Curriculum vitae et studiorum

Personal information

Name, surname:	Emilia, Conti
Place and date of birth:	Florence, Italy, July 18th 1987.
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Current position

2023-present Researcher, National Institute of Optics, National Research Council
Florence, Italy.

Previous positions

2020-2023 Postdoctoral research fellow, Neuroscience Institute, National Research Council (CNR)

2018-2020 Postdoctoral research fellow, Dept. of Physics and Astronomy, University of Florence
Sesto Fiorentino (FI), Italy.

Education

2015-2018 PhD in Biophysics, European Laboratory for Non-linear Spectroscopy (LENS)
Sesto Fiorentino (FI), Italy.
PhD thesis: "In vivo optical imaging of cortical plasticity induced by rehabilitation after stroke", supervisor Dr. Anna Letizia Allegra Mascaro and Prof. Francesco Saverio Pavone.

2012-2015 Master's degree in Biology, University of Florence
Florence, Italy.
Master thesis: *"In vivo structural and functional plasticity in an ischemia mouse model"*, supervisor Prof. Francesco Saverio Pavone.
Final grade: 110/110, *magna cum laude*.

2007-2012 Bachelor's degree in Biological Sciences, University of Florence
Florence, Italy.
Bachelor thesis: *"Evaluation of the presence of lymphatic endothelial progenitor cells in Crohn's disease patients"*, supervisor Prof. Annarosa Arcangeli.
Final grade: 107/110.

Research activity

My research focuses on understanding structural and functional plasticity of the brain in preclinical models of stroke, through the use of advanced optical imaging techniques. I have extensive experience in in vivo two-photon and wide-field calcium imaging, applied to investigate synaptic remodeling, functional connectivity, and vascular dynamics after cerebral ischemia.
During my academic path, I contributed to the development and application of innovative rehabilitation strategies combining motor training with optogenetic stimulation, as well as to the design of a novel stroke model targeting large cerebral vessels, closely mimicking clinical stroke conditions. I investigated post-stroke plasticity at multiple levels: from synaptic changes to alterations in interhemispheric communication, from blood–brain barrier permeability to the expression of molecular markers of plasticity.

My technical expertise includes mouse surgery (e.g., photothrombotic stroke, viral injections, cranial window implantation), behavioral assessment (e.g., Schallert test), ex vivo immunostaining and confocal imaging, as well as image analysis using tools such as ImageJ and OriginPro.

Training

2021 Elementi base per l'approccio dei ricercatori all'utilizzo degli animali ai fini scientifici, Istituto Zooprofilattico Sperimentale della Lombardia dell'Emilia Romagna.

2019 Use and care of laboratory animals, Centro di Servizi per la Stabulazione Animali da Laboratorio (CeSAL) University of Florence.

Awards

2018 Travel grant Optics and the Brain conference talk: All-Optical Rehabilitation Promotes Motor Recovery in a Mouse Model of Stroke

Teaching activity

Seminars

2017 "Rehabilitation-induced cortical plasticity after stroke" Klein Colloquium part of Enrico Fermi Colloquium seminars cycle, European Laboratory for Non-linear Spectroscopy University of Florence.

2021 - 2022 *"Aspetti traslazionali della ricerca sull'ictus acuto: progetti in corso nella AOUC"* Course "Ictus ischemico acuto: dal laboratorio al letto del malato" part of the Annual Education Program of the Azienda Ospedaliero Universitaria Careggi.

2023 – pres. "Studio dell'ischemia cerebrale in modelli murini" Course "Psycobiology and animal models" Master's Degree in Behavioral Biology (*Biologia del comportamento*), University of Florence.

Conference Chair

2nd Brayn Conference, Milan (Italy), 14.11.2019-16.11.2019
Session "Neural plasticity"

1st Translational Research on Stroke (TREES) Meeting: Hot topics in acute stroke: from bench to bedside and back again, Webinar, 19.10.2021
Session "In vivo imaging in preclinical stroke research"

2nd Translational Research on Stroke (TREES) Meeting, Florence (Italy), 25.11.2022
Session "Neuroimaging markers of reperfusion and recovery after stroke"

Publications

Since 2018 I have published 14 papers, 8 of which as first author, in the Neuroscience field in peer review journals. Furthermore, I have published 1 book chapter and 8 conference proceedings (3 as first author). My articles received globally 182 citations (Scopus), resulting in an h-index of 8 (Scopus).

