LEONID L. RUBCHINSKY

Curriculum Vitae

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ADDRESS

Department of Mathematical Sciences
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EDUCATION

Degrees

Ph.D., Physics (nonlinear dynamics)	Institute for Applied Physics, Russian Academy of Sciences, Nizhny Novgorod, Russia, 2000 (advisors: M.I. Rabinovich and M.M. Sushchik Sr.)
M.S., Physics	University of California, San Diego, 1997
B.S., Physics	University of Nizhny Novgorod, Russia, 1995

Non-degree training

Workshop on Dynamics of Neural Networks: From Biophysics to Behavior.	University of California, Santa Barbara, 2001
Workshop on Dynamical Systems	International Center for Theoretical Physics, Italy, 1998

ACADEMIC APPOINTMENTS

2004 – present	Assistant professor, Associate professor, Full Professor Department of Mathematical Sciences, Indiana University Indianapolis (formerly Indiana University – Purdue University Indianapolis), and Stark Neurosciences Research Institute, Indiana University School of Medicine
2001 – 2004	Postdoctoral Research Fellow, University of California, Davis (postdoctoral mentors: K.A. Sigvardt and N. Kopell)
1997 – 2001	Junior Research Associate Institute for Applied Physics, Russian Academy of Science
1999 – 2000	Lecturer University of Nizhny Novgorod, Nizhny Novgorod, Russia
1995 – 1997	Research Assistant, Teaching Assistant University of California, San Diego
1994 – 1995	Research Assistant Institute for Applied Physics, Russian Academy of Science

OTHER PROFESSIONAL EXPERIENCE

2003 – 2004 Consulting Electrophysiologist for Functional Neurosurgery
Kaiser Permanente Medical Group, Sacramento, CA

RESEARCH INTERESTS

Applied dynamical systems, mathematical biology, computational neuroscience: nonlinear dynamics, biological oscillators, coupled oscillators and synchronization, neuronal assemblies, neurodynamics, dynamics of neural networks, electrophysiology, basal ganglia, Parkinson's disease and other movement disorders, addiction, autism spectrum disorder

AWARDS AND FELLOWSHIPS

- IU Indianapolis Athletics Favorite Professor Award (2025)
- IUPUI Athletics Favorite Professor Award (2006, 2010)
- Open Society Institute (Moscow, Russia) Grant (2000)
- Razuvaev Fellowship of Nizhny Novgorod Region Administration (1998, 1999)
- Soros International Science Educational Program Fellowships (1995, 1998-2000)
- The Russian Presidential Fellowship (1995)

FUNDING

- **Indiana University** International Mobility Grant (2022).
- **NSF DMS** 1813819, "Mechanisms and Functions of Intermittent Synchronization in Neural and Other Living Systems" (2018-2022).
- **Indiana University** Overseas Conference Grant (2017).
- **Indiana Clinical and Translational Sciences Institute**, "Closed-Loop Adaptive Deep Brain Stimulation for Parkinson's disease" (2014-2017).
- **Purdue Research Foundation** International Travel Grant (2015).
- **Indiana University Collaborative Research** Grant "Relating electrophysiology and symptoms of Parkinson's disease" (2013-2014).
- **NIH/NINDS** R01NS067200, "Dynamics and mechanisms of rhythmic activity in basal ganglia" (2009-2013).
- **Purdue Research Foundation** International Travel Grant (2013).
- **Indiana University Research Support Fund**, "Dynamics of cortico-subcortical oscillations in Parkinson's disease" (2012-2013).
- **IUPUI Institute of Mathematical Modeling and Computational Sciences**, "Transient neurodynamics of behavioral sensitization" (2012-2013).
- **Indiana University Research Support Fund**, "Activity of Basal Ganglia Networks in Parkinson's disease: laying the foundation for adaptive brain stimulation" (2007-2008).
- **Purdue Research Foundation**, "Mathematical modeling of tremor dynamics in Parkinson's disease" (2006).

