

Curriculum Vitae¹

Horacio G. Rotstein, PhD

Federated Department of Biological Sciences
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Professor,

Mathematical Biology & Computational Neuroscience,
Federated Department of Biological Sciences,
Rutgers University / NJIT.

Graduate Faculty Member,

Behavioral Neuroscience (BNS) Program,
Center for Molecular and Behavioral Neurosciences (CMBN),
Rutgers University.

Core Faculty Member and Interim Co-director,

Institute for Brain and Neuroscience Research (IBNR),
NJIT.

Corresponding Investigator,

Consejo Nacional de Investigaciones Científicas y Técnicas -
CONICET, Argentina.

Education

- **Doctor of Philosophy (PhD).** Interdisciplinary Committee of Applied Mathematics, **TECHNION - Israel Institute of Technology**, Haifa, Israel, 1998.
Thesis: Phase transition dynamics with memory.
- **Master of Science (MSc) in Applied Mathematics.** Interdisciplinary Committee of Applied Mathematics, **TECHNION - Israel Institute of Technology**, Haifa, Israel, 1994.
Thesis: Coagulation equations with cluster-wall interactions.
- **Licenciado en Química** (5 years program). Departamento de Química e Ingeniería Química, **UNS - Universidad Nacional del Sur**, Bahía Blanca, Argentina, 1989.
Thesis: evaluation of an AgI electrochemical cell as a I₂(g) sensor.

Languages: Spanish, Hebrew and English (fluent, languages of instruction). Basic knowledge of French and Italian.

¹Updated August 24, 2020

Professional Experience

- 2019 - **Interim Co-Director**,
Institute for Brain and Neuroscience Research (IBNR),
New Jersey Institute of Technology, Newark, NJ, USA.
- 2017 - **Professor**,
Mathematical Biology & Computational Neuroscience,
Federated Department of Biological Sciences,
Rutgers University & New Jersey Institute of Technology,
Newark, NJ, USA.
- 2015 - 2017 **Professor**,
Department of Mathematical Sciences,
New Jersey Institute of Technology, Newark, NJ, USA.
- 2016 - **Corresponding Investigator**,
Consejo Nacional de Investigaciones Científicas y Técnicas
(CONICET), Argentina.
- 2015 - 2015 **Visiting Professor**,
Instituto del Cálculo, Facultad de Ciencias Exactas y Naturales,
Universidad de Buenos Aires, Buenos Aires, Argentina.
- 2012 - **Visiting Scholar/Academic**,
Courant Institute of Mathematical Sciences,
New York University, New York, NY, USA
- 2011- 2015 **Associate Professor**,
Department of Mathematical Sciences,
New Jersey Institute of Technology, Newark, NJ, USA.
- 2006 - **Graduate Faculty Member**,
Behavioral Neuroscience (BNS) Program,
Center for Molecular and Behavioral Neurosciences (CMBN),
Rutgers University, Newark, NJ, USA.
- 2006 - 2017 **Graduate Faculty Member**,
Federated Department of Biological Sciences,
Rutgers University - NJIT, Newark, NJ, USA.
- 2006 - 2011 **Assistant Professor**,
Department of Mathematical Sciences,
New Jersey Institute of Technology, Newark, NJ, USA.
- 2004 - 2006 **Research Assistant Professor**,
Center for Biodynamics and Department of Mathematics,
Boston University, Boston, MA, USA.
- 2001 - 2004 **Research Associate and Lecturer**,
Center for Biodynamics and Department of Mathematics,
Boston University, Boston, MA, USA.
- 1999 - 2001 **Postdoctoral fellow**,
Department of Chemistry and Volen Center for Complex Systems,
and **Lecturer**, (2000-2001), Department of Mathematics,
Brandeis University, Waltham, MA, USA.
- 1998 - 1999 **Technion Postdoctoral Research Fellow / Instructor**,
Department of Mathematics, 2
TECHNION - Israel Institute of Technology, Haifa, Israel.

- 1998 - 1999 **Lecturer**,
School of Mathematical Sciences,
Tel Aviv University, Israel.
- 1991 - 1998 **Teaching Assistant**,
Department of Mathematics,
TECHNION - Israel Institute of Technology, Haifa, Israel.
- 1990 - 1991 **Instructor**,
Department of Chemistry,
TECHNION - Israel Institute of Technology, Haifa, Israel.
- 1989 - 1990 **Full-Time Teaching and Research Assistant**,
Department of Chemistry and Chemical Engineering,
UNS - Universidad Nacional del Sur,
Bahía Blanca Argentina.
- 1988 - 1989 **Teaching Assistant**,
Department of Mathematics,
UNS - Universidad Nacional del Sur, Bahía Blanca, Argentina.

Administrative positions

- 2017 **Chair**, Faculty Senate Standing Committed on Academic Outreach.
New Jersey Institute of Technology.
- 2018 - 2020 **Chair**, Institutional Review Board (IRB).
New Jersey Institute of Technology.

Publications

Theses

- [1] **Horacio G. Rotstein**, Phase transition dynamics with memory. **PhD thesis. TECHNION** - Israel Institute of Technology, 1998. Supervisors: Alexander A. Nepomnyashchy and Simon Brandon.
- [2] **Horacio G. Rotstein**, Coagulation Equations with Cluster-Wall Interactions. **MSc thesis. TECHNION** - Israel Institute of Technology, 1994. Supervisors: Amy Novick-Cohen and Rina Tannenbaum.
- [3] **Horacio G. Rotstein**, Evaluacion de una Pila de $AgI(s)$ como Sensor de $I_2(g)$. **Fifth year Undergraduate Thesis** (Advanced Chemistry Lab), **UNS** - Universidad Nacional del Sur, 1988. Supervisor: Julio C. Bazan.

Peer Reviewed

- [1] **Horacio G. Rotstein, Amy Novick-Cohen, Rina Tannenbaum**, Gelation and cluster growth with cluster-wall interactions (1998). *J. Stat. Phys.* **90** (1/2):119-143.

- [2] **Horacio G. Rotstein, Alexander I. Domoshnitsky, Alexander A. Nepomnyashchy**, Phase transition dynamics with memory (1998). *Funct. Differ. Eqs. (International Conference on Functional Differential Equations)* **5 (3-4)**: 439-451.
- [3] **Horacio G. Rotstein, Alexander A. Nepomnyashchy, Amy Novick-Cohen**, Hyperbolic non-conserved phase field equations (1999). *J. Crystal Growth (Proceedings of the ICaCG12)* **198-199**:1262-1266.
- [4] **Horacio G. Rotstein, Simon Brandon, Amy Novick-Cohen**, Hyperbolic flow by mean curvature (1999). *J. Crystal Growth (Proceedings of the ICCG12)* **198-199**:1256-1261.
- [5] **Horacio G. Rotstein, Alexander A. Nepomnyashchy**, Dynamics of kinks in two dimensional hyperbolic models (2000). *Physica D* **136**: 245-265.
- [6] **Boris Malomed, Horacio G. Rotstein**, A quasicrystallic domain wall in nonlinear dissipative systems (2000). *Physica Scripta* **62**: 164-168.
- [7] **Horacio G. Rotstein, Alexander I. Domoshnitsky, Alexander A. Nepomnyashchy**, Front motion for phase transitions in systems with memory (2000). *Physica D* **146**: 137-149.
- [8] **Boris Malomed, Horacio G. Rotstein**, Ramped-induced states in the parametrically driven Ginzburg-Landau model (2001). *Phys. Lett. A* **283**: 327-334.
- [9] **Horacio G. Rotstein, Igor Mitkov, Anatol M. Zhabotinsky, Irving R. Epstein**, Dynamics of Kinks in One- and Two- Dimensional Hyperbolic Models with Quasi-discrete Nonlinearities (2001). *Phys. Rev. E* **63**:066613.
- [10] **Maurizio Graselli, Horacio G. Rotstein**, Hyperbolic phase-field dynamics with memory (2001). *J. Math. Anal. Appl.* **261**: 205-230.
- [11] **Horacio G. Rotstein, Simon Brandon, Amy Novick-Cohen, Alexander Nepomnyashchy**, Phase Field Equations with Memory: the Hyperbolic Case (2001). *SIAM J. Appl. Math.* **62**: 264-282.
- [12] **Mariela Sola, Horacio G. Rotstein, Julio C. Bazan**, The $Ag/AgI/Graphite$ solid cell as iodine sensor: speed of response and use of Cs -doped AgI as electrolyte (2002). *J. Solid State Electrochem. (JOSSEC)* **6**:279-283.
- [13] **Horacio G. Rotstein, Anatol M. Zhabotinsky, Irving R. Epstein**, Dynamics of one- and two- dimensional kinks in bistable reaction diffusion equations with quasi-discrete sources of reaction. *Chaos* **11**:833-842, 2001.
- [14] **Horacio G. Rotstein, Rina Tannenbaum** Cluster coagulation and growth limited by surface interactions with polymers (2002). *J. Phys. Chem. B* **106**: 146-151.
- [15] **Horacio G. Rotstein, Nancy Kopell, Anatol M. Zhabotinsky, Irving R. Epstein**, A canard mechanism for localization in systems of globally coupled oscillators (2003). *SIAM J. Appl. Math.* **63**:1998-2019.

- [16] **Vicenç Méndez, Joaquim Fort, Horacio G. Rotstein, Sergei Fedotov**, Speed of reaction-diffusion fronts in spatially heterogeneous media (2003). *Phys.Rev. E*. **68**:041105.
- [17] **Horacio G. Rotstein, Nancy Kopell, Anatol M. Zhabotinsky, Irving R. Epstein**, Canard phenomenon and localization of oscillations in the Belousov-Zhabotinsky reaction with global feedback (2003). *J. Chem. Phys.* **119**:8824-8832.
- [18] **Horacio G. Rotstein, Rina Tannenbaum**, Distribution patterns due to diffusion in a coagulation-fragmentation process with cluster-wall interactions (2004). *Chem. Eng. Comm.* **191** (9):1234-1257.
- [19] **Horacio G. Rotstein, Dmitri Pervouchine, Martin J. Gillies, Corey D. Acker, John A. White, Eberhardt H. Buhl, Miles A. Whittington, Nancy Kopell** Slow and fast inhibition and an h-current interact to create a theta rhythm in a model of CA1 interneuron networks (2005). *J. Neurophysiol.* **94**:1509-1518.
- [20] **Tengis Gloveli, Tamar Dugladze, Horacio G. Rotstein, Roger D. Traub, Hannah Monyer, Uwe Heinemann, Miles A. Whittington, Nancy Kopell**. Orthogonal arrangement of rhythm generating microcircuits in the hippocampus (2005). *Proc. Nat. Acad. Science. U S A.* **102**:13295-13300.
- [21] **Robert Clewley, Horacio G. Rotstein, Nancy Kopell**. A computational tool for the reduction of nonlinear ODE systems possessing multiple scales (2005). *SIAM Journal of Multiscale modelling and simulations* **4**:732-759.
- [22] **Horacio G. Rotstein, Rachel Kuske.** Localized and asynchronous patterns via canards in coupled calcium oscillators (2006). *Physica D* **215**:46-61.
- [23] **Dmitri D. Pervouchine, Theoden I. Netoff, Horacio G. Rotstein, John A. White, Mark O. Cunningham, Miles A. Whittington, Nancy Kopell**. Low-dimensional maps encoding dynamics in the entorhinal cortex and hippocampus (2006). *Neural Computation* **18**: 2617-2650.
- [24] **Horacio G. Rotstein, Anatol A. Zhabotinsky, Irving R. Epstein.**, Localized structures in a nonlinear wave equation: Propagation failure of one-dimensional and quasi-two-dimensional kinks (2006). *Phys. Rev. E* **74**: 016612.
- [25] **Horacio G. Rotstein, Tim Oppermann, John A. White, Nancy Kopell**. The dynamic structure underlying subthreshold oscillatory activity and the onset of spikes in a model of medial entorhinal cortex stellate cells (2006). *J. Comp. Neurosci.* **21**: 271-292.
- [26] **Nancy Kopell, Dmitri Pervouchine, Horacio G. Rotstein, Teoden Netoff, Miles Whittington, Tengis Gloveli**. Multiple rhythms and switches in the nervous system (2007). *Proceedings of the Second International Symposium on the Frontier of Applied Mathematics, in honor of Prof. C.C. Lin*.

