

CURRICULUM VITAE of ANTONIO GIOVANNI PIFFERI

PERSONAL INFORMATION

Surname, Name = Pifferi, Antonio Giovanni:

Researcher unique identifiers: ORCID=0000-0002-2261-2089, Scopus Author ID: 7004537463

Nationality: ITALY

• EDUCATION

- 1995 PhD in Physics, Politecnico di Torino, Italy, title “Time-resolved reflectance spectroscopy for the optical characterisation of highly scattering media”, supervisor prof. R.Cubeddu.
- 1991 Bachelor+Master (5years cumulative) in Nuclear Engineering, Politecnico di Milano, Italy

• CURRENT POSITIONS

- 2020 – Director, Centre for Ultrafast Science and Biomedical Optics (CUSBO), Laser Facility at Politecnico di Milano, Italy
- 2016 – Full Professor, Department of Physics, Politecnico di Milano, Italy
- 2003 – Associate Personnel, Consiglio Nazionale delle Ricerche (CNR), Istituto di Fotonica e Nanotecnologie (IFN), Milano (Italy)

• PREVIOUS POSITIONS

- 2003 – 2016 Associate Professor, Department of Physics, Politecnico di Milano, Italy
- 1996 – 2003 Researcher, Department of Physics, Politecnico di Milano, Italy

• FELLOWSHIPS AND AWARDS

- 1995 – 1996 Human Capital and Mobility (now Marie Skłodowska-Curie action programme) Fellowship, Lund Institute of Technology, Atomic Physic, Lund, Sweden.
- 1991 – 1992 Research Internship and Civil Service, Istituto di Ricerche Farmacologiche "Mario Negri", Milano (Italy)

• SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

- 2009 – 5 Postdoctoral Fellows at Politecnico di Milano, Department of Physics
- 2010 – 6 PhD Students at Politecnico di Milano, Department of Physics
- 2004 – 16 Master Students at Politecnico di Milano, Department of Physics

• TEACHING ACTIVITIES

- 2019 – 1 Course in BioPhotonics (5 ECTS) for Master in Engineering Physics, Politecnico di Milano, Italy
- 2009 – 2018 10 Courses in Photonics (5 ECTS each) for Master in Engineering Physics, Politecnico di Milano, Italy
- 2000 – 19 Courses in Basic Physics (about 10 ECTS each) for Bachelor in Engineering programmes, Politecnico di Milano, Italy

• ORGANISATION OF SCIENTIFIC MEETINGS

- 2018,2019 Co-organizer together with the Photonics Unit of the European Commission of the Workshop on “Performance Assessment and Standardization in Biophotonics”, Bruxelles, 26 Oct 2018 and 12 Sept 2019.
- 2020 Member of the Program Committee of Photonics Europe-2020 (Strasbourg, 2020).
- 2014 Member of the Program Committee of BIOMED-2014 (Topical Meeting on Biomedical Optics, Optical Society of America, Miami, 2014)
- 2012 Member of the Program Committee of BIOMED-2012 (Topical Meeting on Biomedical Optics, Optical Society of America, Miami, 2012).
- 2001 Member of the Program Committee of EBOM-2001 (European Biomedical Optics Meetings, Optical Society of America, Monaco, 2001).
- 2000 Member of the Program Committee of CLEO-Europe 2000 (Conference on Laser and Electrooptics, Optical Society of America, Nizza, 2000).

- **INSTITUTIONAL RESPONSIBILITIES**

- 2017 – Member of the Teaching Committee, Bachelor and Master programs in Engineering Physics, Politecnico di Milano, Italy
- 2010 – Referent faculty in charge of interaction with high schools and Open Day, Bachelor and Master programs in Engineering Physics, Politecnico di Milano, Italy
- 2000 – 2001 Member of the Scientific Board of Department of Physics, Politecnico di Milano, Italy
- 2000 – 2001 Member of the Executive Board of Department of Physics, Politecnico di Milano, Italy