PROFESSIONAL ACTIVITIES AND SERVICE TO RESEARCH COMMUNITY

Panelist and reviewer for funding agencies

- Collaborative Research in Computational Neuroscience (National Science Foundation/National Institutes of Health)
- NSF (BIO, ENG, MPS)
- EU Joint Programme – Neurodegenerative Disease Research
- Medical Research Council, UK
- Natural Sciences and Engineering Research Council of Canada
- Review Board Member for Bernstein Award for Computational Neuroscience of the German Federal Ministry of Education and Research (BMBF)
- Oak Ridge Associated Universities
- Israel Science Foundation
- Luxembourg National Research Fund
- Neurological Foundation of New Zealand

Professional organizations and societies service

- Organization for Computational Neuroscience President (2027-)
- Organization for Computational Neuroscience Vice-President (2023-2026)
- International Neuroinformatics Coordinating Facility Governing Board member (2020-)
- Organization for Computational Neuroscience Treasurer (2019-2022)
- Organization for Computational Neuroscience Executive Committee member (2019-)
- Organization for Computational Neuroscience Board of Directors member (2017-2019 term)
- Annual Computational Neuroscience Meeting Program Committee member (2012, 2013, and 2014 meetings).
- Organizer of Student Poster Award Competition at the Annual Computational Neuroscience Meeting (2012-2014)
- Reviewer for the Annual Computational Neuroscience Meeting

Editorial Boards

- PLOS Computational Biology, Editorial Board
- Frontiers in Computational Neuroscience, Associate Editor
- Frontiers in Network Physiology, Associate Editor
- Frontiers in Physics, Associate Editor (2014-2020)

Organization of Professional Meetings

- Organizing committee of 30th Annual Computational Neuroscience Meeting CNS*2021 Online, July 2021.
- Organizing committee of 29th Annual Computational Neuroscience Meeting CNS*2020 Online, July 2020.

- Co-organizer of "Computational and Systems Neuroscience: from theory to clinical applications" symposium, Indianapolis, April 2018.
- Co-organizer of "Mathematical Modeling Basal Ganglia", minisymposium at the SIAM conference on application of dynamical systems, Snowbird, UT, May 2015.
- Co-organizer of "Dynamics of Basal Ganglia in Brain Disorders", minisymposium at the SIAM conference on application of dynamical systems, Snowbird, UT, May 2013.
- Co-organizer of "Neuronal and network dynamics in basal ganglia", minisymposium at the SIAM conference on application of dynamical systems, Snowbird, UT, May 2011.
- Co-organizer of "Phase locking in the presence of biological noise", workshop at the 19th Annual Computational Neuroscience Meeting CNS*2010, San Antonio, TX, July 2010.
- Co-organizer of "Basal Ganglia dynamics vs. Basal Ganglia function and dysfunction", workshop at the 17th Annual Computational Neuroscience Meeting CNS*2008, Portland, Oregon, July 2008.
- Co-organizer of "Theoretical approaches to basal ganglia function", two-day mini-symposium at the 13th Annual Computational Neuroscience Meeting CNS*2004, Baltimore, July 2004.

Manuscript reviewer

- American Journal of Physiology-Regulatory, Integrative and Comparative Physiology
- Biological Cybernetics
- BioSystems
- Brain Research
- Bulletin of Mathematical Biology
- Cerebral Cortex
- Chaos
- Chaos, Solitons & Fractals
- Clinical Neurophysiology
- Cognitive Neurodynamics
- Communications Biology
- Computers in Biology and Medicine
- European Journal of Neuroscience
- Europhysics Letters
- Frontiers in Computational Neuroscience
- Frontiers in Neural Circuits
- Frontiers in Neuroscience
- Frontiers in Systems Neuroscience
- IEEE Transactions on Biomedical Engineering
- IEEE Transactions on Circuits and Systems
- IEEE Transactions on Communications
- International Journal of Bifurcations and Chaos
- Journal of Computational Neuroscience
- Journal of Neural Engineering
- Journal of Neurophysiology

- Journal of Neuroscience
- Journal of Physics A
- Journal of Physiology
- Journal of Theoretical Biology
- Mathematical Biosciences
- Neural Networks
- Neuroscience and Biobehavioral Reviews
- Nonlinear Dynamics
- Physica Scripta
- Physical Review E
- Physical Review Letters
- Physical Review Research
- Physics Letters A
- Physiological Measurement
- PLOS Computational Biology
- PLOS ONE
- Research (Science Partner Journals)
- Science Translational Medicine
- Scholarpedia
- Scientific Reports
- SIAM Journal on Applied Dynamical Systems
- Springer's Association for Women in Mathematics Series
- Book reviewer for Taylor and Francis
- Book reviewer for Pearson
- Book reviewer for Wiley