- [27] **Adriano B. L. Tort, Horacio G. Rotstein, Tamar Dugladze, Tengis Gloveli, Nancy Kopell** Formation of gamma coherent cell assemblies by oriens lacunosum-moleculare interneurons in the hippocampus: a modeling study (2007). *Proc. Nat. Acad. Science. U S A.* **104**:13490-13495.
- [28] **Horacio G. Rotstein, Farzan Nadim** Neurons and neural networks: Computational models (2007). In: *Encyclopedia of Life Sciences. John Wiley & Sons, Ltd: Chichester* <http://www.els.net/> [DOI: 10.1002/9780470015902.a0000089.pub2]
- [29] **Morten Brøns, Tasso J. Kaper, Horacio G. Rotstein** Introduction to focus issue: Mixed mode oscillations: Experiment, Computation, and analysis (2008). *Chaos* **18**:015101 (1-4).
- [30] **Martin Krupa, Nikola, Popović, Nancy Kopell, Horacio G. Rotstein** Mixed-mode oscillations in a three time-scale model for the dopaminergic neuron (2008). *Chaos* **18**:015106 (1-19).
- [31] **Horacio G. Rotstein, Martin Wechselberger.** Rhythmic activity in the medial entorhinal cortex: dynamical systems and biophysical modeling (2008). *Actas de la Academia Nacional de Ciencias, Córdoba - Argentina* **14**:23-37.
- [32] **Horacio G. Rotstein, Martin Wechselberger, Nancy Kopell.** Canard induced mixed-mode oscillations in a medial entorhinal cortex layer II stellate cell model (2008). *SIAM J. Appl. Dyn. Sys. (SIADS)* **7**:1582-1611.
- [33] **Jozsi Jalics, Martin Krupa, Horacio G. Rotstein** Mixed-mode oscillations in a three time scale system of ODEs motivated by a neural model (2010). *Dynamical Systems: An International Journal*, **25**:445-482.
- [34] **Yassine Boubendir, Vicenç Méndez, Horacio G. Rotstein.** Dynamics of one- and two-dimensional fronts in a bistable equation with delayed feedback: Propagation failure and control mechanisms (2010). *Phys. Rev. E.* **82**:036601 (1-20).
- [35] **Tilman Kispersky, John A. White, Horacio G. Rotstein.** The Mechanism of abrupt transition between theta and hyper-excitable spiking activity in medial entorhinal cortex layer II stellate cells (2010). *PLoS One* **5**:e13697 (1-21).
- [36] **Horacio G. Rotstein, Stephen Coombes, Ana Maria Gheorghe.** Canard-like explosion of limit cycles in two-dimensional piecewise-linear models of FitzHugh-Nagumo type (2011). *SIAM J. of Applied Dynamical Systems (SIADS)*, **11**:135-180.
- [37] **Horacio G. Rotstein and Hui Wu.** Dynamic mechanisms of generation of oscillatory cluster patterns in a globally coupled chemical system (2012). *J Chem Phys*, **137**:104908 (1-20).
- [38] **Horacio G. Rotstein and Hui Wu.** Swing, release, and escape mechanisms contribute to the generation of phase-locked cluster patterns in a globally coupled FitzHugh-Nagumo model (2012). *Phys Rev E*, **86**:066207 (1-18).

- [39] **Horacio G. Rotstein** Abrupt and gradual transitions between low and hyperexcited firing frequencies in neuronal models with fast synaptic excitation: A comparative study (2013). *Chaos*, **23**: 046104 (1-22).
- [40] **Horacio G. Rotstein, Farzan Nadim**. Frequency preference in two-dimensional neural models: a linear analysis of the interaction between resonant and amplifying currents (2013). *J. Comp. Neurosci.*, **37**:9-28.
- [41] **Eran Stark, Ronny Eichler, Lisa Roux, Shigeyoshi Fujisawa, Horacio G. Rotstein, György Buzsáki**. Inhibition induced theta resonance in cortical circuits (2013). *Neuron*, **80**: 1263-1276.
- [42] **Horacio G. Rotstein, Farzan Nadim** Neurons and neural networks: Computational models (2013). In: *Encyclopedia of Life Sciences. John Wiley & Sons, Ltd: Chichester* <http://www.els.net/> [DOI: 10.1002/9780470015902.a0000089.pub2]
- [43] **Horacio G. Rotstein** Preferred frequency responses to oscillatory inputs in an electrochemical cell model: Linear amplitude and phase resonance (2013). *Phys. Rev. E*, **88**:062913 (1-16)
- [44] **Tasso J. Kaper, Mark A. Kramer, Horacio G. Rotstein**. Introduction to the focus issue: Rhythms and Dynamic Transitions in Neurological Disease: Modeling, Computation, and Experiment (2013). *Chaos*, **23**:046001 (1-4).
- [45] **Horacio G. Rotstein** Subthreshold amplitude and phase resonance in single cells (2014). In: *Encyclopedia of Computational Neuroscience (D. Jaeger and R. Jung, eds., Springer, New York)*, pp:1-12 [DOI: 10.1007/978-1-4614-7320-6_598-1]
- [46] **Horacio G. Rotstein** Mixed-mode oscillations in single neurons (2014). In: *Encyclopedia of Computational Neuroscience (D. Jaeger and R. Jung, eds., Springer, New York)*, pp:1-9
- [47] **David M. Fox, Horacio G. Rotstein, Farzan Nadim** Bursting in Neurons and Small Networks (2014). *Encyclopedia of Computational Neuroscience (D. Jaeger and R. Jung, eds., Springer, New York)*, pp:1-17
- [48] **Horacio G. Rotstein** Frequency preference response to oscillatory inputs in two-dimensional neural models: a geometric approach to subthreshold amplitude and phase resonance (2014). *J Math Neurosci*, **4**:11 (1-41).
- [49] **Horacio G. Rotstein**. Subthreshold amplitude and phase resonance in models of quadratic type: nonlinear effects generated by the interplay of resonant and amplifying currents (2015). *J Comp Neurosci*, **38**:325-354.
- [50] **Horacio G. Rotstein** Cluster-size dynamics: A phenomenological model for the interaction between coagulation and fragmentation processes (2015). *J. Chem. Phys.*, **142**:224101 (1-11).
- [51] **Malena Español, Horacio G. Rotstein** Complex mixed-mode oscillatory patterns in a periodically forced excitable chemical reaction model (2015). *Chaos*. **25** 064601(1-18)

- [52] **Craig Schindewolf, Dongwook Kim, Andrea Bel, Horacio G. Rotstein.** Complex patterns in networks of hyperexcitable neurons with multiple time scales (2016). *Theoretical Computer Science C- Natural Computing, focus issue on “Brain and Neural Networks Computing”.*, 633:71-82.
- [53] **Yinbo Chen, Xinping Li, Horacio G. Rotstein, Farzan Nadim.** Membrane potential resonance frequency directly influences network frequency through gap junctions (2016). *J. Neurophysiol.*, 116:1554-1563.
- [54] **Horacio G. Rotstein, Motolani Olarinre, Jorge Golowasch.** Dynamic compensation mechanism give rise to period and duty cycle level sets in oscillatory neuronal models (2016). *J. Neurophysiol.*, 116:2431-2452
- [55] **Horacio G. Rotstein.** The shaping of intrinsic membrane potential oscillations: positive/negative feedback, ionic resonance/amplification, nonlinearities and time scales (2017). *J. Comp. Neurosci.*, 42:133-166
- [56] **Horacio G. Rotstein.** Resonance modulation, annihilation and generation of anti-resonance and anti-phasonance in 3D neuronal systems: interplay of resonant and amplifying currents with slow dynamics (2017). *J. Comp. Neurosci.* 43:35-63
- [57] **David Fox, Hua-an Tseng, Tomasz Smolinsky, Horacio G. Rotstein, Farzan Nadim.** Mechanisms of generation of membrane potential resonance in a neuron with multiple resonant ionic currents (2017). *PLoS Comp. Bio.*, 13: e1005565
- [58] **Randolph J. Leiser, Horacio G. Rotstein.** Emergence of localized patterns in globally coupled networks of relaxation oscillators with heterogeneous connectivity (2017). *Phys. Rev. E*, 96:022303
- [59] **Horacio G. Rotstein, Elisa Schneider, Lidia Szczupak.** Feedback signal from motoneurons influences a rhythmic pattern generator (2017). *J. Neurosci.*, 37:9149-9159.
- [60] **Dennis A. Burke, Horacio G. Rotstein, Veronica A. Alvarez.** Striatal local circuitry: a new framework for lateral inhibition (2017). *Neuron*, 96:267-284
- [61] **Horacio G. Rotstein.** Spiking resonances in models with the same slow resonant and fast amplifying ionic currents but different subthreshold dynamic properties (2017). *J Comp Neurosci*, 43:243-271
- [62] **Horacio G. Rotstein.** Subthreshold amplitude and phase resonance in single neurons: 2D models (2018). *Encyclopedia of Computational Neuroscience (D. Jaeger and R. Jung, eds., Springer, New York).*
- [63] **Horacio G. Rotstein.** Subthreshold antiresonance and antiphasonance in single neurons: 3D models (2018). *Encyclopedia of Computational Neuroscience (D. Jaeger and R. Jung, eds., Springer, New York).*
- [64] **Axel G. R. Turnquist, Horacio G. Rotstein.** Quadraticization: From conductance-based models to caricature models with parabolic nonlinearities (2018). *Encyclopedia of Computational Neuroscience (D. Jaeger and R. Jung, eds., Springer, New York).*