- **REVIEWING ACTIVITIES AND COMMISSIONS OF TRUST**

- 2019 Member of the Committee (composed by Italian Scientists with highest H-index in selected topics) in charge of proposing candidates for the prestigious prize “Lombardia è Ricerca”, edition 2019 on “Healthy Aging”.
- 2016 – Scientific Advisory Board, European Institute for Biomedical Imaging Research, Wien, Austria
- 2017,2018 Reviewer for Deutsche Forschungsgemeinschaft (DFG), Germany
- 2016 Reviewer for PhD contracts IdEx 2016, University of Strasbourg, France,
- 2012 – Expert Member of Standardization Committee SC62D "Medical Devices", Comitato Elettrotecnico Italiano CEI - section of IEC, Milano (Italy)
- 2000 – Reviewer for International Journals (e.g. Optics Letters, Applied Spectroscopy, Acta Materialia, Biomedical Optics Express, Journal of Biomedical Optics, Applied Optics, Optics Express, Journal of Near Infrared Spectroscopy, Journal of Physics D, Journal of Biophotonics, Applied Physics B, Continuum, Journal Optical Society of America, Physics in Medicine and Biology, Methods, Technology in Cancer Research & Treatment)

- **SCIENTIFIC RESPONSIBILITIES IN RESEARCH PROJECTS**

- ❑ Coordinator, Bilateral Italy-Sweden Project, Optical Technologies for non-destructive characterization of archaeological wood and consolidation processes, call: Art. 20 L.401/1990 – Large Scale Projects MAE/MIUR, 2 partners – 2011/2013.
- ❑ Project Manager unit Politecnico, EU-Project BABYLUX, An optical neuro-monitor of cerebral oxygen metabolism and blood flow for neonatology, EU ICT CIP project n. 620996, 9 partners – 2014/2016.
- ❑ Principal Investigator unit Politecnico, EU-Project OILTEBIA - Optical Imaging and Laser Techniques for Biomedical Applications – EU FP7 – ITN-GA-2012-317526, 13 partners – 2014/2018.
- ❑ Principal Investigator unit Politecnico, EU-Project BITMAP - Brain injury and trauma monitoring using advanced photonics – Horizon2020 – H2020-MSCA-ITN-2015-675332, 15 partners - 2016/2019.
- ❑ Intellectual Property Coordinator unit Politecnico, EU-Project BITMAP - Brain injury and trauma monitoring using advanced photonics – Horizon2020 – H2020-MSCA-ITN-2015-675332, 15 partners - 2016/2019.
- ❑ Deputy-Director – Centre for Ultrafast Science and Biomedical Optics (CUSBO) – partner in LASERLAB-EUROPE 3 – The Integrated Initiative of European Laser Research Infrastructures III, FP7-INFRASTRUCTURES-2011-1, 23 partners – 2012/2015.
- ❑ Work Package Leader, EU-Project MEDPHOT, Optical Methods for Medical Diagnosis and Monitoring of Diseases, EU FP5, QLRT-1999-31464, 20 partners - 2001/2004.
- ❑ Work Package Leader, EU-Project nEUROPt, Non-invasive imaging of brain function and disease by pulsed near infrared light, EU FP7 Cooperation STREP - HEALTH-2008-201076, 17 partners - 2008/2012.
- ❑ Principal Investigator unit Politecnico in the Joint Research Activity (WP) of the EU-Project LASERLAB-EUROPE 3 – The Integrated Initiative of European Laser Research Infrastructures III, FP7-INFRASTRUCTURES-2011-1, 23 partners – 2012/2015.
- ❑ Principal Investigator unit Politecnico in the Joint Research Activity (WP) of the EU-Project LASERLAB-EUROPE 2 – The Integrated Initiative of European Laser Research Infrastructures II – FP7-INFRASTRUCTURES-2008-1: "The Integrated Initiative of European Laser Research Infrastructures II", 2009/2012.

