

CURRICULUM VITAE

Address

Cognitive and Systems Neuroscience Group, Center for Neuroscience
Swammerdam Institute for Life Sciences, University of Amsterdam
Science Park 904, 1098XH Amsterdam, Netherlands
Email: j.f.mejias at uva.nl

Education

04/2006-12/2009: Ph.D. in Computational Neuroscience, University of Granada (Spain).
10/2005-12/2007: Masters in Physics and Mathematics, University of Granada (Spain).
09/2000-09/2005: *Licenciado* (Bachelor plus Masters) in Physics, University of Granada (Spain).

Research positions

12/2017-present: *Assistant professor of computational neuroscience*. Swammerdam Institute for Life Sciences, University of Amsterdam, Netherlands

02/2016-11/2017: *Assistant research scientist*. Center for Neural Science, New York University, USA.
Supervisor: Xiao-Jing Wang

09/2013-01/2016: *Postdoctoral associate*. Center for Neural Science, New York University, USA. Supervisor: Xiao-Jing Wang

07/2010-08/2013: *Postdoctoral fellow*. Dept. of Physics and Centre for Neural Dynamics, University of Ottawa, Canada. Supervisor: Andre Longtin

04/2006-06/2010: *Research assistant*. Dept. of Physics of the Matter, University of Granada, Spain. Supervisor: Joaquin J. Torres

06/2004-12/2005: *Undergraduate research assistant*. Dept. of Physics of the Matter, University of Granada, Spain. Supervisor: Joaquin J. Torres

Honors, awards and fellowships

- Faculty member, European Institute for Theoretical Neuroscience (2020-present)
- External member, Institute Carlos I of Theoretical and Computational Physics (2019-present)
- Member, Board of Directors, Organization for Computational Neurosciences (2013-2015; 2020-2022)
- Invited Visiting Professor (1 week/year), COSI training program, University of Granada (2016-present)
- Outstanding PhD Thesis Award (University of Granada), 2014
- CNS Presidential Travel Award (OCNS), 2013
- FPU Fellowship (top PhD competitive program in Spain), 2006-2010.
- FPU Program for International Research Visits: Universite Paris V, 2007
- MEC Undergraduate Research Fellowship (Spanish Ministry of Science), 2005
- UGR Undergraduate Research Fellowship (Univ. Granada), 2004

Scientific affiliations and memberships

Amsterdam Neuroscience (2018-present), Amsterdam Brain and Cognition (2018-present), Cognitive Neuroscience Society (2016-present), Organization for Computational Neurosciences (2011-present), Society for Neuroscience (2013-present), New York Academy of Sciences (2013-2018).

List of publications**Peer-reviewed journal articles and book chapters (* means equal contribution):**

1. J. F. Mejias and X.-J. Wang, Mechanisms of distributed working memory in a large-scale model of macaque neocortex. Under review, 2021. <https://www.biorxiv.org/content/10.1101/760231v3>
2. R. V. Nunes, M. B. Reyes, J. F. Mejias and R. Y. de Camargo, Inferring large-scale structural connectivity from local activity in a model of the mouse large-scale cortical network. Under review, 2021. <https://www.biorxiv.org/content/10.1101/2021.01.28.428656v2>
3. J. J. Torres, M. A. Muñoz, J. M. Cortes and J. F. Mejias, Special issue on emergent effects in stochastic neural networks with application to learning and information processing. **Neurocomputing**, in press, 2021.
4. S. Lindeman*, L Kros*, S Hong*, J. F. Mejias, V. Romano, R. Oostenveld, M. Negrello, L. W. Bosman and C. I. de Zeeuw, Cerebellar Purkinje cells can differentially modulate coherence between sensory and motor cortex depending on region and behavior. **PNAS** 118 (2), e2015292118, 2021.
5. G. Meijer, P. Marchesi, J. F. Mejias, J. S. Montijn, C. S. Lansink and C. M. A. Pennartz, Neuronal mechanisms underlying multisensory stimulus detection in the primary and secondary visual cortex. **Cell Reports**, 31, 107636, 2020.
6. J. Jaramillo, J. F. Mejias and X.-J. Wang, Engagement of pulvino-cortical feedforward and feedback pathways in cognitive computations. **Neuron**, 101, 321-336, 2019. *Perspectives of this work in Fiebelkorn and Kastner; Neuron 2019.*
7. R. R. Deza, I. Deza, N. Martinez, J. F. Mejias and H. S. Wio, A non-equilibrium potential approach to competition in neural populations. **Frontiers in Physics**, 6:154, 2019
8. M. R. Joglekar, J. F. Mejias, G. R. Yang and X.-J. Wang, Inter-areal balanced amplification enhances signal propagation in a large-scale circuit model of the primate. **Neuron**, 98, 222-234, 2018. *Perspectives of this work in: Stroud and Vogels, Neuron 2018; Mashour, Science 2018.*
9. L. C. Garcia del Molino, G. R. Yang, J. F. Mejias and X.-J. Wang. Paradoxical response reversal of top-down modulation in cortical circuits with three interneuron. **eLife**, 6:e29742, 2017.
10. A. Melanson, J. F. Mejias, J. J. Jun, L. Maler and A. Longtin, Non-stationary stochastic dynamics underlie spontaneous transitions between active and inactive behavioural states. **eNeuro**, 4 (2), ENEURO.0355-16.2017, 2017.
11. J. F. Mejias, J. D. Murray, H. Kennedy and X.-J. Wang, Feedforward and feedback frequency-dependent interactions in a large-scale laminar network of the primate cortex. **Science Advances**, 2, e1601335, 2016.
12. J. F. Mejias and A. Longtin, Differential effects of excitatory and inhibitory heterogeneity on the gain and asynchronous state of sparse cortical networks. **Frontiers Comput. Neurosci.**, 8:107, 2014.
13. J. F. Mejias*, A. Payeur*, E. Selin, L. Maler and A. Longtin, Subtractive, divisive, and non-monotonic gain control in feedforward nets linearized by noise and delays. **Frontiers Comput. Neurosci.**, 8:19, 2014.
14. K. Bol, G. Marsat, J. F. Mejias, E. Harvey-Girard, L. Maler and A. Longtin, Modeling cancellation of periodic inputs with burst-STDP and feedback. **Neural Networks**, 47, 120133, 2013.
15. J. F. Mejias*, G. Marsat*, K. Bol, L. Maler and A. Longtin, Learning contrast-invariant cancellation of