Peer-reviewed articles

[14] **Conti E**, Minetti A, Turrini L, Carlini N, Sarti C, Gori AM, Sticchi E, Giusti B, Spalletti C, Baldereschi M, Allegra Mascaro AL, Pavone FS. A novel model of light-induced middle cerebral artery occlusion and recanalization in mice. Commun Biol. 2025 Jul 28;8(1):1117. doi: 10.1038/s42003-025-08398-w. PMID: 40721498; PMCID: PMC12304093.

[13] Sodero A[§], **Conti E**[§], Piccardi B, Sarti C, Palumbo V, Kennedy J, Gori AM, Giusti B, Fainardi E, Nencini P, Allegra Mascaro AL, Pavone FS, Baldereschi M. Acute ischemic STROKE - from laboratory to the Patient's BED (STROKELABED): A translational approach to reperfusion injury. Study Protocol. Transl Neurosci. 2024 Jul 12;15(1):20220344. doi: 10.1515/tnsci-2022-0344.
[§] Primo autore a pari contributo.

[12] Scardigli M, Pásek M, Santini L, Palandri C, **Conti E**, Crocini C, Campione M, Loew LM, de Vries AAF, Pijnappels DA, Pavone FS, Poggesi C, Cerbai E, Coppini R, Kohl P, Ferrantini C, Sacconi L. Optogenetic confirmation of transverse-tubular membrane excitability in intact cardiac myocytes. J Physiol. 2024 Feb 13. Epub ahead of print. doi: 10.1113/JP285202.

[11] **Conti, E.***, Carlini, N., Piccardi, B., Allegra Mascaro A.L., Pavone S.F., *"Photothrombotic middle cerebral artery occlusion in mice: a novel model of ischemic stroke",* 2023, eNeuro 2023 Feb 8;10(2):ENEURO.0244-22.2022. doi: 10.1523/ENEURO.0244-22.2022.
* Corresponding author.

[10] Kreuz, T., Senocrate, F., Cecchini, G., Checcucci, C., Allegra Mascaro, A.L., **Conti, E.**, Scaglione, A., Pavone, F.S., *"Latency correction in sparse neuronal spike trains",* 2022, Journal of Neuroscience Methods 6 381:109703. doi: 10.1016/j.jneumeth.2022.109703.

[9] Scaglione, A.[§], **Conti, E. §**, Allegra Mascaro, A.L., Pavone, F.S., *"Tracking the effect of therapy with single-trial based classification after stroke",* 2022, Frontiers in Systems Neuroscience doi: 10.3389/fnsys.2022.840922.
[§] First author with equal contribution.

[8] **Conti, E.**, Piccardi, B., Sodero, A., Tudisco, L., Lombardo, I., Fainardi, E., Nencini, P., Sarti, C., Allegra Mascaro, A.L., Baldereschi, M., *"Translational Stroke Research Review: Using the Mouse to Model Human Futile Recanalization and Reperfusion Injury in Ischemic Brain Tissue",* 2021, Cells 10 3308 doi: 10.3390/cells10123308.

[7] **Conti, E.**, Scaglione A., de Vito G., Calugi F., Pasquini M., Pizzorusso T., Micera S., Allegra Mascaro A.L., Pavone F.S. *"Combining optogenetic stimulation and motor training improves functional recovery and perilesional cortical activity",* Neurorehabilitation and Neural Repair, 2021; 1-12, doi: 10.1177/15459683211056656.

[6] Cecchini, G., Scaglione, A., Allegra Mascaro, A.L., Checcucci, C., **Conti, E.**, Adam, I., Fanelli, D., Ulivi, R., Pavone, F.S., Kreuz, T., "*Cortical propagation tracks functional recovery after stroke",* 2021, Plos Computational Biology,17(5), doi: 1008963.

[5] Adam, I., Cecchini, G., Fanelli, D., Kreuz, T.,Livi, R., diVolo, M., Allegra Mascaro, A.L., **Conti, E.**, Scaglione, A., Silvestri, L., Pavone F.S., *" Inferring network structure and local dynamics from neuronal patterns with quenched disorder",* 2020, Chaos, Solitons & Fractals, Volume 140, 110235, doi: 2020.110235.

[4] Allegra Mascaro, A.L., Falotico, E., Petkoski, S., Pasquini, M., Vannucci, L.,Tort-Colet, N., **Conti, E.**, Resta, F.,Spalletti, C., Ramalingasetty, S.T., von Arnim, A., Formento, E., Angelidis, E., Blixhavn, C., B. Leergaard, T., Caleo, M., Destexhe, A., Ijspeert, A., Micera, S., Laschi, C., Jirsa, V., Gewaltig, M.O., Pavone F.S., *"Experimental and Computational Study on Motor Control and Recovery After Stroke: Toward a Constructive Loop Between Experimental and Virtual Embodied Neuroscience",* 2020, Frontiers in Systems Neuroscience, 14:31, doi: 10.3389/fnsys.2020.00031.