- [65] **Robert E. Kass, Shun-ichi Amari, Kensuke Arai, Emery N. Brown, Casey O. Diekman, Markus Diesmann, Brent Doiron, Uri T. Eden, Adrienne Fairhall, Grant M. Fiddymment, Tomoki Fukai, Sonja Grün, Matthew Harrison, Moritz Helias, Mark A. Kramer, Hiroyuki Nakahara, Jun-nosuke Teramae, Peter J. Thomas, Mark Reimers, Jordan Rodu, Horacio G. Rotstein, Eric Shea-Brown, Hideaki Shimazaki, Shigeru Shinomoto, and Byron M. Yu.** Computational Neuroscience: Mathematical and Statistical Perspectives (2018). *Annu. Rev. Statistics and its applications*, 5: 183-214
- [66] **Yujia Zhou, Theodore Vo, Horacio G Rotstein, Michelle M McCarthy, Nancy Kopell** M-current expands the range of gamma frequency inputs to which the neuronal target entrains (2018). *J. Math. Neurosci.*, 8:13.
- [67] **Trinh Tran, Cagri T. Unal, Laszlo Zaborszky, Alfredo Kirkwood, Horacio G. Rotstein and Jorge Golowasch.** Ionic current correlations are ubiquitous: evidence from mammalian neurons (2019). *Scientific Reports*, 9:1687.
- [68] **Andrea Bel, Horacio G. Rotstein** Membrane potential resonance in non-oscillatory neurons interacts with synaptic connectivity to produce network oscillations (2019). *J. Comp. Neurosci.*, 46:169-195.
- [69] **Randolph J. Leiser, Horacio G. Rotstein.** Network resonance: impedance interactions via a frequency response alternating map (FRAM) (2019). *SIAM J. Applied Dynamical Systems*, 18:769-807.
- [70] **Andrea Bel, Ana Torresi, Horacio G. Rotstein.** Inhibition-based relaxation oscillations emerge in resonator networks (2019). *Mathematical Modeling of Natural Phenomena.*, 14, 405.
- [71] **Horacio G. Rotstein, Farzan Nadim.** Membrane potential resonance arising from responses of neuronal models to oscillatory inputs in current versus voltage clamp (2019). *Biological Cybernetics*, 113:373395.
- [72] **Rodrigo F. O. Pena, Vinicius Lima, Renan O. Shimoura, Cesar C. Ceballos, Horacio G. Rotstein, Antonio C. Roque.** Asymmetrical voltage response in resonant neurons shaped by nonlinearities (2019). *Chaos*, 29:103135.
- [73] **Andrea Bel, Horacio G. Rotstein** Resonance-based mechanisms of generation of relaxation oscillations in networks of non-oscillatory neurons (2019), *Trends in Mathematics: Research Perspectives (CRM Barcelona, Summer 2018)*.
- [74] **Horacio G. Rotstein, Esteban G. Tabak** Analysis of spike-driven processes through attributable components (2019). *Comm. Math. Sci.*, 17, 1177-1192.
- [75] **Horacio G. Rotstein, Farzan Nadim** Neurons and neural networks: Computational models (2020). *In: Encyclopedia of Life Sciences. John Wiley & Sons, Ltd: Chichester*
- [76] **Takuya Ito, Scott L. Brincat, Markus Siegel, Ravi D. Mil, Biyu J. He, Earl K. Miller, Horacio G. Rotstein, Michael W. Cole.** Task-evoked activity quenches

neural correlations and variability in large-scale brain systems (2020). *PLoS Comput. Biol.*, 16:e1007983.

Book Chapters

- [1] **Horacio G. Rotstein, Rina Tannenbaum**, Polymer-metal nanocluster composites (2002). Invited contribution to “Advances in Nanophase Materials and Nanotechnology (Vol. Functionalization and Surface Treatment of Nanoparticles)” edited by Marie-Isabelle Baraton, American Scientific Publishers.

Preprints (arXiv, bioRxiv)

- [1] **Daniel Levenstein, Veronica A. Alvarez, Asohan Amarasingham, Habiba Azab, Richard C. Gerkin, Andrea Hasenstaub, Ramakrishnan Iyer, Renaud Jolivet, Sara Marzen, Joseph D. Monaco, Astrid A. Prinz, Salma Quraishi, Fidel Santamaría, Sabyasachi Shivkumar, Matthew F. Singh, David B. Stockton, Roger Traub, Horacio G. Rotstein*, Farzan Nadim* , A. David Redish***. On the role of theory and modeling in neuroscience (2020). arXiv:2003.13825 [q-bio.NC]. (* co-senior authors.)
- [2] **Horacio G. Rotstein, Fidel Santamaría**. Present and future frameworks of theoretical neuroscience: outcomes of a community discussion (2020). arXiv:2004.01665 [q-bio.NC].
- [3] **Eran Stark, Horacio G. Rotstein**. Neuronal resonance can be generated independently at distinct levels of organization (2020)

Submitted (papers under peer review process)

- [1] **Daniel Haggerty, Horacio G. Rotstein, Natalie Adams, Vasilejos Glykos, Nancy J. Kopell, Miles A. Whittington, Fiona E. N. LeBeau**. Noradrenergic modulation of theta frequency activity in the hippocampus *in vitro*: lasting effects mediated via beta-adrenergic receptors (β -AR) (2013).
- [2] **Horacio G. Rotstein**. Nonlinearities shape the response patterns to oscillatory inputs in an electrochemical cell model: resonance and more complex patterns (2018)
- [3] **Andrea Bel, Romina Cobiaga, Walter Reartes, Horacio G. Rotstein**. Periodic solutions in threshold-linear networks and their entrainment (2020).
- [4] **Eran Stark, Horacio G. Rotstein**. Neuronal resonance can be generated independently at distinct levels of organization (2020)

Protopapers (to be submitted to peer reviewed journals)

- [1] **Horacio G. Rotstein** Parameter estimation in the age of unidentifiability
- [2] **Jorge Golowasch, Horacio G. Rotstein** Onset of separation of attribute level sets
- [3] **Andrea Bel, Horacio G. Rotstein** Neuronal filter interactions in two-cell networks
- [4] **Horacio G. Rotstein, Eran Stark.** Post-inhibitory rebound interacts with preventing or deleting mechanisms to generate theta spiking resonance in hippocampal CA1 pyramidal cells (2019).
- [5] **Casey Diekman, Emel Khan, Yong-Ick Kim, Horacio G. Rotstein.** Light-driven entrainment of a cyanobacteria circadian oscillator: a dynamic analysis (2017).
- [6] **Juliana Reves-Szemere, Horacio G. Rotstein, Alejandra Ventura.** Frequency preference in covalent modification cycles under sequestration conditions

Teaching Material

- [1] **Tipheret Saadon and Horacio G. Rotstein,** Problems and Solutions for Partial Differential Equations Courses (in Hebrew). **TECHNION - Israel Institute of Technology.**

Research Grants awarded

- **National Science Foundation (NSF) Grant, IOS-2002863.** Co-Principal Investigator. *Collaborative Research: Dynamic interactions of individual neurons in supporting hippocampal network oscillations during behavior*, 1/9/2020 to 8/31/2025
- **National Science Foundation (NSF) Grant, FAIN-1820631.** Principal Investigator. *Workshop: Present and Future Theoretical Frameworks in Neuroscience*, 7/1/2018 to 6/30/19
- **Faculty Seed Grant, NJIT.** Principal Investigator. *The Response of Biological Oscillatory Networks to Periodic Signals*, 10/1/17 to 6/30/18
- **National Science Foundation (NSF) Grant, DMS-1715808.** Co-Principal Investigator. *The role of neuronal ionic current correlations on network activity*, 8/1/17 to 7/31/20.
- **National Science Foundation (NSF) Collaborative Research in Computational Neuroscience (CRCNS) Grant, DMS-1608077.** Principal Investigator. *US-Israel Research Proposal: Network resonance: revealing the neuronal mechanisms*, 9/1/16 to 8/31/21. 9/1/16 to 8/31/20.

- **National Science Foundation (NSF) Grant, DMS-1313861.** Principal Investigator. *Mechanisms of frequency preference in neurons and networks: biophysics and dynamics.* Mathematical Biology Program, Division of Mathematical Sciences (DMS), 9/1/13 to 8/31/17.
- **National Institutes of Health (NIH) Grant, NINDS R56NS085330.** Principal Investigator (with J. Golowasch, multiple PIs). *Ionic conductance correlations tune neuronal network activity to natural inputs,* 9/30/14 to 8/31/15.
- **National Science Foundation (NSF) Grant, DMS-0817241.** Principal Investigator. *Rhythmic oscillations in the entorhino-hippocampal system: biophysics and dynamics.* Mathematical Biology Program, Division of Mathematical Sciences (DMS) and Division of Integrative Organismal Systems, (IOS), 7/1/08 to 6/30/13
- **National Science Foundation (NSF) Grant, Undergraduate Biology and Math Training Program (UBMTP), DMS-0926232.** Investigator. (PI: V. Matveev, CO-PIs: J. Golowasch and G. Russell), 9/1/09 to 9/1/12.

Editorial / Peer Review Activity

- **Recommender (journal editor).** it Peer Reviewer Community (PCI) Math Comp Biol. (2020 - current).
- **Guest Editor and Coordinator. *Chaos (An Interdisciplinary Journal of Non-linear Science)*.** Focus Issue on Mixed-Mode Oscillations: Modeling, Computation, and Experiment (2007-2008). Joint work with Tasso J. Kaper and Mörten Brons.
- **Guest Editor and Coordinator. *Chaos (An Interdisciplinary Journal of Non-linear Science)*.** Focus Issue on Rhythms and Dynamic Transitions in Neurological Disease: Modeling, Computation, and Experiment (2012-2013). Joint work with Tasso J. Kaper and Mark A. Kramer
- **Peer Reviewer** for various scientific journals and conference proceedings including *SIAM J Dyn Sys, J Comp Neurosci, J Math Neurosci, J Neurosci, J Neurophysiol, Cerebral Cortex, Chaos, Physica D, Phys Rev E, Biophys J, PLoS, J Theoret Biol, Neural Networks, CNS Meetings.*
- **National Science Foundation Panel Member.**

Scholarships, Fellowships, Honors and Awards

- **Full Scholarship (expanded on a competitive basis):** MSc studies. Awarded by the **Technion - Israel Institute of Technology**, Haifa, Israel, 10/91 - 07/94.
- **Full Scholarship (expanded on a competitive basis):** PhD studies. Awarded by the **Technion - Israel Institute of Technology**, Haifa, Israel, 08/94 - 07/98.

- **Excellence in Teaching Prize** awarded by the **Technion - Israel Institute of Technology**, Haifa, Israel.
- **Fischbach Fellowship**: postdoctoral research at Brandeis University, awarded by the **Technion - Israel Institute of Technology**, Haifa, Israel, 1999-2001.
- **Dr. César Milstein Fellowship (Subsidio)**, July-August, 2007. Awarded by the *Secretaría de Ciencia, Tecnología e Innovación Productiva; Ministerio de Educación, Ciencia y Tecnología*, Argentina.
- **Dr. César Milstein Fellowship (Subsidio)**, July, 2008. Awarded by the *Secretaría de Ciencia, Tecnología e Innovación Productiva; Ministerio de Educación, Ciencia y Tecnología*, Argentina.
- **Member of the Consulting Committee. International Programs of Scientific and Technological Cooperation (CAPICCyTE)**. Ministry of Science, Technology and Productive Innovation. Argentina (2014-2016).
- **Dr. César Milstein Fellowship (Subsidio)**, March-May, 2015. Awarded by the *Ministerio de Ciencia, Tecnología e Innovación Productiva*, Argentina.
- **“Raíces” Prize 2016** (Premio RAICES a la Cooperación Internacional en Ciencia, Tecnología e Innovación). Awarded by the *Ministry of Science, Technology and Innovation*, Argentina.
- **Distinguished Research Award (2017)**. College of Science and Liberal Arts, New Jersey Institute of Technology, NJ, USA.

Teaching Activity

- **Elements of Algebra, Analytical Geometry, Mathematical Analysis**. Served as a **Undergraduate Student Teaching Assistant**, Department of Mathematics, **UNS** - Universidad Nacional del Sur, Bahía Blanca, Argentina. 1988-1989.
- **Physical Chemistry**. Served as a **Teaching Assistant**, Department of Chemistry and Chemical Engineering, **UNS** - Universidad Nacional del Sur, Bahía Blanca, Argentina. 1989-1990.
- **Chemistry**. Served as a **Teaching Assistant**. Department of Chemistry, **TECHNION**, Israel Institute of Technology, Haifa, Israel. 1990-91.
- **Differential Equations, Ordinary Differential Equations, Partial Differential Equations, Linear Algebra, Fourier Series and Integral Transforms, Differential and Integral Calculus**. Served as a **Teaching Assistant**. Department of Mathematics, **TECHNION**, Israel Institute of Technology, Haifa, Israel. 1991-1998.
- **Ordinary Differential Equations, Differential and Integral Calculus and Topics in Mathematics for Students of Medicine II**. Served as a **Instructor**. Department of Mathematics, **TECHNION**, Israel Institute of Technology, Haifa, Israel. 1998-1999.

