Alessandro Scaglione, Ph.D. –Curriculum Vitae

Sede lavorativa:
Dipartimento di Fisica e Astronomia,
Università degli studi di Firenze,
Via Sansone 1,
50019, Sesto Fiorentino, (FI), Italy

EDUCAZIONE

2010 **Dottorato di ricerca (Ph.D.) in Ingegneria Biomedica**, presso la School of Biomedical Engineering, Science and Health Systems Drexel University, Philadelphia, USA (12/06/2010)
Titolo tesi: Assessing the Impact of Auto-correlations on the Information Represented by Neurons in the Central Nervous System.
Media voto: 4.0/4.0 (GPA)

2004 **Laurea vecchio ordinamento in Ingegneria Biomedica,** Politecnico di Milano, Milano, Italia (23/07/2004)
Titolo tesi: Information Encoding and Decoding in the Mammalian Cerebral Cortex

ATTIVITA' PROFESSIONALI

2023-Oggi Ricercatore a Tempo Determinato di tipo A presso il dipartimento di Fisica e Astronomia dell'Universita' degli studi di Firenze.

2021-Marzo 2023 **Assegnista di ricerca.** "Esplorazione della rappresentazione globale della navigazione spaziale tramite un microscopio a campo largo in topi liberi di esplorare l'ambiente". Neuroimage group, Dipartimento di Fisica e Astronomia, Universita' degli studi di Firenze

2018-2020 **Assegnista di ricerca.**
Progetto di ricerca: *Brain-to-brain transfer of patterns of neuronal activity: identification of invariants for shaping successful motor recovery in stroke mice*. Neuroimage group, Dipartimento di Fisica e Astronomia, Universita' degli studi di Firenze

2016-2017 **Ricercatore (Research Fellow).**
Progetto di ricerca: *A platform for imaging neuronal activity in head-fixed mice using miniature microscope*.
Presso il Laboratory of Behavioral Neuroscience, National Institute on Aging / NIH.

2011-2016 **Ricercatore (Visiting Fellow).**
Progetto di ricerca: *Optogenetic dissection of motivational salience neuronal circuit in the Basal Forebrain*.
Presso il Laboratory of Behavioral Neuroscience, National Institute on Aging / NIH.

2010-2011 **Ricercatore (Post-doctoral research associate).**
Progetto di ricerca: *Role of spike count and spike timing in awake freely moving rats during different behavioral states.*
Presso la School of Biomedical Engineering, Health and Science Systems. Drexel University, Philadelphia, PA USA

2007-2010 **Dottorando (Research Assistant)**.
Progetto di ricerca: *Information theoretic methods for the study of the role of variability in information encoding by ensemble of neurons.*
Presso la School of Biomedical Engineering, Science and Health Systems. Drexel University, Philadelphia, PA USA. Drexel University, Philadelphia, PA USA

May-June 2008 **Dottorando (Visiting Researcher)**.
Progetto di ricerca: *Role of trial-to-trial variability in the encoding of stimulus location in the rat VPM thalamus.* Neurosignals Group, Hospital Nacional de Parapléjicos, SESCAM, Finca La Peraleda s/n, 45071 Toledo, Spain.

2004-2007 **Dottorando (Graduate Assistant)**.
Progetto di ricerca: *Activity of the thalamic reticular nucleus during different behavioral states.* School of Biomedical Engineering, Science and Health Systems. Drexel University, Philadelphia, PA USA

PUBBLICAZIONI

Resta, F., Montagni, E., de Vito, G., Scaglione, A., Allegra Mascaro, A. L., & Pavone, F. S. (2022). Large-scale all-optical dissection of motor cortex connectivity shows a segregated organization of mouse forelimb representations. *Cell reports, 41(6), 111627.*

Kreuz, T., Senocrate, F., Cecchini, G., Checcucci, C., Mascaro, A. L. A., Conti, E., **Scaglione, A.**, et al. (2022). Latency correction in sparse neuronal spike trains. *Journal of neuroscience methods*, 381, 109703.

Scaglione, A., Conti, E., Allegra Mascaro, A. L., & Pavone, F. S. (2022). Tracking the Effect of Therapy With Single-Trial Based Classification After Stroke. *Frontiers in systems neuroscience*, *16*, 840922.

