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- M.S., Mathematics & Physics, University of Nizhny Novgorod, Russia, 1984.
- Ph.D., Differential Equations including Mathematical Physics, University of Nizhny Novgorod, Russia, 1990. Mentors: LP. Shilnikov and VN. Belykh.
- Royal Society Postdoctoral Fellow, DAMTP, Cambridge University, UK, 1994-1995. Mentors: C. Sparrow and P. Glendenning

Professional Credentials

04/2018 – current	Distinguished University Professor, Neuroscience Institute, and Department of Mathematics & Statistics, GSU
03/2012 – 04/2018	Professor, Neuroscience Institute, and
06/2014 – 12/2016	Department of Mathematics & Statistics, GSU Professor, Institute for Information Technology, Mathematics and Mechanics, Lobachevsky State University of Nizhniy Novgorod, Russia
07/2008 – 03/2012	Associate Professor, Neuroscience Institute, GSU
08/2006 – 03/2012	Associate Professor, Department of Mathematics and Statistics, GSU
09/2007 – 12/2007	Sabbatical leave at Juelich Research Center, Germany
08/2000 – 06/2006	Assistant Professor, Department of Mathematics and Statistics, GSU
12/1999 – 06/2000	Visiting Assistant Professor, Cornell University
11/1999 – 06/1999	Assistant Research Scientist, UC Berkeley
01/1999 – 06/1999	Visiting Assistant Professor, Georgia Institute of Technology
05/1996 – 12/1998	Visiting Assistant Research Scientist, UC Berkeley
05/1994 – 05/1995	Post-Doctoral Fellow, Cambridge University, UK
10/1993 – 05/1994	Post-Doctoral Fellow, UC Berkeley
05/1989 – 05/1996	Research Scientist I, Institute of Applied Mathematics, Nizhny Novgorod, Russia
08/1987 – 05/1989	Senior Lecturer, Department of Mathematics, Academy of Transport Engineers, Nizhny Novgorod, Russia
08/1984 – 05/1989	Research Associate, Department of Nonlinear Oscillations, University of Nizhny Novgorod, Russia

Publications

My current citation # is 6041 and h-index is 41 (Google Scholar) and 43 (ResearchGate)

<https://scholar.google.com/citations?user=Pi7dBeMAAAAJ&hl=en>

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https://www.researchgate.net/profile/Andrey_Shilnikov

<https://www.webofscience.com/wos/author/record/AAX-5100-202>

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Books

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6. Chinese Editions of Shilnikov L.P., Shilnikov A.L., Turaev D. and Chua L., Methods of Qualitative Theory in Nonlinear Dynamics. 俄罗斯数学教材选译非线性动力学定性理论方法(第二卷 Part I, 2011
5. Chinese Editions of Shilnikov L.P., Shilnikov A.L., Turaev D. and Chua L., Methods of Qualitative Theory in Nonlinear Dynamics. 俄罗斯数学教材选译非线性动力学定性理论方法(第二卷 Part I, 2011
4. Шильников Л.П., Шильников А.Л., Тураев Д.В. и Чуа Л. Методы качественной теории в нелинейной динамике. *Russian Edition* of Shilnikov L.P., Shilnikov A., Turaev D. and Chua, L., Methods of Qualitative Theory in Nonlinear Dynamics. Part II. World Scientific Pub., 2009
3. Russian Edition of Shilnikov L.P., Shilnikov A.L., Turaev, DV. and Chua, Leon O. Methods of qualitative theory in nonlinear dynamics. Volume I. Шильников Л.П., Шильников А.Л., Тураев Д.В., Чуа Л. Методы качественной теории в нелинейной динамике. Часть 1, ИКИ, 2004
2. Shilnikov L. P., Shilnikov A. L., Turaev D. V. and Chua L.O. Methods of qualitative theory in nonlinear dynamics. Part II. World Scientific Series on Nonlinear Science. Series A: Monographs and Treatises, 5. World Scientific Publishing Co., Inc., River Edge, NJ, 2001
1. Shilnikov L.P., Shilnikov A. L., Turaev, D. V. and Chua L.O. Methods of qualitative theory in nonlinear dynamics. Part I. World Scientific Series on Nonlinear Science. Series A: Monographs and Treatises, 4. World Scientific Publishing Co., Inc., River Edge, NJ, 1998

Journal Articles

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83. Qie X.*, Zang J.*, Liu S., and Shilnikov A.L. The role of connection delays in shaping dynamics and bifurcations of multistable 3-cell neural networks. J. Chaos 35(4), 2025
82. Scully J.*, Hinsley C.*, Bloom D.*, Meijer, H.G.E. and Shilnikov A.L. Slow oscillating currents induce widespread neuronal chaos, J. Chaos 35, 033120, 2025.
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79. Scully J.*, Bourahmah J.*, Bloom D.*, Shilnikov AL. Pairing cellular and synaptic dynamics into building blocks of rhythmic neural circuits. A tutorial. Front. Network Physiology, Sec. Networks of Dynamical Systems 4, 2024 <https://doi.org/10.3389/fnetp.2024.1397151>
78. Fallah H.*, and Shilnikov A.L. Quasiperiodicity at transition from spiking to bursting in the Pernarowski model of pancreatic beta-cells. J. Regular and Chaotic Dynamics (Springer), 29(1), 100-119, 2024 <https://doi.org/10.1134/S1560354724010>
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74. Baruzzi V.* Lodi M., Storace M., and Shilnikov AL. Towards more biologically plausible CPG models. *Physics Review E* 104, 064405, 2021 DOI: 10.1103/PhysRevE.104.064405
73. Scully J.*, Neiman A., and Shilnikov AL. Measuring chaos in the Lorenz and Rossler models: Fidelity tests for reservoir computing. *J. Chaos* 31(9), 0931121, 2021 <https://doi.org/10.1063/5.0065044>
72. Xing T.*, Pusuluri K.*, and Shilnikov AL. Ordered intricacy of Shilnikov saddle-focus homoclinics in symmetric systems. *J. Chaos* 31, 073143, 2021 <https://doi.org/10.1063/5.0054776>
71. Bakharova Yu.*, Kazakov A., Malykh S.*, Pusuluri K*. and Shilnikov AL. Homoclinic chaos in the Rossler model. *J. Chaos* 30, 113126, 2020 <https://doi.org/10.1063/5.0026188>
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68. Collens J.* Pusuluri K.*, Kelly A.*, Knapper D.*, Basodi S.*, Acacam D.* and Shilnikov A.L. Dynamics and bifurcations on multistable 3-cell neural networks. Invited Review. *J. Chaos* 30,072101, 2020 <https://doi.org/10.1063/5.0011374>
67. Pusuluri K.*, Meyer H., and Shilnikov AL. Homoclinic chaos in a laser model. Invited Review. *J. Communications in Nonlinear Science and Numerical Simulation*, 83, 2020 <https://doi.org/10.1016/j.cnsns.2019.105139>
66. Pusuluri K.*, Basodi S.*, and Shilnikov AL. Computational exposition of multistable rhythms in 4-cell neural circuits. *J. Communications in Nonlinear Science and Numerical Simulation*, 83, 105139, 2020 <https://doi.org/10.1016/j.cnsns.2019.105139>
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49. Shilnikov L.P. Shilnikov A.L. and Turaev D.V., Showcase of Blue-Sky Catastrophes, Bifurcations and Chaos, 4(8), 2014
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44. Shilnikov A. Complete dynamical analysis of an interneuron model. Dynamics in Biology and Medicine. J. Nonlinear Dynamics, 68(3), 305-328, 2012.
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41. Barrio R., Blesa F.*, Serrano S.* and Shilnikov A. Global organization of spiral structures in parametric phase space of dissipative flows, Physics Review E 84, 035201, 2011.
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39. Barrio R., and Shilnikov A. Parameter-sweeping techniques for temporal dynamics of neuronal systems: Hindmarsh-Rose model, J. Mathematical Neuroscience 1:6, 2011. doi:10.1186/2190-8567-1-6
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35. Belykh I., Jalil S.*, and Shilnikov A. Burst-duration mechanism of in-phase bursting in inhibitory networks. Regular & Chaotic Dynamics, 15(2-3), 148-160, 2010
34. Коломиец М.Л. и Шильников А.Л. Методы качественной теории для модели Хиндмарш-Роуз. Нелинейная Динамика, Т. 6, №2, с. 1–30, 2010
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- desynchronizing networks of bursting neurons, *Physics Review Letters*, 101, 078102, 2008
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28. Shilnikov L.P. and Shilnikov A., Shilnikov Bifurcation, *Scholarpedia*, 2(8):1891, 2007
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19. Shilnikov A. L., Calabrese R. and Cymbalyuk G. Mechanism of bistability: tonic spiking and bursting in a neuron model, *Physics Review E* 71(1), 205, 2005
18. Shilnikov A. L. and Cymbalyuk, G. Homoclinic saddle-node orbit bifurcations en a route between tonic spiking and bursting in neuron models, *Regular & Chaotic Dynamics* 9 (3), 281-297, 2004
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2. Bykov V. V. and Shilnikov, A. L. Boundaries of the domain of existence of a Lorenz attractor. Methods in qualitative theory and bifurcation theory, 151-159, Gorkov. Univ., Gorky, 1989, in Russian
1. Shilnikov A. L. Bifurcation and chaos in the Morioka-Shimizu system. Methods of qualitative theory of differential equations, 180-193, 216, Gorkov. Gos. Univ., Gorky 1986, in Russian

Book chapters

11. Kolomiets ML and Shilnikov AL. Poincare return maps in neural dynamics: three examples. Progress on Difference Equations and Discrete Dynamical Systems, 5th ICDEA, London, UK, June 24–28, 2019, Springer Proceedings in Mathematics & Statistics book series, vol. 34, pp. 45-57, 2021
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10. Pusuluri K.*, Ju H.*, and Shilnikov AL. Chaotic dynamics in neural systems. In book: R. A. Meyers (ed.), Encyclopedia of Complexity and Systems Science, Springer Science, 2020
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6. Shilnikov A. L. and Rulkov N.F. Chaos in 2D slow-fast maps for spiking-bursting neural activity, *IEEE Proc. Nonlinear Dynamics of Electronic Systems*, 2003
5. Shilnikov A. L. and Cymbalyuk G. and Calabrese R. Multistability and infinite cycles in a model for the leech heart interneuron, *Proc. NDES IEEE*, 2003
4. Pisarevskii, A., Shilnikov, A.L., And Turaev, D.V. Asymptotic normal forms for equilibria with a triplet of zero characteristic exponents in systems with symmetry. *Iteration theory (ECIT '96) (Urbino)*, *Grazer Math. Ber.*, 339, Karl-Franzens-Univ., 291-300, 1999
3. Gavrilov N. and Shilnikov A.L., On a blue-sky catastrophe model, *Contemporary Problems in Theory of Dynamical Systems*, Nizhny Novgorod, Russia, 37-40, 1996
2. Shilnikov A.L. and Shilnikov L.P, Dangerous and safe stability boundaries of equilibria and periodic orbits, *IEEE NDES 95*, University College Dublin, Ireland, 55-63, 1995
1. Shilnikov A.L., Codimension-2 homoclinic bifurcations and three-level laser models, *IEEE NDES'95*, University College Dublin, Ireland, 65-70, 1995

Preprints

2. Shilnikov A.L., Shilnikov L.P. and Turaev, D.V. Blue sky catastrophe in singularly perturbed systems, Preprint no. 841, WIAS, Berlin, 2003
1. Shilnikov A.L., Shilnikov L.P. and Turaev, D.V. On some mathematical topics in classic synchronization. WIAS Preprint No. 892, 2003

PhD Thesis

Shilnikov A.L. On qualitative and numerical analysis of models of the Lorenz type, Gorky University Publishing. 1989.

Presentations at Professional Meetings

(* indicates students directed)

- J. Scully*, C. Hinsley* and AL. Shilnikov, Widespread neuronal chaos induced by slow oscillating currents. Int Conference “Shilnikov Workshop 2024,” UNN, December 16-18, 2024. **Keynote Speaker.**
- J. Scully*, C. Hinsley* and AL. Shilnikov, Bifurcation structure of interval maps with orbits homoclinic to a saddle-focus. The 24th European Conference on Iteration Theory. Vimeiro, Portugal, May 27-31, 2024. **Invited Speaker.**
- J. Scully*, C. Hinsley* and A. Shilnikov. Widespread chaos in a neuron model. GSU B&B retreat, May 12, 2024, Poster
- AL. Shilnikov AL. Pairing cellular and synaptic dynamics into building blocks of rhythmic neural circuits. 2024 Dynamics Days, UC Davis, January 8-10, 2024.
- AL. Shilnikov. Bifurcation structure of interval maps with orbits homoclinic to a saddle-focus. Workshop “Chaos: Homoclinic Bifurcations, Strange Attractors, Arnold Diffusion, Fermi Acceleration, Solitons“, Sep. 25-29, 2023. **Keynote Speaker.**
- D. Bloom*, C. Hinsley*, J. Scully*, and AL. Shilnikov. Chaotic Intracellular Dynamics in a Conductance Neuronal Model. 2023 SIAM conference Applications of Dynamical Systems. Portland (OH), May 14-18, 2023. Poster.
- J. Bourahmah*, and AL. Shilnikov. An Error Function, Data Augmentation, and Visualization for Fitting Voltage Time Series. 2023 SIAM conference Applications of Dynamical Systems. Portland (OH), May 14-18, 2023. Poster.
- J. Scully*, J. Bourahmah*, and AL. Shilnikov. Network Hysteresis: A Framework for Understanding Emergent Oscillations. 2023 SIAM conference Applications of Dynamical Systems. Portland (OH), May 14-18, 2023. Poster.
- AL. Shilnikov. Persistent chaos in neuronal systems. Shilnikov workshop. Dec 18-19, 2022. **Keynote Speaker.**
- AL. Shilnikov. Rhythms in neural networks. Interdisciplinary Mathematics and Neuroscience (online). South China University of Technology. Dec 3-4, 2022. **Keynote Speaker.**
- AL. Shilnikov. Complex dynamics in slow-fast neural model. Banff International Research Station, Canada, Nov 28- Dec 2, 2022. **Invited Speaker.**
- J. Bourahmah*, and A. Shilnikov. Combining mathematical and biological models of a Melibe CPG. Scientific Computing Day conference, September 28, 2022, Poster
- D. Bloom*, J. Scully*, and A. Shilnikov. *Melebe iris* swim CPG model. Scientific Computing Day conference, September 28, 2022, Poster
- J. Scully*, and A. Shilnikov. Fidelity tests for reservoir computing. Scientific Computing Day conference, September 28, 2022, Poster
- AL. Shilnikov. Swim CPG networks. Reconstructing Network Dynamics from Data: Applications to Neuroscience and Beyond, Institute for Pure and Applied Mathematics (IPAM), UCLA, Aug 29 – Sep 2, 2022. **Invited Speaker.**
- F. Padilla, J. Scully and AL. Shilnikov. Cellular and synaptic interplay towards rhythmic neural dynamics. GSU CASA Math Path Summer Undergraduate Research conference, Aug 3, 2002, Poster
- A. Fani, M. James, P/ Mills, and AL. Shilnikov. A Methodical Approach to Rhythm-Generating Circuits. GSU CASA Math Path Summer Undergraduate Research conference, Aug 3, 2002, Poster
- AL. Shilnikov. Computational exposition of multistable rhythms in 4-cell neural circuits. Chimera States: From Theory and Experiments to Technology and Living Systems, Max Planck Institute, Dresden,