- **Harmonic Analysis** (for engineering students). Served as a **Lecturer**. School of Mathematical Sciences, **Tel Aviv University**, Israel. 1998-1999.
- **Introduction to Applied Mathematics (Graduate course)**. Served as **Invited Lecturer**. Department of Mathematics, **UNS - Universidad Nacional del Sur**, Bahía Blanca, Argentina. 1999
- **Applied Linear Algebra, Techniques of Calculus**. Served as a **Lecturer**. Department of Mathematics, **Brandeis University**, Waltham, MA, USA. 2000-2001.
- **Canard Phenomena in Oscillatory Systems and Some Applications (Special Seminar)**. Served as coordinator, overseer and lecturer, Center for Biodynamics, **Boston University**, Boston, MA, USA. 2001-2002.
- **Pattern Formation in Chemistry and Biology (Special Seminar)** Served as coordinator, overseer and lecturer. Center for Biodynamics, **Boston University**, Boston, MA, USA. 2001-2002.
- **Stochastic Differential Equations and Applications (Cross-disciplinary Special Seminar)**. Served as coordinator and overseer. Center for Biodynamics, **Boston University**, Boston, MA, USA. 2002.
- **Discrete Math 2, (Graph theory)**. Served as a **Lecturer**. Department of Mathematics, **Boston University**, Boston, MA, USA. 2002-2003
- **fMRI (Cross-disciplinary Special Seminar on functional magnetic resonance imaging)** Served as coordinator and overseer, Center for Biodynamics, **Boston University**, Boston, MA, USA. 2003
- **Multivariate Calculus**. Served as a **Lecturer**, Department of Mathematics, **Boston University**, Boston, MA, USA. 2004
- **Canard Phenomena in Oscillatory Systems and Some Applications (Special Seminar)**. Served as lecturer, Center for Biodynamics, **Boston University**, Boston, MA, USA. 2005.
- **Topics in Biomathematics** (A dynamical systems approach to the study of chemical, biochemical and neural processes) (**Graduate course**). Served as **Invited Lecturer**. Department of Mathematics, **UNS - Universidad Nacional del Sur**, Bahía Blanca, Argentina. 2006.
- **Differential Equations, Linear Algebra, Calculus I, Calculus II, Calculus III**. Served as **Instructor**. Department of Mathematical Sciences, **NJIT**, New Jersey Institute of Technology, Newark, NJ, USA.
- **Physiology and Medicine** (Mathematical Biology, Undergraduate). Served as **Instructor**. Department of Mathematical Sciences, **NJIT**, New Jersey Institute of Technology, Newark, NJ, USA.

- **Quantitative Neuroscience Core Course** (Graduate). Served as **Instructor**, Quantitative Neuroscience joint program New Jersey Institute of Technology / Rutgers University / University of Medicine and Dentistry of New Jersey, 2007-2008.
- **Analytical and Computational Neuroscience** (Graduate). Served as **Instructor**, Department of Mathematical Sciences, **NJIT**, New Jersey Institute of Technology, Newark, NJ, USA.
- **Systems Computational Neuroscience** (Graduate). Served as **Instructor**, Department of Mathematical Sciences, **NJIT**, New Jersey Institute of Technology, Newark, NJ, USA.
- **Foundations of Mathematical Biology** (Graduate). Served as **Instructor**, Department of Mathematical Sciences, **NJIT**, New Jersey Institute of Technology, Newark, NJ, USA.
- **Foundations of Neuroscience** (Graduate). Served as **Teaching Team Member**. Behavioral Neuroscience Program, Center for Molecular & Behavioral Neuroscience, Rutgers University, Newark, NJ, USA.
- **Honors Methods of Applied Mathematics II (Capstone)** Served as **Instructor**, Department of Mathematical Sciences, **NJIT**, New Jersey Institute of Technology, Newark, NJ, USA.
- **Intermediate Differential Equations (Dynamical Systems)** Served as **Instructor**, Department of Mathematical Sciences, **NJIT**, New Jersey Institute of Technology, Newark, NJ, USA.
- **Mathematical modeling of neuronal systems: a conversation between mathematics and neuroscience.** Served as **Instructor**, Instituto del Cálculo, Facultad de Ciencias Exáctas y Naturales (FCEN), Universidad de Buenos Aires (UBA), Argentina.
- **Computational Systems Neuroscience of Neuronal Oscillations.** Rutgers University Behavioral Neurosciences (BNS) Program, Center for Molecular and Behavioral Neurosciences (CMBN).
- **Introduction to Computational Neuroscience (Graduate & Undergraduate).** Served as **Instructor**, Federated Department of Biological Sciences, **Rutgers University & NJIT**, Newark, NJ, USA.
- **Advanced Computational Neuroscience (Graduate & Undergraduate).** Served as **Instructor**, Federated Department of Biological Sciences, **Rutgers University & NJIT**, Newark, NJ, USA.
- **Proposal Preparation for External Funding (Graduate).** Served as **Instructor**, Federated Department of Biological Sciences, **Rutgers University & NJIT**, Newark, NJ, USA.

Mentoring Activity

Graduate students and postdoctoral trainees

- Ulises Chialva (4/1/2020 - current).
- Rodrigo Pena. Postdoctoral Fellow (2/1/2019 - current). NJIT. Universidad Nacional del Sur (Bahía Blanca, Buenos Aires) and CONICET (Consejo Nacional de Investigaciones Científicas y Técnicas) Argentina.
- Rocio Balderrama. Postdoctoral Fellow (4/1/2017 - 3/30/2019). Universidad de Buenos Aires (Facultad de Ciencias Exactas y Naturales) and CONICET (Consejo Nacional de Investigaciones Científicas y Técnicas) Argentina.
- Andrea Bel. Postdoctoral fellow (9/1/2014 - 8/31/2017), Beginning Investigator (9/1/2017 - current). Universidad Nacional del Sur (Bahía Blanca, Buenos Aires) and CONICET (Consejo Nacional de Investigaciones Científicas y Técnicas) Argentina. Visitor at New Jersey Institute of Technology. Department of Mathematical Sciences.
- Martin Ibarra. Universidad de la Patagonia San Juan Bosco and CONICET (Consejo Nacional de Investigaciones Científicas y Técnicas) Argentina (2020)
- Javier Almarza. Courant Institute of Mathematical Sciences, New York University (2019)
- Yugarshi Mondal. Department of Applied Mathematics. Stony Brook University (2018)
- Ana Stetsenko. Rotation student. Behavioral Neurosciences (BNS) Program, Center for Molecular and Behavioral Neurosciences (CMBN), Rutgers University (2018).
- Omar Itani. Rotation student. Federated Department of Biological Sciences, Rutgers University and New Jersey Institute of Technology (2017)
- Juliana Reves Szemere. Doctoral candidate. Expected graduation: 3/2022. Universidad Nacional del Sur (Bahía Blanca, Buenos Aires) and CONICET (Consejo Nacional de Investigaciones Científicas y Técnicas) Argentina. Co-advised with A. Ventura.
- David Fox. PhD 2017. Federated Department of Biological Sciences, Rutgers University and New Jersey Institute of Technology. Co-advised with F. Nadim. Project: *The frequency dependent dynamics of modulator actions*.
- Randolph J. Leiser. PhD 2017. Expected graduation: 5/2017. New Jersey Institute of Technology. Project: *Effect of individual oscillators heterogeneity on network dynamics with applications to pancreatic beta cell networks*.
- Emel Khan. MSc 2017. Department of Mathematical Sciences, New Jersey Institute of Technology. Co-advised with C. Diekman. Project: *Preferred voltage response to oscillatory parametric inputs in neuronal models*.
- Takuya Ito. Rotation Student. Behavioral Neurosciences (BNS) program, Rutgers University.

- Hoa Pham. Research MD student. Rutgers Medical School.
- Axel Turnquist. Department of Mathematical Sciences, New Jersey Institute of Technology.
- Yinbo Chen. MSc 2015. Federated Department of Biological Sciences, Rutgers University and New Jersey Institute of Technology. MsC Project: *Dynamic influence of membrane potential resonance on network dynamics*. Co-advised with F. Nadim.
- Oscar Flodin. MSc Research Student. 9/1/2014 - 8/31/2015. New Jersey Institute of Technology. Department of Mathematical Sciences. Exchange student from Lund University, Sweden. Project: *Conductance correlation mechanisms in a neuronal network*.
- Craig Schindewolf. MSc 2012. New Jersey Institute of Technology. Department of Mathematical Sciences. Project: *Abrupt transitions between firing frequency regimes in recurrently excited neuronal networks*.
- Motolani Olarinre. MSc 2013. New Jersey Institute of Technology. Department of Mathematical Sciences. Co-advised with J. Golowasch. Project: *Dynamic compensation mechanisms in oscillatory neuronal models*.
- Nima Sheikholeslami. Rotation Student. 2009-2010. Rutgers University. Computational Neuroscience MSc program.
- Dongwook Kim. PhD 2011. New Jersey Institute of Technology. Department of Mathematical Sciences. PhD thesis. *The effects of periodic and non-periodic inputs on the dynamics of medial entorhinal cortex layer II stellate cells*.
- Hui Wu. PhD 2010. New Jersey Institute of Technology. Department of Mathematical Sciences. PhD thesis. *Pattern formation in oscillatory systems*.
- Federico Contigiani. PhD 2010. Universidad Nacional del Sur, Bahía Blanca, Buenos Aires, Argentina. Co-advised with F. Tohmé. Thesis: *Estudios de la economía del comportamiento y la neuroeconomía (Studies on Behavioral Neuroscience and Neuroeconomics)*.
- Tim Oppermann. PhD 2005. Humboldt University zu Berlin, Berlin, Germany. Institute for Theoretical Biology. Co-advised with A. Herz. PhD thesis. *Rhythmic activity in medial entorhinal cortex stellate cells: The underlying dynamical structure and its analysis*.

Undergraduate students

- Shiva Sentilkhumar - Federated Department of Biological Science, NJIT/Rutgers (2019-current)
- Raghav Patel - Department of Computer Sciences, NJIT (2018-20).

- Pedro Vazquez Perez - MBI undergraduate research project *conductance correlations*. Jointly with J. Golowasch (2017).
- Adam Willerth - MBI undergraduate research project *Iterativity and resonance in the locomotor network of Caenorhabditis elegans* (2017)
- Joseph Ballardo. EXTREEMS undergraduate research project *Data driven biophysical modeling of neuronal dynamics*. Jointly with D. Dieckman (2016).
- Nilanjan Haldar. EXTREEMS undergraduate research project. *Data driven biophysical modeling of neuronal dynamics*. Jointly with D. Dieckman (2016).
- Jonathan Dougherty. EXTREEMS undergraduate research project. *Data driven biophysical modeling of neuronal dynamics*. Jointly with D. Dieckman (2016).
- Fremy Santana. Summer 2013. New Jersey Institute of Technology, Department of Mathematical Sciences. Undergraduate project: *Dynamics of networks of oscillatory neurons*. Jointly with A. Bose.
- Kelvin Rivera. Summer 2013. New Jersey Institute of Technology, Department of Mathematical Sciences. Undergraduate project: *Dynamics of networks of oscillatory neurons*. Jointly with A. Bose.
- Malena Español. BSc 2005. Universidad de Buenos Aires, Argentina. Department of Mathematics. Co-advised with G. Acosta. Undergraduate thesis: *Dynamical study of oscillatory chemical reactions: control using periodic external forcing*.