Quarta, E., **Scaglione, A.**, Lucchesi, J., Sacconi, L., Allegra Mascaro, A. L., & Pavone, F. S. (2021). Distributed and localized dynamics emerge in the mouse neocortex during reach-to-grasp behavior. *The Journal of neuroscience: the official journal of the Society for Neuroscience*. Retrieved from http://dx.doi.org/10.1523/JNEUROSCI.0762-20.2021 **[co-first author]**

Cecchini, G., **Scaglione, A.**, Allegra Mascaro, A. L., Checcucci, C., Conti, E., Adam, I., Fanelli, D., et al. (2021). Cortical propagation tracks functional recovery after stroke. *PLoS computational biology*, *17*(5), e1008963. **[co-first author]**

Conti, E., **Scaglione, A.**, de Vito, G., Calugi, F., Pasquini, M., Pizzorusso, T., Micera, S., et al. (2021). Combining Optogenetic Stimulation and Motor Training Improves Functional Recovery and Perilesional Cortical Activity. *Neurorehabilitation and neural repair*, 15459683211056656.

Adam, I., Cecchini, G., Fanelli, D., Kreuz, T., Livi, R., Volo, M. di, Allegra Mascaro, A. L., Conti, E., **Scaglione, A.**, Silvestri, L., & Pavone, F.S. (2020). Inferring network structure and local dynamics from neuronal patterns with quenched disorder. *Chaos, Solitons & Fractals*, *140*, 110235. Elsevier.

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 (2019). Combined Rehabilitation Promotes the Recovery of Structural and Functional Features of Healthy Neuronal Networks after Stroke. *Cell reports*, *28*(13), 3474–3485.e6.

Zanettini, C., **Scaglione, A.**, Keighron, J. D., Giancola, J. B., Lin, S.-C., Newman, A. H., & Tanda, G. (2019). Pharmacological classification of centrally acting drugs using EEG in freely moving rats: an old tool to identify new atypical dopamine uptake inhibitors. *Neuropharmacology*, *161*, 107446.

Montagni, E., Resta, F., Conti, E., **Scaglione, A.**, Pasquini, M., Micera, S., Mascaro, A. L. A., et al. (2018). Wide-field imaging of cortical neuronal activity with red-shifted functional indicators during motor task execution. *Journal of physics D: Applied physics*. IOP Publishing. Retrieved December 5, 2018,

Liu, C., Foffani, G., **Scaglione, A.**, Aguilar, J., & Moxon, K. A. (2017). Adaptation of Thalamic Neurons Provides Information about the Spatiotemporal Context of Stimulus History. *The Journal of neuroscience: the official journal of the Society for Neuroscience*, *37*(41), 10012–10021.

Scaglione, A., Foffani, G., & Moxon, K. A. (2014). Spike count, spike timing and temporal information in the cortex of awake, freely moving rats. *Journal of Neural Engineering*, *11*(4), 046022.

Scaglione, A., Moxon, K. a, Aguilar, J., & Foffani, G. (2011). Trial-to-trial variability in the responses of neurons carries information about stimulus location in the rat whisker thalamus. *Proceedings of the National Academy of Sciences of the United States of America*, *108*(36), 14956–61.

Scaglione, A., Moxon, K. A., & Foffani, G. (2010). General Poisson exact breakdown of the mutual information to study the role of correlations in populations of neurons. *Neural Comput*, 22(6), 1445-1467.

Scaglione, A., Foffani, G., Scannella, G., Cerutti, S., & Moxon, K. A. (2008). Mutual information expansion for studying the role of correlations in population codes: how important are autocorrelations? *Neural Comput*, 20(11), 2662-2695.

CONFERENZE

Jessica Lucchesi, Alessandro Scaglione, Anna Letizia Allegra Mascaro, Francesco Saverio Pavone (2023). *Miniaturized head-mounted wide-field microscope to monitor bilateral cortical activity in mice engaged in social interaction* (Conference Presentation), Proc. SPIE 12363, SPIE Photonics West, (28 Jannuary 2023).