Affiliation with Centers and Institutes

- Stark Neurosciences Research Institute, Indiana University School of Medicine, Primary Investigator (2004-)
- Biocomplexity Institute, Indiana University, Bloomington, Affiliated Researcher
- Center for Mathematical Biosciences, Indiana University Purdue University Indianapolis, Affiliate (2007-2013)
- Member of the IUPUI Institute for Mathematical Modeling and Computational Science (2012-)
- Indiana University Network Science Institute, Affiliated Faculty (2014-2023)
- IUPUI Center for Translating Research into Practice, Translational Scholar (2020-)
- IUPUI Institute of Integrative Artificial Intelligence, Associated Faculty (2020-2023)
- IUI Artificial Intelligence Consortium (2023-)

PROFESSIONAL ACTIVITIES AND SERVICE AT HOME INSTITUTIONS

University Service

- Indiana University Faculty Council Member (2026-)
- IU Indianapolis Faculty Council Member At-Large (2026-)
- Science Faculty President (2024-2025)
- School of Science Secretary of the Faculty (2023-2024)
- Purdue University Sustainability Committee (2021-2022)
- Indianapolis Faculty Council Budgetary Affairs Committee (2021-2023)
- School of Science Steering Committee (2019-)
- Indiana University – Minority Serving Institutions STEM Initiative Faculty Exchange (2019-2022)
- Parkinson's Disease Center of Excellence visit speaker (2019)
- Reviewer for Indiana University Collaborative Research Grants Program (2015-2017)
- Reviewer for Brain Research Foundation pre-proposals (2015-2016)
- Neuroscience Undergraduate Program Advisory Committee member (2014-)
- Indiana University Review Committee for NSF pre-proposals (2013)
- Indiana University Vice President for Research Advisory Board member (2012-2016)
- Steering Committee member of the Institute for Mathematical Modeling and Computational Science (2012-)
- IUPUI School of Science Dean's Advisory Council retreat (2006)
- Young Scientists Council (Institute for Applied physics, Russian Academy of Science, 2000-2001)

Seminar organization

- Organizer of a seminar series in mathematical neuroscience (Indiana University Purdue University Indianapolis).

Department Service

- Advisory Committee (2012-2016, 2021-2022, 2023-)
- Promotion and Tenure Committee (2021-2022, 2023-2024)
- Colloquium Committee (2005-2006, 2007-2011, 2014-2023), Chair (2014-2018)
- Hiring Committee (2010-2011, 2015-2016, 2023-2024)
- Departmental initiative to improve applied mathematics programs (2010)
- Graduate Committee (2007-2011, 2013-2015, 2017-2023)
- Undergraduate Committee (2006-2007, 2011-2012, 2016-2017, 2022-2023)
- Technology Committee (2011-2012)
- High School Mathematics Contest Committee (2004-2007)
- Center for Mathematical Biosciences – Signature Center at IUPUI proposal development (2006).

TEACHING AND MENTORING EXPERIENCE

Teaching, advising and curriculum development

2004- Indiana University

- Teaching:
  - Calculus for Technology
  - Calculus for Life Sciences
  - Calculus and Analytical Geometry
  - Multivariate Calculus
  - Multidimensional mathematics
  - Differential Equations
  - Linear Algebra
  - Vector Calculus
  - Integrative Neurophysiology (medical neuroscience graduate program)
  - Introduction to Biomathematics
  - Windows on Science

- Courses and Programs development:
  - Calculus for Life Sciences. Undergraduate course
  - Integrative Neurophysiology. Graduate course
  - Introduction to Biomathematics. Graduate course
  - Neuroscience BS program

- Course coordination:
  - Calculus for Life Sciences

- Faculty member:
  - Mathematical Sciences,
    Indiana University Purdue University Indianapolis
  - Medical Neuroscience graduate program
    Indiana University School of Medicine

- Advising:
  - advisor to applied mathematics undergraduates
  - advisor to applied mathematics MS students

2003-2004 University of California, Davis

- Supervised student research assistants

1999-2000 University of Nizhny Novgorod, Nizhny Novgorod, Russia

- introductory course on mathematical modeling of neural systems dynamics for graduate students

