Rodrigo Felipe de Oliveira **Pena**

Post-Doctoral Research Associate ·

Federated Department of Biological Sciences · New Jersey Institute of Technology and Rutgers University

Newark, New Jersey, NJ 07102, USA

(+1) 347-825-6540 | pena@njit.edu | rfdopena | 0000-0002-2037-9746

Education

USP(University of São Paulo) — *Ribeirão Preto, São Paulo, Brazil*

Ph.D. in Physics Applied to Medicine and Biology — *Feb. 2014 - Dec. 2018*

HUB(Humboldt Universität zu Berlin) — *Berlin, Germany*

Visiting Ph.D. student, International Research Training Group IRTG 1740 — *Sept. 2015 - Oct. 2016*

EPFL(École Polytechnique Fédérale de Lausanne) — *Lausanne,Switzerland*

Research Internship and exchange studies — *Mar. 2012 - Feb. 2013*

USP(University of São Paulo) — *Ribeirão Preto, São Paulo, Brazil*

B.S. in Medical Physics — *Mar. 2009 - Dez. 2013*

UNASP(University Center Adventist São Paulo) — *Hortolândia, São Paulo, Brazil*

Technical Education in Computer Science — *Feb. 2005 - Dez. 2007*

Honors & Awards

2022	**Poster award winner**, 17th Annual Conference on Frontiers in Applied and Computational Mathematics	*New Jersey, USA*
2019	**Honorable Mention for Ph.D. Thesis due to its excellent quality**, Graduate Program in Physics Applied to Medicine and Biology (FAMB)	*São Paulo, Brazil*
2018	**Travel Award CNS*2018**, Conference Organization For Computational Neuroscience (2018)	*Seattle, USA*
2018	**Best project presented award**, LASCON – Latin American School on Computational Neuroscience (2018)	*São Paulo, Brazil*
2014	**John Roderick Cameron award**, Best student graduating with honors in Medical Physics	*São Paulo, Brazil*
2014	**Second best presentation award**, GCARI-RP meeting	*São Paulo, Brazil*
2012	**Best presentation award**, Brazilian Conference in Medical Physics	*São Paulo, Brazil*
2012	**Science Without Borders**, Brazilian scholarship to pursue one year of studies in Switzerland	*Lausanne*

Publications

Peer reviewed journals

- **Pena, R.F.O.**, Rotstein, H.G. (2022). Oscillations and variability in neuronal systems: the role of autonomous transient dynamics in the presence of fast deterministic fluctuations. *Journal of Computational Neuroscience*, 50:331–355. doi 10.1007/s10827-022-00819-7
- **Pena, R.F.O.**, Rotstein, H.G. (2022). The voltage and spiking responses of subthreshold resonant neurons to structured and fluctuating inputs: persistence and loss of resonance and variability. *Biological Cybernetics*, 116:163–190. doi 10.1007/s00422-021-00919-0
- Mondal, Y., **Pena, R.F.O.**, Rotstein, H.G (2022). Temporal filters in response to presynaptic spike trains: Interplay of cellular, synaptic and short-term plasticity time scales. *Journal of Computational Neuroscience*, 50:395–429. doi 10.1007/s10827-022-00822-y
- Lima, V., **Pena, R.F.O.**, Shimoura, R.O., Kamiji, N.L, Ceballos, C.C., Higa, G.S.V., de Pasquale, R., Roque, A.C. (2021). Modeling and characterizing stochastic neurons based on in vitro voltage-dependent spike probability functions. *The European Physical Journal - Special Topics*, 230:2963–2972. doi 10.1140/epjs/s11734-021-00160-7.
- Shimoura, R.O., **Pena, R.F.O.**, Lima, V., Kamiji, N.L., Girardi-Schappo, M., Roque A.C. (2021). Building a model of the brain: from detailed connectivity maps to network organization. *The European Physical Journal - Special Topics*, 230:2887–2909. doi 10.1140/ep js/s11734-021-00152-7
- Ceballos, C.C., **Pena, R.F.O.**, Roque A.C. (2021). Impact of the activation rate of the hyperpolarization-activated current I_h on the neuronal membrane time constant and synaptic potential duration. *The European Physical Journal - Special Topics*, 230:2951–2961. doi 10.1140/ep js/s11734-021-00176-z
- Shimoura, R.O., **Pena, R.F.O.**, Kamiji, N.L., Lima, V., Roque A.C., Models of neocortical neuronal networks and observed emergent phenomena. *Brazilian Journal of Education in Physics.*, 43: e20200452. doi 10.1590/1806-9126-RBEF-2020-0452
- Lima, V., Dellajustina, F.F., Shimoura, R.O, Girardi-Schappo, M., Kamiji, N.L., **Pena, R.F.O.**, Roque, A.C. Granger causality in the frequency domain: derivation and applications. *Brazilian Journal of Education in Physics*, 42:e20200007. doi 10.1590/1806-9126-RBEF-2020-0007
- **Pena, R.F.O.**, Ceballos C.C., Deus, J.L., Roque, A.C., Garcia-Cairasco, N., Leão, R.M., Cunha A.O. (2020). Modeling hippocampal CA1 GABAergic synapses of audiogenic rats. *International Journal of Neural Systems*, 30:2050022. doi 10.1142/S0129065720500227
- **Pena, R.F.O.**, Lima., V., Shimoura, R.O., Novato, J.P., Roque, A.C. (2020). Optimal interplay between synaptic strengths and network structure enhances activity fluctuations and information propagation in hierarchical modular networks. *Brain Sciences*, 10:228. doi 10.3390/brainsci10040228