Elena Montagni, Francesco Resta, Giuseppe de Vito, Alessandro Scaglione, Anna Letizia Allegra Mascaro, and Francesco Saverio Pavone (2020). *Movement-specific patterns of cortical activation revelated by in vivo all-optical imaging and manipulation of neuronal activity in the motor cortex* (Conference Presentation), Proc. SPIE 11360, Neurophotonics, 1136007 (1 April 2020).

Francesco Resta, Anna Letizia Allegra Mascaro, Elena Montagni, Giuseppe de Vito, Alessandro Scaglione, and Francesco Saverio Pavone (2020). *Mesoscale imaging of neuronal activity coupled with light-evoked motor mapping reveal movement-specific spatiotemporal patterns of cortical activation in awake mice*, Proc. SPIE 11226, Neural Imaging and Sensing 2020, 112260I.

Scaglione, A., Conti, E., Mascaro, A. L. A., Pavone, F.S (2019). *Spatiotemporal features of large scale motor-evoked calcium activity patterns*, SFN Annual Meeting, Chicago, IL, USA

Emilia Conti, Anna Letizia Allegra Mascaro, Francesco Resta, Alessandro Scaglione, Maria Pasquini, Silvestro Micera, and Francesco S. Pavone (2019). *Combined rehabilitation promotes recovery of motor functionality in a mouse model of stroke*, Proc. SPIE 10865, Neural Imaging and Sensing 2019, 108650R

Francesco Resta, Elena Montagni, Giuseppe De Vito, Alessandro Scaglione, Anna Letizia Allegra Mascaro, and Francesco Saverio Pavone (2019). *Full-optical stimulation and readout of neuronal activity during optogenetically-evoked movements in awake mice*, Proc. SPIE 11076, Advances in Microscopic Imaging II, 1107609.

Zanettini, C., Scaglione A., Keighron, J., Lin, S.-C., Newman, A.H., Tanda, G. (2017). *Characterization of the effects of typical and atypical dopamine uptake inhibitors and other centrally acting drugs on the ElectroEncephaloGram of freely moving rats*, SFN Annual Meeting, Washington, DC, USA.

Hunt, J.B., Scaglione A., Lin, S.-C. (2017). *A platform for imaging neuronal activity in head-fixed mice using miniature microscope*, NIA Retreat, Baltimore MD.

Scaglione, A., Liang, J., Lin, S.-C. (2016). *Optogenetic dissection of basal forebrain neuronal circuitry reveals GABAergic identity of salience-encoding neurons*, SFN Annual Meeting, San Diego, IL, USA.

Scaglione, A., Greenfield, R., Lin, S.-C. (2015). *Optogenetic dissection of motivational salience neuronal circuits in the basal forebrain*, SFN Annual Meeting, Chicago, IL, USA.

Scaglione, A., Greenfield, R., Lin, S.-C. (2014). *Optogenetic investigation of basal forebrain neuronal circuits in freely moving mice in operant chambers*, SFN Annual Meeting, Washington DC, USA.

Scaglione, A., Moxon, K. A., Aguilar, J., Foffani, G. (2011). *Trial-to-trial variability and the encoding of stimulus location in the rat whisker thalamus: an information theoretic study*, SFN Annual Meeting, Washington, DC, USA.

Scaglione, A., Foffani, G., Aguilar, J., Moxon, K. A. (2010). *Assessing the functional role of variability in the encoding of stimulus location in the VPM thalamus*, SFN Annual Meeting, San Diego, CA, USA.

Scaglione, A., Moxon, K. A., Aguilar, J., Foffani, G. (2010). *Encoding of stimulus location by (population) pairs of neurons in the rat VPM Thalamus: role of auto-correlations*, The Neural Basis of Vibrissa-Based Tactile Sensation, Janelia Farm, Ashburn, VA, USA

Scaglione, A., Moxon, K. A., Aguilar, J., Foffani, G. (2009). *Spike correlations within neurons and redundancy between neurons for encoding stimulus location in the rat VPM thalamus*, SFN Annual Meeting, Chicago, IL, USA.

Scaglione, A., Foffani, G., Scannella, G., Ceruti, S., Moxon, K. A., (2008). *Mutual information expansion for studying the role of correlations in population codes: how important are auto-correlations?*, SFN Annual Meeting, Washington DC, USA.