Germany, May 16-20, 2022. **Travel award.**

- AL. Shilnikov. Symbolic dynamics, chaos and homoclinic bifurcations. International conference Dynamical Systems, Theory and Application: Satellite meeting to the 2021 International Congress in Mathematics Jun 28- July 4, 2022. **Keynote Speaker.**
- J. Bourahmah*, and A. Shilnikov. Combining mathematical and biological models of a Melibe CPG. GSU B&B retreat, May 12, 2022, Poster
- D. Bloom*, J. Scully*, and A. Shilnikov. Melebe's swim CPG model. GSU B&B retreat, May 12, 2022, Poster
- J. Scully*, and A. Shilnikov. Dendronotus Iris's swim CPG model. GSU B&B retreat, May 12, 2022, Poster
 - AL. Shilnikov. Measuring chaos in the Lorenz and Rossler models: fidelity tests for reservoir computing. 2022 Georgia Scientific Computing Symposium, Feb 19, 2022. **Keynote Speaker.**
- AL. Shilnikov. L.P. Shilnikov and mathematical theory of chaos. Shilnikov workshop. Dec 16-17, 2021. **Keynote Speaker.**
- J. Bourahmah, A. Shilnikov. Combining mathematical and biological models of a Melibe CPG. Dynamic neural networks: STG meeting, Nov 5, 2021
- J. Benetto, J. Scully, A. Shilnikov. Dendronotus Iris's swim CPG model. Dynamic neural networks: . Dynamic neural networks: STG meeting, Nov 5, 2021
- AL. Shilnikov. Stability of rhythm-generating circuits. 2021 Volga Neuroscience meeting. Aug 24-26, 2021. **Invited Speaker.**
- AL. Shilnikov. Chaos and topology in slow-fast neural systems. Topological Methods in Dynamics and Related Topics IV., N. Novgorod, Russia, Aug 2-5, 2021. **Invited Speaker.**
- AL. Shilnikov. Cooperative rhythm generation in neural networks. Solvay workshop on 'Nonlinear Phenomena and Complex Systems' in memory of Prof. Grégoire Nicolis. June 14-16, 2021. **Invited Speaker.**
- AL. Shilnikov and K. Pusuluri. Cooperative rhythm generation in neural networks. AMS special session "Advances in computational dynamics" group, 03/21. **Invited Speaker.**
- AL. Shilnikov. Cooperative rhythm generation in neural networks. SIAM Conference on Dynamical Systems 2021. **Invited Speaker.**
- AL. Shilnikov. Synchrony of rhythms in neural networks. Science and Technology Foresight – National Research Council of Italy Workshop “A quest for an interface between information and action”, April 9, 2021. **Keynote Speaker**
- AL. Shilnikov, H. Ju and K. Pusuluri. Rare chaos in neuron models. 2020 L.P. Shilnikov workshop, December 17, 2020. **Keynote Speaker**
- K. Pusuluri and AL. Shilnikov. Symbolic methods for neural dynamics and emergent network behavior in a swim CPG. Neuromatch 3.0, 2020.
- AL. Shilnikov. Mathematical models of rhythm-generating circuits. The Italian Society for Chaos and Complexity, October 5, 2020. **Keynote Speaker.**
- AL. Shilnikov. Mathematical models of rhythm-generating circuits. 2019 EquaDiff, Leiden, July 8-12, 2019. **Invited Speaker.**
- AL. Shilnikov. Return maps in neuroscience: from individual models to neural circuits. The 25th International Conference on Difference Equations and Applications. University College London, June 24-28, 2019. **Keynote Speaker.**
- J. Bourahmah, A. Sakurai, PS. Katz and AL. Shilnikov. Synaptic Dynamics and Bursting in Neural Networks. 2019 SIAM Applied Dynamical Systems Conference. Utah, 2019. Poster. **Best Poster Award.**
- K. Pusuluri, S. Basodi and AL. Shilnikov. Computational Approaches for Multistable Rhythms in Modular Neural Networks. 2019 SIAM Applied Dynamical Systems Conference. Utah, 2019, contributed talk.
- H. Ju and AL. Shilnikov. Bottom-Up Approach to Torus Bifurcation in Neuron Models. 2019 SIAM Applied Dynamical Systems Conference. Utah, 2019, contributed talk.
- M. Lodi, M. Storace and AL. Shilnikov. Design of Central Pattern Generator for Locomotion. 2019

- SIAM Applied Dynamical Systems Conference. Utah, 2019, contributed talk.
- AL. Shilnikov. Modeling the Emergent Network Bursting in Swim Neural Circuits. 2019 SIAM Applied Dynamical Systems Conference. Utah, 2019. Session Organizer.
 - J. Scully and AL. Shilnikov. Modelling the Swim Behavior of Dissected Sea Slug *Ganglii*. 2019 SIAM Applied Dynamical Systems Conference. Utah, 2019, contributed talk.
 - H. Ju, L. Ge, and AL. Shilnikov. Principles for Making Half-Center Oscillators. 2019 SIAM Applied Dynamical Systems Conference. Utah, 2019. Poster.
 - S. Basodi, K. Pusuluri, and AL. Shilnikov. Symbolic Representation of Neuronal Dynamics and Network Behaviors, 2019 SIAM Applied Dynamical Systems Conference. Utah, 2019. Poster.
 - R. Lindsay, J. Scully, J. Bourahmah and AL. Shilnikov. Application and Analysis of Iterative and Stochastic Optimization for a Hybrid Neural Circuit. B&B Retreat, 2019. Poster.
 - J. Hu and AL. Shilnikov. Half-center oscillator from non-bursting neuron models. GSU B&B Retreat, 2019. Poster.
 - L. Pusuluri and AL. Shilnikov. Symbolic dynamics for models of neurons and neural circuits. GSU B&B Retreat, 2019. Poster.
 - T. Mitroy, J. Bourahmah and AL. Shilnikov. Optimizing a neural behavior model of the sea slug *Melibe leonine*. Georgia State Undergraduate Research Conference, 2019. Oral presentation. **Provost 2nd best presentation award.**
 - AL. Shilnikov. Biologically plausible models of rhythm-generating circuits. 2018 Volga Neuroscience meeting, July 26, 2018. **Keynote Speaker. Organizer.**
 - D. Alacam*, and AL. Shilnikov. Model of Melibe swim CPG circuit. 2018 Shilnikov meeting, University of Nizhniy Novgorod, Russia, July 20-25, 2018, contributed talk
 - J. Scully*, and AL. Shilnikov. GPU simulations of complex dynamics. 2018 Shilnikov meeting, University of Nizhniy Novgorod, Russia, July 20-25, 2018, contributed talk
 - A.L. Shilnikov. Mathematical Neuroscience: 3 lecture series. International Conference “Dynamics, Bifurcations, and Chaos”, University of Nizhniy Novgorod, Russia, July 22-25, 2018. **Keynote Speaker**
 - D. Alacam*, and AL. Shilnikov. Model of Melibe swim CPG circuit. 2018 Volga Neuroscience meeting, 2018, poster. **Best Poster Award.**
 - J. Scully*, D. Alacam*, and AL. Shilnikov. Model of Dendronotus swim CPG circuit. 2018 Volga Neuroscience meeting, 2018, Poster.
 - AL. Shilnikov. Biologically plausible models of rhythm-generating circuits. Nonlinear Dynamics of Electronic Systems (NDES) 2018, June 11-13, 2018, contributed talk.
 - K. Pusuluri*, S. Basodi*, A. Shilnikov. Computational approaches for multistability in 4-cell central pattern generators. 2018 Brain and Behaviors annual retreat, GSU, Atlanta, May 18, 2018. Poster.
 - H. Ju*, A. Neiman and A. Shilnikov. Bottom-up approach to amplitude modulation in neuron models. 2018 Brain and Behaviors annual retreat, GSU, Atlanta, May 18, 2018. Poster.
 - K. Pusuluri* and AL. Shilnikov. Symbolic simulations for homoclinic chaos. 2018 Dynamic Days, Bolder. CO, January 5, 2018. Poster
 - AL. Shilnikov. L.P. Shilnikov’s homoclinic story. Nonlinear Dynamics workshop, Volos, Greece, July 23, 2017. **Invited Speaker**
 - AL. Shilnikov. Rhythmic neural networks. International Conference “Dynamics, Bifurcations, and Chaos,” University of Nizhniy Novgorod, Russia, July 22, 2017. **Keynote Speaker**
 - S. Basodi*, K. Pusuluri*, and AL. Shilnikov. Neuronal Motifs - Multistability Using Hybrid Computational Approaches. 2017 SIAM Applied Dynamical Systems Conference. Utah, 2017. Poster
 - J. Collens*, D. Alacam*, A. Kelly*, D. Knapper*, and AL. Shilnikov. Bifurcation Theory and Phase-Lag Variance in 3-Node Neural Networks. 2017 SIAM Applied Dynamical Systems Conference. Utah, 2017. Poster
 - D. Alacam*, and AL. Shilnikov. Network Bursting in Melibe Swim CPG. 2017 SIAM Applied Dynamical Systems Conference. Utah, 2017. Poster
 - H. Ju*, and AL. Shilnikov. Torus Bifurcation in Purkinje Cell. 2017 SIAM Applied Dynamical Systems Conference. Utah, 2017. Poster

- K. Pulusuri*, A. Pikovsky and AL. Shilnikov. Unraveling the Chaos-Land and Its Organization in the Rabinovich System. 2017 SIAM Applied Dynamical Systems Conference. Utah, 2017. Poster
- J. Scully*, D. Alacam*, and AL. Shilnikov. Model of Dendronotus Iris Swim CPG Circuit. 2017 SIAM Applied Dynamical Systems Conference. Utah, 2017. Poster
- Pulusuri, K.*, T. Xing* and AL. Shilnikov. Homoclinic chaos painted. Dynamics Days Latin America and the Caribbean, Puebla, Mexico, October 24 - November 01, 2016. **Invited speaker**
- Shilnikov, A.L. Analysis and Dynamics of Multifunctional and Dedicated Neural Circuits. IEEE International Workshop on Complex Systems and Networks, GSU, Atlanta, November 14-15, 2016. **Invited Speaker**
- Ju, H.*, and Shilnikov, A.L. Torus bifurcations in neural systems. IEEE International Workshop on Complex Systems and Networks, GSU, Atlanta, November 14-15, 2016. Poster
- Alacam, D.*, and Shilnikov, A.L. Modelling the Melebe swim CPG. IEEE International Workshop on Complex Systems and Networks, GSU, Atlanta, November 14-15, 2016. Poster
- Pulusuri, K.*, Pikovsky, A., and Shilnikov, A.L. Unraveling the Chaos-land and its organization in the Rabinovich System. IEEE International Workshop on Complex Systems and Networks, GSU, Atlanta, November 14-15, 2016. Poster
- Basodi, S.*, Pulusuri, K.*, and Shilnikov, A.L. Return maps in oscillatory networks. IEEE International Workshop on Complex Systems and Networks, GSU, Atlanta, November 14-15, 2016. Poster
- Ju, H.*, and Shilnikov, A.L. Torus bifurcation in Purkinje cell. Scientific Computing Day 2016, GSU, Atlanta, September 29, 2016. Poster
- Pulusuri, K.*, Pikovsky, A., and Shilnikov, A.L. Unraveling the Chaos-land and its organization in the Rabinovich System. Scientific Computing Day 2016, GSU, Atlanta, September 29, 2016. Poster
- 2016 CNS Workshop Dynamical Principles in Neural Circuits. July 6, 2016. **Co-Organizer.**
- J. Collens*, D. Alacam*, A. Kelley*, K. Pulusuri*, D. Knapper*, J. Schawabedal and AL. Shilnikov. Polyrhythmic Pattern Generation in Networks with Three-Node CPG Kernels., 2016 SIAM Conference on the Life Sciences, Boston, MA, USA, July 11014, 2016. Poster.
- Pulusuri, K.* and Shilnikov, A.L. Deconstructing the stunning complexity of global bifurcations in a far-infrared Raman laser model. Special Session 120: Global bifurcations and complex dynamics. AIMS 2016 Meeting, Orlando, Florida, USA, July 1-5, 2016. **Invited.**
- D. Alacam*, J. Collens*, A. Kelley*, K. Pulusuri*, D. Knapper*, J. Schawabedal and AL. Shilnikov. Stability and bifurcations of rhythms in neuronal circuits. Special Session 85: Differential Equation Modeling and Analysis for Brain and other complex bio-systems. AIMS 2016 Meeting, Orlando, Florida, USA, July 1-5, 2016. **Invited.**
- Shilnikov, A.L. Rhythmogenesis and stability of neural networks. Volga Neuroscience meeting, Saint Petersburg- Nizhny Novgorod, Russia, July 24-30, 2016. **Co-chair and Keynote Speaker**
- Kelley, A.* and Shilnikov, A.L. 2-theta models of oscillatory CPG networks. Volga Neuroscience meeting, Saint Petersburg- Nizhny Novgorod, Russia, July 24-30, 2016. **Best Poster award.**
- Kelley, A.* and Shilnikov, A.L. Reduced model of 3-cell motifs. Volga Neuroscience meeting, Saint Petersburg- Nizhny Novgorod, Russia, July 24-30, 2016. Contributed.
- Pulusuri, K.*, T. Xing* and AL. Shilnikov. Homoclinic bifurcations and symbolic dynamics in action. 2016 Shilnikov meeting, University of Nizhniy Novgorod, Russia, July 2016. **Keynote Speaker**
- Collens, J.*, Alacam, D.*, Knapper, D.E.*, Shilnikov, A. Phase-lag variance and bifurcation theory in neural networks. Brains & Behavior Annual Retreat, April 2016, Atlanta, Poster
- Collens, J.*, Knapper, D.E.*, Alacam, D.*, Kelley, A.*, Pulusuri, K.*, Schwabedal, J., Shilnikov, A. Towards bifurcation theory for rhythmogenesis in neural networks. Computational and Systems Neuroscience (COSYNE) Conference, February 2016. Poster
- Collens, J.*, Knapper, D.E.*, Alacam, A.*, Xing, T.*, Kelley, A.*, Schwabedal, J.T., Shilnikov, A.L. Polyrhythmic and recurrent pattern generation in three-node CPG networks.” Dynamics in Networks with Special Properties. MBI at OSU, 2016 – Columbus, OH. Poster
- AL. Shilnikov. Bifurcation Theory for neural networks, MBI at OSU, January 2016, Columbus, OH, **Invited**