- **Pena, R.F.O.**, Lima., V., Ceballos, C.C., Shimoura, R.O., Rotstein, H.G., Roque, A.C. (2019). Asymmetrical voltage response in resonant neurons shaped by nonlinearities. *Chaos*, 29:103135. doi10.1063/1.5110033
- Borges, F.S., Protachevicz, P.R., **Pena, R.F.O.**, Lameu, E.L., Higa, G.S.V., Kihara, A.H., Matias, F.S., Antonopoulos, C.G., de Pasquale, R., Roque, A.C., Iarosz, K.C., Ji, P., Batista, A.M. (2020). Low frequency self-sustained activity in balanced networks. *Physica A*, 537:122671. doi10.1016/j.physa.2019.122671
- **Pena, R.F.O.**, Zaks, M., Roque, A.C. (2018). Spontaneous activity dynamics in random networks of spiking neurons with synaptic noise. *Journal of Computational Neuroscience*, 45:1–28. doi10.1007/s10827-018-0688-6
- **Pena, R.F.O.**, Ceballos, C.C., Lima., V., Roque, A.C. (2018). Interplay of activation kinetics and the derivative conductance determines resonance properties of neurons. *Physical Review E*, 97:042408. doi10.1103/PhysRevE.97.042408
- **Pena, R. F.O.**, Vellmer, S., Bernardi, D., Roque, A. C., and Lindner, B. (2018). Self-Consistent Scheme for Spike-Train Power Spectra in Heterogeneous Sparse Networks. *Frontiers in Computational Neuroscience*, 12:9. doi10.3389/fncom.2018.00009
- Lima, V., **Pena, R.F.O.**, Ceballos, C.C., Shimoura, R.O., Roque, A.C. (2019). Information theory applications in neuroscience. *Brazilian Journal of Education in Physics*, 41:e20180197. doi10.1590/1806-9126-rbef-2018-0197
- Cunha A.O., Ceballos C.C., Deus, J.L., **Pena, R.F.O.**, Oliveira, J.A.C., Roque, A.C., Garcia-Cairasco, N., Leão, R.M. (2018). Intrinsic and synaptic properties of hippocampal CA1 pyramidal neurons of the Wistar Audiogenic Rat (WAR) strain, a genetic model of epilepsy. *Scientific Reports*, 8:10412. doi10.1038/s41598-018-28725-y
- Shimoura, R.O., Kamiji, N.L., **Pena, R.F.O.**, Cordeiro, V., Ceballos, C.C., Romaro, C., Roque, A.C. (2018). [Re] The cell-type specific cortical microcircuit: relating structure and activity in a full-scale spiking network model. *The ReScience Journal*, 4:785-806. doi10.5281/zenodo.1243268
- Ceballos, C. C., **Pena, R. F.**, Roque, A. C., and Leão, R. M. (2018). Non-Decaying postsynaptics potentials and delayed spikes in hippocampal pyramidal neurons generated by a zero slope conductance created by the persistent Na^+ current. *Channels*, 12:81–88. doi10.1080/19336950.2018.1433940
- Tomov, P., **Pena, R. F.**, Roque, A. C., and Zaks, M. A. (2016). Mechanisms of self-sustained oscillatory states in hierarchical modular networks with mixtures of electrophysiological cell types. *Frontiers in Computational Neuroscience*, 10:23. doi10.3389/fncom.2016.00023
- Tomov, P., **Pena, R. F.**, Zaks, M. A., and Roque, A. C. (2014). Sustained oscillations, irregular firing, and chaotic dynamics in hierarchical modular networks with mixtures of electrophysiological cell types. *Frontiers in Computational Neuroscience*, 8:103. doi10.3389/fncom.2014.00103

