Curriculum Vitae

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Horacio G. Rotstein

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Associate Professor,
Department of Mathematical Sciences,
New Jersey Institute of Technology,
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Member of the Graduate Faculty,

- Federated Department of Biological Sciences,
  Rutgers University / NJIT, Newark, NJ 07102.
- Behavioral Neuroscience (BNS) Program, Center for Molecular and Behavioral Neurosciences, **Rutgers University**, Newark, NJ 07102.

Visiting Scholar,

- Courant Institute of Mathematical Sciences, **New York University**, New York, NY 10012.

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 Ingenieria Química, **UNS - Universidad Nacional del Sur**, Bahía Blanca, Argentina, 1989. Thesis: evaluation of an AgI electrochemical cell as a I_2(g) sensor.
- **Químico**. Departamento de Química en Ingenieria Química, **UNS - Universidad Nacional del Sur**, Bahía Blanca, Argentina, 1988.

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

Professional Experience

2011-	**Associate Professor**, Department of Mathematical Sciences, **New Jersey Institute of Technology**, 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, **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.

Publications

Theses

[1] **Horacio G. Rotstein**, Phase transition dynamics with memory. **TECHNION** - Israel Institute of Technology, 1998.

PhD thesis. Supervisors: Alexander A. Nepomnyashchy and Simon Brandon.

[2] **Horacio G. Rotstein**, Coagulation Equations with Cluster-Wall Interactions, **TECHNION** - Israel Institute of Technology, 1994.

M.Sc. thesis. Supervisors: Amy Novick-Cohen and Rina Tannenbaum.

[3] **Horacio G. Rotstein**, Evaluacion de una Pila de $AgI(s)$ como Sensor de $I_2(g)$, Undergraduate Final Thesis (Advanced Laboratory of Chemistry), **UNS** - Universidad Nacional del Sur, 1988.

Fifth year Undergraduate Final Thesis. Supervisor: Julio C. Bazan.

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.

Peer Reviewed Journals

[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 (2006). *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 globablly coupled FitzHugh-Nagumo model (2012). *Phys Rev E*, **86**:066207.

Submitted (under peer review process)

[1] **Eran Stark, Ronny Eichler, Lisa Roux, Shigeyoshi Fujisawa, Horacio G. Rotstein, György Buzsáki**. Inhibition induced theta resonance in cortical circuits (2012).

[2] **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).

In Preparation

[1] **Horacio G. Rotstein** Interaction between resonant and amplifying currents in two-dimensional neural models of frequency preference response to oscillatory current inputs (2012).

[2] **Horacio G. Rotstein** Dynamic mechanisms of generation of subthreshold resonance in neuronal models: A dynamic phase-plane approach (2012).

[3] **Horacio G. Rotstein et al.** Effects of time scale separation on subthreshold (membrane potential) resonance in neuronal models in the presence of Hopf bifurcations (2012)

[4] **Dongwook Kim and Horacio G. Rotstein** Firing rate (super-threshold) frequency preferences in a persistent sodium / h-current model (2012).

Teaching Material

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

Grants

- **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), 07/01/08 to 06/30/10.
- **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), 9/01/09-9/01/12

Editorial Activity

- **Guest Editor and Organizer. Chaos (An Interdisciplinary Journal of Nonlinear 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 Organizer. Chaos (An Interdisciplinary Journal of Nonlinear 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.

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 Bioloby (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, 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** at the Department of Mathematical Sciences, **NJIT**, New Jersey Institute of Technology, Newark, NJ, USA.

- **Foundations of Mathematical Biology** (Graduate). Served as **Instructor** at the 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 Neurosciece, Rutgers University, Newark, NJ, USA.

Mentoring Activity

- David Fox. Computational Neuroscience PhD Program. Department of Biological Sciences, NJIT / Rutgers University.

- Motolani Olarinre. Computational Biology MSc Program. Department of Mathematical Sciences, NJIT.

- Nima Sheikholeslami. Computational Neuroscience MSc Program. Department of Biological Sciences, Rutgers University.

- Dongwook Kim (2011). Department of Mathematical Sciences, New Jersey Institute of Technology. PhD thesis. *The effects of periodic and non-periodic inputs on the dynamics of medial entorhinal cortex layer II stellate cells.*

- Hui Wu. PhD thesis (2010). Department of Mathematical Sciences, New Jersey Institute of Technology. PhD thesis. *Pattern formation in oscillatory systems.*

- Tim Oppermann. PhD thesis (2006). *Rhythmic activity in medial entorhinal cortex stellate cells: The underlying dynamical structure and its analysis.* (Joint work with Prof. Andreas Herz, Humboldt University zu Berlin, Berlin, Germany.).

- Malena Español. Undergraduate thesis (2005). *Dynamical study of oscillatory chemical reactions: control using periodic external forcing.* (Joint work with Prof. Gabriel Acosta, Universidad de Buenos Aires.)

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 Juliá de Loriá, 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 Mechanistics, 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 Jalics 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, anaysis 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** Member of the Program Committee. (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.

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** . Poymer-Induced Metal Nanoparticle Aggregation. Joint work with Rina Tannenbaum and Erika Heitman.

[9] **Internation 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) int hte hippocampal area CA1: synchronization properties of networks of interneurons involving H currents. Workshop on Nonlinear 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. Contiggiani 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. Contiggiani 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.

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.*

Scholarships, Fellowships, Honors and Awards

[1] **Increased Full Scholarship** for pursuing MSc studies. Awarded by the **Technion - Israel Institute of Technology**, Haifa, Israel, 10/91 - 07/94.

[2] **Increased Full Scholarship** for pursuing PhD studies. Awarded by the **Technion - Israel Institute of Technology**, Haifa, Israel, 08/94 - 07/98.

[3] **Excellence in Teaching Prize** awarded by the **Technion - Israel Institute of Technology**, Haifa, Israel.

[4] **Fischbach Fellowship** for pursuing postdoctoral research at Brandeis University, awarded by the **Technion - Israel Institute of Technology**, Haifa, Israel, 1999-2001.

[5] **Dr. César Milstein Scholarship (Subsidio)**, July-August, 2007. Awarded by the *Secretaria de Ciencia, Tecnología e Innovación Productiva; Ministerio de Educación, Ciencia y Tecnología*, Argentina.

[6] **Dr. César Milstein Scholarship (Subsidio)**, July, 2008. Awarded by the *Ministerio de Ciencia, Tecnología e Innovación Productiva*, Argentina.

Memberships

- **Society for Industrial and Applied Mathematics (SIAM).**
- **American Mathematical Society (AMS).**
- **Society for Neuroscience (SFN).**
- **Society for Mathematical Biology (SMB).**
- **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).
- **Teaching experience in Group Leadership & Group Dynamics.**

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.