International Conferences

Organization

- [1] **SIAM Conference on Applications of Dynamical Systems, May 27 - 31, 2003, Snowbird, UT, USA.** Organization of the Minisymposium on **Localized and Synchronized Patterns Via Local and Nonlocal Interactions**, parts I and II. Joint work with Rachel Kuske.
- [2] **SIAM Conference on the Life Sciences, July 10 - 14, 2004, Portland, OR, USA.** Organization of the Minisymposium on **Canards in the Life Sciences I: Oscillation Patterns via a Canard Phenomenon**. Joint work with Martin Wechselberger.
- [3] **SIAM Conference on the Life Sciences, July 10 - 14, 2004, Portland, OR, USA** Organization of the Minisymposium on **Canards in the Life Sciences II: Neuronal Patterns and Dynamics**. Joint work with Martin Wechselberger.
- [4] **SIAM Conference on Applications of Dynamical Systems, May 22-26, 2005, Snowbird, UT, USA.** Organization of the Minisymposium on **The Canard Phenomenon: Mechanisms in Chemical, Biochemical and Biological Systems**, parts I and II. Joint work with Martin Wechselberger.

- [5] **Computational Neuroscience (CNS) Meeting, Jul 16-20, 2006, Edinburgh, UK.** Organization of the Workshop on **Phase Response Curves: Where Theory and Experiments Intersect.** Joint work with Theoden Netoff.
- [6] **NEUROMATH 06 - Conference on Mathematical Neuroscience** (a satellite activity of the International Congress of Mathematicians 2006), **Sep 1-4, 2006, Sant Julià de Lloria, Andorra.** Member of the Scientific Committee.
- [7] **SIAM Conference on Applications of Dynamical Systems, May 28 - Jun 1, 2007, Snowbird, UT, USA.** Organization of the Minisymposium on **Mixed-Mode Oscillations: Dynamics and Mechanisms, parts I and II.** Joint work with Martin Wechselberger and Nicola Popović.
- [8] **SIAM Conference on Applications of Dynamical Systems, May 28 - Jun 1, 2007, Snowbird, UT, USA.** Organization of the Minisymposium on **Rhythms in Neural Dynamics, parts I and II.** Joint work with Jozsi Jalks and Stefanos Folias.
- [9] **Computational Neuroscience (CNS) Meeting, Jul 18-23, 2009, Berlin, Germany.** Organization of the Workshop on **Cortical Oscillations.** Joint work with Caroline Geisler.
- [10] **Frontiers in Applied and Computational Mathematics (FACM), June 1-2, 2009, Newark, NJ, USA.** Member of the Scientific Committee.
- [11] **Spring 2010 Eastern Sectional Meeting of the American Mathematical Society (AMS), May 22-23, 2010.** Organization of the Minisymposium on **Mathematical Neuroscience: modeling, analysis and simulations.**
- [12] **4th Argentine School of Mathematics and Biology (BIOMAT IV), Aug 2-4, 2010, Córdoba, Argentina.** Member of the Scientific Committee.
- [13] **Frontiers in Applied and Computational Mathematics (FACM), June 9-11, 2011, Newark, NJ, USA.** Member of the Organizing Committee.
- [14] **2011 International Joint Conference on Neural Networks (IJCNN), Jul 31 - Aug 5, 2011, San Jose, CA, USA** Program Committee Member. (International Neural Network Society & IEEE Computational Intelligence Society.)
- [15] **Frontiers in Applied and Computational Mathematics (FACM), May 31 - Jun 2, 2013, Newark, NJ, USA.** Member of the Organizing Committee.
- [16] **2013 International Joint Conference on Neural Networks (IJCNN), August 4 - 9, 2013, Dallas, TX, USA** Program Committee Member. (International Neural Network Society & IEEE Computational Intelligence Society.)
- [17] **Computational Neuroscience Meeting (CNS-2014), Jul 26-31, 2014, Quebec City, Canada.** Organization of the Workshop on **Cortical Oscillations: Computational models and dynamic mechanisms.** Joint work with Mark Kramer.

- [18] **Computational Neuroscience Meeting (CNS-2015), Jul 18-23, 2015, Prague, Czech Republic.** Organization of the Workshop on Neuronal Oscillations: Computational models and dynamic mechanisms.
- [19] **Mathematical Biology International Workshop: “Mathematics as tool to understand biology / Biology as a source of mathematical problems”, April 23-24, 2015, Buenos Aires, Argentina.** Scientific and Organizing Committee, Chair.
- [20] **VI Argentine Congress of Bioinformatics and Computational Biology (CAB2C-2015), October 14-16, 2015, Bahía Blanca, Buenos Aires, Argentina.** Member of the Program Committee.
- [21] **Analysis of Complex Data in Biological Systems, MBI Emphasis Semester, Fall 2016, MBI, OSU, USA** Member of the Organizing Committee.
- [22] **Dynamical Systems and Data Analysis in Neuroscience: Bridging the Gap, October 17-21, 2016, MBI Emphasis Semester Workshop, MBI, OSU, USA** Member of the Organizing Committee.
- [23] **VI Congreso de matemática aplicada, computacional e industrial (VI MACI 2017), May 2-5, 2017, Comodoro Rivadavia, Chubut, Argentina** Member of the Organizing Committee.
- [24] **International Conference of Mathematical Neuroscience (ICMNS 2017), May 30 - June 2, Boulder, CO, USA** Member of the Program Committee.
- [25] **XIV Congreso Dr. Antonio Monteiro, May 31 - June 2, 2017, Bahía Blanca, Buenos Aires, Argentina.** Member of the Scientific Committee.
- [26] **Computational Neuroscience Meeting (CNS-2017), Jul 15-20, 2017, Antwerp, Belgium.** Organization of the Workshop on Neuronal Oscillations: Mechanisms and functionality. Joint work with Frances Skinner and Vassilis Cutsuridis.
- [27] **International Conference of Mathematical Neuroscience (ICMNS 2018), June 11 - 13, 2018, Juan Les Pins, France** Member of the Program Committee.
- [28] **Escuela Latinoamericana de Modelado de Sistemas Biológicos (Latin American School on Modeling of Biological Systems), January 7 - 18, 2019, Ciudad Autónoma de Buenos Aires, Argentina.** Organizer.
- [29] **Workshop on “Present and Future Theoretical Frameworks in Neuroscience”, February 3-8, 2019, San Antonio, TX** Organizer. Joint work with Fidel Santamaría.
- [30] **International Conference of Mathematical Neuroscience (ICMNS 2019), June 24 - 26, 2019, Copenhagen, Denmark** Member of the Program Committee.
- [31] **Computational Neuroscience Meeting (CNS-2019), Jul 13-17, 2019, Barcelona, Catalunya.** Organization of the Workshop on Neuronal Oscillations: Mechanisms, computational properties and functionality. Joint work with Adrien Peyrache and Vassilis Cutsuridis.

Participation

- [1] **I International Conference on Functional Differential Equations, Israel, June 29 - July 2, 1998**, Phase field equations with memory. Joint work with Alexander Domoshnitsky and Alexander Nepomnyashchy.
- [2] **12th International Congress of Crystal Growth - Workshop on Phase Field Models, Jerusalem, July 1998**. Hyperbolic non-conserved phase field equations. Joint work with Alexander Nepomnyashchy and Amy Novick-Cohen.
- [3] **12th International Congress of Crystal Growth, - Workshop on Phase Field Models Jerusalem, July 1998**. Hyperbolic flow by mean curvature. Joint work with Simon Brandon and Amy Novick-Cohen.
- [4] **Nonlinear Partial Differential Equations and Applications: Interfaces in Continuous Media, Lisboa, March 1-5, 1999**. Front motion for phase transitions in systems with memory (invited speaker), Joint work with Alexander I. Domoshnitsky and Alexander A. Nepomnyashchy.
- [5] **III International Conference on Complex Systems, Nashua, NH, USA, May 21-26, 2000**. Distribution patterns due to diffusion in a coagulation fragmentation process with cluster-wall interactions. Joint work with Rina Tannenbaum.
- [6] **International Workshop on Dissipative Solitons, Nonlinear Excitations (lattices) and High-T Super Conductivity, Instituto Pluridisciplinar, Universidad Complutense de Madrid, Madrid, Spain June 23-26, 2000**. Bistable reaction diffusion equations with quasi-discrete sources of reaction. Joint work with Anatol Zhabotinski and Irving Epstein.
- [7] **Conference on Differential Equations and Dynamical Systems (in honor of Waldyr Oliva), Lisboa, Portugal, June 26-30, 2000**. Bistable reaction diffusion equations with quasi-discrete sources of reaction. Joint work with Anatol Zhabotinski and Irving Epstein.
- [8] **Symposium on the Liquid Phase Synthesis of Nanoparticles, AIChE Fall 2000 National Meeting, November 12-16, 2000, San Francisco, California**. Polymer-Induced Metal Nanoparticle Aggregation. Joint work with Rina Tannenbaum and Erika Heitman.
- [9] **International Conference on Emergence in Chemical Systems, Jun 20-22, 2002, Anchorage, Alaska, USA**. A Canard Mechanism of Oscillations in Chemical Systems. Joint work with Nancy Kopell, Anatol M. Zhabotinsky and Irving R. Epstein.
- [10] **Gordon Conference on Oscillations and Dynamical Instabilities in Chemical Systems, July 28 - August 2, 2002, Oxford, UK**. A Canard Mechanism of Localization of Oscillations in Chemical Systems. Joint work with Nancy Kopell, Anatol M. Zhabotinsky and Irving R. Epstein.

- [11] **2002 Annual Meeting of the Society for Neuroscience (SFN), November 2 - 7, 2002, Orlando, FL, USA.** A Model of an inhibition-based atropine-resistant theta frequency oscillation in CA1 in vitro. Joint work with Martin Gillies, Miles A. Whittington, Eberhardt H. Buhl and Nancy Kopell.
- [12] **SIAM Conference on Applications of Dynamical Systems, May 27 - 31, 2003, Snowbird, UT, USA.** Slow and fast inhibition interact to create a theta rhythm in CA1. Joint work with Martin Gillies, Miles A. Whittington, Eberhardt H. Buhl, Corey D. Acker, John A. White and Nancy Kopell.
- [13] **SIAM Conference on Applications of Dynamical Systems, May 27 - 31, 2003, Snowbird, UT, USA.** Localization of oscillations in a mathematical model of the BZ reaction. joint work with Nancy Kopell, Anatol M. Zhabotinsky and Irving R. Epstein.
- [14] **Computational Neuroscience, Jul 5 - 9, 2003, Alicante, Spain,** A model of an inhibition-based atropine-resistant theta frequency oscillation in CA1 in vitro. Joint work with Martin Gillies, Corey D. Acker, John A. White, Miles A. Whittington, Eberhardt H. Buhl and Nancy Kopell.
- [15] **Computational Neuroscience (CNS), Jul 5 - 9, 2003, Alicante, Spain.** Slow and fast inhibition and a h current interact to create a theta rhythm in CA1. Joint work with: Martin J. Gillies, Corey D. Acker, John A. White, Miles A. Whittington and Nancy Kopell.
- [16] **2003 Annual Meeting of the Society for Neuroscience (SFN), November 7 - 12, 2003, New Orleans, LA, USA.** Slow and fast inhibition and a h current interact to create a theta rhythm in CA1. Joint work with: Martin J. Gillies, Corey D. Acker, John A. White, Miles A. Whittington and Nancy Kopell.
- [17] **SIAM Conference on the Life Sciences, July 10 - 14, 2004, Portland, OR, USA.** Localized oscillations in chemical and biochemical systems. Joint work with Nancy Kopell, Anatol M. Zhabotinsky, Irving R. Epstein and Rachel Kuske.
- [18] **Computational Neuroscience (CNS), Jul 18 - 22, 2004, Baltimore, MD, USA,** Spiking and subthreshold oscillations in a stellate cell: a geometric asymptotic analysis of a biophysical model. Workshop on Reduced models of Neuronal Excitability and Dynamics of Spike-Generation. Joint work with Nancy Kopell.
- [19] **Computational Neuroscience (CNS), Jul 18 - 22, 2004, Baltimore, MD, USA,** Coherent activity at theta frequencies ((8-12 Hz) in the hippocampal area CA1: synchronization properties of networks of interneurons involving H currents. Workshop on Non-linear Spatio-temporal Neural Dynamics - Experiments and Theoretical Models. Joint work with: Martin J. Gillies, Corey D. Acker, John A. White, Miles A. Whittington and Nancy Kopell.
- [20] **SIAM Conference on Applications of Dynamical Systems, May 22 - 26, 2005, Snowbird, UT, USA.** Subthreshold Oscillations and Spiking in a Medial Entorhinal Cortex Stellate Cell. Joint work with Tim Oppermann, John A. White and Nancy Kopell.

