

# Curriculum Vitae

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## PERSONAL DATA

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| <u>Name</u>        | Diego FASOLI  |
| <u>ORCID</u>       | <a href="http://orcid.org/0000-0003-4278-6630">http://orcid.org/0000-0003-4278-6630</a> |
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| <u>UPF Email</u>   | <a href="mailto:diego.fasoli@upf.edu">diego.fasoli@upf.edu</a>                          |
| <u>IIT Email</u>   | <a href="mailto:diego.fasoli@iit.it">diego.fasoli@iit.it</a>                            |
| <u>Website</u>     | <a href="http://spiking-neural.net">http://spiking-neural.net</a>                       |
| <u>Nationality</u> | Italian   |

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## RESEARCH EXPERIENCE AND EDUCATION

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| <u>07/2016 – Present</u> | <b>Postdoc at the Pompeu Fabra University</b> ( <a href="#">UPF</a> ) in Barcelona (Spain), under the supervision of Dr. Gustavo Deco. My work will focus on the development of whole-brain models, in collaboration with the Italian Institute of Technology ( <a href="#">IIT</a> ).  |
| <u>10/2013 – 07/2016</u> | <b>Postdoc at the Italian Institute of Technology</b> ( <a href="#">IIT</a> ) in Rovereto (Italy), under the supervision of Dr. Stefano Panzeri. My purpose was to develop a mathematical model for the dynamics of the neural network of a cortical column, and then to analyze the model in order to understand how the biophysical parameters of the system determine the level of attention and the coding of visual information.   |
| <u>01/2010 – 06/2013</u> | <b>Ph.D. in Computational Neuroscience and Informatics at the University of Nice-Sophia Antipolis</b> ( <a href="#">UNS</a> ) in France, under the supervision of Dr. Olivier Faugeras. My Ph.D. was funded by the French Institute for Research in Computer Science and Automation ( <a href="#">INRIA</a> ). I got my Ph.D. on September 25th 2013, with mention "Très Honorable" (the highest distinction in the French academic system), discussing a thesis entitled "Attacking the brain with neuroscience: |

Mean-field theory, finite size effects and encoding capability of stochastic neural networks" ([thesis](#) written in English and partially in French).

01/2005 – 01/2007

**Master course in theoretical physics at the Catholic University of the Sacred Heart (UCSC)** in Brescia (Italy). I graduated magna cum laude discussing a thesis entitled "Elements of tachyon condensation in background independent string field theory" ([thesis](#) written in Italian).

09/2001 – 12/2004

**Undergraduate program in physics at the Catholic University of the Sacred Heart (UCSC)** in Brescia (Italy). I undergraduated magna cum laude discussing a thesis entitled "Quantum teleportation" ([thesis](#) written in Italian).

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## **SKILLS**

Language

I have a good knowledge of written and spoken English. I have also a fair knowledge of spoken French.

Informatics

Good knowledge of website programming by html language, programming of multiplayer online videogames and animation of three-dimensional polygonal models. I also have a good knowledge of Python and Matlab.

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## **PERSONAL FEATURES**

I think to be a reliable person with a strong sense of duty, ability to adapt to different contexts and that knows how to work within a team. I am interested in every scientific topic and I quickly understand them, so I can quickly fill my gaps and be versatile. My interests in free time are sport, music and different scientific topics, mainly quantum cosmology (especially pre-Big Bang theories and the birth of the universe), artificial intelligence and 3D videogame programming.

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## **AWARDS AND FELLOWSHIPS**

- 01/2007 I was granted a special mention by the board of trustees at the completion of my master course ([article](#) written in Italian).
- 01/2010 – 06/2013 Marie Curie [FACETS-ITN](#) fellowship (FP7-PEOPLE-ITN-2008 under the Grant #237955).

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## **COLLABORATION IN INTERNATIONAL PROJECTS**

- 07/2016 – Present [Human Brain Project](#) (FP7-FET Flagship Programme).
- 10/2013 – 08/2017 [ATTEND](#) (Autonomous Province of Trento, Call "Grandi Progetti 2012").  
[VISUALISE](#) (FET Grant FP7-600954).
- 01/2011 – 06/2013 [BrainScaleS](#) (FP7-FET-Proactive, under the Grant #269921).