- AL. Shilnikov and T. Xing*. Ordered Intricacy of Shilnikov saddle-focus homoclinics. International Conference-School: 50 years of the Shilnikov saddle-focus, University of Nizhny Novgorod, Russia, 17-19 December 2015. **Keynote Speaker**
- AL. Shilnikov. Bifurcation Theory for Networks. Workshop at Brain Modes, GSU, Atlanta, 2015 December 8-11, 2015. **Invited Speaker**
- D. Alacam* and AL. Shilnikov, Parabolic Bursting in Inhibitory Neural Circuits. Brain Modes, GSU, Atlanta, 2015 December 10-11. Poster.
- AL. Shilnikov. Bifurcation Theory for Networks. Network Frontier Workshop 2015, Northwestern University, Evanston, IL, December 6-7, 2015. Contributed
- AL. Shilnikov. Rhythmgensis in central pattern generators. Dynamics of Coupled Oscillators: 40 years of the Kuramoto Model. Max Plant Institute, Dresden, Germany, July 27-31, 2015. **Invited Speaker**
- AL. Shilnikov. Symbolic Quest into Homoclinic Chaos. International Conference-School: Dynamics, Bifurcations and Chaos 2015, University of Nizhny Novgorod, Russia, 20–24 July, 2015.
- AL. Shilnikov. Plausible and phenomenological models of multifunctional central pattern generators. 2015 Society of Mathematical Biology meeting, GSU. Atlanta, June 30-August 3, 2015. Contributed talk. **Co-Organizer.**
- J. Collens*, JT. Schwabedal, D. Alacam*, D. Knapper* and AL. Shilnikov, Polyrhythmic Synchronization in Modular Networks. 2015 Society of Mathematical Biology meeting, GSU. Atlanta, June 30-August 3, 2015. Poster.
- D. Knapper*, JT. Schwabedal, and AL. Shilnikov, Understanding Patterns in Neural Networks. 2015 Society of Mathematical Biology meeting, GSU. Atlanta, June 30-August 3, 2015. Poster.
- D. Alacam* and AL. Shilnikov, Parabolic Bursting in Inhibitory Neural Circuits. 2015 Society of Mathematical Biology meeting, GSU. Atlanta, June 30-August 3, 2015. Poster.
- A. Kelley* and AL. Shilnikov. Two-Theta Neuron: Phase Models for Bursting Networks. 2015 Society of Mathematical Biology meeting, GSU. Atlanta, June 30-August 3, 2015. Poster.
- AL. Shilnikov. Quest into homoclinic chaos. 2015 AMS international meeting. Porto, June 10-13, 2015.
- AL. Shilnikov. Plausible and phenomenological models of multifunctional central pattern generators. 1st International Conference on Mathematical Neuroscience. Antibes Juan les Pins, June 8-10, 2015. Contributed talk.
- R. Barrio, M. Lefranc, M. A. Martínez, M. Rodríguez, S. Serrano and A. Shilnikov. Roadmaps for neuronal models: individual and networked. 1st International Conference on Mathematical Neuroscience. Antibes Juan les Pins June 8-10, 2015. Poster
- J. Collens*, JT. Schwabedal, D. Alacam*, D. Knapper*, A. Kelley*, D. Alacam*, T Xing* and AL. Shilnikov, Polyrhythmic Synchronization in Modular Networks. 2015 SIAM Meeting on Applied Dynamical Systems, May 16-21, 2015, Contributed talk.
- J. Wojcik, R. Clewley, JT. Schwabedal and AL. Shilnikov. Key Bifurcations of Bursting Polyrhythms in 3-Cell Central Pattern Generator. 2015 SIAM Meeting on Applied Dynamical Systems, May 16-21, 2015. Contributed talk.
- AL. Shilnikov and A. Neiman. Torus Canard Breakdown. 2015 SIAM Meeting on Applied Dynamical Systems, May 16-21, 2015. Contributed talk.
- M. Rodriguez, R. Barrio, S. Serrano and AL. Shilnikov. From Andronov-Hopf to Z3 Heteroclinic Bifurcations in CPGs. 2015 SIAM Meeting on Applied Dynamical Systems, May 16-21, 2015. Contributed talk.
- J. Collens*, JT. Schwabedal, D. Alacam*, D. Knapper* and AL. Shilnikov, Polyrhythmic Synchronization in Modular Networks. 2015 SIAM Meeting on Applied Dynamical Systems, May 16-21, 2015. Poster.
- D. Alacam* and AL. Shilnikov, Parabolic Bursting in Inhibitory Neural Circuits. 2015 SIAM Meeting on Applied Dynamical Systems, May 16-21, 2015. Poster.
- T. Xing* and AL. Shilnikov, A Symbolic Method in Chua's Circuit. 2015 SIAM Meeting on Applied Dynamical Systems, May 16-21, 2015. Poster.
- A. Kelley* and AL. Shilnikov. Two-Theta Neuron: Phase Models for Bursting Networks. 2015 SIAM

Meeting on Applied Dynamical Systems, May 16-21, 2015. Poster.

- J. Collens* and AL. Shilnikov, Polyrhythmic generation and key bifurcations in three-node CPG networks. Brains and Behavior Annual Spring Retreat, Georgia State University, April 24, 2015.
- D. Knapper*, JT. Schwabedal, and AL. Shilnikov. Quantitative and qualitative stability analysis of polyrhythmic circuits. Brains and Behavior Annual Spring Retreat, Georgia State University, April 24, 2015. Poster.
- T. Xing, J. Wojcik, R. Barrio, and A. Shilnikov. Chaos stirred not shaken. Brains and Behavior Annual Spring Retreat, Georgia State University, April 24, 2015. Poster.
- A.L. Noriega*, A.M. Kelley*, A. Shilnikov. Post inhibitory rebound in a reduced 3-cell network. Brains and Behavior Annual Spring Retreat, Georgia State University, April 24, 2015.
- D. Alacam* and A. Shilnikov. Half center oscillators of parabolic non-burster. Brains and Behavior Annual Spring Retreat, Georgia State University, April 24, 2015.
- T. Xing* and A. Shilnikov. Homoclinic quest. Shilnikov workshop. Nizhny Novgorod, Russia. 12/17-19/2014. **Invited speaker.**
- A. Kelley*, J. T. Schwabedal, and A. Shilnikov. Robustness and Multifunctionality of Reduced CPG Models. 2014 SIAM Conference on the Life Sciences, Charlotte, NC, 08/407/2014. Contributed talk.
- J. T. Schwabedal, A. Neiman and A. Shilnikov. Robust Design of Polyrhythmic Neural Circuits. 2014 SIAM Conference on the Life Sciences, Charlotte, NC, 08/407/2014. Contributed talk.
- D. Alacam* and A. Shilnikov. Network Bursting in Inhibitory Neural Circuits. 2014 SIAM Conference on the Life Sciences, Charlotte, NC, 08/407/2014. Poster.
- J. Collens*, A. Kelley*, D. Alacam*, T. Xing*, J. T. Schwabedal, and A. Shilnikov. Intrinsic Mechanisms for Pattern Generation in Three-Node Networks. 2014 SIAM Conference on the Life Sciences, Charlotte, NC, 08/407/2014. Poster.
- A. Kelley* and A. Shilnikov. Two-Theta Neuron: Phase Models for Bursting Networks. 2014 SIAM Conference on the Life Sciences, Charlotte, NC, 08/407/2014. Poster.
- J. Wojcik, R. Clewley, J. Schwabedal and A. Shilnikov. Key bifurcations of bursting polyrhythms in central pattern generators. International Workshop on Neurodynamics, Castro-Urdiales, Spain, 06/14-17/2014. **Invited speaker.**
- R. Barrio, M.A. Martinez, S. Serrano, M. Lefranc and A. Shilnikov. Describing chaotic structures in the Hindmarsh-Rose model of bursting neurons. International Workshop on Neurodynamics, Castro-Urdiales, Spain, 06/14-17/2014. **Organizer.**
- M. Rodriguez, R. Barrio, S. Serrano and A. Shilnikov. Computational tools for analysis of bursting polyrhythms in 3-cell CPG. International Workshop on Neurodynamics, Castro-Urdiales, Spain, 06/14-17/2014. **Organizer.**
- R. Barrio, T. Xing*, and A. Shilnikov. Towards a symbolic quest into homoclinic chaos. The 10th AIMS Conference on Dynamical Systems, Differential Equations and Applications Madrid, Spain. 06/07-11/2014.
- R. Barrio, M.A. Martinez, S. Serrano, M. Lefranc and A. Shilnikov. Describing chaotic structures in the Hindmarsh-Rose model of bursting neurons. The 10th AIMS Conference on Dynamical Systems, Differential Equations and Applications Madrid, Spain. 06/07- 11/ 2014.
- M. Rodriguez, R. Barrio, S. Serrano and A. Shilnikov. Computational tools for analysis of bursting polyrhythms in 3-cell CPG. The 10th AIMS Conference on Dynamical Systems, Differential Equations and Applications Madrid, Spain. 06/07- 11/ 2014
- A. Shilnikov. Rhythms in Central pattern generators. SDG workshop Challenges arising in singularly perturbed dynamical systems. Kingscliff. Australia. 06/10-13/2014. **Invited speaker.**
- A. Shilnikov, J Wojcik, R Clewley and J Schwabedal. Key bifurcations of bursting polyrhythms in 3-cell central pattern generators. XXXIII Dynamic Days. GaTech, Atlanta, Jan 2-5, 2014. Contributed talk.
- T. Xing*, J. Wojcik, R. Barrio and A. Shilnikov. Chaos stirred not shaken. XXXIII Dynamic Days. GaTech, Atlanta, Jan 2-5, 2014. **Best Poster Award.**
- A. Kelley* and A. Shilnikov. Two Theta neuron: Phase models for bursting activity in multifunctional central pattern generators. XXXIII Dynamic Days. GaTech, Atlanta, Jan 2-5, 2014. Poster.