Thesis

- **Pena, R.F.O.** Emergence of activity fluctuations in cortical network models with heterogeneous neural populations. doi10.11606/T.59.2019.tde-18012019-095012

Other Publications

- My Career in the Midst of a Pandemic: Overcoming the Limitations of COVID-19. *Journal of Stories in Science*. link
- The publication "Modeling hippocampal CA1 GABAergic synapses of audiogenic rats" was in covered by the media in many important national Brazilian newspapers including UOL VivaBem which is a web newspaper content and the fifth most visited website in Brazil (data from 2012). link
- **Pena, R.F.O.**, Lima., V., Ceballos, C.C., Shimoura, R.O., Roque, A.C. (2019). A new measure to evaluate subthreshold resonance in neurons. Book Chapter at *The Production of Knowledge in Biomedical Engineering*, doi10.22533/at.ed.8281901069

Manuscripts submitted or in preparation

- **Pena, R.F.O.**, Ibarra, M.V., Rotstein, H.G. Extracting intrinsic neuronal dynamics from spike-train cross-correlation functions of synaptically connected neurons. **In preparation**.
- **Pena, R.F.O.**, Itani, O., Nadim, F., Rotstein, H.G. Two faces of the same coin: biological and mathematical degeneracy in neuroscience. Invited paper. **In preparation**.
- **Pena, R.F.O.**, Rotstein, H.G. Flexible selection of cognitive tasks and memory suppression in a hippocampus - prefrontal cortex - nucleus reuniens model: role of firing-rate resonance, stochastic resonance and lateral inhibition. **In preparation**.
- Mondal, Y., Benito, V.B., **Pena, R.F.O.**, Rotstein, H.G. Frequency preference response of neurons to presynaptic spike trains: An analysis of frequency-dependent filters in feedforward networks with short-term plasticity. **In preparation**.
- Lowet, E., Mount, R.A., Chialva, U., **Pena, R.F.O.**, Xiao, S., Zhou, S.L., Sheehan, D.J., Tseng, H., Gritton H., Shroff, S., Kondabolu, K., Cheung, C., Mertz, J., Hasselmo, M.E., Rotstein, H.G., Han, X. Cellular voltage rhythmicity organizes distinct spiking output modes in the hippocampus. **In review**. doi10.1101/2022.04.06.487256
- Girardi, V.A., Ferreira, R.F. , **Pena, R.F.O.** Empirical transfer entropy applied to effective connectivity inference. **In preparation**.

Selected abstracts & presentations

- **Pena, R.F.O.**, A deep learning approach to infer connectivity and neuronal dynamics from spike trains, Machine Learning and Optimization Seminar at the Math. Department NJIT, 2023.
- **Pena, R.F.O.**, Ibarra, M., Rotstein, H.G., Intrinsic ionic dynamics, oscillations, and resonance are reflected in and can be extracted from neuronal spike-train cross-correlations, San Diego. SfN 2022.
- **Pena, R.F.O.**, Ibarra, M., Rotstein, H.G., Intrinsic ionic dynamics, oscillations, and resonance are reflected in and can be extracted from neuronal spike-train cross-correlations, Conference on Cognitive Computational Neuroscience, 2022.
- **Pena, R.F.O.**, Ibarra, M., Rotstein, H.G., Extracting intrinsic neuronal dynamics from spike-train cross-correlation functions of synaptically connected neurons, 17th Annual Conference on Frontiers in Applied and Computational Mathematics (FACM'22), 2022.
- **Pena, R.F.O.**, Chialva, U., Rotstein, H.G., The contribution of subthreshold voltage patterns to the theta-gamma hippocampal activity: a computational model, 17th Annual Conference on Frontiers in Applied and Computational Mathematics (FACM'22), 2022.
- **Pena, R.F.O.**, The Brief History of a Computional Neuroscientist, PUB NY meeting, Consulate General of Brazil in New York, 2022.
- **Pena, R.F.O.**, Rotstein, H.G., Resonance-based flexible selection of cognitive tasks and memory suppression in a hippocampus–prefrontal cortex network regulated by the nucleus reuniens, 50th Annual Meeting SfN, 2021.