1996-1997 University of California, San Diego

- Teaching assistant

Students and postdoctoral fellows mentored

- Anh Nguyen, PhD (postdoctoral mentor, 2019-2021)
- Shivakeshavan Ratnadurai-Giridharan, PhD (postdoctoral mentor, 2014-2016)
- Sungwoo Ahn, PhD (postdoctoral mentor, 2010-2014)
- Choongseok Park, PhD (postdoctoral mentor, 2007-2011)
- Joel Zirkle, PhD (PhD advisor, 2016-2020)
- Chung Cheung, PhD (PhD co-advisor, 2014-2019)
- Andrey Dovzhenok, PhD (PhD advisor, 2008-2012)
- Simone Cassani, PhD (PhD committee, 2014-2016)
- Yeonjoo Yoo, PhD (PhD committee, 2014-2016)
- Abolhassan Behrouzvaziri, PhD (PhD committee, 2014-2018)
- Daniele Prada, PhD (PhD committee, 2015)
- Sunday Gbodogbe (graduate advisor, 2024-)
- Tajkera Khatun (graduate advisor, 2023-2024)
- Aparajeeta Guha (graduate advisor, 2019-2020)
- Kalina Misiolek, MD (IMPRS research mentor, 2018)
- Riley George (MS committee, 2024-)
- Prafull Patil (MS committee, 2024-)
- Howard King (MS committee, 2022-2023)
- Amelie Svejda (MS committee, 2022-2023)
- Patricia Lopes (MS committee, 2021-2022)
- Alex Duncan (MS committee, 2016-2017)
- Brant Coburn (MS committee, 2017-2019)
- Katrina Hoetmer (REU mentor, 2022)
- Kelly Ryan (REU mentor, 2022)
- Ona Ugboaja (REU mentor, 2022)
- Stephanie Marsh (REU mentor, 2021)
- Micah Swartz (REU mentor, 2020-2021)
- Anneliese Markus (REU mentor, 2020)
- Jessica Solfest (REU mentor, 2012)
- Abhishek Ray, MD (REU mentor, 2003-2004)

REU mentoring

- Mentor at Undergraduate Summer Research Program at the Mathematical Biosciences Institute at Ohio State University
- Mentor at the NSF REU at IUI/IUPUI program
- Mentor at the NSF Louis Stokes Alliances for Minority Participation (LSAMP) program

Other mentoring

- Postdoc Mentor at the Mathematical Biosciences Institute at Ohio State University.
- Research Mentor for the Indiana Medical Student Program for Research and Scholarship, Indiana University School of Medicine and Indiana Clinical and Translational Sciences Institute.
- Mentor for Dr. C. Park (North Carolina A&T State University) on a Historically Black Colleges and Universities – Undergraduate Program NSF award
- Mentor in IUSM Short-Term Training Program in Biomedical Sciences (NIH T35 award)

INVITED AND COMPETITIVE TALKS AND PRESENTATIONS

- "Intermittent synchronization: models and applications in neuroscience and beyond." Department of Mathematical Science and Center for Data Science, University of Indianapolis, Indianapolis, IN (March 2025).
- "Unstable synchronization in neural circuits and sensitivity to input signals." Workshop on Neuronal Oscillations: From mechanisms to Computation at the 33rd Annual Computational Neuroscience Meeting CNS*2024, Natal, Brazil (July 2024).
- "Some mechanisms of the temporal patterns of synchronization in neural circuits and how they can contribute to their adaptability". International Workshop "Information processing, Noise, and Adaptation in Living Systems". Max Planck Institute for the Physics of Complex Systems, Dresden, Germany (May 2024).
- "Detection and modeling of the temporal patterns of neural synchrony". American Mathematical Society Central Sectional Meeting, AMS Special Session on Mathematical Modeling in Biosciences. University of Cincinnati (May 2023).
- "Experimental observations and modeling of the temporal patterns of neural synchrony". International Workshop "Chimera States: From Theory and Experiments to Technology and Living Systems". Max Planck Institute for the Physics of Complex Systems, Dresden, Germany (May 2022).
- "Intermittent neural synchronization: observations, mechanisms, and functions". Center for Cognition and Decision Making seminar, High School of Economic, Moscow, Russia (online, February 2021).
- "In and Out of Synch: Intermittent Synchronization in Living Systems". Mathematical and Statistical Biology Seminar, Iowa State University (online, May 2020).
- "In and out of synch: from XVII century clocks to London Millennium Bridge, Canadian hare–lynx cycle, and control of neural activity in Parkinson's disease" EmNet (Xylem, Inc.), South Bend, IN (December 2019).
- "Modelling experimentally observed properties of intermittent neural synchronization" International Workshop "Dynamical Methods in Data-based Exploration of Complex Systems". Max Planck Institute for the Physics of Complex Systems, Dresden, Germany (October 2019).
- "Dynamics of intermittent neural synchronization: observations, mechanisms, and functions". Department of Computer Engineering, Autonomous University of Madrid, Spain (July 2019).
- "Spike-timing-dependent plasticity effect on the patterns of neural synchrony". 5th International Conference on Mathematical Neuroscience, University of Copenhagen, Denmark (June 2019).
- "Intermittent Synchronization: Models and Applications in Neuroscience and Beyond". Department of Mathematics, North Carolina A&T State University (May 2019).
- "Dynamics of intermittent neural synchronization: observations, mechanisms, and functions". Mathematical Biology/Quantitative Biology Seminar, University of Michigan, Ann Arbor, MI (April 2019).
- "Dynamics of intermittent neural synchronization: observations, mechanisms, and functions". Applied Mathematics Colloquium, New Jersey Institute of Technology, Newark, NJ (January 2019).