- A. Shilnikov, Phase-lag maps for rhythmic activity patterns in central pattern generators. Q-Bio Summer school UCSD. San Diego, July 30, 2013. **Invited lecturer.**
- A. Shilnikov, Voltage maps revealing dynamics transitions in individual neuron models. Q-Bio Summer school UCSD. San Diego, July 30, 2013. **Invited lecturer.**
- T. Xing*, R. Barrio and A. Shilnikov, Chaos stirred not shaken. LP Shilnikov memorial conference. Nizhny Novgorod, Russia, July 5-9, 2013. **Organizer.**
- R. Clewley, J. Wojcik* and A. Shilnikov, Bifurcations of bursting polyrhythms in 3-cell central pattern generators. SIAM Meeting on Applied Dynamical Systems, May 19-23, 2013. **Organizer.**
- T. Xing*, R. Barrio, J. Wojcik and A. Shilnikov, Chaos stirred not shaken. 2013 B&B Retreat, GSU, Atlanta, April 5 2013. Poster.
- M. Bazhenov, G. Krishnan, and A. Shilnikov, Ionic dynamics mediate pattern generation in epilepsy. SIAM Meeting on Applied Dynamical Systems, May 19-23, 2013. **Invited.**
- T. Xing*, and A. Shilnikov, Symbolic tools for deterministic chaos. SIAM Meeting on Applied Dynamical Systems, May 19-23, 2013. Contributed talk.
- R. Barrio, M. Lefranc, M. A. Martinez, S. Serrano and A. Shilnikov, Topological structures and parameter-sweeping techniques in the Hindmarsh-Rose neuron model. SIAM Meeting on Applied Dynamical Systems, May 19-23, 2013. Contributed talk.
- A. Kelley, J. Youker and A. Shilnikov, 2 θ neuron model for 3-cell inhibitory central pattern generators. SIAM Meeting on Applied Dynamical Systems, May 19-23, 2013. Poster.
- T. Xing*, R. Barrio, J. Wojcik and A. Shilnikov, Kneading Invariants for the elucidation of chaos. SIAM Meeting on Applied Dynamical Systems, May 19-23, 2013. Poster. **Best Poster Award.**
- A. Shilnikov: Elements of bifurcation theory for bursting patterns in multifunctional Central Pattern Generator models. Workshop Mathematics and Biology: a Roundtrip in the Light of Suns and Stars. Leiden, The Netherlands, April 14-19, 2013. **Keynote speaker.**
- R. Clewley, J. Wojcik* and A. Shilnikov, Bifurcation of bursting polyrhythms in 3-cell CPGs. Mathematical Biosciences Institute, Columbus, OH. March 18-23, 2013. Poster.
- T. Xing*, R. Barrio, J. Wojcik and A. Shilnikov, Symbolic tools for deterministic dynamics. International Conference on Dynamics of Differential Equations, GaTech, Atlanta, March 16-20, 2013. **Invited.**
- T. Xing*, R. Barrio, J. Wojcik and A. Shilnikov, Chaos stirred not shaken. International Conference on Dynamics of Differential Equations, Gatech, Atlanta, March 16-20, 2013. Poster.
- T. Xing, J. Wojcik, R. Barrio and A. Shilnikov, Kneading in Shimizu-Morioka Model. Georgia Scientific Computing Symposium (GSCS), Georgia State University, February 23rd, 2013
- R. Clewley, J. Wojcik* and A. Shilnikov, Bifurcation of bursting polyrhythms in 3-cell CPGs. Mathematical Biosciences Institute, Columbus, OH. October 2, 2012. Poster.
- G. Krishnan*, A. Shilnikov, M. Bazhenov, Novel bursting mode leads to seizure termination. "Bernstein Conference 2012. Munich, Germany, September 12-14, 2012.
- T. Xing*, R. Barrio and A. Shilnikov, Kneadings, Symbolic Dynamics and Painting Lorenz Chaos. International Conference on Theory and Applications in Nonlinear Dynamics. Seattle, WA, August 26-30, 2012. **Invited.**
- J. Wojcik*, R. Clewley, A. Shilnikov, Bifurcations of bursting polyrhythms three-cell motifs. International Conference on Theory and Applications in Nonlinear Dynamics. Seattle, WA, August 26-30, 2012.
- J. Wojcik*, and A. Shilnikov, Dynamics in Models of Individual and Networked Neurons. Mini symposium "Dynamics in Models of Individual and Networked Neuron." SIAM 2012 Life Sciences, San Diego, CA, August 7-10, 2012.
- J. Wojcik*, R. Clewley, A. Shilnikov, Basic bifurcations of polyrhythmic bursting in three-cell inhibitory motifs. Workshop "Principles of Motor Pattern Generation: Experiments and Modeling." 2012 Computational Neuroscience meeting, Atlanta, GA, July 24-27, 2012. Co-organizer.
- J. Wojcik*, R. Clewley, A. Shilnikov, Phase-lag return mappings for a 3-cell multifunctional central pattern generator. 2012 Computational Neuroscience meeting, Atlanta, GA, July 24-27, 2012.

- S. Jalil*, D. Allen*, and A. Shilnikov, Modeling study of a Central Pattern Generator in the Melibe seaslug. 2012 Computational Neuroscience meeting, Atlanta, GA, July 24-27, 2012.
- A. Shilnikov, A. Neiman, K. Dierkes* and B. Lindner. Voltage oscillations and response dynamics in a model of sensory hair cells. 2012 Computational Neuroscience meeting, Atlanta, GA, July 24-27, 2012.
- R. Barrio_, F. Blesa, S. Serrano (*) and A. Shilnikov. Homoclinic spirals: theory and numerics. Dynamical Systems: 100 years after Poincaré, Gijón, September 2012
- R. Barrio and A. Shilnikov and S. Serrano*. Symbolic Dynamics for Painting Chaos: Homoclinic spirals. Dynamics, Topology and Computations, Bedkewo, Poland, June 24-30, 2012.
- J. Wojcik*, and A. Shilnikov, Principle bifurcations of bursting polyrhythms in small network. 7th Crimean School and Workshop. Mellas, Crimea, Ukraine. May 20-27, 2012.
- S. Jalil*, D. Allen*, and A. Shilnikov, Minimal configuration models for experiment-based central pattern generator of Melibe. 12th Experimental Chaos and Complexity Conference, University of Michigan, May 16-19, 2012.
- J. Wojcik*, and A. Shilnikov. Return phase-lag mapping approach uncover multi-rhythmicity in 3-cell CPGs with mixed synapses. 12th Experimental Chaos and Complexity Conference, University of Michigan, May 16-19, 2012.
- S. Jalil*, D. Allen*, and A. Shilnikov, Experimental phase relation captured by model central pattern generator. Section: Mathematical Biology and Neuroscience. Carolina Dynamical Systems Symposium, Clemson University, MC, April 13-15, 2012.
- T. Xing*, J. Wojcik* and A. Shilnikov, Kneading on the Lorenz systems and Shimizu-Morioka model. Carolina Dynamical Systems Symposium, Clemson University, MC, April 13-15, 2012.
- J. Wojcik*, R. Clewley, A. Shilnikov, Phase-lag return mappings for control of polyrhythms in bursting 3-cell networks. Section: Mathematical Biology and Neuroscience. Carolina Dynamical Systems Symposium, Clemson University, MC, April 13-15, 2012.
- G. Krishnan*, A. Shilnikov, M. Bazhenov, Dynamical mechanisms underlying generation of epileptic states. Society for Neuroscience conference, Washington DC, November 12-16, 2011
- A. Shilnikov, J. Wojcik*, X. Hu* and R. Clewley, Models of multifunctional Central Pattern Generators: bursting polyrhythmic motifs. 2011 ASME Dynamic Systems and Control Conference. Arlington, VA, Oct 31 – Nov 2, 2011. **Invited.**
- A. Shilnikov, X. Hu* and J. Wojcik*, Reduced models of CPGs. Workshop on Nonlinear Physics and Applications. Joao Pessoa, Brazil. September 5-9, 2011. **Invited.**
- R. Barrio and A. Shilnikov, Techniques for temporal dynamics of neuronal systems: the Hindmarsh-Rose model, XXII Congreso de Ecuaciones Diferenciales y Aplicaciones, Palma de Mallorca, September 5-9, 2011.
- A. Shilnikov and R. Barrio, Painting chaos and global bifurcations: universality of the Lorenz attractor. The sixth international conference on Differential and Functional Differential Equations: Spatio-temporal workshop. Moscow, Russia, August 14-21, 2011. Contributed.
- A. Shilnikov, **Invited** Lecturer at Workshop: Advanced Course on New Trends in Applied Bifurcation Analysis, Castro-Urdiales, Spain, July 25-29, 2011.
- A. Shilnikov, Scientific Committee member: Advanced Course on New Trends in Applied Bifurcation Analysis, Castro-Urdiales, Spain, July 25-29, 2011
- R. Barrio and A. Shilnikov, Parameter-sweeping techniques for studying complex systems: numerical and rigorous results, Conference on Computational Methods in Dynamics. The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy. 4-8 July 2011
- GP Krishnan*, A Shilnikov, M Bazhenov, Dynamical mechanisms underlying generation of epileptic states, 18th Joint Symposium on Neural Computation, Institute for Neural Computation, UCSD, La Jolla, CA, June 4, 2011.
- A. Shilnikov and R. Barrio, Painting chaos: universality of parameter patterns of systems with the Lorenz attractor, 4th Chaotic Modeling and Simulation International Conference (CHAOS2011), Agios Nikolaos, Crete, Greece, May 31-June 3, 2011. Contributed.
- A. Shilnikov, co-organizer of Multistability and rhythmogenesis: basic motifs and network dynamics.

SIAM Applied Dynamical Systems, Snowbird, UT. May 21-26, 2011.

- A. Shilnikov, J. Wojcik*, M. Brooks*, and R. Clewley, Duty cycle as order parameter for polyrhythms in multifunctional center pattern generator motifs. SIAM Applied Dynamical Systems, Snowbird, UT. May 21-26, 2011. Contributed.
- S. Jalil*, I. Belykh, and A. Shilnikov, Multiple Phase Locked States in Half-Center Oscillators. SIAM Applied Dynamical Systems, Snowbird, UT. May 21-26, 2011. Contributed.
- J. Wojcik*, R. Clewley and A. Shilnikov, An Equationless Approach to Studying the Organizing Principles of a Multifunctional Central Pattern Generator. SIAM Applied Dynamical Systems, Snowbird, UT. May 21-26, 2011. Contributed.
- A. Neiman, A. Shilnikov, Complex Spontaneous Oscillations and Response Properties of Sensory Hair Cells, SIAM Conference on Applications of Dynamical Systems, May 22-26, 2011, Snowbird, Utah, USA, p89.
- R. Barrio and A. Shilnikov, Painting chaos: computational methods for exploration of complex behaviors. SIAM Applied Dynamical Systems, Snowbird, UT. May 21-26, 2011. Contributed.
- A. Shilnikov, Co-organizer of Symbolic and computational algorithms for chaos explorations. SIAM Applied Dynamical Systems, Snowbird, UT. May 21-26, 2011.
- V. Bondarenko and A. Shilnikov, Spiking and bursting in an autonomous model of mouse ventricular myocytes. SIAM Applied Dynamical Systems, Snowbird, UT. May 21-26, 2011. Contributed.
- R. Clewley, J. Wojcik* and A. Shilnikov, Order parameter for multifunctional central pattern generators. Mathematical Biosciences Institute, Columbus, OH. "CTW: New Developments in Dynamical Systems Arising from the Biosciences" (March 22-26, 2011). Poster.
- A. Shilnikov, J. Wojcik*, and R. Clewley, Bursting duty cycle as an order parameter in a multifunctional central pattern generator. COSYNE 2011, Salk Lake City, UT. Feb 24-27, 2011. Poster.
- A. Neiman, L. Han*, and A. Shilnikov. Interactions of Mechanical and Electrical Oscillations in Bullfrog Sacculus Hair Cells, Abstracts of the 34-th annual winter research meeting of the Association for Research in Otolaryngology, February 19-23, 2011, Baltimore, MD, USA, p.116 v34 (2011)
- J. Wojcik* and A.L. Shilnikov, Poincare mapping for voltage intervals in elliptic bursters. Dynamic Days 2010, Duke University, SC, Jan 5-9, 2011. Poster
- A. Neiman, L. Han*, A. Shilnikov, Interactions of mechanical and electrical oscillations in hair cells, The Dynamics of Nonlinear Stochastic Systems International Focus Workshop – October 6 - 7, 2010, Max Planck Institute for the Physics of Complex Systems, Dresden, Germany
- A.L. Shilnikov and J. Wojcik*, Polyrhythms in dynamical models of multi-functional central pattern generator networks, Workshop on Bifurcation Analysis and its Applications, Montreal, Canada, July 7-10, 2010 July 6-10, 2010. **Invited.**
- A.L. Shilnikov and J. Wojcik*, Polyrhythms of Synchronous Bursting in Models of Multifunctional Central Pattern Generators, the Seventh Annual Conference on Frontiers in Applied and Computational Mathematics (FACM '10), New Jersey Institute of Technology (NJIT), Newark, New Jersey, May 21-23, 2010. **Invited.**
- S. Jalil*, I. Belykh and A.L. Shilnikov, Synchronization in a Bursting Half-center Oscillator with Slow-to-fast Reciprocal Inhibition, the Seventh Annual Conference on Frontiers in Applied and Computational Mathematics (FACM '10), New Jersey Institute of Technology (NJIT), Newark, New Jersey, May 21-23, 2010. Contributed.
- J. Wojcik* and A.L. Shilnikov, Poincare mapping for voltage intervals in elliptic bursters, the Seventh Annual Conference on Frontiers in Applied and Computational Mathematics (FACM), New Jersey Institute of Technology (NJIT), Newark, New Jersey, May 21-23, 2010. Poster.
- A.L. Shilnikov and J. Wojcik*, Dynamical Models of Multifunctional Central Pattern Generators, Nonlinear Dynamics: New Directions, Guanajuato, Mexico May 11-14, 2010. **Invited.**
- A.L. Shilnikov and J. Wojcik*, Polyrhythms of bursting patterns in deterministic models for central pattern generators, Dynamics of Bursting Activity of Neurons, GSU, Atlanta, April 16-17, 2010. Contributed. Co-organizer.
- S., Jalil*, I. Belykh and A.L. Shilnikov, Synchronization in a Bursting Half-center Oscillator with

Slow-to-fast Reciprocal Inhibition, Dynamics of Bursting Activity of Neurons, GSU, Atlanta, April 16-17, 2010. Poster.

- A.L. Shilnikov and J.Wojcik*, Poincare mapping for voltage intervals in elliptic bursters, B&B Retreat, GSU, Atlanta, April 30, 2010. Poster.

- S., Jalil*, I. Belykh and A.L. Shilnikov, Synchronization in a Bursting Half-center Oscillator with Slow-to-fast Reciprocal Inhibition, B&B Retreat, GSU, Atlanta, April 30, 2010. Poster.

- A.L. Shilnikov and J.Wojcik*, Poincare mapping for voltage intervals in elliptic bursters, Dynamics of Bursting Activity of Neurons, GSU, Atlanta, April 16-17, 2010. Poster.

- S., Jalil*, I. Belykh and A.L. Shilnikov, Synchronization in a Bursting Half-center Oscillator with Slow-to-fast Reciprocal Inhibition, Joint Southeast Nerve Net and Georgia/South Carolina Neuroscience Consortium Conference 2010, Emory University, Atlanta, March 5-7. Poster.

- A.L. Shilnikov and J.Wojcik*, Poincare mapping for voltage intervals in elliptic bursters, Joint Southeast Nerve Net and Georgia/South Carolina Neuroscience Consortium Conference 2010, Emory University, Atlanta, March 5-7. Poster.

- V. Bondarenko and A.L. Shilnikov Bursting and tonic spiking in a comprehensive model of a myocytes. Dynamics of Bursting Activity of Neurons, GSU, Atlanta, April 16-17, 2010.