- **Pena, R.F.O.**, Revealing the Link between Spiking Cross-Correlation Patterns and the Underlying Subthreshold Neuronal Dynamics, Conference on Dynamical Systems at SIAM Society for Industrial and Applied Mathematics, 2021.
- **Pena, R.F.O.**, Rotstein, H.G., Modeling theta-band resonance in a neocortical circuit, NeuroMatch 2.0, 2020.
- **Pena, R.F.O.**, Rotstein, H.G., Biophysics and dynamics shape the cross-correlation properties of monosynaptic connections, 29th Annual Computational Neuroscience Meeting (CNS), 2020
- Y. Mondal, **Pena, R.F.O.**, Rotstein, H.G., Synaptic short-term plasticity and temporal filters: interplay of synaptic and postsynaptic dynamics, 29th Annual Computational Neuroscience Meeting (CNS), 2020.
- **Pena, R.F.O.**, Rotstein, H.G., Modeling theta-band resonance in a neocortical circuit, 29th Annual Computational Neuroscience Meeting (CNS), 2020.
- **Pena, R.F.O.**, Chialva, U., Rotstein, H.G., Neuronal resonance may not be apparent, but still present, for realistic input signals using standard impedance measurements, 29th Annual Computational Neuroscience Meeting (CNS), 2020.
- **Pena, R.F.O.**, Perspectives in Biophysics and Computational Neuroscience, UNESCO Complex systems digital campus, UFRGS, 2020.
- **Pena, R.F.O.**, Different perspectives when creating models in computational neuroscience, Federal University of Alagoas UFAL, 2020.
- **Pena, R.F.O.**, Revealing the Link between Spiking Cross-Correlation Patterns and the Underlying Subthreshold Neuronal Dynamics,Dynamics Days D 2020, 2020.
- **Pena, R.F.O.**, Emergence of activity fluctuations in cortical network models with heterogeneous neural populations, Biomathematics / Computational Biology Colloquium at Courant Department of Mathematics at New York University (NYU), 2019.
- **Pena, R.F.O.**, Roque, A.C., Zaks, M.A., Lifetime of self-sustained activity in random networks of two-dimensional integrate-and-fire neurons: role of input strength, Bernstein Conference, 2018. doi 10.12751/nncn.bc2018.0146
- **Pena, R.F.O.**, Zaks, M.A., Roque, A.C., Spontaneous activity patterns in networks of two-dimensional integrate and fire neurons with synaptic noise, Bernstein Conference, 2018. doi 10.12751/nncn.bc2018.0147
- **Pena, R.F.O.**, Lima, V., Celis, C.C., Roque, A.C., On the subthreshold resonance properties of neurons, 27th Annual Computational Neuroscience Meeting (CNS), 2018.
- **Pena, R.F.O.**, Bernardi D., Roque A.C., Lindner B., Determination of the spike-train power spectrum statistics in modular networks with mixtures of different excitatory and inhibitory populations, BMC Neuroscience (Online) doi 10.1186/s12868-017-0371-2, 2017.
- **Pena, R.F.**, Zaks, Michael A., Roque A.C., Noise-enhanced transition from synchronized to desynchronized states in a cortical network model, 2017, Washington. SfN 2017.
- **Pena, R.F.O.**, Roque A.C., Zaks, Michael A., Synaptic noise facilitates transitions from sleep-like state to awake-like state, 2017, Araraquara. SBNeC annual meeting, 2017.