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## **SUPERVISED STUDENTS**

D. Corti, Oscillatory behavior in asymmetric Hopfield networks, Politecnico di Milano, Master Thesis, 2014 ([PDF](#)).

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## **ORGANIZATION OF SCIENTIFIC MEETINGS**

I co-organized the [first FACETS-ITN student conference](#) in Heidelberg (Germany) and the [second FACETS-ITN student conference](#) in Barcelona (Spain).

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## TALKS

**D. Fasoli**, Transitions between Asynchronous and Synchronous States: A Theory of Correlations in Small Neural Circuits, NeuroMath, Mathematical and Computational Neuroscience: Cell, Network and Data Analysis, September 12-16 2016 Cortona, Italy ([Abstract](#)).

**D. Fasoli**, Finite size effects in a network of rate neurons, 3rd Workshop of the GDR 2904 'Multi-electrode systems and signal processing to study neuronal networks', October 25-26 2012 Marseille, France ([Abstract](#)).

**D. Fasoli**, Mean-field analysis of populations of realistic spiking neurons, 2nd BrainScaleS Plenary Meeting, March 22-23 2012 Jülich, Germany.

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## COURSES

2010 - 2012

Various courses within the [FACETS-ITN](#) Ph.D. program on neuromorphic hardware, experiments with large scale hardware systems, presenting for scientists, theoretical approaches to new computing concepts, scientific grant writing, theoretical neuroscience, ethics, intellectual property and experimental neurobiology.

Fall 2011

Various courses held at [CIRM](#) in Marseille (France) on bifurcations in stochastic systems, dynamics and self-organization, mathematical image analysis and neurogeometry of the brain, equivariant dynamical systems, stochastic models and simulations in neuroscience, and the geometry of functional architectures underlying neural fields.

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## PEER-REVIEWED PUBLICATIONS

**D. Fasoli\***, A. Cattani\*, S. Panzeri, The complexity of dynamics in small neural circuits, *PLoS Computational Biology*, **12**(8):1-35, 2016 ([URL](#)).

\*These authors contributed equally.

**D. Fasoli**, O. Faugeras, S. Panzeri, A formalism for evaluating analytically the cross-correlation structure of a firing-rate network model, *The Journal of Mathematical Neuroscience*, **5**:6, 2015 ([URL](#)).

J. Baladron, **D. Fasoli**, O. Faugeras, Three applications of GPU computing in neuroscience, *Computing in Science and Engineering*, **14**(3):40-47, 2012 ([URL](#)).

J. Baladron, **D. Fasoli**, O. Faugeras, J. Touboul, Mean-field description and propagation of chaos in networks of Hodgkin-Huxley and FitzHugh-Nagumo neurons, *The Journal of Mathematical Neuroscience*, **2**(1):10, 2012 ([URL](#)).

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## PUBLICATIONS SUBMITTED OR IN PREPARATION

**D. Fasoli**, S. Panzeri, Optimized brute-force algorithms for the bifurcation analysis of a spin-glass-like neural network model, 2017. Arxiv version available at <https://arxiv.org/abs/1705.05647>.

**D. Fasoli**, A. Cattani, S. Panzeri, Pattern storage, bifurcations and higher-order correlation structure of an exactly solvable asymmetric neural network model, 2017. Arxiv version available at <https://arxiv.org/abs/1702.03183>.

**D. Fasoli**, A. Cattani, S. Panzeri, Transitions between asynchronous and synchronous states: A theory of correlations in small neural circuits, 2016. Submitted. ArXiv version available at <https://arxiv.org/abs/1605.07383>.

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## **POSTERS**

A. Cattani, **D. Fasoli**, S. Panzeri, How bifurcations affect functional connectivity in finite-size neural networks, BMC Neuroscience, **16**(Suppl 1):P193, 2015 ([URL](#)).

**D. Fasoli**, A. Cattani, S. Panzeri, Analytical calculations of functional connectivity and of information processing capabilities of neural networks of arbitrary size, 1st International Conference on Mathematical NeuroScience (ICMNS), June 8-10 2015 Antibes - Juan les Pins, France ([Abstract](#), [Poster](#)).

**D. Fasoli**, O. Faugeras, Perturbative analysis of finite stochastic networks, The Versatile Brain: Structures, Functions and Pathologies (INT Inaugural Conference), September 20-21 2012 Marseille, France ([Poster](#)).

**D. Fasoli**, O. Faugeras, J. Touboul, Chaos propagation in a mean-field theory of spiking neural networks, 1st BrainScaleS Plenary Meeting, March 24th 2011 Barcelona, Spain ([Poster](#)).