- A.L. Shilnikov, R. Gordon*, I. Belykh. Polyrhythms in Central Pattern Generator motifs, Workshop at the 18th annual Computational Neuroscience Science meeting 2009, Berlin, Germany, July 21-26, 2009. Workshop **keynote speaker**.

I. Belykh, S.Jalil*, A. Shilnikov, Synchronization in inhibitory networks of bursting neurons. ICCSA 2009, The 3rd International Conference on Complex Systems and Applications, University of Le Havre Le Havre, Normandy, France Jun 29 - Jul 02, 2009. Contributed.

- S., Jalil*, I. Belykh and A.L. Shilnikov, Fast Reciprocal Inhibition Can Synchronize Bursting Neurons 2009 SIAM Conference on Application of Dynamical Systems, Snowbird, Utah, May 17-21 2009. Co-organizer.

- A.L. Shilnikov, R. Gordon*, I. Belykh. Polyrhythmic synchronization in bursting network motifs. Mathematical Neuroscience 2009, Edinburgh, UK March 23-25, 2009. **Invited speaker**.

- A.L. Shilnikov, R. Gordon, I. Belykh. Polyrhythmic bursting patterns in models of central pattern generators. Dynamics and Statistics of Spatially Extended Systems, BIRS, Canada, January 18-23, 2009. **Invited speaker**.

- A.L. Shilnikov, R. Gordon* and I. Belykh, Polyrhythmic synchronization in bursting network motifs. Minisymposium "Polyrhythms of central pattern generators." 2009 SIAM Conference on Application of Dynamical Systems, Snowbird, Utah, May 17-21 2009.

- A.L. Shilnikov, and R. Barrio. "Lorenz equation revisited." Minisymposium. 2009 SIAM Conference on Application of Dynamical Systems, Snowbird, Utah, May 17-21 2009. **Co-organizer**.

- A.L. Shilnikov, I. Rybak. Minisymposium "Polyrhythms of central pattern generators." 2009 SIAM Conference on Application of Dynamical Systems, Snowbird, Utah, May 17-21 2009. **Co-organizer**.

- I. Belykh, R. Gordon* and A. Shilnikov, Polyrhythmic synchronization in inhibitory-excitatory bursting motifs. Atlanta Computational Neuroscience Workshop, GSU, April 7-8, 2008.

- A. Shilnikov, I. Belykh. R. Clewley and G. Cymbalyuk. Atlanta Computational Neuroscience Workshop, GSU, April 7-8, 2008. **Organizer**.

- I. Belykh and A.L. Shilnikov. Bursting rhythmogenesis and synchronization in inhibitory CPG networks. Synergetics: Self-Organization Principles in Animate and Inanimate Systems, Physikzentrum Bad Honnef, Germany, October 22-24, 2007.

- I. Belykh and A.L. Shilnikov. Bursting rhythmogenesis and synchronization in inhibitory CPG networks. Coherent Behavior in Neuronal Networks, Mallorca, Spain, October 17-20, 2007.

- P. Channell*, G. Cymbalyuk and A. Shilnikov Homoclinic Chaos on a Spike Adding Route into Bursting Neurons. SIAM Conference on Applications of Dynamical Systems, Salk Lake City, Utah, May 28-June 2, 2007. **Co-organizer** of a mini-symposium "Exotic bifurcation in neuronal models."

- P. Channell*, G. Cymbalyuk and A. Shilnikov, Complex homoclinic bifurcations of periodic orbits for onset on bursting in a neuron model. Dynamics Days 2007, Boston, January 3-6, 2007.

- P. Channell*, G. Cymbalyuk and A. Shilnikov, Mapping reduction of voltage dynamics in a Hodgkin-Huxley type model. Neuroscience Meeting, Atlanta, October 14-18, 2006.
- P. Channell*, G. Cymbalyuk and A. Shilnikov, Applications of the Poincare mapping technique to analysis of spike adding. CNS-2006, Edinburgh, UK, July 16-20, 2006.
- G. Cymbalyuk, R. Calabrese, A. Olypher, and A. Shilnikov, Regulation of bursting activity of simple units of CPGs. CNS-2006, Edinburgh, UK, July 16-20, 2006,
- A. Shilnikov, P. Channell* and G. Cymbalyuk, Methods of qualitative theory for bursting rhythmogenesis. 6th Crimean School and Workshops Nonlinear Dynamics, Chaos, and Applications Workshop 1: Stochastic and Chaotic Dynamics in Action: from Laser to Brain, from Communication to Medicine, May 15-19, 2006. **Invited**
- R. Calabrese (Emory), G. Cymbalyuk and A. Shilnikov (GSU) Origin and Regulation of Bursting Activity in Neurons Atlanta, GA, April 6-7, 2006. Scientific Committee: I. Belykh, D. Edwards, P. Katz (GSU) **Co-organizer**
- A. Shilnikov, P. Channell* and G. Cymbalyuk, Homoclinic chaos on a spike adding route into bursting in a neuronal model, Origin and Regulation of Bursting Activity in Neurons, Atlanta, April 6-7, 2006.
- K. Mokhov*, A. Shilnikov, G. Cymbalyuk. A model of long period bursting activity. Presented as a poster at "Origin and Regulation of Bursting Activity in Neurons", Atlanta, April 6-7, 2006.
- G. Cymbalyuk, J. Bates*, T. Malashchenko* and A. Shilnikov (2006) Bifurcations and regulation of bursting activity. "Origin and Regulation of Bursting Activity in Neurons", Atlanta, April 6-7, 2006.
- SENN, Biophysical Mechanisms Controlling Bursting Activity in a Neuron Model, with G. Cymbalyuk, P. Channell*, J. Bates*, T. Malashchenko*, GSU, Atlanta, April 29-30, 2006
- SENN, Applications of the Poincare mapping technique to analysis of neuronal dynamics, with P. Channell*, G. Cymbalyuk, GSU, Atlanta, April 29-30, 2006
- SENN, A model of long period bursting activity. with K. Mokhov* and G. Cymbalyuk, GSU, Atlanta, April 29-30, 2006
- Annual AMS meeting, Applications of the Poincare mapping technique to analysis of neuronal dynamics, with A. Shilnikov, P. Channell* and G. Cymbalyuk, San Antonio TX, January 12-15, 2006
- Neuroscience Meeting, Bifurcations giving rise to Bursting Activity in a Neuron Mode, with Channell P., Malashchenko T. and Cymbalyuk G., Washington, DC, November 12-16, 2005
- Neuroscience Meeting, Regulation of Calcium Driven Bursting Activity in a Neuron Model, with Mokhov K., and Cymbalyuk G., Washington, DC, November 12-16, 2005
- 2005 Fall Central Section Meeting: Special Session in Mathematical Ecology Multistability and map reduction in a neural model, **Invited** talk, Lincoln NE, October 21-23, 2005
- Conference on control and synchronization of dynamical systems, Homoclinic saddle-node cycles in a Hodgkin-Huxley type model of neurons, **Invited** talk, León, México, October 4-7, 2005
- SIAM Conference on Applications of Dynamical Systems, Complex Dynamics of Two Time Scale Neuron Models, with Cymbalyuk G, Salk Lake City, Utah, May 22-26, 2005. A **co-organizer** of a mini-symposium Complex dynamics of systems with multiple time scales
- GSU biotech symposium, Implementation of neuronal models, dynamic clamp, and tools for the hybrid system analysis using FPGA technology, with Bourgeois A. and Cymbalyuk G. Atlanta, June 5, 2005.
- Calcium Club Meeting, Regulation of Calcium Driven Bursting Activity, with Mokhov, K.* and Cymbalyuk G., Atlanta, May 1-2, 2005
- Dynamical Systems in Neuroscience, Canard torus bifurcation in a two-time scale neuron model, **Invited**, with Cymbalyuk G, AMS, Santa Barbara, April 16-17, 2005
- Henri Poincare symposium, Poincaré Homoclinic Orbits: The State of the Art, **Invited**. With L. Shilnikov, Brussels, October 8-9, 2004
- Society for Neuroscience 34th Annual Meeting, Genesis and Regulation of bursting activity in a neuron model, with G. Cymbalyuk. San Diego, CA, October 23-27, 2004
- 2nd IEEE International Conference on Circuits and Systems for Communications, Development of Synchronization Theory, **Invited**, with Shilnikov L., Moscow, Russia. June 30-July 2, 2004

- Coupled Map Lattices, Subthreshold oscillations in map based neural models, Paris, June 21-July 2, 2004
- Computational Neuroscience Meeting, Transition between tonic spiking and bursting in a neuron model, with R. Calabrese, and G. Cymbalyuk, Baltimore July, 18-20, 2004
- CNS'04 workshop “Reduced Models of Neuronal Excitability and Dynamics of Spike-Generation”, Two Routes to Bursting in Neuron models, **Invited**, with G. Cymbalyuk, Baltimore July, 18-20, 2004
- 2004 SIAM Conference on the Life Science, Mechanism of Bistability: Simultaneous Tonic Spiking and Bursting in a Neuron Model, with G. Cymbalyuk. Portland, Oregon, July 11-14, 2004. A **co-organizer** of a mini-symposium The Geometry of Spiking and Bursting.
- SECABC Symposium, Neurobehavioral section, Co-existence of tonic-spiking and bursting modes in a leech neuron model, with G. Cymbalyuk. Atlanta, May 19-21, 2004
- 20th Annual South-East Nerve Net, Regulation of bursting activity in a neuronal model, with Cymbalyuk G, Atlanta, GA, March 26-27, 2004
- Symmetry and Bifurcation in Biology, Multistability and Infinite Cycles in a Model of the Leech. **Invited**. Banff International Research Station, Canada, May 31- June 05, 2003
- SIAM Conference on Applications of Dynamical Systems, Canards and Chaos in Some Slow-fast Maps, Snowbird, Utah, May 27-31, 2003. A **co-organizer** of a mini-symposium Bursting in Mappings,
- 11th IEEE Workshop on Nonlinear Dynamics of Electronic Systems, Multistability and infinite cycles in a model of the leech heart interneuron, with Cymbalyuk G, Scuol, Switzerland, May 18-21, 2003
- 11th IEEE Workshop on Nonlinear Dynamics of Electronic Systems, Chaos in 2D slow fast maps for spiking-bursting neural activity, with Rulkov N., Scuol, Switzerland, May 18-21, 2003
- NATO Advanced Study Institute: Synchronization: Theory and Application, 1D singularly perturbed maps for neural dynamics; Crimea, Ukraine May 19-June 1, 2002.
- School on Dynamical Systems, Infinite cycles in two times scale systems, ICTP, Trieste, Italy, July 30-August 17, 2001
- Int. Conference: Progress in Nonlinear Science. Dedicated to the 100-th anniversary of A. Andronov, Asymptotic Normal Forms and Strange Attractors, Nizhny Novgorod, Russia, July 2-6, 2001
- MRI meeting: Analysis and Continuation of Bifurcations, Complex dynamics of systems in backward time, Utrecht University, the Netherlands, June 21-22, 2001. **Invited**
- SIAM Conference on Applications of Dynamical Systems, Blue sky catastrophe in two time-scale systems, Snowbird, Utah, May 25-29, 2001, a **co-organizer**
- Bifurcations: Numerical Methods, Software, Applications. On a blue-sky bifurcation, **Invited**. Gent, Belgium, June 29-30, 2000
- Dynamical Systems and Applications, Strange attractors in normal forms, Atlanta, May 26-29, 1999
- Numerical Methods for Bifurcation Problems. Qualitatively numerical analysis of some concrete models with non-trivial dynamics, IMA, Minnesota, September 15-19, 1997. **Invited**
- IEEE Nonlinear Dynamics Electronic Systems, Homoclinic cod-2 bifurcations in laser modes, Moscow, Russia, July 1-3, 1996
- Contemporary Problems in Dynamical Systems Theory, On a model with the blue-sky catastrophe, Nizhny Novgorod, Russia, June 2-4, 1996. **Co-organizer**.
- Solvey Meeting. On dynamics in a low order atmospheric model, Brussels, Belgium, March 16-21, 1996. **Invited**
- Iteration Theory, Asymptotic normal forms with triple zero, Urbino, Italy, September 1-4, 1996. **Invited**.
- Contemporary Problems in Theory of Dynamical Systems, Bifurcations of Lorenz attractors in cod-3 normal forms with symmetries, Moscow, June 23-26, 1996
- Noninvertible Dynamical Systems Workshop. Maps near codimension two homoclinic bifurcations, Minneapolis, MN, March 17-20, 1995. **Invited**.
- IEEE Nonlinear Dynamics Electronic Systems. On safe and dangerous stability boundaries. Dublin, Ireland, August 15-17, 1995. **Invited**.