- “Dynamics of intermittent neural synchronization: observations, mechanisms, and functions”. Computational and Systems Neuroscience: from theory to clinical applications. Indianapolis, IN (April 2018).
- “Optogenetic vs. electrical stimulation of synchronized oscillations in a computational model of parkinsonian basal ganglia.” Control and Modulation of Neuronal and Motor Systems Workshop, Mathematical Biosciences Institute, Columbus, OH (September 2017).
- “Temporal patterns on neural synchrony: observations, mechanisms, and functions.” Neuronal Oscillations: mechanisms and functionality Workshop at the 26th Annual Computational Neuroscience Meeting CNS*2017, Antwerp, Belgium (July 2017).
- “Temporal patterns of intermittent neural synchronization.” International Workshop "Brain Dynamics on Multiple Scales - Paradigms, their Relations, and Integrated Approaches". Max Planck Institute for the Physics of Complex Systems, Dresden, Germany (June 2017).
- “Synchronization in neuroscience”. IUPUI Neuro Club, Indianapolis, IN (December 2016).
- “Temporal patterns of intermittent neural synchronization”. Dynamical Systems and Data Analysis in Neuroscience: Bridging the Gap Workshop, Mathematical Biosciences Institute, Columbus, OH (October 2016).
- “Properties, mechanisms, and potential functions of intermittent neural synchronization.” Dynamical Principles in Neural Circuits Workshop at the 25th Annual Computational Neuroscience Meeting CNS*2016, Jeju, South Korea (July 2016).
- “Dynamics of intermittent synchronization: from theory to neuroscience applications”. Applied Mathematics Seminar, Department of Applied and Computational Mathematics and Statistics, University of Notre Dame, Notre Dame, IN (May 2016).
- “Dynamics of intermittent synchronization: from theory to neuroscience applications”. Physics Colloquium, Physics Department, IUPUI (January 2016).
- “Dynamics of Intermittent Synchronization”. Department of Mathematics, North Carolina A&T State University (May 2015).
- **“**Cortical impact on the dynamics of subthalamo-pallidal networks.” Mathematical Modeling of Basal Ganglia minisymposium at the SIAM conference on application of dynamical systems, Snowbird, UT (May 2015).
- “Fine temporal structure of intermittent synchronization: from theory to neuroscience applications.” Mathematics + Computation + Science = Solutions (iMCSS Symposium), Indianapolis, IN (September 2014).
- “Fine temporal structure of neural synchronization: Parkinson's disease, addiction, etc.” Mathematical and Computational Cognitive Sciences Colloquium, Purdue University (February 2014).
- “Fine temporal structure of intermittent synchronization: detection, mechanisms, and applications in neuroscience.” Mathematical Modeling and Computational Sciences Seminar, IUPUI (November 2013).
- **“**Dynamical circuits coupling between basal ganglia and cerebral cortex.” Dynamics of Basal Ganglia in Brain Disorders minisymposium at the SIAM conference on application of dynamical systems, Snowbird, UT (May 2013).