- **RESEARCH ACTIVITY**

My key research activity aimed at the solid foundation of time-domain diffuse optics and scouting of novel methods and applications. I pursued this field horizontally, that is enlarging the range of applications from optical mammography and risk assessment of breast cancer to functional imaging of brain activation and monitoring of vital signs (e.g. oxygenation). From non-destructive assessment of food quality up to wood optics and monomer uptake in porous media [8]. Also, I explored the field vertically, i.e. from basic research up to exploitation of new applicative directions. In particular, my key achievements in last 10 years were:

- 1) new disruptive technology towards wearable and highly parallelized devices with breakthrough performances [1];
- 2) proposal of novel protocols, phantoms and inter-laboratory comparison at EU level to enforce the culture of performance assessment and standardization for a solid and open science [2]
- 3) novel approaches to diffuse optical tomography, in particular for brain imaging exploiting the depth-sectioning capability of photon traveling time [3]
- 4) single-fibre interstitial spectroscopy with a high depth of view empowering my proposal of null-distance, time-gated detection [4]
- 5) basic reference spectroscopy of biological tissues and constituents exploiting our unique workstation for broadband time-resolved diffuse spectroscopy with record sensitivity and spectral coverage [10]
- 6) Proposal of new Diffuse Raman techniques based either on multiple excitation frequencies (FORS) [7] or time-domain approaches [9], complemented with construction of related modelling [8].

- **TECHNOLOGY TRANSFER**

- The pioneering activity on cerebral oximetry using time-resolved techniques (see Section on Research Activities) has led to the recent foundation of the innovative Start-Up PIONIRS srl., Which has created a new concept device for non-invasive monitoring. oxygenation in the brain and muscle. This type of device will also be used for monitoring COVID patients as part of a recently approved EU project.
- 1 granted patent and 1 filed application

- **BIBLIOMETRICS**

- Author ID: SCOPUS=7004537463, orcid=0000-0002-2261-2089
- Citations: SCOPUS=8545
- H-index: SCOPUS=54
- Publications (SCOPUS): Papers=206, Proceedings+Book Chapters=306, Total=512

PUBLICATIONS

1. Mora A.D., Contini D., Arridge S., Martelli F., Tosi A., Boso G., Farina A., Durduran T., Martinenghi E., Torricelli A., Pifferi A., 'Towards next-generation time-domain diffuse optics for extreme depth penetration and sensitivity' *Biomedical Optics Express*, 6: A015 (2015) - cit=67, IF=3.3, rank=Q1.
2. Wabnitz H., Jelzow A., Mazurenka M., Steinkellner O., MacDonald R., Milej D., Zetek N., Kacprzak M., Sawosz P., Maniewski R., Liebert A., Magazov S., Hebden J., Martelli F., Di Ninni P., Zaccanti G., Torricelli A., Contini D., Re R., Zucchelli L., Spinelli L., Cubeddu R., Pifferi A., 'Performance assessment of time-domain optical brain imagers, part 2: NEUROPt protocol' *Journal of Biomedical Optics*, 19:86012 (2014) - cit=57, IF=2.5, rank=Q2.
3. Pifferi A., Zhao Q., Spinelli L., Bassi A., Valentini G., Contini D., Torricelli A., Cubeddu R., Zaccanti G., Martelli F., 'Functional tomography using a time-gated ICCD camera' *Biomedical Optics Express*, 2:705-716 (2011) - cit=31, IF=3.3, rank=Q1.
4. Alerstam E., Svensson T., Andersson-Engels S., Spinelli L., Contini D., Mora A.D., Tosi A., Zappa F., Pifferi A., 'Single-fiber diffuse optical time-of-flight spectroscopy' *Optics Letters*, 37:2877-2879 (2012) - cit=30, IF=3.4, rank=Q1.
5. Farina A., Torricelli A., Bargigia I., Spinelli L., Cubeddu R., Foschum F., Jäger M., Simon E., Fugger O., Kienle A., Martelli F., Di Ninni P., Zaccanti G., Milej D., Sawosz P., Kacprzak M., Liebert A., Pifferi A., 'In-vivo multilaboratory investigation of the optical properties of the human head' *Biomedical Optics Express*, 6: A024 (2015) - cit=26, IF=3.8, rank=Q1.
6. Farina A., Bargigia I., Janeček E.-R., Walsh Z., D'Andrea C., Nevin A., Ramage M., Scherman O.A., Pifferi A., 'Nondestructive optical detection of monomer uptake in wood polymer composites' *Optics Letters*, 39:228-231 (2014) - cit=14, IF=3.3, rank=Q1.
7. Sekar S.K.V., Mosca S., Farina A., Martelli F., Taroni P., Valentini G., Cubeddu R., Pifferi A., 'Frequency offset Raman spectroscopy (FORS) for depth probing of diffusive media' *Optics Express*, 25:4585-4597 (2017) - cit=12, IF=3.6, rank=Q1.
8. Martelli F., Binzoni T., Sekar S.K.V., Farina A., Cavalieri S., Pifferi A., 'Time-domain Raman analytical forward solvers' *Optics Express*, 24:20382-20399 (2016) - cit=9, IF=3.6, rank=Q1.
9. Konugolu Venkata Sekar S., Mosca S., Tannert S., Valentini G., Martelli F., Binzoni T., Prokazov Y., Turbin E., Zuschratter W., Erdmann R., Pifferi A., 'Time domain diffuse Raman spectrometer based on a TCSPC camera for the depth analysis of diffusive media' *Optics Letters*, 43:2134-2137 (2018) - cit=5, IF=3.9, rank=Q1.
10. Konugolu Venkata Sekar S., Farina A., Dalla Mora A., Lindner C., Pagliuzzi M., Mora M., Aranda G., Dehghani H., Durduran T., Taroni P., Pifferi A., 'Broadband (550-1350 nm) diffuse optical characterization of thyroid chromophores' *Scientific Reports*, 8:10015 (2018) - cit=4, IF=4.1, rank=Q1.