- Singular Vector Fields, On boundaries of the existence region of the Lorenz attractor. Invited. Trieste, Italy, September 2-12, 1995
- Homoclinic Bifurcations, Codimension-2 homoclinic bifurcations and strange attractors, in Lorenz-like systems, Amsterdam, Netherlands, June 8-11, 1994. **Invited**
- Dynamics of Vector Fields, Normal forms and Lorenz attractors, Kyoto, Japan, June 1-6, 1994. **Invited.**
- Dynamical Systems and Chaos, Dynamics of Lorenz attractors in asymptotic normal forms, Tokyo, Japan, May 26-30, 1994
- Differential Equations, Topological normal forms of codimension three with nontrivial dynamics, Katseveli, Ukraine, May 12-21, 1994. **Invited.**
- Solvey Meeting, One dimensional maps and non-oriented Lorenz attractors, **Invited.** Brussels, Belgium, January 5-9, 1994
- Volga-laser-tour: On normal form reduction in laser models, Russia, Moscow-Nizhny Novgorod, Russia, June 10-18, 1993
- NATO Complexity in Optical Systems, Lorenz attractors in laser models, Edinburgh, Scotland, August 25-30, 1992
- NATO Homoclinic Chaos, Qualitative and numeric studies of Lorenz attractors in Shilimizu-Morioka system. Brussels, Belgium, May 6-10, 1991. **Invited.**
- Synchronization in coupled systems, Lorenz attractor through homoclinic bifurcations, Saratov, Russia, September 2-10, 1990
- Numerical Methods in Bifurcation Theory, Bifurcations in asymmetric Lorenz model, Puschino, Russia, February 2-6, 1989
- Numerical Methods in Bifurcation Theory, Boundaries of symmetric Lorenz attractor, Puschino, Russia, February 2-6, 1989
- Nonlinear Oscillations and Waves, On non-orientable Lorenz attractor, Gorky, Russia, March 8-18, 1987.
- Qualitative Theory of Differential Equations, Bifurcations of a Lorenz-like attractor, Riga, Lithuania, May 15-19, 1986.
- Numerical Methods in Bifurcation Theory: On orbit flip homoclinic figure-8 bifurcation, Puschino, Russia, February 2-6, 1985.
- Nonlinear Oscillations and Waves, On Shimizu-Morioka systems, Gorky, Russia, March 7-16, 1985
- Numerical Methods in Bifurcation Theory: On resonant homoclinic figure-8, Puschino, Russia, February 2-6, 1984
- Nonlinear Oscillations and Waves, Poincare revolving number in coupled Josephson junctions, Gorky, Russia, March 7-17, 1983

Colloquia and Seminar Presentations

- AL. Shilnikov, Structural stability of rhythm-generating neural networks. NI Research forum, November 15, 2024
- J. Scully*, and AL. Shilnikov, Pairing cellular and synaptic dynamics in small neural networks. UCSD, September 28, 2024
- AL. Shilnikov. Overview of GPU-based tools for studying multiscale and complex dynamics. M@th Hub workshop seminar series: Overcoming the Computational Complexity of Large Dynamical Systems with Parallel Computations, School of Mathematics, GaTech, Sep 30, 2022
- AL. Shilnikov. Long saga of in-depth modeling of two swim CPGs in two sea slugs, WIAS colloquium, Berlin, Germany. May 20, 2022
- AL. Shilnikov. Rare chaos in neural systems. MathNeuro seminar at INRIA, Nice, France, May 19, 2022
- AL. Shilnikov. Rare chaos in neural systems. High School of Economics, Russia. April 9, 2021
- AL. Shilnikov. Rhythm-generating neural networks. High School of Economics, Russia. March 30, 2021

- AL. Shilnikov, J. Scully and A. Neiman. Measuring Chaos in the Lorenz and Rössler models. ML-based Turing test. High School of Economics, Russia. December 4, 2020
- Bakharova Yu.*, Kazakov A., Malykh S.*, Pusuluri K*. and Shilnikov AL. Homoclinic chaos in the Rossler model. High School of Economics, Russia. October 15, 2020
- AL. Shilnikov, The saga of making half center oscillator models. Technion University, Israel, June 30, 2019.
- AL. Shilnikov, Stability and adaptability of CPG circuits. University of Ohio, December 7, 2018.
- AL. Shilnikov, Biologically plausible models of rhythm generating circuits. INRIE, Nice, France, January 29, 2018.
- AL. Shilnikov, Torus bifurcation in neuronal models. Imperial College London, January 23, 2018.
- AL. Shilnikov, Symbolic computations for deterministic chaos. Brussels Free University, Belgium, January 18, 2018.
- AL. Shilnikov, Quasiperiodicity in neuroscience. WIAS, Germany, January 10, 2018.
- AL. Shilnikov, Long saga of making fantastic CPG models. Potsdam University, Germany, January 8, 2018.
- AL. Shilnikov, Symbolic computations and deterministic chaos. GaTech, Atlanta, Dec 5, 2017.
- AL. Shilnikov, Sinister saga of making CPG models. University of Ohio, March 14, 2017.
- AL. Shilnikov, New era of symbolic dynamics for chaotic systems. Humboldt University, Berlin, Germany, July 14, 2016.
- AL. Shilnikov, Dynamical basics of central pattern generators. Integrative BioSystems Institute at Georgia Institute of Technology, Atlanta. Nov 4, 2015.
- AL. Shilnikov, Plausible and phenomenological models of multifunctional central pattern generators. Monash University, Melbourne, Australia. Aug 24, 2015.
- AL. Shilnikov, Homoclinic chaos. Potsdam University, Germany, Aug 3, 2015.
- AL. Shilnikov. Dynamics of Neural Circuits. 2015 KSU Math Circle Summer Camp. June 18, 2016
- A. Shilnikov, Key Bifurcations of Bursting Polyrythms in Central Pattern Generators. University of Utrecht, the Netherlands, 01/7/2015.
- A. Shilnikov, Mathematical Neuroscience. Invited lecture. University of Nizhny Novgorod, Russia, 12/25/2014.
- AL. Shilnikov, CPG networks as dynamical systems. Neuroscience Institute, GSU, 11/02/2014.
- AL. Shilnikov, Homoclinic chaos. Kennesaw State University, 10/09/2014.
- AL. Shilnikov, Symbolic quest into homoclinic chaos. University of Sydney, Australia, 06/06/2014.
- AL. Shilnikov, Key bifurcations of bursting polyrythms in 3-cell CPGs. SEMINARI DE SISTEMES DINAMICS UB-UPC. Barcelona, Spain, June 26, 2013.
- AL. Shilnikov, Chaos stirred not shaken. Imperial College, London, UK, 05/11/2013.
- AL. Shilnikov, Key bifurcations of bursting polyrythms in 3-cell CPGs. Imperial College, London, UK, June 12 2013.
- A. Shilnikov, Key bifurcations of bursting polyrythms in 3-cell CPGs. Bristol, UK, June 7, 2013.
- A. Shilnikov, Symbolic Toolkit for Exploration of Deterministic Chaos. Exeter University and Online AG Dynamics Seminar, UK, June 7 2013.
- A. Shilnikov, Dynamical foundation of neuroscience. Department of Mathematics and Statistics, GSU, March 14, 2013.
- A. Shilnikov, Mathematical Neuroscience. University Zaragoza, Spain. March 1 and 8, 2013.
- A. Kelley, J. Youker and A. Shilnikov, 20 neuron model for 3-cell inhibitory central pattern generators. 2013 B&B Retreat, GSU, Atlanta, April 5, 2013. Poster.
- J. Wojcik*, R. Clewley, and A. Shilnikov, Bifurcations in CPG networks, Bernstein center, Humboldt University, Berlin, Germany, Jan 15, 2013.
- T. Xing and A. Shilnikov, Symbolic Toolkit for Exploration of Deterministic Chaos. Weierstrass Institute for Applied Analysis and Stochastics, Berlin, Germany, Jan 8, 2013.
- Dynamics and bifurcations in bursting neuronal networks: central pattern generators. LP Shilnikov

- Seminar: Institute for Applied Mathematics Cybernetics, Nizhny Novgorod. March 22, 2012.
- A. Kelley*, J. Youker*, and A. Shilnikov. Reduced phase models for 3-cell CPG. Spineless Neuroscience Forum, Georgia State University, February 2012.
 - J. Wojcik*, R. Clewley, and A. Shilnikov, Bifurcations in 3-cell motifs. Spineless Neuroscience Forum, Georgia State University, February 2012.
 - S. Jalil*, D. Allen*, and A. Shilnikov, A model for a central pattern generator in the Melibe seaslug. Georgia State University Undergraduate Conference, March 26, 2012.
 - A. Kelley*, J. Youker*, and A. Shilnikov. Reduced phase models for 3-cell CPG. Georgia State University Undergraduate Conference, March 26, 2012.
 - S. Jalil*, D. Allen*, and A. Shilnikov, A four neuron CPG model for swimming behavior in Melibe. Spineless Neuroscience Forum, Georgia State University, February 2012.
 - S. Jalil*, I. Belykh, and A. Shilnikov, Stability analysis of phase-locked bursting in inhibitory neuron networks. Brains and Behavior Annual Spring Retreat, Georgia State University, April 2012.
 - S. Jalil*, D. Allen*, and A. Shilnikov, Experimental phase relation captured by model central pattern generator. Brains and Behavior Annual Spring Retreat, Georgia State University, April 2012.
 - S. Jalil*, I. Belykh, and A. Shilnikov, Multiple phase locked states in half-center oscillators. Frances Skinner's Neural Computational Lab, Toronto Western Hospital, July 2011.
 - (co-author) Spontaneous voltage and mechanical oscillations in a model of sensory hair cell, University of Oldenburg, ICBM, December 2, 2010, Oldenburg, Germany.
 - (co-author) Complex spontaneous oscillations and response properties of sensory hair cells, University of Houston, Networks Cluster Seminar, April 29, 2011
 - (co-author) Stochastic oscillations enhance sensitivity of sensory hair cells, Colloquium: University of Missouri at St. Louis, Department of Physics, March 11, 2011, St. Louis, MO, USA
 - Multiple phase locked states in bursting outcomes of CPGs. Boston University. November 5, 2010.
 - Bifurcation theory in life sciences. Augusta State University. October 29, 2010.
 - Overview on qualitative methods for neurodynamics. Spineless colloquium talk, Atlanta. October 8, 2010.
 - Polyrythms of bursting activity in CPG motifs. NI colloquium talk, GSU. October 5, 2010.
 - Multistability in CPG motifs. Neuroscience Department colloquium talk, UC Riverside, September 15, 2010.
 - Poincaré mapping technique for bursting models of neurons. Potsdam University, Berlin, July 22, 2009. Joint with J. Wojcik*.
 - Multistability in models of center pattern generators. Weierstrass Institute for Applied Analysis and Stochastics. Berlin, Germany, July 21, 2009. Joint with I. Belykh
 - A case study: from a model to the single leech interneuron to a network, University of Saragossa, Spain, July 10, 2009
 - Mathematical models and bifurcations for individual neurons. University of Saragossa, Spain, June, 17, 2009.
 - Multistability in neurons and networks. Imperial College, London, UK, March 19, 2009. Joint with I. Belykh
 - Polyrythms in networking motifs. Spineless Seminar, GSU, March 13, 2009. Joint with I. Belykh and R. Gordon*.
 - Multistability in bursting inhibitory networks motifs. UC San Diego, Department of Neuroscience, August 9, 2009.
 - University of New York, Polyrythmic synchronization in inhibitory-excitatory motifs composed of bursting neuron models, New York, April 4, 2008.
 - Applied Dynamical Systems and Mathematical Neuroscience Seminar, GSU, Methods of the qualitative theory for the Hindmarsh-Rose model. February 28, 2008.
 - University Libre de Bruxelles, Neuronal motifs: Bursting rhythmogenesis, synchronization and its regulation, Brussels, Belgium. November 20, 2007. Invited
 - Utrecht University, Complex bifurcations in slow-fast systems of neuronal types, Utrecht, the

Netherlands, November 19, 2007. Invited

- The Institute of Medicine, Julich Research Center, Synchronization of inhibitory networks. Juelich, Germany. November 15, 2007
- Joint colloquium of Weierstrasse Institute and Free University of Berlin. Complex homoclinic bifurcations in slow-fast systems for neurons dynamics. Berlin, Germany. October 30, 2007. Invited
- Department of Theory of Oscillations, University of Nizhny Novgorod, Origin of Bursting, its Regulation in Neuronal models/networks of Hodgkin-Huxley formalism. Nizhny Novgorod, Russia, September 19, 2007.
- Quantitative Biology Institute and Biophysics Seminar Series. Routes to bursting in neuronal models. University of Athens, Athens, OH, May 16, 2007. Invited
- School of Mathematics CDSNS Colloquium, Gatech, Complex homoclinic bifurcations of periodic orbits for onset on bursting in a neuron model, Atlanta, GA, February 12, 2007. Invited
- Colloquium of Department of Mathematical Sciences at Indiana University-Purdue University Indianapolis, Homoclinic chaos on routes into bursting in slow-fast models of neurons, Indianapolis, IA, January 20, 2007.
- The Institute of Medicine, Julich Research Center, Spike adding cascade toward bursting in neuronal models, Julich, Germany, December 15, 2006
- Nizhny Novgorod Mathematical Society, Methods of qualitative theory for bursting rhythmogenesis, Nizhny Novgorod, Russia, July 4, 2006
- Ben-Gurion University, Homoclinic saddle-node periodic orbits in singularly perturbed systems of Hodgkin-Huxley type, Israel, March 10, 2005
- Weizmann Institute, Saddle-node periodic orbits in singularly perturbed systems of Hodgkin-Huxley type, Israel, March 9, 2005
- The Salk Institute, Bifurcation transitions between tonic-spiking and bursting regimes in neuron models, San Diego, CA, July 28, 2004
- UC San Diego, Bifurcations of saddle-node periodic orbits in slow-fast systems and ghosting effect, August 6, 2003
- GaTech, Bifurcations of saddle-node periodic orbits in slow-fast systems and ghosting effect, September 18, 2003
- Weierstrass Institute for Applied Analysis and Stochastics, Chaotic dynamics in singularly perturbed, noninvertible maps. Berlin, Germany, June 15, 2002
- Boston University, Blue sky bifurcations in singularly perturbed systems, November 26, 2001
- UC San Diego, Strange attractors from homoclinic bifurcations, August 1, 2001
- Cornell University, Blue-sky catastrophe bifurcation, Ithaca, NY, March 27, 2000
- Weierstrass Institute for Applied Analysis and Stochastics, Chaotic repeller in low order atmospheric model, Berlin, Germany, July 2000
- GaTech, On homoclinic codimension two bifurcations and chaotic dynamics, Atlanta, GA March 1999
- Seminar talk, Institute Nonlinear Science at UC San Diego, San Diego, CA, August 1998
- United Technologies Research Center, Safe and dangerous stability boundaries, East Harford, Connecticut, August 8, 1998
- Seminar talk, University of Cambridge, On blue sky bifurcation model, Cambridge, UK, May 1997
- Seminar talk, On a new cod-1 bifurcation for periodic orbits. Center for Informatics & Computers, Netherlands, 1997
- Seminar talk, UC Berkeley, Berkeley, CA, August 1996
- Seminar talk, Noninvertible maps of Lorenz type. University of Urbino, Italy, 1995
- Seminar talk, Bifurcations of Lorenz attractors. Cornell University, Ithaca, NY. January 1995
- Seminar talk at United Technologies Research Center, Numeric technique for homoclinic bifurcations based on kneading invariants. East Harford, Connecticut, January 1995
- Seminar talk, Bath University, Bath, UK, 1995
- Seminar talk, Bristol University, Bristol, UK, 1995
- Seminar talk, Brussels Free University, Brussels, Belgium, 1995

