

# *Lorenzo Fontolan, PhD*

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Date of Birth: *15 June 1984*  
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## Current Position

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May 2015 - present	<b>Postdoctoral associate at Janelia Research Campus, HHMI.</b> Group Leader: <i>Dr. Sandro Romani.</i>
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## Education

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Apr. 2011 - May 2015	<b>PhD in Neuroscience</b> at University of Geneva and ENS Paris. Advisors: <i>Prof. Anne-Lise Giraud and Prof. Boris Gutkin.</i> <i>Graduation Mark: 6/6.</i>
Sept. 2007 - Mar. 2011	<b>MASTER DEGREE IN THEORETICAL PHYSICS</b> “La Sapienza” Università di Roma. <i>Graduation Mark: 110/110 cum laude.</i>
Nov. 2009 - Mar. 2011	<b>MASTER THESIS</b> at Center for Theoretical Neuroscience, Columbia University, New York. Title: “Learning of hierarchical memories with binary synapses”. Advisors: <i>Prof Enzo Marinari, Prof. Stefano Fusi.</i>
Sept. 2003 - May 2007	<b>BACHELOR DEGREE IN PHYSICS</b> “La Sapienza” Università di Roma, Thesis: “Infrared Reflectance of a $V_2O_3$ Crystal”, <i>Graduation Mark: 109/110.</i>
1998 - 2003	<b>DIPLOMA DI MATURITÀ (HIGH SCHOOL DEGREE)</b> Liceo Classico “E.Q. Visconti”, Roma, <i>Graduation Mark: 100/100.</i>

## Publications

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- Finkelstein\* A, **Fontolan\* L**, Economo M, Li N, Romani S, Svoboda K. *Attractor dynamics gate cortical information flow during decision-making.* Nature Neuroscience (accepted) \*equal contribution
  - Inagaki H, **Fontolan L**, Romani S, Svoboda K (2019). *Discrete attractor dynamics underlying selective persistent activity in frontal cortex.* Nature, 566: 212-217.
  - Pefkou M, Arnal L, **Fontolan L**, Giraud AL (2016). *Theta- and beta-band neural activity reflect independent syllable tracking and intelligibility of time-compressed speech.* J Neurosci., 37: 7930-7938.
  - Hyafil A, Giraud AL, **Fontolan L**, Gutkin B (2015). *Neural cross-frequency coupling: From mechanisms to functions.* Trends Neurosci., 2015;38: 725-740.

- Hyafil A, **Fontolan L**, Kabdebon C, Gutkin B, Giraud AL (2015). *Speech encoding by coupled cortical theta and gamma oscillations*. eLife, 10.7554/eLife.06213.
- **Fontolan L**, Morillon B, Liegeois-Chauvel C, Giraud AL (2014). *The contribution of frequency-specific activity to hierarchical information processing in the human auditory cortex*. Nature Communications, 5(May), 4694.
- **Fontolan L**, Krupa MP, Hyafil A, Gutkin B (2013). *Analytical insights on theta-gamma coupled neural oscillators*. The Journal of Mathematical Neuroscience, 3:16.

## Talks and Presentations

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- *Neural circuit dynamics underlying short-term memory in frontal cortex* (2019). NJIT, Newark, USA.
- *Neural circuit dynamics underlying short-term memory in frontal cortex* (2019). Brandeis University, Waltham, USA.
- *Neural circuit dynamics underlying short-term memory in frontal cortex* (2019). IDIBAPS, Barcelona, Spain.
- *Neural circuit dynamics underlying short-term memory in frontal cortex* (2019). ENS Paris, France.
- *Neural circuit dynamics underlying short-term memory in frontal cortex* (2019). University of Padova, Italy.
- *A simple model of Theta-Gamma coupling* (2015). International Conference on Mathematical Neuroscience, Juan-les-Pins, France.
- *The contribution of frequency-specific activity to hierarchical information processing in the human auditory cortex* (2014). Nanosymposium at the Society for Neuroscience Annual Meeting, Washington DC, USA.
- *Inference with cortical rhythms in auditory cortex: the role of oscillations and predictive coding* (2014). Predictive coding and oscillations workshop, Geneva, Switzerland.
- *The role of oscillations in auditory cortex* (2012). Institut de Neurosciences de la Timone, Marseille, France.
- *A nested theta-gamma oscillators network for parsing speech* (2011). Brhycoco Meeting, New York University, USA.
- *Learning of hierarchical memories with binary synapses* (2010). IDIBAPS, Barcelona, Spain.

## Conference Abstracts

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- **Fontolan L**, Finkelstein A, Economo M, Li N, Romani S, Svoboda K (2020). *Attractor dynamics gate cortical information flow during decision-making*. CoSyNe, Denver, USA.
- **Fontolan L**, Inagaki H, Romani S, Svoboda K (2018). *Discrete attractors underlie preparatory activity in rodent frontal cortex*. CoSyNe, Denver, USA.
- **Fontolan L**, Inagaki H, Romani S, Svoboda K (2017). *Models for short-term memory in a motor preparation task*. Society for Neuroscience Annual Meeting, Washington DC, USA.
- **Fontolan L**, Krupa M, Romani S, Gutkin B (2015). *A simple model of Theta-Gamma coupling*. Society for Neuroscience Annual Meeting, Chicago, USA.
- **Fontolan L**, Morillon B, Liegeois-Chauvel C, Giraud AL (2014). *Frequency specific activity in human auditory cortex*. Gordon Research Conference on Neurobiology of Cognition, Maine, USA.