- “Intermittent neural synchronization in basal ganglia in Parkinson’s disease”. BME Seminar at Johns Hopkins University, Baltimore, MD (March 2013).
- “Synchronized oscillatory dynamics of cortico-basal ganglia networks in Parkinson’s disease”. Disease Workshop. Mathematical Biosciences Institute, Columbus, OH (February 2013).
- “Fine Temporal Structure of Intermittent Synchrony”. Indianapolis chapter of the Society for Neuroscience Annual Meeting, Indiana University, Indianapolis (September 2012).
- “Partially synchronous parkinsonian basal ganglia and delayed feedback deep brain stimulation”. Focus Program “Towards Mathematical Modeling of Neurological Disease from Cellular Perspectives”. Fields Institute, Toronto, ON, Canada (May 2012).
- **“**Intermittent Synchronization of Basal Ganglia Activity.” Neuronal and network dynamics in basal ganglia minisymposium at the SIAM conference on application of dynamical systems, Snowbird, UT (May 2011).
- “Intermittent Neural Synchronization in Parkinson’s Disease: Detection and Modeling”, Complex Biological Systems Group Themes Days, University of Pittsburgh, PA, (May 2011).
- “Oscillations, Synchronization, Basal ganglia, and Parkinson’s disease”. Department of Mathematics, Drexel University, Philadelphia, PA, (April 2011).
- “Intermittent neural synchronization in Parkinson’s disease: experimental observations and mathematical models.” Applied Dynamical Systems: dynamics and networks and computational neuroscience, 2010 Hot Topics Workshop of Korean National Institute for Mathematical Sciences, Daejeon, Korea (December 2010).
- “Analysis of the fine temporal structure of synchronization of neural oscillations. Examples from parkinsonian basal ganglia.” Phase Locking in the Presence of Biological Noise Workshop at the 19th Annual Computational Neuroscience Meeting CNS*2010, San Antonio, TX (July 2010).
- “Fine temporal structure of beta-band synchronization in Parkinson’s disease: experiments, models and mechanisms.” 19th Annual Computational Neuroscience Meeting CNS*2010, San Antonio, TX (July 2010).
- “Synchronization in Basal Ganglia Networks in Parkinson’s disease.” Indiana University Bloomington – Indiana University Purdue University Indianapolis 2008 Neuroscience Retreat, Bradford Woods, IUB (October 2008).
- “Variability of basal ganglia oscillations and its possible relation to function.” Basal Ganglia dynamics vs. Basal Ganglia function and dysfunction, Workshop at the 17th Annual Computational Neuroscience Meeting CNS*2008, Portland, Oregon (July 2008).
- “Synchronization of local filed potentials and neuronal units oscillations in parkinsonian subthalamic nucleus.” Real Time Brain Interfacing Applications Workshop, Mathematical Biosciences Institute, Ohio State University, Columbus, OH (May 2008).
- “Dynamics of Basal Ganglia Networks in Parkinson's Disease: Models and Experiments.” Workshop on Interdisciplinary Biomedical Research, University of Notre Dame, IN (April 2008).
- “Synchronization in Basal Ganglia Networks.” Special Session on Some Mathematical Problems in Biology, from Macromolecules to Ecosystems. American Mathematical Society Sectional Meeting, Bloomington, IN, (April 2008).

- "Synchronization Patterns in Basal Ganglia." Mathematical Neuroscience – Neuroimaging meeting at Indiana University Purdue University Indianapolis (November 2007).
- "Dynamics of tremor networks in Parkinson's disease." Networks and Complex Systems Talk Series, Indiana University, Bloomington (April 2007).
- "Modeling pathophysiology of motor symptoms in Parkinson's disease." Special Session on Mathematical Modeling of Biological Systems. American Mathematical Society Sectional Meeting, Cincinnati, OH (October 2006).
- "How Basal Ganglia Control Motor Programs? Merging theoretical and experimental approaches to basal ganglia function in health and disease**.**" Department of Biology Lecture Series, IUPUI (March 2005).
- "Oscillatory Dynamics in Basal Ganglia Tremor-Supporting Networks." Neural Dynamics Laboratory Seminar, Krasnow Institute for Advance Study, George Mason University (November 2004).
- "Complex and Simple Dynamics in Neural Networks of Basal Ganglia." Biocomplexity Institute Seminar, Indiana University, Bloomington (October 2004).
- "Modeling facilitation and inhibition of competing motor programs in GPe-STN-GPi circuits of basal ganglia." Workshop on the Sensory-Motor Systems, Mathematical Biosciences Institute, Ohio State University, Columbus, OH (June 2003).

OTHER PRESENTATIONS

- "Properties of intermittent synchrony of gamma rhythm oscillations" 34th Annual Computational Neuroscience Meeting CNS*2025, Florence, Italy (July 2025).
- "Modeling of temporal variability of gamma oscillations synchrony" 33rd Annual Computational Neuroscience Meeting CNS*2024, Natal, Brazil (July 2024).
- "Temporal patterns of gamma rhythms synchrony. Computational study." 2023 Annual Meeting of the Greater Indiana Chapter Society for Neuroscience, Purdue University, West Lafayette, IN (September 2023).
- "Synaptic effect on the temporal patterning of intermittent gamma synchrony" 32nd Annual Computational Neuroscience Meeting CNS*2023, Leipzig, Germany (July 2023).
- "Temporal patterning of gamma rhythms synchronization. Computational study." 2023 Big Ten Neuroscience Annual Meeting, Indianapolis, IN (June 2023).
- "Dynamics of Intermittent Synchrony of Ping Gamma Rhythms" SIAM conference on applications of dynamical systems, Portland, OR (May 2023).
- "Fine temporal patterning of partial synchronization of gamma rhythms" 31st Annual Computational Neuroscience Meeting CNS*2022, Melbourne, Australia (July 2022).
- "Modeling intermittent synchronization of gamma-band neural oscillations" Bernstein Computational Neuroscience Conference 2021 Online (September 2021).
- "Modeling intermittent synchronization of gamma-band neural oscillations" 30th Annual Computational Neuroscience Meeting CNS*2021 Online (July 2021).
- "Channel noise and fine temporal structure of intermittent synchronization of synaptically coupled neurons", 2021 International Conference on Mathematical Neuroscience, online (June 2021)