- Seminar talk, Royal Meteorological Institute, Solvay Institute, Brussels, Belgium, 1995
- Technical University of Copenhagen, Copenhagen, Denmark, 1994
- Seminar talk, University of Modena, Modena, Italy, 1994
- Seminar talk, Keldysh Applied Math., Moscow, Russia, 1990
- Seminar talk, Institute, Space Research Institute, Moscow, Russia, 1989
- Seminar talk, Leningrad State University, Leningrad, Russia, 1989
- Seminar talk, Electronic Research Institute, Moscow, Russia, 1988
- Seminar talk, Leningrad State University, Leningrad, Russia, 1989
- Institute for Applied Mathematics, Nizhny Novgorod, Russia, 1986-1991

Sponsored activities and grants

External grants

- Symbolic toolkit for exploration of homoclinic chaos, NSF, **\$250K**, 09/2024-05/2027, **PI**. Awarded.
- Establishing fundamental principles of bio-circuit design from assimilation of electrophysiological data and dynamic clamping, **NSF USA-the UK, \$1.2M**, 04/2025-05/2028, **PI**. Pending
- Dynamical foundation of neuroscience. MPS-TSM: Mathematics and Physical Sciences - Travel Support for Mathematicians. Simon Foundation. **\$120K**, 01/2024-31/2025, **PI**. Pending
- Topological and dynamical properties of complex systems, USA-Israel Bination, **\$220K**, 09/2023-05/2025, **PI**. Pending
- Collaborative Research: RTG: Dynamics and Applications, Co-PI from GSU, NSF-RTG submission joint with Georgia Tech and Florida Atlantic University, 2022, pending
- Center for Predictive and Interpretable Neuroscience (ChoPIN), NSF STC, Co-PI with TrenDS, 2022, pending
- Invited Digital Professor, High School of Economics, Russia. 12/2021, **\$5,000**
- CRCNS Research Proposal: Collaborative Research: Structural Stability of Rhythm-Generating Neural circuits: machine learning approach. NSF. **\$1.4M**, 11/2021-10/2025, **PI**. Pending
- Collaborative Research Italy-Russia: Decoding the neuromechanics of quadruped locomotion (DECOMOTION), \$250K, 06/2021- 05/2025, Co-**PI**. Pending
- Joint DMS/NIGMS: Resilience of rhythm-generating neural circuits, NSF. **\$1.5M**, 08/2021-05/2025, **PI**. Pending
- The 25th International Conference on Difference Equations and Applications. University College London, June 24-28, 2019, The UK, **Keynote speaker**, travel grant **\$2,400**.
- Technion University, Israel, Research visit June 29 – July 10, 2019, travel grant **\$1900**.
- Neural Mechanisms underlying evolvability of behavior. NSF. **\$880,000**. 06/2015-06/2021, **PI**.
- 2016 Volga Neuroscience Conference grant, Office of Naval Research, **\$15,000**, 2016, **PI**
- Phase Description of Oscillations in Singularly Perturbed Systems 2012-2015
German Research Foundation (Bonn) 2012-2015 GRANT_NUMBER: 224195127
<https://app.dimensions.ai/details/grant/grant.4824843>, **PI**
- Bifurcations and dynamics in dissipative and Hamiltonian systems. **\$980,000** (27,000,000 rubles) from Russian Scientific Foundation, 09/2014-12/2016, **Co-PI**
- Multistability and bifurcations for polyrhythmic Central Pattern Generators. DMS-1009591 NSF Applied Mathematics Division and Mathematical Biology, **\$219,738**. 08/2010-08/2014, **PI**
- Studies of formation mechanisms of rhythms for motor activities in biological neuronal networks in application to adaptive bio-robotics, **\$91,000** (2,400,000 rubles), #14.740.11.0919 grant “Attracting leading scientists to Russian universities” by Ministry of Education and Science of Russian Federation, 2011-12, **PI**
- Summer Research Experience for Undergraduates (REU) Supplement to DMS #1009591, **\$14,931**. 2011-12.
- Advanced Course on New Trends in Applied Bifurcation Analysis, Castro-Urdiales, Spain, July 25-29,

- 2011, **Invited** lecturer - travel grant **\$2,200**.
- Workshop on Bifurcation Analysis and its Applications, Montreal, Canada, July 7-10, 2010. **\$300** Travel grant for to cover local expenses.
 - The Seventh Annual Conference on Frontiers in Applied and Computational Mathematics (FACM '10), New Jersey Institute of Technology (NJIT), Newark, New Jersey, May 21-23, 2010. **\$400** Travel grant to cover local expenses.
 - Nonlinear Dynamics: New Directions, Guanajuato, Mexico, May 11-14, 2010. **\$400** Travel grant to cover local expenses.
 - Computational Neuroscience Meeting 2009, Berlin, Germany, July 21-26, 2009. Travel award **\$240**.
 - Mathematical Neuroscience Meeting, Mar 23-25, 2008 Royal Society of Edinburgh, 22-26 George Street, Edinburgh. Travel award **\$1500** in addition to local expenses.
 - Imperial College, London, UK. March 18-22, 2009. Travel award **\$450**.
 - Weierstrass Institute for Applied Analysis and Stochastics. Berlin, Germany, Research visit July 19-21, 2009. Travels grant **\$350**.
 - Potsdam University, Germany, Research visit July 21-23, 2009. Travel grant **\$300**.
 - University of Saragossa, IUMA, Mathematics Research Institute, Spain, June 16–July 20, 2009, Research Grant **\$6,000**. Travel great **\$1200**.
 - Shilnikov A., the Neuroscience Institute short visit grant, San Diego, CA, **\$2,000** travel grant, 8/10/2007.
 - Shilnikov A., Institute for Mathematics and Its Applications conference and travel grant: Organization of Biological Networks, March 3-7, 2008, **\$800** Travel grant.
 - Shilnikov A., Institute for Medicine of Juelich Research Center Visiting grant, September 23-December 23, 2007, **\$24,000** Research.
 - Shilnikov A., Institute for Mathematics and Its Application conference and travel grant. RNA in Biology, Bioengineering and Nanotechnology, Oct 29-Nov 2, 2007, **\$1,200** travel grant
 - Shilnikov A., Xilinx FPGA hardware and software, **\$5280** equipment grant (External funding), 2006
 - Bourgeois A., Cymbalyuk G. and Shilnikov A. (Co-PI), Implementation of neuronal models, dynamic clamp, and tools for the hybrid system analysis using FPGA technology, Project with P20 Planning Grant, NIH, 2005-2006, DLN55, **\$20,191**.
 - Govaertz W., Hazewinkel M., Kuznetsov Y. and Shilnikov A. (Co-PI) INTAS Grant 99-000 Numerical Methods for Local and Global Bifurcations in ODE, **46,000 Euro**, 1999–2001.
 - World Scientific Publ. Grant, **\$5,000**. Singapore - New York - London, 1998.
 - World Scientific Publ. Grant, **\$3,000**. Singapore - New York - London, 1996.
 - International Science Foundation Travel Grant, **\$1,100**, 1996.
 - International Science Foundation Travel Grant, **\$500**, 1995.
 - International Science Foundation Travel Grant, **\$1,000**, 1994.
 - Royal Society Postdoctoral Award **£20,000**, London-Cambridge, UK, 1993-1994.

Internal grants

- B&B summer assistantships for undergrads, **\$4,000**, 05/2024
- CASA Summer Undergraduate Research Program, \$1,000, 2022
- B&B Pilot Grant Adaptability of rhythm-generating circuits. **\$30,000**, 2018-2019, PI
- Bridge grant **\$8,500**, 2014-2015, PI
- B&B summer assistantships for undergrads, **\$4,000**, 05/2014
- Shilnikov A., Comparative analysis of neural circuit dynamics. B&B grant, **\$30,000**, 2012-2013, Co-PI
- Modeling of active amplification and tuning in inner hair cells. B&B grant **\$21,300**, 2011-2012, PI
- B&B summer assistantship for J. Yourker, **\$2,000**, 05/2011

- Dynamical principles of multifunctional central pattern generators, B&B Pilot grant **\$28,000**, 2009-2010, PI
- B&B Pilot Grant Modeling and dynamical analysis of isolated cardiac cells and cells connected into multicellular tissues. **\$13,000**, 2009-2010, PI
- Presidential B&B summer assistantships for R. Gordon and J. Wojcik, **\$2,200**, 07/1/2007
- Center for Neuromics: Visiting scientist travel support for collaboration and work on bursting neurons. Award amount **\$840**, 2007.
- Shilnikov A. (Co-PI), Belykh I. Synchronization in networks of bursting neurons, B&B seed grant, **\$21,000**, 2007-2008.
- Pallas S., Prasad S. and Shilnikov A. (Co-PI) Modeling circuits for stimulus velocity tuning in the superior colliculus, Brains & Behaviors seed grant, **\$30,000**, 2006-2007.
- Belykh I., Bourgeois A., Cymbalyuk G. and Shilnikov A. (Co-PI), Analysis of Computationally Intensive Neuronal Models Using FPGA Technology, Brains & Behaviors seed grant **\$30,000**, 2005-2006.
- Cymbalyuk G. and Shilnikov A. (PI), Applications of the Poincaré mapping technique to analysis of neuronal dynamics, Brains & Behaviors seed grant, **\$23,000**, 2005-2006.
- Cymbalyuk G., and Shilnikov A, Brains & Behaviors research supplement, **\$6,000**, 2005.
- Bourgeois A., Cymbalyuk G. and Shilnikov A. (Co-PI), P20 Implementation of neuronal models, dynamic clamp, and tools for the hybrid system analysis using FPGA technology, **\$20,000**, 2005.
- Cymbalyuk G. and Shilnikov A. (Co-PI) GRA Brains & Behaviors fellowships for K. Mokhov, **\$21,900** annually, 2005-2008
- Cymbalyuk G. and Shilnikov A. (Co-PI) Brains & Behaviors seed grant: The Bifurcation Analysis of Neuronal Rhythmogenesis, **\$30,000**. 2004-2005.
- Shilnikov A. (PI) GRA Brains & Behaviors fellowships for P. Channell and C. Chen, **\$66,000**, 2004-2006.
- Shilnikov A., Summer Brains & Behaviors assistantship. **\$2,000**, 2004.
- Arav, M., Miller V., Patterson N., Shilnikov A. (Co-PI), Smirnova, A. and Vidakovic, D., Mobile Classroom for Teaching Mathematics and Statistics. GSU Tech Fee Grant Program **\$105,045**, 2004.
- Cymbalyuk G. and Shilnikov A. (Co-PI) GSU Research Team Grant Dynamics of Bursting Behaviors in Neural Models, **\$15,000**, 2004-2005.

Professional service and recognition

Editorship

- Associate Editor for J. Mathematical Neuroscience and Applications, 2019-current
- Associate Editor for Frontier J. Applied Mathematics and Statistics, 2015-current
- Guest Editor for J. Chaos, Special issues, 2020-2021
- Associate Editor for J. Mathematical Neuroscience, Springer since 2015-2020
- Associate Editor at J. Mathematics and Computers in Simulations (MATCOM) by Elsevier, 2019-20
- Associate Editor for J. Discontinuity, Nonlinearity and Complexity, L&H Scientific Publ. 2010-2020
- Guest Editor for J. Bifurcations and Chaos, 4(8), 2014, World Scientific
- Guest Editor for J. Bifurcations and Chaos, 15(11), 2005, World Scientific
- Guest Editor for J. Bifurcations and Chaos, 2000, World Scientific
- Editor for a volume: Contempt. Problems in Nonlinear Dynamics, 1996

Reviewer

- Ad-Hoc Reviewer for NSF, Polish, Indian, Dutch, Belgian, Czech and Russian Science Foundations; Nazarbayev University Research Review panelist, 2021; UK Research and Innovation reviewer, 2021.

- Habilitation defense committee member. Dr. A. Manos, Non Linear Dynamics in Complex Systems: From Quantum Systems to Brain Neurons and Galaxies. CERGY PARIS UNIVERSITÉ, De 15, 2020.