[3] Allegra Mascaro, A.L[§], **Conti, E.§**, Lai, S. DI Giovanna, A.P., Spalletti, C., Alia, C., Panarese, A., Scaglione, A., Sacconi, L., Micera, S., Caleo, M., Pavone F.S., *"Combined Rehabilitation Promotes the Recovery of Structural and Functional Features of Healthy Neuronal Networks after Stroke",* 2019, Cell Reports, Vol 8, Issue 13, doi: 2019.08.062.
[§] First author with equal contribution

[2] **Conti, E.**, Allegra Mascaro A.L., Pavone F.S., *"Large Scale Double-Path Illumination System with Split Field of View for the All-Optical Study of Inter-and Intra-Hemispheric Functional Connectivity on Mice",* 2019, Methods and Protocols, 2(1):11, doi: 10.3390/mps2010011.

[1] Montagni, E., Resta, F., **Conti, E.**, Scaglione A., Pasquini M., Micera S., Allegra Mascaro A.L., Pavone F.S., *"Wide-field imaging of cortical neuronal activity with red-shifted functional indicators during motor task execution",* 2018, Journal of Physics D: Applied Physics 52.7 (2018): 074001, doi: 10.1088/1361-6463/aaf26c.

Book

Conti, E., Allegra Mascaro A.L., Pavone F.S., Chapter *"In vivo imaging of the structural plasticity of cortical neurons after stroke"* in Neural Repair: Methods and Protocols, 2023, ISBN 1071629255 Springer US.

Conference proceedings

[8] **Conti, E.**, Allegra Mascaro, A.L., Francesco Resta, Alessandro Scaglione, Maria Pasquini, Micera, S., M., Pavone, F.S., *"Combined rehabilitation promotes recovery of motor functionality in a mouse model of stroke",* 2019, Proc. SPIE, Neurophotonics; doi: 12.2508321.

[7] Montagni, E., Resta, F., **Conti, E.**, Pasquini, M., Mascaro, A.L.A., Pavone, F.S., *"Imaging of cortical neuronal-activity with red-shifted functional indicators during motor task execution"*, 20th Italian National Conference on Photonic Technologies (Fotonica 2018), Lecce, Italy; 23-25 May 2018. IET Conference Publications, 2018 (CP748); doi: 10.1049/cp.2018.1653.

[6] **Conti, E.**, Mascaro, A.L.A., Resta, F., Scaglione,A., Pasquini, M., Micera, S., M., Pavone, F.S., *"All-Optical Rehabilitation Promotes Motor Recovery in a Mouse Model of Stroke",* Optics and the Brain 2018, Hollywood, Florida United States, 3–6 April 2018. Optics InfoBase Conference Papers, Part F88-BRAIN 2018; doi: 10.1364/BRAIN.2018.BTh2C.2.

[5] Resta, F., **Conti, E.**, Montagni E., Sacconi L., Mascaro, A.L.A., Pavone, F.S*., "All-Optical Simultaneous Stimulation and Readout of Motor Cortex Activity in Awake Mice"*, Clinical and Translational Biophotonics 2018, Hollywood, Florida United States, 3–6 April 2018. Optics InfoBase Conference Papers, Part F91-TRANSLATIONAL 2018; doi: 10.1364/TRANSLATIONAL.2018.JTu3A.47.

[4] Allegra Mascaro, A.L., **Conti, E.,** Lai, S., Spalletti, C., Di Giovanna, A.P. Alia, C., Panarese, A., Sacconi, L., Micera, S., Caleo, M., Pavone, F.S., "*Multi-scale optical investigation of robotic rehabilitation-induced cortical plasticity after stroke"*, Optics and the Brain 2017, San Diego, California United States, 2–5 April 2017 Optics InfoBase Conference Papers, Part F76-BRAIN 2017; doi: 10.1364/BRAIN.2017.BrW3B.4.

[3] Allegra Mascaro, A.L., Spalletti, C., Lai, S., **Conti, E.**, Alia, C., Sacconi, L., Micera, S., Caleo, M., Pavone, F.S., "*Multi-level imaging of brain plasticity after stroke*", Optics and the Brain 2016, Fort Lauderdale, Florida United States, 25–28 April 2016. Optics InfoBase Conference Papers doi: 10.1364/BRAIN.2016.BTh3D.3.

