CURRICULUM VITAE

PERSONAL INFORMATION

Name, Surname	Michele Sorelli
E-mail	michele.sorelli@unifi.it, sorelli@lens.unifi.it
Place and Date of birth	Florence, 02/01/1989

WORK EXPERIENCE

Dates (from – to)		
	September 2019 – present:	**Post-doctoral researcher at the European Laboratory for Non-linear Spectroscopy and the Department of Physics and Astronomy of the University of Florence** Design and development of an image processing pipeline for the quantitative analysis of the brain structural connectivity in fluorescence microscopy volume images (available at: https://github.com/lens-biophotonics/Foa3D.git). Acquisition and 3D fiber orientation analysis of two-photon fluorescence microscopy and light-sheet fluorescence microscopy volume images of human brain tissue samples. Development of a virtual reality system for the investigation of visually evoked neuronal activity patterns and behaviors in zebrafish larvae. Design and development of an ultra-fast control system for the 3D multi-site random access photostimulation of neuronal circuit dynamics. Structure Tensor Analysis-based evaluation of fiber orientations in volume images of the mouse hippocampus (control and pathological samples) acquired using two-photon fluorescence microscopy.
	December 2018 - August 2019:	**Research fellow at the Department of Information Engineering of the University of Florence** Acquisition of Laser Doppler Flowmetry signals of cutaneous blood perfusion from diabetic patients. Linear and non-linear directed connectivity analysis of the cardio-respiratory system in control subjects and type 1 diabetic patients. Statistical analysis of experimental data.
	February 2015 - September 2015:	**Research assistant at the Department of Intensive Care of the Erasmus University Medical Center in Rotterdam (Rotterdam, NL)** Acquisition of microvascular perfusion images using Laser Speckle Contrast Imaging systems and handheld incident dark field video microscopes. Microvascular bioimage processing and analysis. Statistical analysis of experimental data.

EDUCATION AND TRAINING

Dates (from – to)		
	November 2015 - April 2019:	**Doctor of Philosophy in Information Engineering at the University of Florence** Date: *12/04/2019* Thesis title: "*Quantitative analysis of microvascular oscillations and their alterations"* Tutor: *Prof. Leonardo Bocchi*
	December 2011- April 2015:	**Master's Degree in Biomedical Engineering at the University of Florence** Date: *28/04/2015* Grade: *110/110 cum laude* Thesis title: "*Automated methods for the assessment of microcirculatory perfusion and density*" Tutors: *Prof. Leonardo Bocchi, Prof. Dr. Can Ince, Ing. Maurizio Baroni*
	September 2014 - April 2015:	**Erasmus+ Traineeship Programme at the Department of Intensive Care of the Erasmus University Medical Center in Rotterdam (Rotterdam, NL)** Comparative study of state-of-the-art software tools for the automatic noninvasive analysis of the microcirculation in critical care scenarios. Implementation of computer vision algorithms for the automatic estimation of capillary flow velocities in videos acquired using the handheld CytoCam incident dark field microscope (Braedius Medical, NL).
	February 2012 - July 2012:	**Erasmus Study Programme at the Technische Universiteit Delft (Delft, NL)** Courses and exams: *Bio-inspired design*, *Biomaterials*, *Biomaterials mini-research project*, *Biomechatronics*, *Medical Imaging*, *Medical Instruments*.
	September 2008 - December 2011:	**Bachelor's Degree in Electronics and Telecommunications Engineering at the University of Florence** Date: *05/12/2011* Grade: *110/110 cum laude (with special mention for the academic curriculum)* Thesis title: "*Deterministic chaos: bioengineering applications*" Tutor: *Prof. Claudia Manfredi*

RESEARCH ACTIVITIES

Research sectors

Biomedical Image and Signal Processing, Brain Structural Connectivity, Network Physiology, Optogenetics