GRANTED PATENTS

2 pending Patent

INVITED PRESENTATIONS

1. A. Pifferi, A. Torricelli, P. Lanka, H. Wabnitz, "Advancing Clinical Translation in Biophotonics through multi-laboratory initiatives on Performance Assessment and Standardization", International Conference on Laser Applications in Life Sciences (LALS), Nancy, France (2020). [POSTPONED TO 2021 because of COVID-19]

2. A. Pifferi, P. Lanka, L. Spinelli, A. Torricelli, and H. Wabnitz, "Multi-laboratory Efforts for Performance Assessment of Diffuse Optics Instruments", Engineering in Medicine and Biology Conference (EMBC), IEEE, Berlin (2019)
3. A. Pifferi, S. Konugolu, S. Mosca, A. Farina, F. Martelli, P. Taroni, G. Valentini, R. Cubeddu, "Frequency Offset Raman Spectroscopy (FORS) for Subsurface Probing of Scattering Media", SCIX 2017, Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), Reno, USA (2017)
4. A. Pifferi, A. Dalla Mora, E. Martinenghi, D. Contini, L. Di Sieno, R. Re, S. Arridge, F. Martelli, A. Tosi, A. Farina, T. Durduran, A. Torricelli, "Photonics advancements in time-domain diffuse imaging: towards hand-held and wearable devices", Biomedical Optics 2016, Optical Society of America (OSA), Fort Lauderdale, USA (2016).
5. A. Dalla Mora, D. Contini, S.R. Arridge, F. Martelli, A. Tosi, G. Boso, A. Farina, T. Durduran, E. Martinenghi, A. Torricelli, A. Pifferi, "Towards next generation time-domain diffuse optics devices", Photonics West 2015, SPIE, San Francisco, USA (2015)

MENTORING

1 Associate Professor (), 2 Researchers (), 1 Assistant Professor (), 1 Young Researcher now founder of a start-up ().

INDUSTRIAL INNOVATION

The start-up company PIONIRS, based on inventions on novel photonics devices for brain oximetry monitoring was (will be) founded in ??? 2020. [ABOUT TO BE REGISTERED].