- [21] **SIAM Conference on Applications of Dynamical Systems, May 22 - 26, 2005, Snowbird, UT, USA.** Synchronization Mechanisms of Minimal Networks of the Parahippocampal Region. Joint work with D. Pervouchine and Nancy Kopell.
- [22] **5th International Workshop on Bioinformatics and Systems Biology, August 22-25, Berlin, Germany.** Resonance in a medial entorhinal cortex layer II stellate cell model: A geometric approach. Joint work with T. Oppermann, N. Kopell, A. V. M. Herz.
- [23] **2005 Annual Meeting of the Society for Neuroscience (SFN), November 12 - 16, 2005, Washington, DC, USA.** Subthreshold oscillations, spiking and synchronization in medial entorhinal cortex stellate cells: A reduced model. Joint work with: Tim Oppermann, John A. White and Nancy Kopell.
- [24] **IV Taller Regional de Fisica Estadistica y Aplicaciones a la Materia Condensada, May 29 - 31, 2006, Bahia Blanca, Argentina.** Theta Rhythmic activity in the hippocampus: A modeling study.
- [25] **Frontiers in Computational and Applied Mathematics (FACM-07), May 14 - 16, 2007, Newark, NJ, USA.** Rhythmic mixed-mode oscillatory activity in entorhinal cortex stellate cells. Joint work with Martin Wechselberger and Nancy Kopell.
- [26] **SIAM Conference on Applications of Dynamical Systems, May 28 - June 1, 2007, Snowbird, UT, USA.** Rhythmic mixed-mode oscillatory activity in stellate cells of the entorhinal cortex. Joint work with Martin Wechselberger and Nancy Kopell.
- [27] **Workshop on Synchronous Rhythms in the brain. University of British Columbia, June 18 - 20, 2007.** Mechanistic aspects of the creation of theta rhythmic activity in the hippocampal area CA1: A modeling study.
- [28] **Second Argentine School of Mathematics and Biology (Segunda Escuela Argentina de Matemática y Biología), La Falda, Córdoba, Argentina.** Mechanistic aspects of the generation of subthreshold oscillations, the onset of spikes, and related phenomena in a medial entorhinal cortex stellate cell model. (Plenary speaker.)
- [29] **Twelfth International Conference on Cognitive and Neural Systems (ICCNS) - Boston, MA, May 14 - 18, 2008.** Rhythmic oscillations in layer II of the medial entorhinal cortex. Joint work with Tilman Kispersky, Nancy Kopell, Martin Wechselberger and John A. White.
- [30] **Twelfth International Conference on Cognitive and Neural Systems (ICCNS) - Boston, MA, May 14 - 18, 2008.** Decision-making in a cognitive/emotional system: A modeling approach. Joint work with Federico E. Contigiani and Fernando Tohme.
- [31] **Frontiers in Computational and Applied Mathematics (FACM) - Newark, NJ, May 19 - 21, 2008.** Dynamic aspects of a decision-making process in a hot/cool system. Joint work with Federico E. Contigiani and Fernando Tohme.

- [32] **Network Synchronization: from Dynamical Systems to Neuroscience - Leiden, The Netherlands, May 19 - 30, 2008.** The abrupt transition from theta to hyperexcitable spiking activity in stellate cells from layer II of the medial entorhinal cortex. Joint work with Tilman Kispersky and John A. White.
- [33] **Encuentro Internacional de Ecuaciones Diferenciales (EIED) - Universidad de Buenos Aires, Buenos Aires, Argentina, July 28 - August 1, 2008 .** Lecturer: Mathematical Biology course.
- [34] **2008 Annual Meeting of the Society for Neuroscience (SFN), November 14 - 18, 2008, Washington, DC, USA.** The transition to hyperexcitability in stellate cells from layer II of the medial entorhinal cortex during temporal lobe epilepsy: A modeling study. Joint work with Tilman Kispersky and John A. White.
- [35] **2008 Annual Meeting of the Society for Neuroscience (SFN), November 14 - 18, 2008, Washington, DC, USA.** The role of Kv7 mediated potassium currents and recurrent excitation in stellate cells of the entorhinal cortex in a dynamic clamp based model of temporal lobe epilepsy. Joint work with Tilman Kispersky and John A. White.
- [36] **Mathematical Neuroscience Meeting, Mar 23 - 25, 2009, Edinburgh, Scotland, UK.** The dynamic transition from theta to hyper-excitable (gamma) rhythmic activity in medial entorhinal cortex layer II stellate cells. Joint work with T. Kispersky and John A. White.
- [37] **Frontiers in Applied and Computational Mathematics (FACM), June 1-2, 2009, Newark, NJ, USA.** Mechanistic Aspects Underlying the Effects of in-vivo-like Synaptic Inputs on an Entorhinal Cortex Stellate Cell Model. Joint work with Dongwook Kim.
- [38] **Frontiers in Applied and Computational Mathematics (FACM), June 1-2, 2009, Newark, NJ, USA.** The Transition to Hyperexcitability in Stellate Cells (SCs) from Layer II of the Medial Entorhinal Cortex during Temporal Lobe Epilepsy: A Modeling Study. Joint work with T. Kispersky and John A. White.
- [39] **Workshop on Non-Local Effects in Pattern-Forming Systems, June 16-22, 2009 TECHNION, Israel Institute of Technology, Haifa, Israel.** Rhythmic oscillations in the entorhinal cortex and the hippocampus.
- [40] **Computational Neuroscience (CNS) Meeting, Jul 18-23, 2009, Berlin, Germany. Workshop on Cortical Oscillations.** The transition between theta and hyperexcitable (epileptic) rhythmic activity in medial entorhinal cortex layer II stellate cells.
- [41] **Jornada de Finanzas del Sur in honor Prof. Fabio Rotstein, Dec 21, 2009, Bahía Blanca (Buenos Aires) Argentina.** Stocks and noise: representation of the evolution of unstable economies. Joint work with G. Milanesi and F. Thome.
- [42] **Frontiers in Applied and Computational Mathematics (FACM), May 21-23, 2010, Newark, NJ, USA.** The effects of periodic and non-periodic inputs on the

dynamics of a medial entorhinal cortex layer II stellate cell model Joint work with D. Kim.

- [43] **Frontiers in Applied and Computational Mathematics (FACM), May 21-23, 2010, Newark, NJ, USA.** Oscillatory patterns in relaxation oscillators of FitzHugh-Nagumo type with inhibitory global feedback. Joint work with H. Wu.
- [44] **Spring 2010 Eastern Sectional Meeting of the American Mathematical Society (AMS), May 22-23, 2010.** Canard dynamic structures and their roles in generating abrupt transitions between firing frequency regimes in neural models: The stellate cell case.
- [45] **8th AIMS International Conference on Dynamical Systems, Differential Equations and Applications, May 25 - 28, 2010, Dresden University of Technology, Dresden, Germany.** Canard dynamic structures and their roles in generating abrupt transitions between firing frequency regimes in neural models: The stellate cell case. Joint work with T. Kispersky and J. A. White.
- [46] **Behavior and Neural Sciences Minisymposium, Rutgers University, Nov 8, 2010, Rutgers University, Newark, NJ, USA.** The effects of periodic and non-periodic inputs on the firing frequency of medial entorhinal cortex layer II stellate cells model. Joint work with D. Kim.
- [47] **VI Annual Graduate Student Research Day. New Jersey Institute of Technology, Nov 4, 2010, New Jersey Institute of Technology, Newark, NJ, USA.** The effects of periodic and non-periodic inputs on the firing frequency of medial entorhinal cortex layer II stellate cells model. Joint work with D. Kim.
- [48] **2011 Annual Meeting of the Society for Neuroscience (SFN), November 12 - 16, 2011, Washington, DC, USA.** Subthreshold and firing-frequency resonance in a persistent sodium/h-current model: The role of nonlinearities and time scales. Joint work with Dongwook Kim and Nancy Kopell.
- [49] **Frontiers in Applied and Computational Mathematics (FACM), May 18-20, 2012, Newark, NJ, USA.** A modeling study of conductance co-regulation in neural models. Joint work with M. Olarinre and J. Golowasch.
- [50] **Towards Mathematical Modeling of Neurological Diseases from Cellular Perspectives, May 23 - June 1, 2012, Fields Institute, Toronto, ON, Canada.** Mechanisms of frequency preference response to oscillatory inputs in reduced neural models.
- [51] **Mathematical Challenges in Neural Network Dynamics, Oct 1 - 5, 2012, Mathematical Biosciences Institute, Columbus, OH, USA.** Mechanism of generation of theta spiking resonance in a hippocampal circuit. Joint work with E. Stark and G. Buzsáki.
- [52] **2012 Annual Meeting of the Society for Neuroscience (SFN), October 13 - 17, 2012, New Orleans, LA, USA.** Dynamic compensatory mechanisms in conductance correlation models. Joint work with M. Olarinre and J. Golowasch.

- [53] **2013 Dana Knox Student Research Showcase, Apr 17, 2013, New Jersey Institute of Technology, NJ, USA.** Membrane Resonance of Bursting Neuron Captured with an I_{Ca}/I_h model using a multi-objective evolutionary algorithm. Joint work with D. Fox, H. Tseng and F. Nadim.
- [54] **2013 Dana Knox Student Research Showcase, Apr 17, 2013, New Jersey Institute of Technology, NJ, USA.** Dynamic compensatory mechanisms in conductance correlation models. Joint work with M. Olarinre and J. Golowasch.
- [55] **Neuroscience Minisymposium, Center for Molecular and Behavioral Neuroscience, Rutgers University, May 22, 2013, Newark, NJ, USA.** Dynamic compensatory mechanisms in conductance correlation models Joint work with M. Olarinre and J. Golowasch.
- [56] **Frontiers in Applied and Computational Mathematics (FACM), May 31 - June 2, 2013, Newark, NJ, USA.** Membrane Resonance of Bursting Neuron Captured with an I_{Ca}/I_h Model using Multi-objective Evolutionary Algorithms. Joint work with D. Fox, H.-A Tseng and F. Nadim
- [57] **Frontiers in Applied and Computational Mathematics (FACM), May 31 - June 2, 2013, Newark, NJ, USA.** A Modeling Study of Conductance Co-regulation in Neuronal Models. Joint work with M. Olarinre and J. Golowasch.
- [58] **Frontiers in Applied and Computational Mathematics (FACM), May 31 - June 2, 2013, Newark, NJ, USA.** Mechanism of generation of theta spiking resonance in a hippocampal network Joint work with E. Stark and G. Buzsaki.
- [59] **Rhythmic Dynamics and Cognition, June 4-5, 2013, : Boston, MA, USA.** Mechanism of generation of theta spiking resonance in a hippocampal network Joint work with E. Stark and G. Buzsaki.
- [60] **Computational Neuroscience Meeting (CNS 2013), July 13 - 18, Paris, France.** Predicting the firing phase of an oscillatory neuron from its impedance profile. Joint work with D. Fox and F. nadim.
- [61] **Computational Neuroscience Meeting (CNS 2013), July 13 - 18, Paris, France.** Membrane resonance of bursting neurons captured with an I_{Ca}/I_h model using multi-objective evolutionary algorithms. Joint work with D. Fox and F. nadim.
- [62] **2013 Annual Meeting of the Society for Neuroscience (SFN), November 9 - 13, 2013, San Diego, CA, USA.** Predicting the firing phase of an oscillator from its subthreshold impedance profile. Join work with D. Fox and F. Nadim.
- [63] **2013 Annual Meeting of the Society for Neuroscience (SFN), November 9 - 13, 2013, San Diego, CA, USA.** Membrane potential resonance of bursting neuron captured with an I_{Ca}/I_h biophysical model using multi-objective evolutionary algorithms Joint work with D. Fox, H. Tseng and F. Nadim

