Mar. 2018] **PATRIS newspaper** (Inteview in Greek, pp.10): "Τι είδε ο Ιταλός ερευνητής στο ΙΤΕ …ΚΑΙ ΘΕΛΕΙ ΝΑ ΕΠΙΣΤΡΕΨΕΙ", <u>Link to the Article</u>.

[Sept. 2016] **Βραδιά του Ερευνητή (Researchers' night)**: "Optical CT Scanner with Lego" Project by Michalis Orfanakis (Poster and Interactive Stand). <u>Link</u>.

Supervision and Mentoring	[2020-2021] **Master Student – Elena Corbetta** (ongoing) Physics, Department of Physics, Politecnico di Milano, Milan (Italy) [2017-2018] **Master Student – Maria Kefalogianni** (Graduated) Physics, Department of Physics, University of Crete, Heraklion (Greece) [2015-2016] **Master Student – Georgia Giasafaki** (Graduated) Optics and Vision, Department of Medicine, University of Crete, Heraklion (Greece)
International Conferences	[Mar. 2021] **SPIE – Photonics West 2021** (2 Oral presentation) Digital Forum (Online) [Aug. 2020] **EMIM 15th European Molecular Imaging Meeting** (Oral presentation) European Society for Molecular Imaging - ESMI (Online) [Jun. 2020] **OSA Imaging and Applied Optics Congress** (Oral presentation) OSA Virtual Event (Online) [Mar. 2019] **Photonics Workshop** (Oral presentation - Invited) JAT apartmani, Kopaonik (Serbia) [Oct. 2018] **CNR NANOTEC – 3rd annual Workshop** (Oral presentation) Grand Hotel La Chiusa di Chietri, Alberobello (Italy) [Oct. 2018] **Materials.it 2018 –** (Poster presentation) CNR Research Area, Bologna (Italy) [Sept. 2018] **Parisi70 – Disordered Serendipity** (Poster) La Sapienza university of Rome, Department of Physics. [Jan. 2017] **SPIE – Photonics West 2017** (Oral talk) Moscone Center, San Francisco (California) [Feb. 2016] **SPIE – Photonics West 2016** (2 posters presentation) Moscone Center, San Francisco (California) [Jun. 2015] **SPIE – European Conference on Biomedical Optics** (Oral talk) SPIE Optical Society of America - Munich (Germany)
Industrial Involvements Workshops	[Oct. 2016] **Philips OILTEBIA Industrial Involvement Workshop III** (Poster) High Tech Campus, In-Body Systems, Philips Research, Eindhoven (Netherlands) [Feb. 2016] **Laser Sources for Biomedical, Scientific and Industrial Applications** Sacher Lasertechnik, Marburg (Germany) [Nov. 2015] **MEMS – Based Transducers and Biomedical Applications** (Poster) Vermon S.A. - Tours (France) [Jun. 2015] **Advanced Light Scattering Technologies** (Oral presentation) LS Instruments and Adolphe Merkle Institute - Fribourg (Switzerland)
Certifications	[Ongoing] **Applied Data Science with Python** (Online) University of Michigan (Coursera) [Apr. 2020] **Deep Learning Specialization** (Online) Coursera and deeplearning.ai (Coursera) [Apr. 2020] **OSA Reviewer Certification Course** (Online) The Optical Society of America (OSA)

Summer Schools, Workshops and Laboratory trainings

[Sept. 2019] **Imaging in Wave Physics - Multi-Wave and Large Sensor Networks** (Poster)
Institut d'Études Scientifiques de Cargèse, Corsica (France)

[Jul. 2019] **TOPIM TECH - pushing the limits of resolution & speed** (Oral and Poster)
Mediterranean Agronomic Institute of Chania, Chania (Greece)

[Jun. 2019] **MSCA2019 - Marie Skłodowska-Curie Actions to foster scientific excellence**
ARCUB Cultural Centre, Bucharest (Romania)

[Aug. 2018] **MISS 2018 – Medical Imaging meets Deep Learning** (Poster presentation)
Conference Centre - Ex Stabilimento Florio, Favignana (Italy)

[Jul. 2018] **TOPIM TECH – Big data in Imaging** (Oral presentation + Poster)
Mediterranean Agronomic Institute of Chania, Chania (Greece)

[Mar. 2018] **CUDA** (Training)
CINECA, Bologna (Italy)

[Jul. 2017] **TOPIM TECH from Molecules to Humans** (Poster presentation)
Mediterranean Agronomic Institute of Chania, Chania (Greece)

