Alexey N. Pavlov

SUMMARY CURRICULUM VITAE

Personal details

Full name: Alexey Nikolaevich Pavlov
Date of birth: 11 February 1973
Place of birth: Saratov, Russia
Nationality: Russian

Affiliation

Saratov State University,
Institute of Physics, Department of Open Systems Physics,
410012, Astrakhanskaya Str., 83, Saratov, Russia.
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Education, degrees, universities

1990–1995 Saratov State University, Physics Department,
MSci equivalent in ”Radiophysics” (diploma with excellence)

1995–1998 Saratov State University, Physics Department, Radiophysics and Nonlinear Dynamics Chair – “Candidate in Physical and Mathematical Sciences” (PhD equivalent), on the basis of thesis “*Reconstruction of dynamical systems and its applications*”

2007–2009 Saratov State University, Physics Department, Radiophysics and Nonlinear Dynamics Chair – “Doctor of Science” degree, on the basis of thesis “*Analysis of nonstationary, short and noisy signals based on the wavelet-transform*”

Employment

1999–2002 Assistant Professor, Saratov State University,
Physics Department, Radiophysics and Nonlinear Dynamics Chair

2002–2010 Associate Professor, Saratov State University,
Physics Department, Radiophysics and Nonlinear Dynamics Chair

2010–2017 Professor, Saratov State University,
Physics Department, Radiophysics and Nonlinear Dynamics Chair

2016–2019 Head of Department, Yuri Gagarin State Technical University of Saratov,
Department of Electrical Engineering and Electronics,

2019–now Professor, Saratov State University,
Institute of Physics, Department of Open Systems Physics

Honours, awards, grants

1996–1998 Fellowship from the President of Russia for PhD-students

1998 Fellowship from International Soros Foundation

1997–1999 Named participant in INTAS grant (INTAS 96-0305)

1998–2000 Named participant in Royal Society Joint Project grant

2000 Fellowship from INTAS for young scientists (YSF 99-4050)

2000–2003 Fellowship from the President of Russia and Russian Academy of Sciences

2000–2003 Fellowships for young scientists within the framework of
BRHE Program (REC-006) of CRDF

2002–2005 Named participant in INTAS-project (INTAS 01-2061)

2003–2006	Fellowship Award from CRDF (Y1-P-06-06)
2004–2005	Grant from the President of Russia for young scientists
2004	Fellowship from the Foundation of V. Potanin for young teachers
2005	Grant from the Russian Ministry of Sciences (principal investigator)
2006–2007	Named participant in grant from the Russian Ministry of Education
2006, 2007	Fellowships from the Foundation of V. Potanin for young teachers
2008	Grant from DAAD and the Russian Ministry of Education and Sciences ("Mikhail Lomonosov" program)
2009–2010	Named participant in CRDF-grant (BP4MO6, REC RUX0-006-SR-06)
2009–2011	Federal target program of the RF Ministry of Education and Sciences.
2011	Named participant in RFBR grants № 11-02-00560-a, № 11-02-11000-ano
2012	Grant from the Foundation of V. Potanin («Teacher-online»)
2012	Grant from DAAD
2012–2013	Federal target program of the RF Ministry of Education and Sciences.
2014–2018	Named participant in projects of Russian Science Foundation
2018	Named participant in the grant of the President of Russian Federation for the Leading Scientific Schools of Russia (NSh-2737.2018.2)
since 2019	Named participant in the grants of Russian Science Foundation, the Government of the Russian Federation (075-15-2019-1885), the President of Russian Federation for the Leading Scientific Schools of Russia (NSh-2594.2020.2).

Specialization

time-series analysis, dynamics of living systems, theory of oscillations, neuroscience, physical methods of diagnostics, theory of random processes, nonlinear dynamics and its applications in biology and medicine

Current research interests

analysis of nonstationary data, synchronization, applications of nonlinear dynamics to living systems

Teaching activity

Lecture courses in "Models and Methods of Data Mining", "Information Dynamics", "Selected Issues of Information Systems Theory", "Physics of Open Nonlinear Systems", "Mathematical Modeling of Processes and Systems", "Theory of Information Processes and Systems".