Scaglione, A., Foffani, G., Scannella, G., Ceruti, S., Moxon, K. A., (2007). *Comparison of different methods of mutual information expansion to study the role of correlations in population coding*, SFN Annual Meeting, San Diego, CA, USA.

Moxon, K. A., & Scaglione, A. (2007). *Natural Whisking increases the activity of neurons in the rat thalamic reticular nucleus*, SFN Annual Meeting, San Diego, CA, USA.

Morales Botello, M., Aguilar, J., Scaglione, A., Moxon, K. A., Foffani, G. (2007). *Synergy, redundancy and independence in population codes from the perspective of a downstream neuron*, SFN Annual Meeting, San Diego, CA, USA.

Scaglione, A., & Moxon, K. A. (2007). *Effect of serotonin (5-HT) on sensory information conveyed by populations of single neurons*, BMES Annual Fall Meeting, Los Angeles, CA, USA

Scaglione, A., & Moxon, K. A. (2006). Behaviorally modulated filter model for the thalamic reticular nucleus. *Conf Proc IEEE Eng Med Biol Soc*, 1, 595-598.

INVITED TALKS

(2022). *Social Interaction Enhances Inter-Brain Synchrony, (*Oral Communication*)*, Innovative Multidisciplinary Approaches To Human Health And Social Well Being, September 6, Newe-Shalom, Israel

(2017). *The encoding of temporal expectation by reward prediction error in the basal forebrain*, (Oral Communication - TED talk format), NIA Retreat, Baltimore MD, USA

(2016). *Optogenetic dissection of motivational salience neuronal circuits in the basal forebrain*, (Oral Communication - TED talk format) NIA Retreat, Baltimore MD, USA

(2011) *Information theoretic methods to study neuronal encoding mechanisms: role of trial-to-trial variability and influence of behavioral states. Department of Ophthalmology, University of Pittsburgh, Pittsburgh, PA, USA*

(2011) *Information theoretic methods to study neuronal encoding mechanisms: role of trial-to-trial variability and influence of behavioral states. National Institute on Aging, National Institute of Health, Baltimore, MD, USA*

REVIEWER

IEEE Transaction on Information Theory
Frontiers in Neuroscience Methods
IEEE EMBS Annual Meeting
IEEE EMBS Conference on Neural Engineering
Nature Communications

ISCRIZIONI A SOCIETA' PROFESSIONALI

Society for Neuroscience (SFN)
Biomedical Engineering Society (BMES)
Institute of Electrical and Electronics Engineers (IEEE)

ATTIVITA' DIDATTICA

2021-Oggi **Docente** del corso "Python for Data Analysis" per gli studenti di dottorato del Laboratorio Europeo di Spettroscopia non Lineare, Sesto Fiorentino, FI, Italia

2011 **Docente del corso** di "Neural Signals", Drexel University, Philadelphia PA (USA).

2007-2010 **Assistente per il corso** "Neural signals", Drexel University, Philadelphia PA (USA).

2006 **Assistente per il corso** di "Principles of Biomedical Engineering", Drexel University, Philadelphia PA (USA).

2006 **Assistente per il corso** di "Biosimulation II", Drexel University, Philadelphia PA (USA)

2006 **Assistente per il corso** di "Biosimulation I", Drexel University, Philadelphia PA (USA).

2005 **Assistente per il corso** di Senior Design, Drexel University, Philadelphia PA (USA).

RICONOSCIMENTI

2004-2005 Calhoun Fellowship, awarded by the School of Biomedical Engineering, Science and Health Systems, Drexel University, Philadelphia PA (USA).

2009 Honorable mention in Computation, Modeling, & Simulation (Biological) – Graduate, School of Biomedical Engineering, Science and Health Systems: *General Poisson exact breakdown of the mutual information to study the role of correlations in populations of neurons*

2014 2nd placed poster award at Greater Baltimore Chapter of Society for Neuroscience (GBSFN) Meeting in Baltimore, November 2014: *Optogenetic investigation of basal forebrain neuronal circuits in freely moving mice in operant chambers*