- [64] **2013 Annual Meeting of the Society for Neuroscience (SFN), November 9 - 13, 2013, San Diego, CA, USA.** Inhibition-based theta resonance in cortical circuits. Joint work with L. Roux, E. Stark, R. Eichler, S. Fujisawa and G. Buzsaki.
- [65] **Workshop on Diabetes Systems Biology, March 24 - 26, 2014, Fields Institute, Toronto, ON, Canada.** Periodic forcing of insulin-secreting glycolytic oscillators: entrainment and synchronization properties. Joint work with R. Leiser and C. Diekmann.
- [66] **Open Source Brain Symposium on “Oscillation and resonance in CNS network loops”, May 14 - 16, Alghero, Sardinia, Italy.** Inhibition-based theta resonance in a hippocampal network: a modeling study. Joint work with E. Stark and G. Buzsaki.
- [67] **Frontiers in Applied and Computational Mathematics (FACM), May 22 - 23, 2014, Newark, NJ, USA.** Neuronal membrane resonance influences network frequency through electrical synapses. Joint work with Y. Chen and F. Nadim.
- [68] **Frontiers in Applied and Computational Mathematics (FACM), May 22 - 23, 2014, Newark, NJ, USA.** Periodic forcing of insulin-secreting glycolytic oscillators: entrainment and synchronization properties. Joint work with R. Leiser and C. Diekmann.
- [69] **Frontiers in Applied and Computational Mathematics (FACM), May 22 - 23, 2014, Newark, NJ, USA.** The mechanism of generation of oscillations in a mixed system with mixed local-diffusive and global coupling Joint work with D. Kim and H. Wu.
- [70] **Computational Neuroscience Meeting (CNS-2014), Jul 26-31, 2014, Quebec City, Canada.** Workshop on “Cortical Oscillations: Computational models and dynamic mechanisms”. Inhibition-based theta resonance in a hippocampal network: a modeling study. Joint work with E. Stark and G. Buzsaki.
- [71] **Computational Neuroscience Meeting (CNS-2014), Jul 26-31, 2014, Quebec City, Canada.** Workshop on “Resonance”. Frequency preference response to oscillatory inputs in neuronal models: a geometric approach to subthreshold resonance.
- [72] **Computational Neuroscience Meeting (CNS-2014), Jul 26-31, 2014, Quebec City, Canada.** Using multi-objective evolutionary algorithms to predict the parameters that determine membrane resonance in a biophysical model of bursting neurons. Joint work with D. Fox, H. Tseng and F. Nadim.
- [73] **2014 Annual Meeting of the Society for Neuroscience (SFN), November 15 - 19, 2014, Washington, DC, USA.** The role of a persistent inward current in membrane resonance properties of different neuron types in an oscillatory network. Joint work with D. Fox, H. Tseng and F. Nadim.
- [74] **2014 Annual Meeting of the Society for Neuroscience (SFN), November 15 - 19, 2014, Washington, DC, USA.** Membrane resonance influences the frequency of an electrically coupled network. Joint work with Y. Chen and F. Nadim.

- [75] **2014 Annual Meeting of the Society for Neuroscience (SFN), November 15 - 19, 2014, Washington, DC, USA.** Inhibition-based theta resonance in a hippocampal network: a modeling study. Joint work with E. Stark and G. Buzsaki.
- [76] **Dynamic neural networks: the stomatogastric nervous system, November 14, 2014, Washington, DC, USA.** Dynamic compensation mechanisms underlying the generation of period and duty cycles in oscillatory neuronal models. Joint work with J. Golowasch and M. Orlinre.
- [77] **2014 Annual Meeting of the Society for Neuroscience (SFN), November 15 - 19, 2014, Washington, DC, USA.** Current versus voltage clamp measurements of resonance in neuronal systems: lessons from the response of biophysical models to oscillatory inputs Joint work with F. Nadim Farzan Nadim, Horacio G. Rotstein 215.05
- [78] **Mathematics as tool to understand biology / Biology as a source of mathematical problems, April 23-24, 2015, Buenos Aires, Argentina..** Inhibition-based theta resonance in a hippocampal network. Joint work with E. Stark and G. Buzsaki.
- [79] **Mathematics as tool to understand biology / Biology as a source of mathematical problems, April 23-24, 2015, Buenos Aires, Argentina..** Multiple subthreshold linear resonances generated by delay effects in a neuronal model. Joint work with A. Bel and W. Reartes.
- [80] **Frontiers in Applied and Computational Mathematics (FACM), June 5-6, 2015, Newark, NJ, USA.** Mechanisms of generation of resonant spiking patterns in a neuronal model in response to periodic inputs. Joint work with K. O. Flodin.
- [81] **Frontiers in Applied and Computational Mathematics (FACM), June 5-6, 2015, Newark, NJ, USA.** Electrical coupling: non-synchronous behaviors produced via gap junctions. Joint work with R. J. Leiser.
- [82] **Frontiers in Applied and Computational Mathematics (FACM), June 5-6, 2015, Newark, NJ, USA.** Synchronization mechanisms in genetic oscillatory networks. Joint work with C. O. Diekman and A. Bose.
- [83] **Computational Neuroscience Meeting (CNS-2015), Workshop on Neuronal Oscillations: Computational models and dynamic mechanisms, July 22-23, 2015, Prague, Czech Republic.** Inhibition-based theta resonance in a hippocampal network: a modeling study. Joint work with E. Stark and G. Buzsáki.
- [84] **Eighth International Undergraduate Research Symposium, July 30, 2015, NJIT, Newark, NJ** Data-driven biophysical modeling of neuronal dynamics. Joint work with J. Ballardo, N. Haldar, J. Dougherty and C. Diekman.
- [85] **2015 Undergraduate Capstone Conference, August 10, 2015, Mathematical Biosciences Institute, Ohio State University, Columbus, OH.** Data-driven biophysical modeling of neuronal dynamics. Joint work with J. Ballardo, N. Haldar, J. Dougherty and C. Diekman.

- [86] **Challenges in Computational Neuroscience Opening Workshop, August 17-21, 2015, SAMSI, NC, USA.** Inhibition-based theta resonance in a hippocampal network: a modeling study. Joint work with E. Stark and G. Buzsáki.
- [87] **2015 Annual Meeting of the Society for Neuroscience (SFN), October 17 - 21, 2015, Chicago, IL, USA.** The effect of resonance frequency on network oscillations through electrical gap junction coupling Joint work with X. Li, Y. Chen and F. Nadim.
- [88] **COSYNE 2016, February 25 - 28, 2016, Salt Lake City, UT, USA.** The effect of resonance properties on network oscillations through electrical gap junction coupling. Joint work with X. Li, Y. Chen and F. Nadim.
- [89] **AICHE 2015 Annual Meeting** Abstract ID# 433480 (password: 435990) Submitted to FOOD, PHARMACEUTICAL & BIOENGINEERING DIVISION Theory & Experiment for Tumor Growth, Regression & Metastasis Joint work with Adeyinka Lesi, Karim Virani, Vicky Patel, Horacio Rotstein and David Rumschitzki
- [90] **13th Annual Garden State Undergraduate Mathematics Conference, April 16, 2016, William Paterson University, Wayne NJ, USA.** Data-driven Biophysical Modeling of Neuronal Dynamics. Joint work with J. Ballard, J. Dougherty, N. Halder and C. Diekmann.
- [91] **2016 Dana Knox Student Research Showcase, Apr 20, 2013, New Jersey Institute of Technology, NJ, USA.** Network response to period inputs: heterogeneous vs. homogeneous cell components in the presence of gap junctions. Joint work with R. J. Leiser
- [92] **2016 Dana Knox Student Research Showcase, Apr 20, 2013, New Jersey Institute of Technology, NJ, USA.** Frequency preference response of chemical systems to periodic forcing. Joint work with E. Khan, Y.-I. Kim and Casey Diekmann.
- [93] **International Conference of Mathematical Neuroscience (ICMNS), May 30 - Jun 1, 2016, Juan-Les-Pins, France.** Inhibition-based theta resonance in a hippocampal network: a modeling study. Joint work with E. Stark, G. Buzsáki and Taku Ito.
- [94] **Frontiers in Applied and Computational Mathematics (FACM), June 3-4, 2016, Newark, NJ, USA.** Network response to period inputs: heterogeneous vs. homogeneous cell components in the presence of gap junctions. Joint work with R. J. Leiser
- [95] **Modeling Neural Activity 2, Jun 22-24, 2016, Waikoloa, Hawaii.** Inhibition-based theta resonance in a hippocampal network: a modeling study. Joint work with E. Stark, G. Buzsáki.
- [96] **SIAM Conference on the Life Sciences, July 11-14, 2016, Boston, MA, USA.** Pancreatic Beta Cells - Synchronization and intrinsic Heterogeneity. Joint work with R. J. Leiser

- [97] **SIAM Conference on the Life Sciences, July 11-14, 2016, Boston, MA, USA.** Sub-threshold amplitude and phase resonance in models of quadratic type: nonlinear effects generated by the interplay of slow resonant and fast amplifying currents
- [98] **Annual Meeting of the Unión Matemática Argentina, September 20 - 23, 2016, Baha Blanca, Argentina, 2016.** Multiple resonances in neuronal networks connected with gap junctions and delay (Multiples resonancias en redes neuronales conectadas v'a gap junctions con delay. Joint work with A. Bel and W. Reartes A. Bel, W. Reartes, H. G. Rotstein
- [99] **Dynamical Systems and Data Analysis in Neuroscience: Bridging the Gap, October 17-21, 2016, MBI Emphasis Year Workshop, MBI, OSU, USA** Inhibition based theta resonance in a hippocampal network: a modeling study. Joint work with E. Stark and G. Buzsáki.
- [100] **Dynamical Systems and Data Analysis in Neuroscience: Bridging the Gap, October 17-21, 2016, MBI Emphasis Year Workshop, MBI, OSU, USA** Frequency response alternating map (FRAM): A mutually forced approach to resonant networks. Joint work with R. J. Leiser.
- [101] **Dynamical Systems and Data Analysis in Neuroscience: Bridging the Gap, October 17-21, 2016, MBI Emphasis Year Workshop, MBI, OSU, USA** Effects of connectivity delay on the subthreshold resonance in neural networks. Joint work with A. Bel and W. Reartes.
- [102] **2016 Annual Meeting of the Society for Neuroscience (SFN), November 12 - 16, 2016, San Diego, CA, USA.** Neuromodulation produces complex changes in resonance profiles of neurons in an oscillatory network Joint work with D. Fox and F. Nadim
- [103] **2017 Dana Knox Student Research Showcase, Apr 19 2017, New Jersey Institute of Technology, NJ, USA.** Joint work with A. Turnquist
- [104] **VI Congreso de Matemática aplicada, computacional e industrial (MACI-2017), Comodoro Rivadavia, May 2 - 4, 2017, Chubut, Argentina.** Bifurcaciones de equilibrios en un modelo no diferenciable para redes competitivas Joint work with A. Bel and W. Reartes
- [105] **VI Congreso de Matemática aplicada, computacional e industrial (MACI-2017), Comodoro Rivadavia, May 2 - 4, 2017, Chubut, Argentina.** Modeling and dynamics of neuronal systems short course
- [106] **International Conference of Mathematical Neuroscience (ICMNS), May 30 - Jun 2, 2017, Boulder, CO, USA.** Neuromodulator-induced Antiresonance Joint work with F. Nadim and D. Fox
- [107] **International Conference of Mathematical Neuroscience (ICMNS), May 30 - Jun 2, 2017, Boulder, CO, USA.** Frequency Response Alternating Map (FRAM): A Mutually Forced Approach to Resonant Networks Joint work with R. Leiser

