

# Jorge Aurelio Menéndez

*Curriculum Vitæ (October 17, 2019)*

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*Personal website*

<https://jamenendez11.github.io/>

## RESEARCH EXPERIENCE

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**Gatsby Computational Neuroscience Unit & Sainsbury Wellcome Centre (London)** 2016-

*Prof. Peter Latham & Dr. Adam Kampff*

- Doctoral research on recurrent neural network models of motor control and learning.

**Methods in Computational Neuroscience Summer School (Woods Hole, MA)** August, 2018

*Prof. Haim Sompolinsky & Dr. Stephane Deny*

- Research on recurrent network dynamics for linear classification as a model of the olfactory system.

**Cortex Lab, UCL Institute of Ophthalmology (London, UK)**

May-August, 2016

*Prof. Matteo Carandini & Prof. Kenneth Harris*

- Research on orientation selectivity and response adaptation of neurons in mouse primary visual cortex
- Analysis of calcium imaging data from several types of cortical neurons responding to visual stimuli

**Kampff Lab, Sainsbury Wellcome Centre (London, UK)**

April-May, 2016

*Dr. Adam Kampff*

- Research on understanding functional consequences of motor cortical lesions in rats.
- Event-related analysis of electrocorticographic (ECoG) recordings from rat motor cortex.
- Behavioral analysis involving extracting events from video recordings using computer vision techniques

**Gatsby Computational Neuroscience Unit (London, UK)**

February-April, 2016

*Prof. Peter Latham*

- Research on neural computation in spiking networks using biological synapses
- Formal analysis and numerical simulation of excitatory/inhibitory spiking and non-spiking networks

**UCL Department of Genetics, Evolution and Environment (London, UK)** December-January, 2016

*Prof. Andrew Pomiankowski & Dr. Alex Stewart*

- Research on mechanistic models of random monoallelic expression
- Numerical simulation and analysis of stochastic gene networks

**Visual Thinking Lab, Johns Hopkins University (Baltimore, MD)**

2012-2015

*Prof. Jonathan Flombaum & Prof. Justin Halberda*

- Research on representations and algorithms underlying spatial working memory
- Analysis and statistical modelling of psychophysical data
- Designed, implemented, and administered psychophysical experiments with humans

**Visual Electrophysiology Lab, Università Cattolica del Sacro Cuore (Rome, Italy)** June-August, 2014

*Prof. Benedetto Falsini*

- Research on face perception in patients with macular degeneration
- Statistical analysis of psychophysical and focal cone electroretinography data
- Designed and wrote software for testing face recognition ability in hospital patients

## PUBLICATIONS

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5. Aitchison, L., **Menendez, J. A.**, Pouget, A., & Latham, P. E. (2018). Probabilistic Synapses. Under review.
4. Lopes, G., Nogueira, J., Dimitriadis, G., **Menendez, J. A.**, Paton, J. J., & Kampff, A. R. (2017). [A robust role for motor cortex](#). bioRxiv, 058917.

3. Menendez, J.A., Bae, G.Y., Wilson, C. & Flombaum, J.I. (2016). [Deriving configuration effects in spatial working memory from rational correspondence](#). *Manuscript in preparation*
2. Menendez, J.A. (2015). [Free Will and Transworld Identity in Leibniz's Metaphysics](#). *Prometheus Undergraduate Philosophy Journal*.
1. Gross, S., Chaisilprungraung, T., Kaplan, E., Menendez, J.A. & Flombaum, J.I. (2014). [Problems for the purported cognitive penetration of perceptual color experience and Macpherson's proposed mechanism](#). *Baltic International Yearbook of Cognition, Logic and Communication*, 9(1), 6.

## CONFERENCE PRESENTATIONS

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\* PDFs of slides/proceedings papers/posters can be found on my personal website (see above)

