Nadezhda Semenova

Young Researcher,
PhD Student

August 27, 1992

nadya.i.semenova@gmail.com

+7 962 615 888 0

http://semenova.com.ru

68A Kiseleva str., Saratov, Russia
19 rue de l'Epitaphe, bât. Proudhon K204, Besançon, France

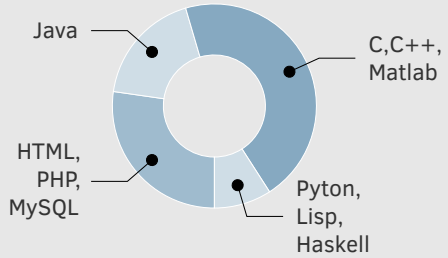
	Scopus	Google Scholar
h-index	9	10
Citations	403	556

Languages

- Russian ●●●●●
- English ●●●●○
- French ●●○○○
- German ●○○○○

Skills

Programming languages



Information representation

- MS Word, Excel, P-Point ●●●●
- Pages, Keynote ●●●●
- Latex ●●●●

Development environments

- Matlab ●●●●
- QT ●●●○

Current affiliation

1. **Saratov State University**(Department of Physics)
   410012 Astrakhanskaya str. 83, Saratov, Russia
2. **FEMTO-ST Institute**(Optics Department)
   Université Bourgogne-Franche-Comté CNRS UMR 6174, Besançon, France

Education

2018 – 2021 **Doctoral school** FEMTO-ST, Saratov State University
Joint project ***"The role of dimensionality in the processing efficiency of Reservoir Computers"*** in FEMTO-ST Institute (France) and Saratov State University (Russia) in the framework of Vernadski program.

2017 **Russian Candidate of Sciences** Saratov State University
Specialization: Radiophysics. Thesis "Poincare recurrences in ergodic systems". Supervisor: Prof. Dr. V.S. Anishchenko

2014 – 2018 **Graduate school** Saratov State University
Diploma with honors in "Physics and Astronomy" is obtained

2010 – 2014 **Additional education** Saratov State University
Diploma of ***translator in the field of professional communication*** has been gained.
Obtained in the Institute of Additional Professional Education

2009 – 2014 **Higher Education** Saratov State University
Diploma of ***Specialist*** (with honors) ***in radiophysics with specialization "Radiophysics and Electronics"*** has been gained, diploma thesis: "Statistics of Poincaré recurrences and Afraimovich—Pesin dimension in circle map".
Obtained in Department of Physics, Chair of Radiophysics and Nonlinear Dynamics.

Working Experience

2019–now **Engineer** Saratov State University
"Smart Sleep" Laboratory.

2021–now **Senior Lecturer** Saratov State University
Institute of Physics, Chair of Radiophysics and Nonlinear Dynamics.

2015–2018 **Teaching assistant** Saratov State University
Department of Physics, Chair of Radiophysics and Nonlinear Dynamics (off-hour job)
Courses: "Algorithms and programming languages";
"Theory of oscillations".

2014–2018 **Engineer** Saratov State University
Department of Physics, University laboratory of Radiophysics.

2014 **Laboratory assistant** Saratov State University
Department of Physics, University laboratory of Radiophysics.

Research interests

machine learning · neural networks · feed-forward networks · deep networks · reservoir computing · dynamical chaos · stochastic bifurcations · noise-induced effects · chimera states · ensembles of oscillators · networks · statistical characteristics

Nadezhda Semenova

Young Researcher,
PhD Student

About Me

I am a dedicated, hardworking and proactive researcher with a background in data analysis, machine learning and nonlinear dynamics. I have experience in designing and carrying out numerical experiments, application of mathematical tools, researching scientific literature and writing scientific articles. I possess excellent analytical and communications skills and a dedicated approach to working in a highly controlled working environment.