- "Modeling intermittent synchronization of gamma-band neural oscillations" Society for Mathematical Biology Annual Meeting 2021, online (June 2021).
- "Modeling Intermittent Synchronization of PING Neural Oscillations" SIAM conference on applications of dynamical systems, online (May 2021).
- "Intermittent synchronization in a pyramidal-interneuron gamma network" Bernstein Computational Neuroscience Conference 2020 Online (September 2020).
- "The impact of noise on the temporal patterning of neural synchronization" Bernstein Computational Neuroscience Conference 2020 Online (September 2020).
- "Intermittent synchronization in a pyramidal-interneuron gamma (PING) network" 29th Annual Computational Neuroscience Meeting CNS*2020 Online (July 2020).
- "The impact of noise on the temporal patterning of neural synchronization" 29th Annual Computational Neuroscience Meeting CNS*2020 Online (July 2020).
- "Exploring mechanisms of intermittent patterns of neural synchrony." 28th Annual Computational Neuroscience Meeting CNS*2019, Barcelona, Spain (July 2019).
- "Temporal Patterning of Intermittent Synchronization Between Coupled Predator-Prey Oscillators" SIAM conference on applications of dynamical systems, Snowbird, UT (May 2019).
- "Spike-timing-dependent plasticity effect on the temporal patterns of neural synchronization." Society for Neuroscience 48th Annual Meeting, San Diego (November 2018).
- "Spike-Timing-Dependent Plasticity Effect on the Patterns of Neural Synchrony." 27th Annual Computational Neuroscience Meeting CNS*2018, Seattle (July 2018).
- "Spike-Timing-Dependent Plasticity Effect on the Patterns of Neural Synchrony." Indianapolis chapter of the Society for Neuroscience Annual Meeting, Purdue University, West Lafayette, IN (March 2018).
- "Potential functions of different temporal patterns of intermittent neural synchronization." 26th Annual Computational Neuroscience Meeting CNS*2017, Antwerp, Belgium (July 2017).
- "Network effects of optogenetic stimulation on synchronized neural oscillations." Indianapolis chapter of the Society for Neuroscience Annual Meeting, Indiana University, Indianapolis (March 2017).
- "Comparison of network effects of optogenetic and electrical stimulation on the synchronized oscillations in a computational model of parkinsonian basal ganglia." Society for Neuroscience 46th Annual Meeting, San Diego (November 2016).
- "Optogenetic vs. electrical stimulation of the parkinsonian basal ganglia. Computational study." 25th Annual Computational Neuroscience Meeting CNS*2016, Jeju, South Korea (July 2016).
- "Controlling synchronized oscillatory activity in a network of spiking/bursting neurons by electrical and optogenetic stimulation" Control and Observability of Network Dynamics. Mathematical Biosciences Institute, Columbus, OH (April 2016).
- "Effects of electrical and optogenetic deep brain stimulation on synchronized oscillatory activity in Parkinsonian basal ganglia" IUPUI Research Day 2016 (April 2016).
- "Temporal Patterning of Spike-LFP Synchronization in the Basal Ganglia in Parkinson's disease." Indianapolis chapter of the Society for Neuroscience Annual Meeting, Indiana University, Indianapolis (March 2016).