Books and Articles

Scientific papers published in the last 5 years

1. P. Ricci, M. Marchetti, **M. Sorelli**, L. Turrini, F. Resta, V. Gavryusev, G. de Vito, G. Sancataldo, F. Vanzi, L. Silvestri, and F.S. Pavone, An AOD breakthrough for volumetric 2P optogenetic applications, Proc. SPIE PC12144, Biomedical Spectroscopy, Microscopy, and Imaging II, 2022, DOI: 10.1117/12.2620313
2. L. Turrini, **M. Sorelli**, G. De Vito, C. Credi, N. Tiso, F. Vanzi, F.S. Pavone, Multimodal characterization of seizures in zebrafish larvae, Biomedicines, Vol. 10, 2022, DOI: 10.3390/biomedicines10050951.
3. **M. Sorelli**, T.N. Hutson, L. Iasemidis, L. Bocchi, Linear and nonlinear directed connectivity analysis of the cardio-respiratory system in type 1 diabetes, Frontiers in Network Physiology, 2022, DOI: 10.3389/fnetp.2022.840829.
4. P. Ricci, M. Marchetti, **M. Sorelli**, L. Turrini, F. Resta, V. Gavryusev, G. De Vito, G. Sancataldo, F. Vanzi, L. Silvestri, F.S. Pavone, Power-effective scanning with AODs for 3D optogenic applications, Journal of Biophotonics, Vol. 15, 2021, DOI: 10.1002/jbio.202100256.
5. I. Costantini, E. Baria, **M. Sorelli**, F. Matuschke, F. Giardini, M. Menzel, G. Mazzamuto, L. Silvestri, R. Cicchi, K. Amunts, M. Axer, F.S. Pavone, Autofluorescence enhancement for label-free imaging of myelinated fibers in mammalian brains, Scientific Reports, Vol. 11, 2021, DOI: 10.1038/s41598-021-86092-7.
6. E. Iadanza, F. Goretti, **M. Sorelli**, P. Melillo, L. Pecchia, F. Simonelli, M. Gherardelli, Automatic detection of genetic disease in pediatric age using pupillometry, IEEE Access, Vol. 8, pp. 34949–34961, 2020, DOI: 10.1109/ACCESS.2020.2973747.
7. **M. Sorelli**, C. Kopietz, S. Zaunseder, L. Bocchi, Pulse decomposition analysis in camera-based photoplethysmography, in: 41st International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), pp. 3179–3182, 2019, DOI: 10.1109/EMBC.2019.8857856.
8. P. Tarchi, F. Bologna, C. Scortecci, E. Tiribilli, D. Pennati, L. Sacconi, **M. Sorelli**, L. Bocchi, Modeling of voltage imaging for the study of action potential propagation, in: CMBEBIH 2019 IFMBE Proceedings, Vol. 73, Springer, pp. 309–314, 2019, DOI: 10.1007/978-3-030-17971-7_47.
9. **M. Sorelli**, A. Perrella, L. Bocchi, Modeling of the microvascular pulse for tracking the vasoconstriction response to a deep inspiratory gasp, in: Proceedings of the World Congress on Medical Physics and Biomedical Engineering 2018, Vol. 68, Springer Singapore, pp. 307–310, 2019, DOI: 10.1007/978-981-10-9038-7_57.
10. A. Perrella, **M. Sorelli**, F. Giardini, L. Frassineti, P. Francia, L. Bocchi, Wavelet phase coherence between the microvascular pulse contour and the respiratory activity, in: Proceedings of the World Congress on Medical Physics and Biomedical Engineering 2018, Vol. 68, Springer Singapore, pp. 311–314, 2019, DOI: 10.1007/978-981-10-9038-7_58.
11. **M. Sorelli**, P. Francia, L. Bocchi, A. De Bellis, R. Anichini, Assessment of cutaneous microcirculation by laser Doppler flowmetry in type 1 diabetes, Microvascular Research, Vol. 124, pp. 91–96, 2019, DOI: 10.1016/j.mvr.2019.04.002.
12. A. Lima, T. van Rooij, B. Ergin, **M. Sorelli**, Y. Ince, P.A.C. Specht, E.G. Mik, L. Bocchi, K. Kooiman, N. de Jong, C. Ince, Dynamic contrast-enhanced ultrasound identifies microcirculatory alterations in sepsis-induced acute kidney injury, Critical Care Medicine, Vol. 46, pp. 1284–1292, 2018, DOI: 10.1097/CCM.0000000000003209.
13. **M. Sorelli**, A. Perrella, L. Bocchi, Detecting vascular age using the analysis of peripheral pulse, IEEE Transactions on Biomedical Engineering, Vol. 65, pp. 2742–2750, 2018, DOI: 10.1109/TBME.2018.2814630.

Recent Scientific Activities

Research projects funded in the last 5 years

Title	Role	Funding body
Human Brain Optical Mapping	Team member	Fondazione Cassa di Risparmio di Firenze
Human Brain Project (SGA2) Human Brain Project (SGA3)	Team member	EU Horizon 2020
3D Random Access 2-Photon Optogenetics (RAPTOGEN)	Team member	EU Horizon 2020
Modelling of microvascular alterations	Team member	Fondazione Cassa di Risparmio di Firenze
Contrast Enhanced Ultrasound Echo and Hand-Held Vital Microscopy for bedside imaging of early microcirculatory alterations associated with the development of acute kidney injury: a validation study	Team Member	Dutch Kidney Foundation