- redundant signals in neural systems. **PLoS Comp. Biol.**, 9 (9), e1003180, 2013.
16. J. F. Mejias and A. Longtin, Optimal heterogeneity for coding in spiking neural networks. **Phys. Rev. Lett.**, 108, 228102, 2012.
 17. J. F. Mejias, B. Hernandez-Gomez and J. J. Torres, Short-term synaptic facilitation improves information retrieval in noisy neural networks. **EPL (Europhysics Letters)**, 97, 48008, 2012.
 18. J. J. Torres, J. Marro and J. F. Mejias, Can adaptive noise induce various resonant peaks? **New J. Phys.**, 13, 053014, 2011.
 19. J. F. Mejias and J. J. Torres, Emergence of resonances in neural systems: the interplay between adaptive threshold and short-term synaptic plasticity. **PLoS One**, 6 (3), e17255, 2011.
 20. J. F. Mejias, H. J. Kappen and J. J. Torres, Irregular dynamics in up and down cortical states. **PLoS One**, 5 (11), e13651, 2010.
 21. J. F. Mejias and J. J. Torres, Maximum memory capacity on neural networks with short-term synaptic depression and facilitation. **Neural Comput.**, 21 (3), 851-871, 2009.
 22. S. Johnson, J. Marro, J. F. Mejias and J. J. Torres, Development of neural network structure with biological mechanisms. **Lect. Not. Comp. Sci.**, 5517 (1), 228-235, 2009.
 23. J. F. Mejias, J. J. Torres, S. Johnson and H. J. Kappen, Switching dynamics of neural systems in the presence of multiplicative colored noise. **Lect. Not. Comp. Sci.**, 5517 (1), 17-23, 2009.
 24. J. F. Mejias and J. J. Torres, The role of synaptic facilitation in spike coincidence detection. **J. Comput. Neurosci.**, 24 (2), 222-234, 2008.
 25. J. F. Mejias and J. J. Torres, Improvement of spike coincidence detection with facilitating synapses. **Neurocomputing**, 70, 2026-2029, 2007.

Funding

Only projects obtained as PI or co-PI are mentioned.

- ABC Project Grant. Project: *Translational biomarkers for compulsivity across large-scale brain networks*. Duration: 2021-2023. **Role: main applicant.**
- NWA-ORC consortium. Project: *Perceptive acting under uncertainty: safety solutions for autonomous systems*. Duration: 2021-2025 **Role: co-applicant.**
- Human Brain Project SGA3 Task 2.1. Project: *Data-driven model of multisensory object recognition in cortical systems*. Duration: 2020-2023. **Role: Task co-leader, co-PI for tasks 2.1.1 and 2.1.2, WP2 Technical Coordinator.**
- UvA High Performance Computing Network Funds. Duration: 2019-2020. **Role: co-PI.**

Teaching experience

- Certifications: Certificate of Pedagogical Aptitude (University of Granada, Spain), 06/2006; Habilitation for Teaching at French Universities (*Maitre de Conferences*, France), 03/2017; BKO Certificate for University-level teaching (Univ. Amsterdam, Netherlands), 05/2020.
- Coordinator of the UvA courses: Network Models and Representations of Consciousness (2018), Advanced Cognitive Neurobiology and Clinical Neurophysiology (2018-present), Neural Dynamics and Deep Learning (2020-present). All courses are MSc level.
- Lecturer at the UvA courses: From Perception to Consciousness (BSc 2018-2019), Learning and Memory (BSc 2018-present), Network Models and Representations of Consciousness (MSc 2018-present), Advanced Cognitive Neurobiology and Clinical Neurophysiology (MSc 2018-present), Neural

Dynamics and Deep Learning (MSc 2020-present).

