

Curriculum vitæ of Daniele Linaro

CONTACT INFORMATION	Via N. Cambiaso 37/6 16039 Sestri Levante Genoa, Italy <i>Voice:</i> +39 0185 459240 <i>Mobile:</i> +39 340 4199578 <i>E-mail:</i> danielelinaro@gmail.com
DATE OF BIRTH	5 th of June, 1983
CITIZENSHIP	Italian
JOB INTERESTS	Software engineering, real-time operating systems, programmable hardware, communication systems.
RESEARCH INTERESTS	Computational neuroscience, dynamical systems, bifurcation and normal form theory, system identification.
EDUCATION	<p>University of Genoa, Genoa, Italy</p> <p>Ph.D. student, Electrical Engineering, January 2008 to December 2010</p> <ul style="list-style-type: none">• Advisor: Professor Marco Storace• Ph.D. topics: dynamical systems applied to computational neuroscience, optimization, system identification, spiking neural networks, electronic oscillators <p>M.Sc. in Electronic Engineering, September 2007</p> <ul style="list-style-type: none">• <i>Magna cum Laude</i>, With Honors in Engineering• Thesis Topic: Bifurcation analysis and piecewise-linear approximation of a neuron model in view of its circuit implementation• Advisor: Professor Marco Storace• Area of Study: dynamical systems theory, computational neuroscience and circuit theory <p>B.Sc. in Electronic Engineering, July 2005</p> <ul style="list-style-type: none">• <i>Magna cum Laude</i>, 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 <p>EVTEK Institute of Technology, Helsinki, Finland</p> <p>Period of study abroad in the framework of the Erasmus programme, from October 2005 to March 2006</p> <ul style="list-style-type: none">• Courses: Real Time Operating Systems, Linux administration, Internetworks <p>Liceo Scientifico Statale G. Marconi, Chiavari, Italy</p> <p>High-school diploma, July 2002.</p> <ul style="list-style-type: none">• Final grade: 100/100.
WORKSHOPS AND ADVANCED SCHOOLS	<p>Discrete Dynamical Systems and Applications July 2010</p> <ul style="list-style-type: none">• 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.

RESEARCH
COLLABORATIONS

Maurizio Mattia and Paolo Del Giudice

Department of Technologies and Health, Rome.

Joint work on system identification in large scale neuron networks. We focus on extracting single-neuron properties from simulations of network dynamics.

Michele Giugliano

Department of Theoretical Neurobiology, Antwerp.

Joint work on spike-timing reliability in network of neurons incorporating channel noise.

Enno de Lange

Department of Physiology, University of Bern.

Joint work on bifurcation analysis of the Hindmarsh-Rose neuron model.

Angelo Brambilla

Dipartimento di Elettronica e Informazione, Politecnico di Milano.

Joint works on bifurcation analysis of electronic oscillators.

ACADEMIC
EXPERIENCE

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.

University of Genoa, Genoa, Italy

Instructor

February 2008 to present

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

Teaching Assistant

October to November 2008

- Teaching assistant for the course of Systems Theory.
- Two lectures on MatCont, a Matlab toolbox for numerical continuation.

TECHNICAL SKILLS Extensive experience in UNIX-based operating systems, namely Linux, Apple OS X, and BSD, both as user and administrator. Good knowledge of Windows operating system.

Programming languages: C, C++, Python, Java, UNIX shell scripting, Assembly, VHDL. Circuit simulators of the Spice family.

MATLAB: data analysis, linear algebra, numerical integration, nonlinear numerical methods, polynomials, statistics, visualization, system identification, continuation.

MATHEMATICA: data analysis, numerical integration, interpolation, visualization.

Good knowledge of networks of computers, with emphasis on the Internet and topics of security in local networks such as LAN or SVPN. Certificate “ELSAG certification for AMTEC Security Professional” issued by ELSAG-DATAMAT.

Scientific applications: **AUTO**, **XPPAUT**, **MatCont**, **Nest** and scientific Python in general (NumPy, SciPy, Matplotlib).

Applications: **T_EX**, **L^AT_EX**, Apple iWork, Microsoft Office, and other common productivity packages for OS X, Linux and Windows platforms.

MATHEMATICAL EXPERTISE Linear and Nonlinear Systems Theory.

Bifurcation Theory.

Probability, Random Variables, Stochastic Processes.

Optimization with emphasis on evolutionary algorithms.

LANGUAGES **Italian:** mother tongue.

English: excellent knowledge spoken and written; certificate of Advanced English issued by the University of Cambridge with grade A.

Spanish: good knowledge spoken and written.

German: basic knowledge spoken and written.

RELATIONAL SKILLS Great ability and interest in living and working in a multicultural environment with people of different nationalities and cultural backgrounds.

Good organisational skills in groups of people.

Ability to cope with working conditions with strict time constraints.

JOURNAL PUBLICATIONS **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*, 2011, in press.

F. Bizzarri, **D. Linaro**, B. Oldeman, and M. Storace. Harmonic analysis of oscillators through standard numerical continuation tools. *International Journal of Bifurcation and Chaos*, vol. 20, no. 12, November 2010.

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

D. Linaro, F. Bizzarri, and M. Storace. Piecewise-linear approximation of the Hindmarsh-Rose neuron model. *Journal of Physics: Conference Series*, 138:012011 (18pp), 2008.

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), September 2008.

CONFERENCE
PUBLICATIONS

D. Linaro, M. Righero, M. Biey, and M. Storace. Synchronization properties in networks of Hindmarsh-Rose neurons and their PWL approximations with linear symmetric coupling. In *Proceedings of the International Symposium on Circuits and Systems*, 2009.

F. Bizzarri, **D. Linaro**, and M. Storace. A parameter-dependent approximation of the Hindmarsh-Rose neuron model suitable for analog circuit implementation. In *Proceedings of the 2008 International Symposium on Nonlinear Theory and its Applications (NOLTA2008)*, pages 277–280, Budapest, Hungary, September 7-10 2008.

D. Linaro and M. Storace. A method based on a genetic algorithm to find PWL approximations of multivariate nonlinear functions. In *Proceedings of the 2008 IEEE International Symposium on Circuits and Systems (ISCAS'2008)*, pages 336–339, Seattle, USA, May 18-21 2008.

F. Bizzarri, **D. Linaro**, and M. Storace. PWL approximation of the Hindmarsh-Rose neuron model in view of its circuit implementation. In *Proceedings of the European Conference on Circuit Theory and Design (ECCTD'07)*, pages 878–881, August 2007.