All major journals in dynamical systems, applied mathematics, biophysics, computational biology and mathematical neuroscience, including:

- Nonlinearity, J. Physics Review Letters, Physica D, Physics Review E, Mathematical Neuroscience, Bifurcations and Chaos, Regular and Chaotic Dynamics, Nonlinear Science, Nonlinear Dynamics, Complexity, Journal of Physics: Conference Proceedings, Mathematics and Mathematical Sciences, IEEE J. Circuits and Systems, Physics, Chaos, Circuits and Systems, SAIM J. Applied Dynamical Systems, IEEE Transactions on Biomedical Engineering, Nonlinear Analysis, Acta Biotheoretica, Neural Network, Biological Cybernetic, Physics Letter A, Communications in Nonlinear Science and Numerical Simulations, Dynamic Systems and Control Conference, Applied Mathematics and Computation, Computers and Mathematics with Applications, Reviewer for J. Neuroendocrinology Nonlinear Mechanics, European Physics Journal B, SAIM J. Applied Mathematics, Neural Systems, Neurocomputing, Computational Neuroscience, Nonlinearity, PloS One, PloS Computational Biology, Neural Computations, etc.
- Curator for Scholarpedia

Organizational leadership

- Chair and Co-organizer of LP Shilnikov conference “Dynamics, Bifurcations and Strange Attractors.” Nizhny Novgorod, Russia, 06/20-25/2018.
- Co-Chair and Co-organizer of 2018 Volga Neuroscience meeting. July 26-31, 2018, Russia
- Chair and Co-organizer of LP Shilnikov conference “Dynamics, Bifurcations and Strange Attractors.” Nizhny Novgorod, Russia, 06/2-9/2017.
- Co-Chair and Co-organizer of 2016 Volga Neuroscience meeting. July 24-31, 2016, Russia
- Chair and Co-organizer of LP Shilnikov conference “Dynamics, Bifurcations and Strange Attractors.” Nizhny Novgorod, Russia, 06/17-22/2016.
- Co-Chair and co-organizer of LP Shilnikov conference “Dynamics, Bifurcations and Strange Attractors.” Nizhny Novgorod, Russia, 06/18-23/2015.
- Co-Chair and co-organizer of 2015 Mathematical Biology meeting at GSU, Atlanta, USA, 05/30-06/03/2015.
 - Co-organizer of International Workshop on Neurodynamics, Castro-Urdiales, Spain, 06/14-17/2014.
 - Co-Chair and co-organizer of LP Shilnikov memorial conference “Dynamics, Bifurcations and Strange Attractors.” Nizhny Novgorod, Russia, 06/1-5/2013.
- Organizer of Mini-symposium “Multistability and rhythmogenesis: basic motifs and network dynamics” at 2013 SIAM Conference on Application of Dynamical Systems, Snowbird, Utah, May 21-26, 2013. Joint with M. Bazhenov (UCR)
- Organizer of Mini-symposium “Symbolic and Computational Algorithms for Chaos Explorations” at 2011 SIAM Conference on Application of Dynamical Systems, Snowbird, Utah, May 21-26, 2011. Joint with R. Barrio (Saragossa, Spain)
- Co-organizer of Atlanta Computational Neuroscience Workshop, GSU, April 8, 2010.
- Co-organizer of Mini-symposium “Lorenz equation revisited.” 2009 SIAM Conference on Application of Dynamical Systems, Snowbird, Utah, May 17-21 2009. Joint with R.Barrio (Saragossa, Spain)
- Co-organizer of Mini-symposium “Polyrhythms of central pattern generators.” 2009 SIAM Conference on Application of Dynamical Systems, Snowbird, Utah, May 17-21 2009. Joint with I.Rybak (Drexel)
- Co-organizer of Atlanta Computational Neuroscience Workshop, GSU, April 8, 2008.
- Co-organizer of a mini-symposium Exotic bifurcations in slow fast systems at SIAM Conference on Applications of Dynamical Systems, Salk Lake City, Utah, May 28-June 2, 2007
- Co-organizer of a mini-symposium Complex dynamics of systems with multiple time scales at SIAM Conference on Applications of Dynamical Systems, Salk Lake City, Utah, May 22-26, 2005

- Co-organizer of a mini-symposium The Geometry of Spiking and Bursting at 2004 SIAM Conference on the Life Sciences. Portland, Oregon, July 11-14, 2004
- Co-organizer of a mini-symposium Bursting in Mappings at SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah, May 27-31, 2003
- Co-organizer of the meeting Contemporary Problems in Dynamical Systems Theory, Nizhny Novgorod, Russia, June 2-4, 1996

Instruction & Mentoring

The Field of Dreams: Graduate Programs Fair. GSU, Atlanta November 2-3, 2023

BEST PRESENTATION AWARDS

- T. Xing - 2013 SIAM Applied Dynamical Systems
- J. Wojcik - 2013 SIAM Applied Dynamical Systems
- T. Xing - 2014 Dynamics Days
- A. Kelly - 2016 Volga Neuroscience Conference
- D. Alacam - 2018 Volga Neuroscience Conference
- J. Baurahmah - 2018 SIAM Applied Dynamical Systems

POSTDOCTORAL FELLOWS mentored at GSU

1. Dr. F. Tokmak, 2014-15
2. Dr. M. Fen, 2014-15
3. Dr. J. Schwabedal, 2011, 2013-2015
4. Dr. E. Gunay, 2011-12
5. Dr. O. Burylko, 2008.

Ph.D. STUDENTS current

1. Carter Hinsley, 09/2022 – present, Department of Mathematics & Statistics
2. James Scully 08/2020 – present, Neuroscience Institute

M.S STUDENTS current

Yosef 08/2023 – current, present, Department of Mathematics & Statistics

Ph.D. STUDENTS graduated

1. Jassem Bourahman, Biological Neuron Voltage Recordings, Driving and Fitting Mathematical Neuronal Models B&B fellow, Neuroscience Institute, Georgia State University, April 25, 2023.
2. Huiwen Ju, Ph.D. Thesis “Principles for making half-center oscillators and amplitude modulation in neuron models.” B&B fellow, Neuroscience Institute, Georgia State University, November 19, 2020.
3. Krishna Posuluri, Ph.D. Thesis “Complex Dynamics of Neural Systems and Nonlinear Applications.” B&B fellow, Neuroscience Institute, Georgia State University, June 21, 2020.
4. Deniz Alacam, Ph.D. Thesis “Rhythm Generation in Sea Slug CPGs & Bacterial Population Dynamics,” B&B fellow, Department of Mathematics & Statistics, Georgia State University, November 27, 2017.
5. Jarod Collens, Ph.D. Thesis “Rhythogenesis and Bifurcation Analysis of 3-Node Neural Network Kernels.” B&B fellow, Neuroscience Institute, Georgia State University, April 14, 2017.

6. Tingli Xing, Ph.D. Thesis “Computational Study in Chaotic Dynamical Systems and Mechanisms for Pattern Generation in 3-Cell Networks.” Department of Mathematics and Statistics and Neuroscience Institute, Georgia State University, July 16, 2015.
7. Sajiya Jalil, Ph.D. Thesis “Stability analysis of phase-locked bursting in inhibitory neuron networks.” Department of Mathematics and Statistics and Neuroscience Institute, Georgia State University, March 2012.
8. Jeremy Wojcik, Ph.D. Thesis “Neural Cartography: Computer assisted Poincare return maps for biological oscillators.” Department of Mathematics and Statistics and Neuroscience Institute, Georgia State University, May 8, 2012.

MASTER’S THESIS with graduation

1. Daivid Bloom, M.S. Thesis Differing Scales in Spatiotemporal Neurodynamics, Neuroscience Institute, May 2023.
2. Matt Brooks, M.S. Thesis “Multistability in bursting patterns in a model of multifunctional central pattern generator.” Department of Mathematics and Statistics, December 2009.
3. Paul Channell, M.S. Thesis “Poincare mapping for complex slow fast dynamics in an interneuron model.” Brain and Behaviors program, Department of Mathematics and Statistics, December 2009.
4. Tatiana Malashchenko, M.S. Thesis “Mechanism of coexistence of bursting and silent regimes of activity of a neuron.” Co-directed with Dr. Cymbalyuk (Physics and Astronomy) July 2007.
5. Konstantin Mokhov, M.S. Thesis “The role of Ca²⁺ dynamics in generation of oscillatory activity of a neuron.” co-directed with Dr. Cymbalyuk (Physics and Astronomy) December 2004.
6. C. Chen - B&B GRA, 2004.

PAST Ph.D. STUDENTS

1. Shiva Mirzoyan 09/2021 – 08/2022, Department of Mathematics & Statistics
2. Chrisman Hart 08/2017 – 2024, Department of Mathematics & Statistics
3. Aaron Kelley 08/2012 – 05/2016, Neuroscience Institute
4. Liza Latach 08/2015 – 08/2016, Neuroscience Institute
5. Summer (Xia) Hu 09/2010, transferred University of Maryland, 2011.

INTERNATIONAL Ph.D. STUDENTS

1. Matteo Lodi, 9-12/2016, University of Genoa, Italy
2. Alireza Dehghan, 10/2016 – 02/2017, Tabriz University, Iran

MEMBER OF THE DEFENSE COMMITTEES

1. K. Daley, PhD Math, GSU, July 2023.
2. Y. Wu, PhD Math, GSU, November 2023.
3. S. Basodi, “Advances in deep learning through gradient amplification and applications” PhD CS, GSU, July 2020.
4. R. Capps, “Neural coordination of distinct motor learning strategies: latent neurofunctional mechanisms elucidated via computational modeling” PhD NI, GSU, May 2020.
5. Kerry-Lyn Roberts “Geometric Singular Perturbation Theory and Averaging: Analysing Torus Canards in Neural Models.” Department of Mathematics, University of Sydney, Australia, April 26, 2018
6. Bruce Chang, NI, GSU, 2017

7. T. Malashchenko (Physics) “A mechanism of coexistence of bursting and silent regimes of activity of a neuron” (Physics and Astronomy), April 2011.
8. Malcolm Devoe (Mathematics and Statistics), May 2012.
9. William Barnet (Physics and Astronomy), May 2009.
10. Oleksiy Pochapinsky (Biology), May 2007.

UNDERGRADS HONORS PROJECTS

1. Yosef Keleta (Neuroscience) B&B Summer Fellowship \$3,000, 2024
2. A. Fani, M. James, P. Mills. CASA Math Path Summer Undergraduate Research Program, 2022
3. Fredo Padilla (Neuroscience) B&B Summer Fellowship \$2,000, 2022
4. Jesse Benetto (Neuroscience) B&B Summer Fellowship \$2,000, 2021
5. Rickey Lindsay (Mathematics & Physics) B&B Summer Fellowship \$2,000, 2019
6. Jack Scully (Mathematics & Statistics) NSF Research Assistant 2019-2020
7. Theodora Mitroi (Mathematics & Statistics) GSU Honor College, \$1250, 2019.
8. Jack Scully (Mathematics & Statistics) B&B Pilot Grant Research Assistant 2017-18
9. Jack Scully (Mathematics & Statistics) B&B Summer Fellowship \$2,000, 2017.
10. Drake Knopper (Physics) GSU Honor college, 2014-2015.
11. Anna Noriega (Mathematics & Statistics) B&B Summer Fellowship \$2,000, 2014.
12. Drake Knopper (Physics) B&B Summer Fellowship \$2,000, 2014.
13. Joseph Youker (Mathematics & Statistics) “Reduced phase models of CPGs” B&B Summer Fellowship \$2,000 and NSF REU, Summer 2011, Summer 2013
14. Dane Allen (Mathematics & Statistics) “CPG model of the Melibe”, funded through NSF REU. Summer 2011-12
15. Emmanuel Thomas (Mathematics & Statistics) “Reduced phase models of networked interneurons”, \$2,000 Presidential stipend, 2009-10
16. Rene Gordon (Mathematics & Statistics) “Polyrhythmic synchronization in bursting network motifs” B&B Summer Fellowship \$2,000, 2009
17. Robert Burnham (Mathematics & Statistics) “Phasic models of a neuron”, B&B Summer Fellowship \$1600, 2009.
18. Rene Gordon (Mathematics & Statistics) B&B Summer Fellowship \$1,600, 2007
19. Jeremy Wojcik (Mathematics & Statistics) B&B Summer Fellowship \$1,600, 2007

Courses developed at Georgia State University

- “Topics: Intro into Mathematical Neuroscience” This 3000-level course is cross-listed with the Department of Physics, Mathematics and Neuroscience Institute.
- “Applied Dynamical Systems” This 4000/6000 level course is cross-listed with the Department of Physics, and Neuroscience Institute.
- “Mathematical Biology” proposed together with Dr. Belykh and Dr. Smirnova (Math). This 4000/6000 level course is cross listed with the Department of Biology.
- Graduate course “Advanced Topics in Ordinary Differential Equations and Dynamical Systems”
- Graduate course "Dynamical Foundations of Neuroscience"

Affiliations and Membership

- Fellow, Institute for Nonlinear Dynamical Inference, The University of Kansas (2022-current)
- Professor, Nizhny Novgorod Higher School of Economics, Russia (2021-current)
- Professor, Institute for Information Technology, Mathematics and Mechanics, Lobachevsky State

- University of Nizhniy Novgorod, Russia (2014-2018)
- Faculty of Center for Nonlinear Science at GaTech (2001-present)
- Faculty of Center for GSU Behavioral Neuroscience (2008-present)
- American Mathematical Society (AMS)
- Society for Industrial Mathematics (SIAM)
- Dynamical Systems group at SIAM

University and university system committees

- GSU CAS Executive committee, member (2016-2024)
- GSU Internal Grants Peer Review Committee, member (2022-present)
- GSU CAS P&T committee, member (2023-2024)
- GSU CAS P&T committee, member (2014-2018), Chair (2019-2020)
- GSU Senate, member (2017-2020)
- GSU Senate Budget Committee, member (2018-2020)
- Brains and Behavior Interdisciplinary Scientific Committee, member (2017-2019)
- GSU Senate Development Committee, member (2018-2019)
- GSU Senate IS&T Committee, member (2017-2018)
- GSU Senate Academic Affairs Committee, member (2017-2018)
- GSU Senate IS&T Committee, member (2007-2011)
- GSU Senate Research Committee, member (2006-2011)
- GSU Senate, member (2006-2011)
- GSU Senate Supercomputing Committee, member (2010-present)
- GSU Senate Admission and Standard Committee, member (2007-2009)
- GSU Senate IS&T Committee, member (2007-2011)
- GSU Senate Internal Grants Subcommittee, member (2006-2007)
- Brains and Behavior Scientific Committee, member (2004-2009)

Departmental committees

- Neuroscience Institute P&T Committee (2009-present)
- Math P&T Committee (2009-present)
- Neuroscience Institute Executive Committee (2017-2018)
- Neuroscience Institute Undergraduate Committee (2009)
- Math System Administration Advisory committee, head (2001-2009)
- Math Graduate Program Committee, member (2000-present)
- Bioinformatics Faculty Recruitment Committee, member (2004-2006)
- Visiting Instructors and Lecturers Committee, member, head (2004-2009)
- PhD Program Development Committee, member (2002-2008)
- Research Committee, member (2002-present)
- Web design committee, chair (2004)
- Math Colloquium committee, member (2001-2009)
- Mathematics Undergraduate Subcommittee, member (2004-present)
- Mathematics Graduate Committee, member (2004-present)
- Webmaster, Department of Mathematics and Statistics (2005-2009)
- Mathematics Lecturer Search Committee, member, (2011)