- **Fontolan L, Giraud AL (2014).** *Scale-free dynamics during listening: a signature for impairment?* Gordon Research Seminar on Neurobiology of Cognition, Maine, USA.
- **Fontolan L, Oulasagasti I, Giraud AL (2014).** *Inference with cortical rhythms in auditory cortex: the role of oscillations and predictive coding.* Alpine Brain Imaging Meeting, Champéry, Switzerland.
- **Fontolan L, Krupa M, Hyafil A, Giraud AL, Gutkin B (2013).** *Dynamics of coupled theta-gamma neural oscillators.* Society for Neuroscience Annual Meeting, San Diego, USA.
- **Fontolan L, Hyafil A, Kabdebon C, Gutkin B, Giraud AL (2013).** *Cortical theta and gamma oscillations as viable instruments of speech segmentation.* Lemanic Neuroscience Annual Meeting, Les Diablerets, Switzerland.
- **Fontolan L, Morillon B, Liegeois-Chauvel C, Giraud AL (2013).** *The contribution of frequency-specific activity to hierarchical information processing in human auditory cortices.* European Neuroscience Conference, Bordeaux, France.
- **Fontolan L, Morillon B, Liegeois-Chauvel C, Giraud AL (2013).** *Frequency-specific contributions to hierarchical information processing in human auditory cortices.* Swiss Society for Neuroscience. Geneva, Switzerland.
- **Fontolan L, Morillon B, Liegeois-Chauvel C, Giraud AL (2013).** *Frequency-specific contributions to hierarchical information processing in human auditory cortices.* Alpine Brain Imaging Meeting. Champéry, Switzerland.
- **Fontolan L, Liegeois-Chauvel C, Morillon B, Giraud AL (2012).** *Oscillation-based predictive mechanisms in speech processing revealed by intracranial EEG.* iEEG and Emotions Conference. Geneva, Switzerland.
- **Fontolan L, Liegeois-Chauvel C, Morillon B, Giraud AL (2012).** *Distinct contribution of gamma and beta activity to hierarchical message-passing in auditory cortices.* 4th International Conference on Auditory Cortex. Lausanne, Switzerland.
- **Hyafil A, Fontolan L, Gutkin B, Giraud AL (2012).** *A theoretical exploration of speech/neural oscillation alignment for speech parsing.* 4th International Conference on Auditory Cortex. Lausanne, Switzerland.
- **Fontolan L, Hyafil A, Gutkin B, Giraud AL (2012).** *Dynamics of interacting neural oscillators.* Neurodynamics: a workshop on heterogeneity, noise, delays, and plasticity in neural systems. Edinburgh, UK.
- **Hyafil A, Fontolan L, Gutkin B, Giraud AL (2011).** *A nested theta-gamma oscillators network for parsing speech.* Champalimaud Neuroscience Symposium, Lisboa, Portugal.

## Editorial activities

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Ad hoc reviewer for:

Nature Neuroscience, *Nature Publishing Group*.

Neuron, *Cell Press*.

Proceedings of the National Academy of Sciences, *United States National Academy of Sciences*.

Plos Computational Biology *Public Library of Science*.

Cortex, *Elsevier*.

Communications Biology, *Nature Publishing Group*.

Computers in Biology and Medicine, *Elsevier*.

Language, Cognition and Neuroscience, *Taylor & Francis*.

## Honors and Prizes

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- Amicitia Excellence Prize 2015, *Best PhD thesis in Neuroscience*

## Programming Skills

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- Programming languages: *C, Python, Matlab, Mathematica, XPP*.
- Experience with Machine Learning libraries (Tensorflow, Theano) applied to Artificial Neural Networks.

## Languages

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<b>Italian</b>	mother tongue.
<b>English</b>	fluent writing, reading and speaking. <i>TOEFL score: 109/120</i> .
<b>French</b>	fluent writing, reading and speaking.
<b>Spanish</b>	functional reading, speaking and writing.

## Teaching, Mentoring & Academic Services

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2021	Mentor, 2nd Neuromatch academy school in computational neuroscience
2020	Content Reviewer, 1st Neuromatch academy school in computational neuroscience
2019	Organizer and lecturer for the course on Mathematical methods for neuroscience and machine learning at Janelia Research Campus.
2019	Guest Lecturer at General Philosophy course (Catholic University of America).
2017 - 2019	Taught 'Introduction to Computational Neuroscience' for undergraduate Biology and Neuroscience students of American University and George Washington University.
2017	Scientists Teaching Science pedagogy course, taught by Prof. Barbara Houtz (NIH). The course aims at preparing postdocs for teaching STEM in university and college level classes.
2017	Co-creator, exhibition on AI and Neuroscience 'WHAT? Machines that learn'
2015	Thesis Supervisor, 'Isomorphism of Hopfield nets and Ising model' F. Tedeschi, B. Sc. in Physics, La Sapienza University of Rome
2006-2009	Tutoring - college level physics and mathematics

## Miscellaneous Experience

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2019	Attended the NIH grant writing workshop at Janelia Research Campus.
Summer 2016	Student at MBL Methods in Computational Neuroscience Summer School, Woods Hole, USA.
Summer 2003	Intern at Radius Ventures, LLC, a venture capital firm based in New York (NY), focused on leading-edge health and life sciences start-up companies.
2001 - 2003	National Representative of the Italian Forum for Students Associations, a consultative assembly for the Italian Secretary of Education.