- **Pena, R.F.O.**, Bernardi, D., Roque A.C., Lindner, B., Self-consistency in the second-order correlation statistics: from network to a single-neuron scheme, PNLD 2016.
- **Pena, R.F.O.**, Tomov, P., Roque A.C., Zaks, M., Up-down states in a neural network model and their relation with the individual neurons, PNLD 2016.
- **Pena, R.F.O.**, Tomov, P., Roque A.C., Zaks, M.A., Mechanisms of oscillatory self-sustained activity in a cortical model. ICMNS 2016.
- **Pena, R.F.O.**, Tomov, P., Roque A.C., Zaks, M.A., Breakdown and resumption of oscillatory self-sustained activity in hierarchical modular networks, FENS 2016, Copenhagen.
- Shimoura, R.O., **Pena, R.F.O.**, Roque A.C., Effect of synaptic plasticity on functional connectivity and global activity of a neocortical network model. BMC Neuroscience (Online), doi 10.1186/1471-2202-16-S1-P210, 2015.
- **Pena, R.F.O.**, Shimoura, R.O., Roque A.C., A cortical multi-layered model and the properties of its internally-generated activity. BMC Neuroscience (Online), doi 10.1186/1471-2202-16-S1-P209, 2015.
- **Pena, R.F.O.**, Roque A.C., A cortical microcircuit model to study structure-activity relationships. USP - SP 2015.
- **Pena, R.F.O.**, Tomov, P., Zaks, M.A., Roque A.C., Self-sustained Activity Lifetime in a Cortical Network Model, 9th World Congress International Brain Research Organization, 2015.
- Shimoura, R., **Pena, R.F.O.**, Roque A.C., Dynamics of a Cortical Multi-layered Model with Cells of Different Electrophysiological Classes, 9th World Congress International Brain Research Organization, 2015.
- Petar, Tomov, **Rodrigo, Pena.**, Michael, Zaks, Antonio, Roque, Self-sustained activity in cortical network models. Frontiers in Neuroinformatics, doi 10.3389/conf.fninf.2014.18.00007, 2014.
- **Pena, Rodrigo F.O.**, Roque A.C., A bio-inspired computational model to study cortical dynamics, SBNeC anual meeting, 2014.
- Roque A.C., Zaks, M., **Pena, R.F.O.**, A cortical multi-layered computational model and its dynamical properties. INPE, IRTG anual meeting at São José dos Campos 2014.
- Vieira, Diogo PC, **Pena, F.O.**, Roque, Antonio C., Self-sustained activity in neural networks: influence of network topology and cell types. BMC Neuroscience (Online), doi 10.1186/1471-2202-14-S1-P411, 2013.
- Vieira, D. P. C.,**Pena, R.F.O.**, Roque A.C., A study of spontaneous activity in modular neural networks made of neurons of different intrinsic dynamics, Dynamics Days Madrid, 2013.
- **Pena, R. F. O.**, Vieira, D. P. C., Roque A.C., Effect of topology and neuronal composition of a computational cortical model on self-sustained activity, SBNeC annual meeting, 2013.
- **Pena, R.F.O.**, Gaumier, C., Modeling diseases propagation using graph theory, Brazilian Conference in Medical Physics 2013.
- Tomov, P., Roque A.C., **Pena, R. F. O.**, Zaks, M., Modeling of self-sustained activity in neural networks, Dynamics Days BB, TU Berlin, 2013.
- **Pena, R.F.O.**, Roque A.C., Vieira, D. P. C., Construction and Analysis of a Modular and Hierarchical Model for the Cerebral Cortex, USP - Universidade de São Paulo 2011.