- [108] **XIV Congreso Dr. Antonio Monteiro, May 31 - June 2, 2017, Bahía Blanca, Buenos Aires, Argentina.** Generation of limit cycles in competitive neuronal networks Joint work with A. Bel and W. Reartes
- [109] **CRCNS Annual PIs Meeting, June 14 - 16, 2017, Providence, RI, USA.** Inhibition based theta resonance in a hippocampal network: a modeling study. Joint work with E. Stark.
- [110] **Computational Neuroscience Meeting (CNS-2017), Workshop on Neuronal Oscillations: mechanisms and functionality, July 15-20, 2017, Antwerp, Belgium.** A conceptual framework for the investigation of network resonance.
- [111] **Frontiers in Applied and Computational Mathematics (FACM), June 24-25, 2017, Newark, NJ, USA.** Frequency Response Alternating Map (FRAM): A Mutually Forced Approach to Resonant Networks Joint work with R. Leiser
- [112] **Joint Meeting of Biosciences Societies, November 11-13, 2017, Buenos Aires, Argentina** Modeling cellular information processing of pulsatile inputs and the emergence of resonances Joint work with J. Reves-Szemere and A. Ventura
- [113] **2017 Annual Meeting of the Society for Neuroscience (SFN), November 11 - 15, 2017, Washington, DC, USA.** Inhibition-based theta spiking resonance in a hippocampal network Joint work with E. Stark and T. Ito 615.11
- [114] **2017 Annual Meeting of the Society for Neuroscience (SFN), November 11 - 15, 2017, Washington, DC, USA.** Ionic current correlations are ubiquitous and regulated Joint work with J. P. Golowasch, T. Tran, C. T. Unal, L. Zaborszky, H. G. Rotstein, A. Kirkwood 474.17
- [115] **Third Annual Rutgers Brain Health Institute Minisymposium, December 1, 2017.** The effects of synaptic conductance regulation on conductance correlations in an activity-based sensor model Joint work with O. Itani and J. Golowasch Itani O, Golowasch J, Rotstein HG NSF-DMS 1715808
- [116] **Reunión de la Unión Matemática Argentina (UMA), December 11 - 15, 2017, Buenos Aires, Argentina.** Influencia de la señales de retroalimentación de motoneuronas en un generador central de patrones (GCP) Joint work with R. Balderrama and L. Szczupak
- [117] **Barcelona Computational, Cognitive and Systems Neuroscience (BARCC-SYN), May 24 - 25, 2018, Barcelona.** Post-inhibitory rebound interacts with preventing or deleting mechanisms to generate theta-spiking resonance in hippocampal CA1 pyramidal cells Joint work with T. Ito and E. Stark.
- [118] **MURPHYS-HSFS: Interdisciplinary Workshop on Multiple Scale Systems, Systems with Hysteresis and Trends in Dynamical Systems, May 28 - Jun 1, 2018, Barcelona.** Resonance-based mechanisms of generation of oscillations with multiple time scales in networks of non-oscillatory neurons. Joint work with A. Bel.

- [119] **New Trends in Mathematical Biology, Jun 4 - 8, 2018, Barcelona.** Network resonance: impedance interactions and frequency response alternating maps (FRAM) Joint work with R. J. Leiser.
- [120] **Reunión de la Unión Matemática Argentina (UMA), Sep 18-21, 2018, La Plata, Argentina.** Resonant nodes generate oscillations in networks with graded connectivity Joint work with A. Bel.
- [121] **Cognitive Computational Neuroscience conference, Sep 5 - 8, 2018, Philadelphia, PA, USA.** A dynamical systems model of intrinsic and evoked activity, variability and functional connectivity Joint work with T. Ito, B. Keane, R. Mill, R. Chen, L. Hearn, K. Arnemann, B. He, and M. Cole.
- [122] **Neurobiology of Cognition Gordon Conference, July 22-27 2018, Newry, ME, USA.** Neural Circuits Supporting Cognitive Function A dynamical systems model of intrinsic and evoked activity, variability and functional connectivity. Joint work with T. Ito and M. W. Cole
- [123] **Bernstein Conference on Computational Neuroscience, Workshop on 'Resonance in neurons and neural networks: theoretical and experimental approaches', September 25-26, 2018, Berlin, Germany.** From subthreshold neuronal resonance to network resonance.
- [124] **2018 Annual Meeting of the Society for Neuroscience (SFN), November 3 - 7, 2018, San Diego, CA, USA.** Distinct mechanisms underlie electrical coupling resonance and membrane potential resonance Joint work with Xinpeng Li, Farzan Nadim.
- [125] **2018 Annual Meeting of the Society for Neuroscience (SFN), November 3 - 7, 2018, San Diego, CA, USA.** Modification of ion channel gene expression regulates the expression of multiple ionic currents. Joint work with Jorge P. Golowasch, Daniel H. Daudelin, David J. Schulz. 375.01
- [126] **2018 Dana Knox Student Research Showcase, Apr 18, 2018, New Jersey Institute of Technology, NJ, USA.** The Effects of Synaptic Conductance Regulation on Conductance Correlations in an Activity Based Sensor Model. Joint work with O. Itani and J. Golowasch
- [127] **2019 Dana Knox Student Research Showcase, Apr 17, 2019, New Jersey Institute of Technology, NJ, USA.** Mechanistic investigation of degenerate conductance correlations from an activity dependent homeostatic rule. Joint work with O. Itani and J. Golowasch.
- [128] **Computational Neuroscience Meeting (CNS-2019), Workshop on Interneuron diversity and function, July 13-17, 2019, Barcelona, Catalunya.** Post-inhibitory rebound interacts with preventing or deleting mechanisms to generate theta spiking resonance in hippocampal CA1 pyramidal cells.
- [129] **Computational Neuroscience Meeting (CNS-2019), Workshop on Neuronal Oscillations: mechanisms, computational properties and functionality, July**

- 13-17, 2019, Barcelona, Catalunya.** Resonance-based mechanisms of generation of oscillations in non-oscillatory neurons.
- [130] **Society for Mathematical Biology Annual Meeting (2019), Workshop on Mathematical Modeling of Neuronal Networks, July 20-23, Montreal, Quebec.** Resonance-based mechanisms of generation of oscillations in non-oscillatory neurons.
 - [131] **StatPhys 27, Jul 8, 2019, Buenos Aires, Argentina.** Studying the limitations of Michaelis-Menten approximation to describe the response to pulsatile inputs Joint work with J. Reves-Szemere and A. Ventura. Statistical Physics in Biological Networks
 - [132] **Statistical Physics of Biological Networks (2020), Puerto Madryn, Chubut, Argentina, March 2-5, 2020.** Studying signal termination compartment and frequency preference emergence in phosphorylation-dephosphorylation cycles. Joint work with J. Reves-Szemere and A. C. Ventura.
 - [133] **Neuromatch 2.0. An unconference in Computational Neuroscience, May 25-27, 2020, Online -19).** Modeling theta-band resonance in a neocortical circuit. Joint work with R. F. O. Pena
 - [134] **International Conference on Mathematical Neuroscience (ICMNS), July 6 & 7, 2020, Digital (Covid-19).** Competitive Threshold Linear Networks: limit cycles and their response to periodic inputs Joint work with A. Bel and W. Reartes
 - [135] **International Conference on Mathematical Neuroscience (ICMNS), July 6 & 7, 2020, Digital (Covid-19).** Biophysics and dynamics shape the cross-correlation properties of monosynaptic connections Joint work with R. Pena
 - [136] **International Conference on Mathematical Neuroscience (ICMNS), July 6 & 7, 2020, Digital (Covid-19).** Mechanisms by which Synaptic Short-term Plasticity Creates Temporal FiltersffJoint work with Y. Mondal and R. Pena
 - [137] **Computational Neuroscience Meeting (CNS-2020), July 18-22, 2020, Online (Covid-19).** Entrainment of competitive threshold-linear networks. Joint work with A. Bel and Walter Reartes
 - [138] **Computational Neuroscience Meeting (CNS-2020), July 18-22, 2020, Online (Covid-19).** Modeling theta-band resonance in a neocortical circuit. Joint work with R. F. O. Pena
 - [139] **Computational Neuroscience Meeting (CNS-2020), July 18-22, 2020, Online (Covid-19).** Neuronal resonance may not be apparent, but still present, for realistic input signals using standard impedance measurements Joint work with R. F. O. Pena, U. Chialva
 - [140] **Computational Neuroscience Meeting (CNS-2020), July 18-22, 2020, Online (Covid-19).** Biophysics and dynamics shape the cross-correlation properties of monosynaptic connections Joint work with R. F. O. Pena

- [141] **Computational Neuroscience Meeting (CNS-2020), July 18-22, 2020, Online (Covid-19).** Synaptic short-term plasticity and temporal filters: interplay of synaptic and postsynaptic dynamics. Joint work with Y. Mondal and R. F. O. Pena
- [142] **Computational Neuroscience Meeting (CNS-2020), July 18-22, 2020, Online (Covid-19).** The monosynaptic inference problem: linking statistics and dynamics in ground truth models Joint work with Z. Saccomano, R. Pena, S. McKenzie and A. Amarasingham
- [143] **Dynamic Days 2020, August 24 - 28, 2020, Online (Covid-19).** Periodic solutions in threshold-linear networks and their response to periodic input Joint work with A. Bel and Walter Reartes
- [144] **Dynamic Days 2020, August 24 - 28, 2020, Online (Covid-19).** Synaptic short-term plasticity and temporal filters: interplay of synaptic and postsynaptic dynamics Joint work with Y. Mondal and R. Pena
- [145] **Dynamic Days 2020, August 24 - 28, 2020, Online (Covid-19).** Revealing the link between spiking cross-correlation patterns and the underlying subthreshold neuronal dynamics Joint work with R. Pena Pena, Rotstein

Participation in International Courses

- [1] **International School of Mathematics on "Free Boundary Problems in Mathematics and Industry", Santander, Spain, 21 – 25 August, 1995.** *Fellowship by the European Science Foundation, Free Boundary Programme.*
- [2] **International School on "Pattern Formation, Interfacial Dynamics and Crystal Growth", Toledo, Spain, 3 – 7 June, 1996.** *Fellowship by the European Science Foundation, Free Boundary Programme.*

Memberships

- **Society for Industrial and Applied Mathematics (SIAM).**
- **American Mathematical Society (AMS).**
- **Society for Neuroscience (SFN).**
- **Society for Mathematical Biology (SMB).** Chair of the Mathematical Neuroscience Group.
- **Organization for Computational Neuroscience (OCNS).**

Additional Information

- **Programming skills:** C, Matlab, XPP.
- **Department of Chemistry Board, Universidad Nacional del Sur, Bahía Blanca, Argentina.** Served as **member** (student).
- **University Board, Universidad Nacional del Sur, Bahía Blanca, Argentina.** Served as **member** (student).

Further information about invited talks and courses taken as part of my graduate or undergraduate studies as well as courses not included in those programs, social, cultural and political interests and activities may be supplied or discussed personally.