Curriculum vitæ of Daniele Linaro

Contact Information

Dipartimento di Elettronica, Informazione e Bioingegneria
Politecnico di Milano
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E-mail: daniele.linaro@polimi.it

Date of birth June 5, 1983

Citizenship Italian

Research Interests Electrical engineering, dynamical systems, system identification, bifurcation and normal form theory, experimental and computational neuroscience, in vitro and in vivo electrophysiology.

Academic positions and employment

December 2018 - present

Assistant professor in the Department of Electronics, Information Technology and Bioengineering of the Politecnico di Milano.

October 2015 - November 2018

Postdoctoral fellow with Prof. Dr. Pierre Vanderhaeghen, Université Libre de Bruxelles and KU Leuven.

November 2014 - present

Visitor program with Dr. N. Spruston, HHMI Janelia Research Campus.

October 2011 - September 2015

Postdoctoral fellow with Prof. Dr. M. Giugliano, University of Antwerp.

March 2011 - September 2011

Head of the R&D group at Infocom s.r.l., Genoa.

Honors 2011 - 2014
Postdoctoral Fellow of the Research Foundation - Flanders (FWO).

Education **University of Genoa**, Genoa, Italy

Ph.D. in Electrical Engineering, March 2011

- Advisor: Professor Marco Storace
- Ph.D. topics: dynamical systems applied to computational neuroscience, optimization, system identification, spiking neural networks, electronic oscillators

M.Sc. in Electronic Engineering, September 2007

- *Magna cum laude*, With Honors in Engineering
- Advisor: Professor Marco Storace
- Thesis Topic: Bifurcation analysis and piecewise-linear approximation of a neuron model in view of its circuit implementation
- Area of Study: dynamical systems theory, computational neuroscience and circuit theory

B.Sc. in Electronic Engineering, July 2005

- *Magna cum Laude*, With Honors in Engineering

- Thesis Topic: Project, implementation and testing of a system for the registration of biomedical images
- Advisor: Professor Marco Storace
- Area of Study: image processing, optimization, computer science

Workshops and advanced schools

FENS-IBRO-Hertie Winter School 2012 **January 2012**

- Held in Obergurgl, Austria, from the 8th to the 15th of January, 2012.
- Faculty included John O'Keefe (recipient of the Nobel Prize in Physiology and Medicine in 2014), Carl Petersen, Gabor Tamas, Stefano Panzeri, Fritjof Helmchen, Jason Kerr and others.

Discrete Dynamical Systems and Applications **July 2010**

- Held in Urbino, Italy, from the 30th of June to the 3rd of July, 2010.
- Faculty included Laura Gardini, Roberto Dieci, Iryna Sushko and others.

Trends in Bifurcation Analysis **June 2009**

- Held in Milan, Italy, from the 2nd to the 5th of June, 2009.
- Faculty included Yuri Kuznetsov, Eusebius Doedel, Willy Govaerts, Alan Champneys and others.
- Given a short lecture entitled *Organizing points in the 2D bifurcation scenario governing period adding in neuronal bursting models.*

Advanced Course in Computational Neuroscience **August 2008**

- Held at the Bernstein Center for Computational Neuroscience, Freiburg, Germany, from the 4th to the 29th of August, 2008.
- Faculty included John Rinzel, Nicolas Brunel, Peter Latham, Magnus Richardson, Ad Aertsen, Johnathan Pillow, Alain Destexhe, Carl van Vreeswijk, Mark Rossum and others.
- Developed a project concerning spike-frequency adaptation in a biologically plausible (Hodgkin-Huxley type) neuron model.

Academic Experience

OIST Computational Neuroscience Course 2014, Okinawa, Japan

Tutor **June-July 2014**

- Preparation and presentation of lectures on scientific software (Matlab, Python and NEURON).
- Supervision of four students in the development of their project.

Advanced Course in Computational Neuroscience 2012, Bedlewo, Poland

Tutor **August 2012**

- Supervision of four students in the development of their project.

University of Antwerp, Antwerp, Belgium

Visiting student **November 2010**

- Development of the experimental technique known as *dynamic clamp* for recording neural activity *in vitro*.

University of Bristol, Bristol, United Kingdom

Visiting student **October 2010**

- Bifurcation analysis of the Hindmarsh-Rose neuron model with emphasis on the period adding mechanism.

University of Antwerp, Antwerp, Belgium

Visiting student **August 2009**

- Development of a stochastic neuron model incorporating channel noise.