[2] **Conti, E.**, Allegra Mascaro, A.L., Spalletti, C., Lai, S., Alia, C., Sacconi, L., Micera, S., Caleo, M., Pavone, F.S., "Multi-modal optical imaging of brain plasticity after stroke", 2016, 18th Italian National Conference on Photonic Technologies (Fotonica 2016), IET Conference Publications, doi: 10.1049/cp.2016.0924.

[1] Allegra Mascaro, A.L, Spalletti, C., Lai, S., **Conti, E.**, Alia, C., Sacconi, L., Micera, S., Caleo, M., Pavone, F.S., "Multi scale morpho-functional characterization of damage and rehabilitation after stroke", Proc. Optics InfoBase Conference Papers, doi: 10.1364/FIO.2016.FTh4D.1.

Conferences

Talks

[8] "*An All-Optical Mouse Model of MCA Occlusion and Recanalization", 21st SINS National Congress, Pisa (Italy), 2025.*

[7] *"Modeling stroke-related cerebral edema"*, 2nd Translational Research on Stroke (TREES) Meeting, Florence (Italy), 2022.

[6] *"Ischemic stroke and recanalization"*, 2nd Translational Research on Stroke (TREES) Meeting, Florence (Italy), 2022.

[5] *"STROKELAB2BED and NIMBLE projects in a nutshell and preliminary results"*, 1st Translational Research on Stroke (TREES) Online Meeting: Hot topics in acute stroke: from bench to bedside and back again, 2021.

[4] *"Optical manipulation of neural activity combined with longitudinal motor training enhances functional recovery after stroke"*, Neuroscience Institute (CNR) Online Retreat 2020.

[3] *"All-optical rehabilitation promotes functional remodeling in a mouse model of stroke"*, Biophotonics Congress: Biomedical Optics Congress 2018, Fort Lauderdale (FL, USA), 2018.

[2] *"Multi-modal optical imaging of brain plasticity after stroke"*, Fotonica 2016, 18th Italian National Conference on Photonic Technologies, Rome (Italy), 2016.

[1] *"Optical imaging of brain plasticity after stroke"*, New perspective in Neuroscience: Research Results of Young Italian Neuroscientists (SINS), Naples (Italy), 2016.

Posters

[7] *"A novel photothrombotic model of occlusion-recanalization of MCA in mice"*, Neuroscience Institute (CNR) Retreat, Santa Margherita di Pula, Cagliari (Italy), 2022.

[6] *"Generalized recovery of motor functionality after stroke by combined ipsi-lesional excitation and motor training"*, 2nd Brayn Conference, Milan (Italy), 2019.

[5] *"Synergic effect of intensive motor training and optogenetic stimulation promotes recovery of motor functionality in a mouse model of stroke"*, 18th Brain Ischemia and Stroke conference, Rome (Italy), 2018.

[4] *"Optogenetic rehabilitation promotes functional remodeling after stroke"*, ICOBSI, International Conference on Bio Sensing and Imaging, Florence (Italy), 2018.

[3] *"Optogenetic rehabilitation combined with motor training promotes functional recovery in a mouse model of stroke"*, 11th FENS – Forum of Neuroscience, Berlin (Germany), 2018.

[2] *"Optogenetic rehabilitation promotes functional remodeling after stroke: an in vivo imaging study"*, Neuroscience 2017, Society for Neuroscience's 47th annual meeting, Washington (DC, USA), 2017.

[1] *"Robotic rehabilitation promotes stabilization of peri-infarct cortical circuits and inter-hemispheric connectivity: in vivo study in structural and functional plasticity"*, Neuroscience 2016, Society for Neuroscience's 46th annual meeting, San Diego (CA, USA), 2016.

Collaborations

I have collaborated on multidisciplinary projects involving stroke rehabilitation (with Prof. Matteo Caleo and Prof. Silvestro Micera), computational analysis of neural activity (with Prof. Duccio Fanelli and Dr. Thomas Kreuz), and translational stroke research bridging preclinical models and clinical data (with Prof. Cristina Sarti, Dr. Benedetta Piccardi, Prof. Anna Maria Gori, and Dr. Marzia Baldereschi).

Memberships

2015-present Società Italiana di Neuroscienze (SINS)
2016-present Society for Neuroscience (SfN)
2020-present Translational Research on Stroke (TREES) group

Service

Reviewer

I served as reviewer for Applied Sciences (MPDI) journal and Brain and Behavior.

Third mission activity

2019 *"Microscopy in the Neuroscience"*, ScienzEstate 2019, European Laboratory for Non-linear Spectroscopy, Sesto Fiorentino (Italy). Lab experiences, for families and kids, focused on fluorescence and its applications in neuroscience.

21.07.2025

Emilia Conti