8. Menendez, J.A., Latham, P.E. (2019, September). *Learning low-dimensional inputs for brain-machine interface control: a motor cortical model of brain-machine interface learning, fast and slow*. **Poster** presented at Bernstein Annual Meeting, Berlin, Germany.
7. Menendez, J.A., Latham, P.E. (2019, March). *Learning low-dimensional inputs for brain-machine interface control*. **Poster** presented at COSYNE Annual Meeting, Lisbon, Portugal.
6. Menendez, J.A., Latham, P.E. (2018, June). *Bayesian weight updates stabilize and improve local learning in a recurrent neural network*. **Poster** presented at Research in Encoding And Decoding of Neural Ensembles Conference, Firá, Santorini, Greece.
5. Menendez, J.A., Latham, P.E. (2017, November). *Computing with rates vs spikes: insights from two solutions to an integrator network*. **Poster** presented at the Society for Neuroscience Annual Meeting, Washington, DC, USA.
4. Menendez, J.A. (2016, February). *Towards a computational account of art cognition: unifying perception, visual art, and music through Bayesian inference*. **Talk** presented at the Human Vision and Electronic Imaging Conference, part of the IS&T International Symposium on Electronic Imaging, San Francisco, CA, USA.
3. Menendez, J.A., Falsini, B., Ambrosio, L., Corbo, G. (2015, May). *Predicting face recognition ability using macular focal cone electroretinography in patients with macular degeneration*. **Poster** presented at the Association for Research in Vision and Ophthalmology Annual Meeting, Denver, CO, USA.
2. Menendez, J.A., Bae, G.Y., Wilson, C., Flombaum, J.I. (2014, May). *Deriving configuration effects in spatial working memory from rational correspondence*. **Talk** presented at the Vision Sciences Society Annual Meeting, St. Pete Beach, FL, USA.
1. Menendez, J.A., Bae, G.Y., Wilson, C., Flombaum, J.I. (2013, November). *A computational basis for configuration effects in spatial working memory*. **Poster** presented at the Annual Workshop on Object Perception, Attention, and Memory, Toronto, ON, Canada.

## TEACHING

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### Computational Cognitive Neuroscience Summer School

July '19

#### Teaching Assistant

Taught tutorials on linear algebra, statistical inference, neural coding, deep learning, and reinforcement learning to 30 students with a range of experimental and theoretical backgrounds in neuroscience and psychology. Most teaching materials for these are available on my personal website. Additional responsibilities included supervising six student projects.

## COSYNE Tutorial by Prof. Wei Ji Ma on Bayesian Models of Behavior

March '19

*Teaching Assistant*

Guided tutorial attendees through the exercises and answered questions about the lecture.

## Systems and Theoretical Neuroscience

Oct '17 - April '18

*Teaching Assistant*

Joint SWC-Gatsby course for first-year graduate students. As this was the first time this course was being run jointly with the SWC, I formed part of the working group that designed the lecture schedule with Adam Kampff and Maneesh Sahani. Responsibilities during the course included writing homework assignments, teaching tutorials, and marking papers.

## Probabilistic and Unsupervised Learning and Approximate Inference in Probabilistic Models

Oct - Dec '17

*Teaching Assistant*

Maneesh Sahani's course on graphical models and methods for approximate inference. Responsibilities included teaching tutorials and marking assignments.

## SWC-Gatsby Induction Week Crash-Course

Sept '17

*Lecturer*

Co-designed and lectured in a week-long crash-course on basic mathematics and neuroscience to prepare first-year graduate students from the SWC and Gatsby PhD programs for the aforementioned Systems and Theoretical Neuroscience course. Lectured on fundamentals of linear algebra (lecture notes can be found on my website).

## ACADEMIC SERVICE

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### Reviewing:

- NeurIPS 2019
- PLOS Computational Biology

### Workshops and meetings organized:

- March '19: **COSYNE 2019 Workshop: *Data, Dynamics and Computation: using data-driven methods to ground mechanistic theory***  
Co-organizer of accepted COSYNE workshop on understanding computation in the brain using mechanistic and statistical models of network dynamics.
- Sept '18: **Symposium: *Cross-Species Conversations***  
Lead organizer of the third *Systems Seminars* event at the Sainsbury Wellcome Centre. Invited speakers: Gilles Laurent, Suzana Herculano-Houzel, Marta Moita.
- Dec '17: **Symposium: *The Role of Naturalistic Behaviors in Neuroscience***  
Co-organizer of the second *Systems Seminars* event Sainsbury Wellcome Centre and served as moderator for the panel discussion. Invited speakers: Matteo Carandini, Christian Machens, Megan Carey.
- March '17: **Symposium: *The Purpose of Neuronal Diversity in the Brain***  
Co-founded the SWC/Gatsby PhD Student-run *Systems Seminars* series and helped organize the inaugural event. Invited speakers: Tom Mrsic-Flogel, Oscar Marin, Peter E. Latham.

## COMMUNITY OUTREACH

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- October '19: **Talk: *Brain-machine interface learning, fast and slow: a motor cortical circuit model of learning inside and outside the neural manifold***  
Talk at UCL PhDs in Systems Neuroscience (UPSyNe) Society bimonthly meeting.