Scientific Skills

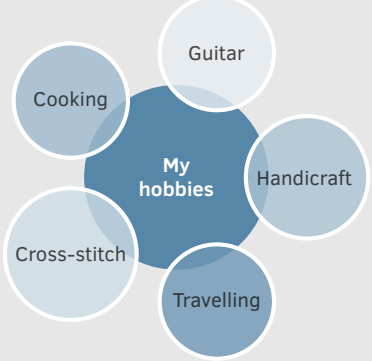
- Numerical Simulation
- Mathematical tools
- Experimental results processing

Hard Skills

- Adaptability and flexibility
- Team-working
- Willingness to learn
- Time management
- Persistence
- Multi-tasking

Soft Skills

- Public speaking
- Writing
- Logical thinking
- Supervising
- Resolving issues
- Value education



Selected Publications

2016 **Coherence-Resonance Chimeras in a Network of Excitable Elements**
N. Semenova, A. Zakharova, V. Anishchenko, and E. Schöll
Physical Review Letters 117, 014102

2015 **Local and global approaches to the problem of Poincaré recurrences. Applications in nonlinear dynamics**
V.S. Anishchenko, Ya.I. Boev, N.I. Semenova, and G.I. Strelkova
Physics Reports 587, 1–39

2019 **Fundamental aspects of noise in analog-hardware neural networks**
N. Semenova, X. Porte, L. Andreoli, M. Jacquot, L. Larger, and D. Brunner
Chaos 29 (10), 103128

2018 **Weak multiplexing induces coherence resonance**
N. Semenova and A. Zakharova
Chaos 28 (5), 051104

2015 **Does hyperbolicity impede emergence of chimera states in networks of nonlocally coupled chaotic oscillators?**
N. Semenova, A. Zakharova, E. Schöll, and V. Anishchenko
EPL (Europhysics Letters) 112 (4), 40002

Fellowships and Awards

2018–2021 Vernadski Scholarship (fellowship of the French Government)

2013, 2016, 2017 Russian President Scholarship

2013 Russian Government Scholarship for achievements in scientific research

Grants

2021-2023 **Russian Science Foundation 21-72-00002** leader
"The effects of noise on neural networks, complex ensembles, and machine learning performance".

2019-2021 **Ministry of Science and Higher Education of the Russian Federation 075-15-2019-1885** researcher
"Discovery of fundamental sleep mechanisms for breakthrough technologies in neurorehabilitation medicine".

2017-2018 **Ministry of Education and Science of the Russian Federation 3.8616.2017/8.9** researcher
"Analysis of spatio-temporal structures in ensembles of nonlocally coupled oscillators and delayed systems. Nonlinear dynamics of bistable oscillators and generators with memristors".

2015-2017 **Russian Science Foundation 15-02-02288** researcher
"Stochastic methods of controlling the dynamics of nonlinear systems".

2014-2016 **Russian Science Foundation 14-52-12002** researcher
"B11. Dynamics of nonlinear networks and active media in the presence of noise: synchronization, control and diagnostics".

2013-2014 **Russian Science Foundation 13-02-00216** researcher
"Physical aspects of the mathematical theory of Poincaré recurrences".

Conferences and Internships

Main Conferences

2021	***Emerging Topics in Artificial Intelligence (ETAI) 2021*** (San Diego, USA, online)
2020	***Emerging Topics in Artificial Intelligence (ETAI) 2021*** (San Diego, USA, online)
2019	Fourth International Conference on Recent Advances in Nonlinear Mechanics, ***RANM*** 2019 (Lodz, Poland)
2019	***The 9th International Scientific Conference on Physics and Control, PhysCon*** (Innopolis, Russia)
2019	***International Workshop on Complex Systems and Networks*** (Berlin, Germany)
2018–2019	***DPG Spring Meeting*** (Berlin and Regensburg, Germany)
2018	***Dynamics Days Europe*** (Loughborough, United Kingdom)
2015–2018	***Saratov Fall Meeting***: Optics and Biophotonics (Saratov, Russia)
2016	***International Conference on Control of Complex Systems and Networks*** (Heringsdorf, Usedom, Germany)
2015	***International Conference of Numerical Analysis and Applied Mathematics*** (Rhodes, Greece)

Organization of Conferences and Meetings

2021	International Workshop “Deep Learning in Unconventional Neuromorphic Hardware” in IJCNN 2021 (virtual)
2016	International Workshop “Spatio-Temporal Structures in Ensembles of Interacting Oscillators” 2016 (Saratov, Russia)
2014	International Conference “Nonlinear Dynamics of Deterministic and Stochastic Systems”, NDDSS-2014 (Saratov, Russia)

Internships and Visits

2018 – now	Education in FEMTO-ST Institute (collab. with Prof. Dr. L.Larger, Dr. D.Brunner and Prof. Dr. M.Jacquot). Besançon, France.
13.09–26.09.2018	Berlin Technical University (collab. with Dr. A.Zakharova). Berlin, Germany.
02.05–06.05.2016	EECI international Graduate School on Control, Institute of Problems of Mechanical Engineering, St. Petersburg, Russia.
18.05–21.05.2015	Lake Como school of advanced studies “Complex networks: theory, methods and applications”, Como, Italy.
23.11–06.12.2014	Berlin Technical University (collab. with Prof. Dr. E.Schöll and Dr. A.Zakharova). Berlin, Germany ***Also in***: 21.05–01.06.***2015***; 01.07–14.07.***2015***; 27.10–09.11.***2015***; 15.01–31.01.***2017***.