[Jul. 2016] **TOPIM TECH Multiscale and Multiparametric Imaging** (Poster)
Mediterranean Agronomic Institute of Chania, Chania (Greece)

[Jun. 2016] **OPUS Optical and Ultrasound Imaging** (Poster presentation)
Université de Lyon, Lyon (France)

[Feb. 2016] **4th Oiltebia Laboratory Training Platform** (Poster presentation)
Helmoltz Zentrum Munchen (Germany)

[Dec. 2015] **Laboratory Safety** (Training)
Institute of Molecular Biology and Biotechnology (FORTH - IMBB), Heraklion (Greece)

[Nov. 2015] **Waves and Imaging in Random Media** (Poster presentation)
Institut Henri Poincaré (CNRS), Paris (France)

[Sep. 2015] **3rd FAST-DOT - Photonics Meets Biology** (Poster presentation)
Institute of Electronic Structure and Laser (FORTH - IESL), Hersonisos (Greece)

[Jul. 2015] **MedICSS – Medical Imaging Computing Summer School** (Poster)
Centre for Medical Image Computing, Univ. College of London (UCL), London (UK)

[Jul. 2015] **BiMI - Biophotonics and Molecular Imaging** (Poster presentation)
Department of Medicine, University of Crete (UoC), Heraklion (Greece)

[Dec. 2014] **Sensors and Instrumentation in Biomedical Imaging** (Oral discussion)
Politecnico di Milano - Milano (Italy)

[Sep. 2014] **Proposal Writing and Project Management Training** (Training)
Universidad Carlos III, Leganés - Madrid (Spain)

[Sep. 2014] **Optical Imaging Techniques for Biomedical Applications** (Poster)
Universidad Carlos III, Leganés - Madrid (Spain)

[Jul. 2014] **BiMI – Biophotonics and Molecular Imaging** (Summer School)
Department of Medicine, University of Crete (UoC), Heraklion (Greece)

[Mar. 2013] **Introduction to Parallel Computing with MPI and OpenMP** (Training)
SCAI - Supercomputing Applications and Innovation - CINECA, Rome (Italy)

[Feb. 2013] **Introduction to the FERMI Blue Gene/Q** (Training)
SCAI - Supercomputing Applications and Innovation - CINECA, Rome (Italy)

[Jan. 2013] **Introduction to GPGPU and CUDA programming** (Training)
SCAI - Supercomputing Applications and Innovation - CINECA, Rome (Italy)

PROFESSIONAL SKILLS

Mother tongue	Italian				

Other languages	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C2	C2	C2
Spanish	C2	C2	C2	C2	C2
Portuguese	B2	B2	B1	B1	B1
Modern Greek	B1	B1	B1	B1	B1

Communication skills

- Everyday use of English as interacting and working language (Spanish as a second).
- I have learned three languages living in their respective countries, always trying to interact with cultures different than mine.
- Trained for oral speeches, seminar presentations and poster interactions, matured during many participations at conferences, secondments, schools and workshops.
- Scientific writing and presentation-design combined with passion for scientific visualization techniques
- Article Reviewer for IEEE-Transactions on Medical Imaging, IEEE-Photonics Journal, OSA Applied Optics, OSA Continuum and Journal of Near Infrared Spectroscopy
- Conference Reviewer for the European Society for Molecular Imaging, conference EMIM-2020.

Organisational / managerial skills

- **Supervision** and mentoring of master students
- **Laboratory management** (handling an imaging lab, coordinating project development)
- Computer and setup **hardware maintenance**
- **Project writing** (for secondment training, student recruiting and project proposals)
- Enjoying **independent-** and **team-working** environments
- **Project Coordination** and Networking

Digital competence

Operating Systems	Programming Languages	Scientific Programs	Productivity Software	Past Experiences
Windows, MacOS, Linux	C/C++, Fortran, Perl, **Python**, **Matlab**, **CUDA**, MPI, OpenMP	**ImageJ/Fiji**, LabView, Mathematica, PovRay, Gnuplot, Origin	**Office Suite**, **Photoshop**, Illustrator, Lightroom, SketchUp, Latex	GROMACS, AmberTools, VMD, XMGrace

Other skills　　VIS-NIR Photography, Cooking, Sport activities. I am good at fixing anything.

Driving licence　　Auto (B) and Moto (A3) European Driving Licence, Sailing Licence (Greek)