Teaching experience & organization of scientific events

Invited lecturer for the course Advanced Computational Neuroscience at NJIT 2023 — *Spring 2023*

- Responsible for teaching Information Theory for Neuroscientists.

Invited lecturer for the course Introduction to Computational Neuroscience at NJIT 2022 — *Autumn 2022*

- Responsible for teaching Machine Learning.

Invited lecturer for the course Introduction to Systems Biology at NJIT 2022 — *Spring 2022*

- Responsible for teaching crash courses on Python and Machine Learning.

Information Theory on Neuroscience course at NJIT — *Fall 2021*

- Responsible for teaching a short course on Information Theory for neuroscientists.

Satellite workshop at the Bernstein Conference 2021 — *2021*

- Responsible for the organization and selection of speakers of the satellite workshop “Frequency-preference responses to external perturbations: from neurons to networks” at the Bernstein Conference 2021. Also a speaker at the event.

Introductory course in data analysis and resonance *2020*

- Responsible for the organization and selection of speakers of the course "Introduction to modeling and data analysis tools to capture resonance phenomena" at the XLIII Annual Meeting of the Brazilian Society for Neuroscience – SBNeC 2020. Also a speaker at the event.

Satellite workshop at the Bernstein Conference 2018 *2018*

- Responsible for the organization and selection of speakers of the satellite workshop "Resonance in neurons and neural networks: theoretical and experimental approaches" at the Bernstein Conference 2018. Also a speaker at the event.

Introduction to Computational Neuroscience *2018*

- Responsible for a lecture in a 3 days Introduction to Computational Neuroscience course in the XLI Annual Meeting of the Brazilian Society for Neuroscience (SBNeC).

Numerical Methods for Differential Equations *Autumn 2018*

- Teaching Assistant.

Tutorial course in Computational Neuroscience *2018*

- Responsible for a 2 days hands-on Computational Neuroscience course Satellite of the XLI Annual Meeting of the Brazilian Society for Neuroscience (SBNeC).
- Course available at sisne.org/eventos/pcn2

Tutorial course in Computational Neuroscience *2017*

- Responsible for a 2 days hands-on Computational Neuroscience course Satellite of the XL Annual Meeting of the Brazilian Society for Neuroscience (SBNeC).
- Course available at sisne.org/eventos/praticoneuro

Tutorial course in Computational Neuroscience *2017*

- Responsible for a 5 days hands-on laboratory entitled "Neuro Mathematics" during the 4th Summer School on Intelligent signal processing for Frontier Research and Industry.

Physics II – Waves, Fluids and Thermodynamics *Autumn 2017*

- Teaching Assistant.
- Helped prepare lecture material and answered student questions for office hours.

Computational Physics *Spring 2015*

- Teaching Assistant.
- Helped prepare lecture material, graded students exercises, and answered student questions for office hours.

Biophysics II *Spring 2011*

- Teaching Assistant.
- Answered student questions for office hours.

Physics I – Classical Mechanics *Spring 2010*

- Teaching Assistant.
- Answered student questions for office hours.

Mentoring activity

Universitat Politècnica de Catalunya

Guillermo Villanueva Benito (Master Degree research project) *2022*

- Network models in neuroscience.
- Co-supervised with Prof. Horacio Rotstein and Farzan Nadim.

Universidad de la Patagonia

Martin V Ibarra (Doctoral candidate project) *2021*

- Extracting intrinsic neuronal dynamics from spike-train cross-correlation functions of synaptically connected neurons.
- Co-supervised with Prof. Horacio Rotstein.

UFSCAR

Joao Victor Russo Izzi (Undergrad research project) *2022*

- Effective connectivity between neurons.
- Co-supervised with Prof. Ricardo Felipe Ferreira.

UFSCAR

Vitor Gomes Schiavone (Undergrad research project) *2022*

- Inference of neuronal connectivity and the model of Galves and Locherbach.
- Co-supervised with Prof. Ricardo Felipe Ferreira.

NJIT

Shiva Senthilkuma (Undergrad research project) *2021*

- Dynamics of Generalized Half-Center Oscillator Neuronal Networks.

NJIT

Nicholas Ramella (Undergrad research project) *2020*

- Biophysical characterization of auto- and cross-correlation from spiking neurons.

NJIT

Rajeev B Botadra (Undergrad research project) *2020*

- Characterization of auto- and cross-correlation from spiking neurons with genetic algorithms.

UFSCAR

Victor Augusto Girardi (Undergrad research project) *2020*

- Inference of neuronal connectivity via information theory measures.
- Co-supervised with Prof. Ricardo Felipe Ferreira.

USP

Joao Paulo Novato de Oliveira (Undergrad research project) *2017*

- Neuronal avalanches in hierarchical and modular cortical network models.
- Co-supervised with Prof. Antonio Roque.

Programming Languages & Environments

- Fluent in C/C++, Matlab, Python (including parallel programming with joblib and multiprocessing libraries).
- Simulation tools for neuroscience including Brian, Brian2 and NEURON.
- Machine learning and Deep learning python packages such as scikit-lean and PyTorch.
- Experience with LaTeX and UNIX-based systems.