- "Effects of electrical and optogenetic deep brain stimulation on synchronized oscillatory activity in Parkinsonian basal ganglia" Indianapolis chapter of the Society for Neuroscience Annual Meeting, Indiana University, Indianapolis (March 2016).
- "Potential mechanisms and functions of short desynchronizations of neural oscillations." Society for Neuroscience 45th Annual Meeting, Chicago (October 2015).
- "Temporal Patterning of Spike-LFP Synchronization in the Basal Ganglia in Parkinson's disease." Gill Symposium, IUB (September 2015).
- "Short desynchronization epochs in neural synchronization: detection, mechanisms, and function." 24th Annual Computational Neuroscience Meeting CNS*2015, Prague, Czech Republic (July 2015).
- **"**Intermittent synchronization/desynchronization in population dynamics." SIAM conference on applications of dynamical systems, Snowbird, UT (May 2015).
- "Interaction of synchronized dynamics in cortical and subcortical circuits in Parkinson's disease." IUPUI Research Day 2015 (April 2015).
- "Correlation of synchronized dynamics in cortical and basal ganglia networks in Parkinson's disease." Society for Neuroscience 44th Annual Meeting, Washington, DC (November 2014).
- "The response of the subthalamo-pallidal networks of the Basal Ganglia to oscillatory cortical input in Parkinson's disease." 23rd Annual Computational Neuroscience Meeting CNS*2014, Quebec City, Canada (July 2014).
- "Fine temporal structure of neural synchronization." IUPUI Research Day 2014 (April 2014).
- "Cortex-Basal Ganglia synchronization in Parkinson's disease." IUPUI Research Day 2014 (April 2014).
- "Relating electrophysiology and symptoms in Parkinson's disease." IUCRG meeting, Indiana University, Indianapolis (March 2014).
- "Fine temporal structure of neural synchronization." Indianapolis chapter of the Society for Neuroscience Annual Meeting, Indiana University, Indianapolis (October 2013).
- "Dynamics of neural synchronization in prefronto-hippocampal networks during behavioral sensitization." Gill Symposium, IUB (September 2013).
- "Fine temporal structure of neural synchronization." 22nd Annual Computational Neuroscience Meeting CNS*2013, Paris, France (July 2013).
- "Dynamics of Short Desynchronization Episodes in the Brain." SIAM conference on applications of dynamical systems, Snowbird, UT (May 2013).
- "Dynamics of Synchronized Neural Activity in Prefrontal-Hippocampal Networks during Behavioral Sensitization." IUPUI Research Day 2013 (April 2013).
- "Dynamics of synchronized neural activity in prefronto-hippocampal networks during behavioral sensitization." Rhythms and Oscillations Workshop. Mathematical Biosciences Institute, Columbus, OH (March 2013).
- "Mechanisms of pathological synchrony in Parkinson's disease induced by changes in synaptic and cellular properties due to dopamine." 21st Annual Computational Neuroscience Meeting CNS*2012, Atlanta, GA (July 2012).

- "Synchronizing and desynchronizing effects of nonlinear delayed feedback deep brain stimulation in Parkinson's disease." 21th Annual Computational Neuroscience Meeting CNS*2012, Atlanta, GA (July 2012).
- "Fluctuating neural synchrony in the basal ganglia of parkinsonian patients: experimental observations, potential mechanisms, and functional implications." Collaborative Research in Computational Neuroscience Principal Investigator Meeting, Washington University in St. Louis (June 2012).
- "Fine temporal patterning of intermittent synchronized oscillations in hippocampal and prefrontal circuits of the rat under repeated use of amphetamine". Schizophrenia Workshop, Focus Program "Towards Mathematical Modeling of Neurological Disease from Cellular Perspectives". Fields Institute, Toronto, ON, Canada (May 2012).
- "Acute d-Amphetamine alters the temporal patterning of intermittent synchronized oscillations in hippocampal and prefrontal circuits". IUPUI Research Day 2012 (April 2012).
- "Acute d-Amphetamine alters the temporal patterning of intermittent synchronized oscillations in hippocampal and prefrontal circuits of the rat". Society for Neuroscience 41th Annual Meeting, Washington, DC (November 2011).
- "Detecting the temporal structure of the phase locking: Parkinson's disease and beyond" Collaborative Research in Computational Neuroscience Principal Investigator Meeting, Princeton University (October 2011).
- "Modulation of thalamocortical relay by basal ganglia in Parkinson's disease and dystonia." 20th Annual Computational Neuroscience Meeting CNS*2011, Stockholm, Sweden (July 2011).
- "Possible mechanisms underlying intermittent synchronous activity in the networks of excitatory and inhibitory bursting neurons." 20th Annual Computational Neuroscience Meeting CNS*2011, Stockholm, Sweden (July 2011).
- "One Possible Mechanism Underlying Intermittently Synchronous Activity Patterns." SIAM conference on applications of dynamical systems, Snowbird, UT (May 2011).
- "Modeling the origin of parkinsonian tremor." IUPUI Research Day 2011 (April 2011).
- "Synchronous neural oscillations in Parkinson's disease: variability and its potential network mechanisms." IUPUI Research Day 2011 (April 2011).
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