- May '19: **TEDx Goodenough College: eQuality**  
Speaker manager for independently organized TEDx event at Goodenough College, London. Was responsible for helping develop and rehearse the talks of two speakers ([Peter Kaznacheev](#) and [Manfredi San Germano](#)), through weekly sessions over the course of eight weeks preceding the event.
- June '18: **Invited talk: *The blind electrician: how neurons learn from experience***  
Invited talk given at an event hosted by the Society of Spanish Researchers in the United Kingdom

## AWARDS AND FUNDING

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|   |          |         |
|---|----------|---------|
| <i>COSYNE Travel Grant</i>  | \$1000   | 2019    |
| <i>Boehringer Ingelheim Fonds Travel Grant</i> (for summer school)  | €2380    | 2018    |
| <i>CoMPLEX MRes Thesis Award</i>  | £150     | 2016    |
| <i>UCL Graduate Research Scholarship</i>  | ~£17k/yr | 2015-19 |
| <i>UCL Overseas Research Scholarship</i> (covers overseas tuition fees)   | ~£24k    | 2015-16 |
| <i>Rhodes Scholarship Finalist</i> , 5th District   |          | 2015    |
| <i>Johns Hopkins University Cognitive Science Award</i>   | \$500    | 2015    |
| <i>Barry Goldwater Scholarship</i>  | \$7500   | 2014    |
| “A Computational Basis for Context Effects in Spatial Working Memory”   |          |         |
| <i>Luigi Burzio Undergraduate Research Award in Psychological and Brain Sciences</i>                                | \$3000   | 2012-14 |
| “Deriving Configuration Effects in Spatial Working Memory from Rational Correspondence” (Supervisor: J.I. Flombaum) |          |         |
| <i>Second Decade Society Summer Internship Grant</i>  | \$2000   | 2014    |
| “Psychophysical Testing of Retinal Disease Patients” (Supervisor: B. Falsini)                                       |          |         |

## EDUCATION

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| <b>PhD Computational Neuroscience</b>  | 2016-        |
| <i>University College London, Gatsby Computational Neuroscience Unit &amp; Sainsbury-Wellcome Center for Neural Circuits and Behaviour, as part of the CoMPLEX PhD program</i> |              |
| Supervisors: Peter Latham & Adam Kampff  |              |
| <b>Methods in Computational Neuroscience Summer School</b>   | August, 2018 |
| <i>Marine Biological Laboratory</i>  |              |
| Course project supervisor: Haim Sompolinsky  |              |
| <b>MRes Modelling Biological Complexity</b>  | 2015-2016    |
| <i>University College London, Centre of Mathematical and Physical Science in Life Sciences and Experimental Biology (CoMPLEX)</i>  |              |
| Graduated with Distinction   |              |
| Award for best MRes thesis   |              |
| Thesis: Contextual processing in mouse visual cortex (supervised by M. Pachitariu & M. Carandini)  |              |
| Rotation projects and thesis pdf available at <a href="http://www.ucl.ac.uk/~ucbpjam/mres.html">http://www.ucl.ac.uk/~ucbpjam/mres.html</a>                                    |              |
| <b>BA Cognitive Science</b>  | 2011-2015    |
| <i>Johns Hopkins University</i>  |              |
| Graduated with General Honors and Departmental Honors (GPA: 3.93/4.00)   |              |
| Focal areas: Computational Approaches to Cognition and Cognitive Psychology  |              |
| Minor: Philosophy, with focus in Philosophy of Mind and Formal Logic   |              |

**BM Classical Guitar Performance**

2011-2015

*Peabody Institute of The Johns Hopkins University*

Graduated with Honors (GPA: 3.93/4.00)

Studied under Grammy-award winning classical guitarist Manuel Barrueco

Recitals are recorded and can be seen on YouTube: [Junior Recital](#), [Senior Recital](#)**International Baccalaureate (IB) Diploma**

2009-2011

*Washington International School*

Final IB Score: 41/45

IB Higher Levels: Mathematics (7/7), Biology (7/7), Chemistry (7/7)

IB Standard Levels: English (6/7), Spanish (6/7), Economics (7/7)

IB Extended Essay: *Musically Enhanced Working Memory in Musicians and Non-Musicians***SKILLS**

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- Programming: Python, MATLAB, R, HTML
- Languages: Spanish, English (fluent); French, Italian (proficient)