- Invited lecturer for the courses: Analysis of Neural Signals (UvA BSc 2019), Introduction to Neurophysiology and Imaging (UvA MSc 2020), Cognitive Neurobiology (UvA MSc 2020), Mind and Machines (VU BSc, 2020), Human Vision (UGR COSI Program, 2016-present).
- Teaching assistant for the courses: Neural Networks (NYU/Courant Institute, MSc 2017), Statistical Mechanics (UGR, 2009) and Computational Physics (UGR, 2008), Computational Neuroscience Summer Schools of Ottawa, Canada (2013) and Okinawa, Japan (2014).

Supervision of students and researchers

- PhD students: Giulia Moreni (2021-present), Matthias Brucklacher (2020-present), Kwangjun Lee (2019-present), Ronaldo Nunes (UFABC visitor, 2019-2020).
- MSc students: Parva Alavian (2021), Siobhan Hall (2020), Steven Schoenmaker (2020), Elvira Brand (2019), Koke Helmes (2019), Amparo Gilhuis (2019), Mark Tensen (2018), Thomas Adrien (2018).
- BSc students: Noah van de Burt (2020), Martijn Piet (2019).
- Summer students: Li Yan McCurdi, Luca Ambrogioni, Katherine Wood (OIST, 2014).

Organization of seminars and conferences

- Chair of the Organizing Committee of CNS 2020 (online). About 400 presenters and 2500 attendants. Conference link: <https://www.cnsorg.org/cns-2020>
- Co-organizer, Amsterdam Brain and Cognition Colloquium (annual program, 2020-present).
- Co-organizer, Swammerdam Lectures in Neuroscience (annual program, 2020-present).
- Main organizer of “Diversity and function of interneurons”, Barcelona (Spain), 2019. About 40 attendants. Workshop link: <https://sites.google.com/view/cns19interneuron/home>
- Main organizer of “Large-scale brain structure and dynamics”, Quebec City (Canada), 2014. 60 attendants. Workshop link: <https://sites.google.com/site/cns14largescale/>
- Main organizer of CNS “Postdoc and Student Career Strategy” workshops at Paris (France, 2013), Quebec City (Canada, 2014) and Prague (Czech Republic, 2015). 50 attendants each.
- Member of the organizing committee of CNS'13 (Paris, France; 800 attendants), CNS'14 (Quebec City, Canada; 250 attendants) and CNS'15 (Prague, Czech Republic; 500 attendants).
- Local organization, Granada Seminar on Computational Physics: 2006, 2008. About 200 attendants.

Selected conference talks

1. Invited speaker, The role of cortical feedback, EITN Paris (France), 2019.
2. Invited speaker, 15th Granada Seminar, Granada (Spain), 2019.
3. Invited speaker, Bernstein conference workshop, Berlin (Germany), 2018.
4. Invited speaker, Mechanisms of neuronal oscillations, Antwerp (Belgium), 2017.
5. Main meeting speaker, CNS'16, Jeju (South Korea), 2016.
6. Invited speaker, Temporal and multiscale organization in cortex, Prague (Czech Rep.), 2015.
7. Invited speaker, Physics, Computation and the Mind, La Herradura (Spain), 2012.
8. Featured main meeting speaker, CNS'12, Atlanta (USA), 2012.
9. Invited speaker, Coherent neural activity for brain functionality, Stockholm (Sweden), 2011.
10. Speaker, IWANN'09, Salamanca (Spain), 2009.

Selected invited seminars

1. Dept. Psychology, Universidad Catolica de Chile, Santiago (Chile, online), 2020.
2. Institut de Neurosciences de la Timone, Marseille (France, online), 2020.
3. Dept. of Neuroscience, Erasmus Medical Center, Rotterdam (Netherlands), 2019.
4. Department of Psychology, York University, Toronto (Canada), 2017.
5. Allen Institute for Brain Science, Seattle (USA), 2016.
6. Group for Neural Theory, Ecole Normale Superieure, Paris (France), 2016.
7. Initiative for Theoretical Sciences, CUNY (USA), 2015.
8. Institute of Mathematical Sciences, ECNU-NYU Shanghai (China), 2013.
9. Computational Laboratory of Cortical Dynamics, Yale University (USA), 2013.
10. Neural Information Processing Group, Technical Univ. of Berlin (Germany), 2009.

Reviewer duties

- *Ad hoc* reviewer for Nature Communications, Science Advances, Cerebral Cortex, PLoS Computational Biology, Physical Review Letters, Physical Review X, and others.
- Editorial roles at Frontiers in Applied Mathematics –Section of Dynamical Systems, Frontiers in Systems Neuroscience and Frontiers in Computational Neuroscience. Guest editor at Neurocomputing.
- Grant reviewer for different agencies, including AAAS, ERC, Human Brain Project and NWO.

Other merits

- Languages: Spanish (native), English (fluent), French (basic), Dutch (basic).
- Programming/software: FORTRAN, C, bash scripting, Matlab/Octave, Python.
- User level on Windows, Mac OS and Linux environments.
- Regular user of high performance computing (HPC) facilities.
- Scientific outreach: occasional scientific writer at Mapping Ignorance (official popular science platform, University of the Basque Country, Spain). Popular science talks at museums and elementary schools.