Publications over the last 5 years

2021	**3D models of the dynamics of cancer cells under external pressure** *N. Semenova, V.V. Tuchin* Chaos 31 (8), 083122
2021	**Impact of osmotic pressure on cancer cells in a three-dimensional cellular lattice and cell spheroid** *N. Semenova, V.V. Tuchin* Izvestiya VUZ. Applied Nonlinear Dynamics 29 (4), 559–570
2021	**Wavelet skeletons in sleep EEG-monitoring as biomarkers of early diagnostics of mild cognitive impairment** *K. Sergeev, A. Runnova, M. Zhuravlev, O. Kolokolov, N. Akimova, A. Kiselev, A. Titova, A. Slepnev, N. Semenova, T. Penzel* Chaos 31 (7), 073110
2020	**Chimera states in ensembles of excitable FitzHugh–Nagumo systems** *N. Semenova* The European Physical Journal Special Topics 229 (12), 2295-2306
2019	**Fundamental aspects of noise in analog-hardware neural networks** *N. Semenova, X. Porte, L. Andreoli, M. Jacquot, L. Larger, and D. Brunner* Chaos 29 (10), 103128

2019 **Noise and Consistency of Analogue Spatio-Temporal Photonic Neural Networks**
X. Porte, L. Andreoli, N. Semenova, V. Semenov, M. Jacquot, L. Larger, and D. Brunner
in "2019 Conference on Lasers and Electro-Optics Europe and European Quantum Electronics Conference (CLEO/Europe-EQEC)", IEEE, p. 1

2018 **Mechanism of solitary state appearance in an ensemble of nonlocally coupled Lozi maps**
N. Semenova, T. Vadivasova, and V. Anishchenko
The European Physical Journal Special Topics 227 (10-11), 1173–1183

2018 **Weak multiplexing induces coherence resonance**
N. Semenova and A. Zakharova
Chaos 28 (5), 051104

2018 **Chimera States in two coupled ensembles of Henon and Lozi maps. Controlling chimera states**
V. Anishchenko, E. Rybalova, N. Semenova
AIP Conference Proceedings 1978 (1), 470013

2018 **Poincaré Recurrences in ergodic systems without mixing**
V. Anishchenko, N. Semenova, E. Rybalova, and G. Strelkova
in "Regularity and Stochasticity of Nonlinear Dynamical Systems", Springer, Cham, p. 19–49

2018 **Chimera States in two coupled ensembles of Henon and Lozi maps. Controlling chimera states**
V. Anishchenko, E. Rybalova, and N. Semenova
in "AIP Conference Proceedings", Vol. 1978, AIP Publishing, p. 470013

2017 **New type of chimera and mutual synchronization of spatiotemporal structures in two coupled ensembles of nonlocally interacting chaotic maps**
A. Bukh, E. Rybalova, N. Semenova, G. Strelkova, V. Anishchenko
Chaos: An Interdisciplinary Journal of Nonlinear Science 27 (11), 111102

2017 **Time-delayed feedback control of coherence resonance chimeras**
A. Zakharova, N. Semenova, V. Anishchenko, E. Schöll
Chaos 27 (11), 114320

2017 **Temporal intermittency and the lifetime of chimera states in ensembles of nonlocally coupled chaotic oscillators**
Semenova N.I., Strelkova G.I., Anishchenko V.S., Zakharova A.
Chaos 27 (6), 061102

2017 **Transition from complete synchronization to spatio-temporal chaos in coupled chaotic systems with nonhyperbolic and hyperbolic attractors**
Rybalova E., Semenova N., Strelkova G., Anishchenko V.
The European Physical Journal Special Topics 226 (9), 1857-1866

2017 **"Coherence–incoherence" transition in ensembles of nonlocally coupled chaotic oscillators with nonhyperbolic and hyperbolic attractors**
Semenova N.I., Rybalova E.V., Strelkova G.I., Anishchenko V.S.
Regular and Chaotic Dynamics 22 (2), 148-162