Membership in professional organizations

- Society for Neuroscience
- Organization for Computational Neuroscience
- Brazilian Society of Neuroscience and Behavior

Academic Service

Peer review activity

- IEEE Access (reviewed 7 papers)
- Cognitive Neurodynamics (reviewed 4 papers)
- Entropy (reviewed 3 papers)
- Frontiers in Computational Neuroscience (reviewed 3 papers)
- Frontiers in Neural Circuits (reviewed 1 paper)
- Frontiers in Applied Mathematics and Statistics (reviewed 1 paper)
- Frontiers in Cellular Neuroscience (reviewed 1 paper)
- Applied Sciences (reviewed 3 papers)
- European Physical Journal - Special Topics (reviewed 1 paper)
- Review of Scientific Instruments (reviewed 1 paper)
- Chaos: An Interdisciplinary Journal of Nonlinear Science (reviewed 1 paper)
- Big Data and Cognitive Computing (reviewed 2 papers)
- Processes (reviewed 1 paper)
- Journal of Sensor and Actuator Networks (reviewed 1 paper)
- Scientific Reports (reviewed 1 paper)
- Electronics (reviewed 2 papers)
- International Journal of Environmental Research and Public Health (reviewed 1 paper)
- Sensors (reviewed 4 papers)
- Mathematics (reviewed 2 papers)
- Algorithms (reviewed 1 paper)
- Symmetry (reviewed 1 paper)
- Brain Sciences (reviewed 1 paper)
- Applied Physics Letters (reviewed 1 paper)
- Epilepsy & Behavior (reviewed 1 paper)
- Science Progress (reviewed 1 paper)
- Brazilian Journal of Physics (reviewed 1 paper)

Editorial activity

- Guest Editor Brain Sciences
- Reviewer Editor Frontiers in Computational Neuroscience

Summary of scientific projects & collaborations

Post-Doctoral Research Associate (Supervised by Prof. Horacio G. Rotstein) *Newark, New Jersey, USA*

New Jersey Institute of Technology *2019 - PRESENT*

- Theoretical and computational research addressing neuronal mechanisms of generation of network resonance.
- Extracting information from neuronal spike-train cross-correlations with deep learning approaches.
- Supported by the National Science Foundation grant DMS-1608077 (HGR).

Collaboration with the Department of Statistics(Prof. Ricardo Felipe Ferreira) *São Carlos, São Paulo*

Federal University of São Carlos *2020 - PRESENT*

- Effective neuronal connectivity inference with information theory.

Ph.D project (Supervised by Prof. Antonio C. Roque) *Ribeirão Preto, São Paulo*

University of São Paulo *2014 - 2018*

- Activity propagation in hierarchical and modular networks of spiking neurons.
- Supported by a FAPESP Ph.D. scholarship (grant 2013/25667-8).

Collaboration with the Laboratory of Electrophysiology at the School of Medicine of Ribeirão Preto, University of São Paulo (Dra. Alexandra Cunha and Dr. Ricardo Leão) *Ribeirão Preto, São Paulo*

University of São Paulo *2017 - PRESENT*

- Modeling of synaptic properties from audiogenetic wistar rats.
- Application of computational methods in electrophysiological recordings.

Ph.D exchange project (Supervised by Dr. Michael Zaks) *Berlin, Germany*

Humboldt Universität zu Berlin *2015 - 2016*

- Self-sustained activity in hierarchical and modular networks with synaptic noise.
- Supported by a FAPESP Research Internships Abroad (BEPE) fellowship (grant 2015/09916-3).

Ph.D exchange project (Supervised by Prof. Benjamin Lindner) *Berlin, Germany*

Bernstein Center for Computational Neuroscience *2015 - 2016*

- Determination of second-order (power spectrum) spike-train statistics with an iterative scheme.
- Research under the scope of the International Research Training Group (IRTG) 1740.

Research internship project (Supervised by Dr. Christian Gaumier) *Lausanne, Switzerland*

École Polytechnique Fédérale de Lausanne *2012 - 2013*

- Modeling disease propagation using graph theory.
- Supported by the Science without Borders fellow (CNPq).

Undergraduate scientific project (Supervised by Prof. Antonio C. Roque) *Ribeirão Preto, São Paulo*

University of São Paulo *2010 - 2013*

- Self-sustained activity in cortical networks of spiking neurons.
- Supported by a FAPESP scholarship for undergraduate students (grant 2011/06806-1).

Undergraduate scientific project (Supervised by Prof. Lauro Wichert Ana) *Ribeirão Preto, São Paulo*

Clinics Hospital of Ribeirão Preto *2009 - 2010*

- Integration of different institutional databases: acquisition of medical-hospital equipment, confrontation and correction of inconsistencies, and search for clinical evidence for technical-scientific advice.
- Supported by a FAEPA scholarship.