Teaching Experience

Politecnico di Milano, Milan, Italy

Assistant professor **2019 – present**

- Teaching assistant for the course of Fundamentals of Circuit Theory.

University of Genoa, Genoa, Italy

Teaching assistant **January 2008 to December 2010**

- Teaching assistant for the course of Systems Theory.
- Practical laboratory and exercises for the course of Fundamentals of Circuit Theory.
- Practical laboratory for a course on dynamical systems and neuron models.

Most significant journal publications

D. Linaro, G. K. Ocker, B. Doiron, and M. Giugliano. Correlation transfer by layer 5 cortical neurons under recreated synaptic inputs in vitro. *Journal of Neuroscience*, vol. 39, no. 39, pp. 7648–7663, 2019.

D. L. Hunt, **D. Linaro**, B. Si, S. Romani, and N. Spruston. A novel pyramidal cell type promotes sharp-wave synchronization in the hippocampus. *Nature Neuroscience*, vol. 21, no. 7, p. 985, 2018.

I. Espuny-Camacho, K. A. Michelsen, **D. Linaro**, A. Bilheu, S. Acosta-Verdugo, A. Herpoel, M. Giugliano, A. Gaillard, and P. Vanderhaeghen. Human pluripotent stem-cell-derived cortical neurons integrate functionally into the lesioned adult murine visual cortex in an area-specific way. *Cell reports*, vol. 23, no. 9, pp. 2732–2743, 2018.

D. Linaro, I. Biró, and M. Giugliano. Dynamical response properties of neocortical neurons to conductance-driven time-varying inputs. *European Journal of Neuroscience*, vol. 47, no. 1, pp. 17–32, 2018.

J. Couto, **D. Linaro**, E. De Schutter, and M. Giugliano. On the firing rate dependency of the Phase Response Curve of rat Purkinje neurons *in vitro*. *PLOS Comput Biol*, vol. 11, no. 3, p. e1004112, 2015.

G. Testa-Silva, M. B. Verhoog, **D. Linaro**, C. P. J. de Kock, J. C. Baayen, R. M. Meredith, C. I. De Zeeuw, M. Giugliano, and H. D. Mansvelder. High bandwidth synaptic communication and frequency tracking in human neocortex. *PLOS Biology*, vol. 12, no. 11, p. e1002007, 2014.

D. Linaro, J. Couto, and M. Giugliano. Command-line cellular electrophysiology for conventional and real-time closed-loop experiments. *Journal of Neuroscience Methods*, vol. 230, pp. 5–19, 2014.

I. Espuny-Camacho, K. Michelsen, D. Gall, **D. Linaro**, A. Hasche, J. Bonnefont, C. Bali, D. Orduz, A. Bilheu, A. Herpoel, N. Lambert, N. Gaspard, S. Péron, S. Schiffmann, M. Giugliano, A. Gaillard, and P. Vanderhaeghen. Pyramidal neurons derived from human pluripotent stem cells integrate efficiently into mouse brain circuits *in vivo*. *Neuron*, vol. 77, no. 3, pp. 440–456, 2013.

A. Brambilla, **D. Linaro**, and M. Storace. Nonlinear behavioural model of charge pump PLLs. *International Journal of Circuit Theory and Applications*, vol. 41, pp. 1027–1046, 2012

D. Linaro, A. Champneys, M. Desroches, and M. Storace. Codimension-two homoclinic bifurcations underlying spike adding in the Hindmarsh-Rose burster. *SIAM Journal of Applied Dynamical Systems*, vol. 11, no. 3, pp. 939–962, 2012.

D. Linaro, M. Storace, and M. Mattia. Inferring network dynamics and neuron properties from population recordings. *Frontiers in Computational Neuroscience*, vol. 5, no. 43, 2011.

D. Linaro, M. Storace, and M. Giugliano. Accurate and fast simulation of channel noise in conductance-based model neurons by diffusion approximation. *PLOS Computational Biology*, vol. 7, no. 3, p. e1001102, 2011

D. Linaro, T. Poggi, and M. Storace. Experimental bifurcation diagram of a circuit-implemented neuron model. *Physics Letters A*, vol. 374, pp 4589–4593, 2010.

F. Bizzarri, A. Brambilla, **D. Linaro**, and M. Storace. Continuation analysis of a phase/quadrature electronic oscillator. *Journal of circuits, systems and computers*, 19(4):773–785, 2010.

M. Storace, **D. Linaro**, and E. de Lange. The Hindmarsh-Rose neuron model: bifurcation analysis and piecewise-linear approximations. *Chaos*, 18(3):033128(1–10), 2008.