Students, received PhD-degree under my supervising:
A.R. Ziganshin (2005), D.V. Dumsky (2005), A.N. Tupitsyn (2009), A.A. Anisimov (2011), A.I. Nazimov (2015), Y.K. Mohammad (2016), A.S. Yasin (2016)

Researches abroad

1998	Technical University of Lodz, Poland (1 month)
1999, 2002, 2004, 2005, 2006, 2007, 2008, 2009, 2010	Technical University of Denmark, Lyngby (1-2 months each visit)
1999	Lancaster University, UK (2 weeks)
2000, 2001	Humboldt University, Berlin, Germany (1 month)
2005, 2006	Complutense University, Madrid, Spain (1 month)
2008	Potsdam University, Germany (3 months)
2012	Warwick University, UK (2 weeks)
2012, 2014	Humboldt University, Berlin, Germany (1 month)

2013 Huazhong University of Science & Technology, Wuhan, China (1 month)
2014-2019 Potsdam Institute for Climate Impact Research (1 month each visit)

Publications

Number of papers in peer-reviewed journals: > 250
Monographs, text-books: 15

Main publications

1. Hramov A.E., Koronovskii A.A., Makarov V.A., Pavlov A.N., Sitnikova E., "*Wavelets in Neuroscience*", Springer Series in Synergetics. – *Springer*, Berlin, Heidelberg (2015). – 318 p.; Second Edition (2021). – 384 p.
2. Pavlov A.N., Makarov V.A., Mosekilde E., Sosnovtseva O.V., "Application of wavelet-based tools to study the dynamics of biological processes", *Briefings in Bioinformatics* **7**, pp. 375-389 (2006).
3. Sosnovtseva O.V., Pavlov A.N., Brazhe N.A., Brazhe A.R., Erokhova L.A., Maksimov G.V., Mosekilde E., "Interference microscopy under double-wavelet analysis: A new approach to studying cell dynamics", *Physical Review Letters* **94**, pp. 218103(4) (2005).
4. Holstein-Rathlou N.-H., Sosnovtseva O.V., Pavlov A.N., Cupples W.A., Sorensen C.M., Marsh D.J., "Nephron blood flow dynamics measured by laser speckle contrast imaging", *American Journal of Physiology* (*Renal Physiol*.) **300**, pp. F319-F329 (2011).
5. Sosnovtseva O.V., Pavlov A.N., Mosekilde E., Yip K.-P., Holstein-Rathlou N.-H., Marsh D.J., "Synchronization among mechanisms of renal autoregulation is reduced in hypertensive rats", *American Journal of Physiology* (*Renal Physiol*.) **293**, pp. F1545-F1555 (2007).
6. Marsh D.J., Sosnovtseva O.V., Pavlov A.N., Yip K.-P., Holstein-Rathlou N.-H., "Frequency encoding in renal blood flow regulation", *American Journal of Physiology* (*Regul. Integr. Comp. Physiol*.) **288**, pp. R1160-R1167 (2005).
7. Pavlov A.N., Hramov A.E., Koronovskii A.A., Sitnikova E.Yu., Makarov V.A., Ovchinnikov A.A., "Wavelet analysis in neurodynamics", *Physics-Uspekhi* **55**(9), pp.845-875 (2012).
8. Pavlov A.N., Anishchenko V.S., "Multifractal analysis of complex signals", *Physics-Uspekhi* **50**(8), pp. 819-834 (2007).
9. Sosnovtseva O.V., Pavlov A.N., Pavlova O.N., Mosekilde E., Holstein-Rathlou N.-H., "Characterizing the effect of L-name on intra- and inter-nephron synchronization", *European Journal of Pharmaceutical Sciences* **36**, pp. 39-50 (2009).
10. Koronovskii A.A., Hramov A.E., Grubov V.V., Moskalenko O.I., Sitnikova E.Yu., Pavlov A.N. "Coexistence of intermittencies in the neuronal network of the epileptic brain", *Physical Review E* **93**, pp. 032220 (2016).
11. Pavlov A.N., Pavlova O.N., Mohammad Y.K., Kurths J., "Characterization of the chaos-hyperchaos transition based on return times", *Physical Review E* **91**, pp. 022921 (2015).
12. Sosnovtseva O.V., Pavlov A.N., Mosekilde E., Holstein-Rathlou N.-H., Marsh D.J., "Double-wavelet approach to study frequency and amplitude modulation in renal autoregulation", *Physical Review E* **70**, pp. 031915(8) (2004).
13. Sosnovtseva O.V., Pavlov A.N., Mosekilde E., Holstein-Rathlou N.-H., "Bimodal oscillations in nephron autoregulation", *Physical Review E* **66**, pp. 061909(7) (2002).
14. Janson N.B., Pavlov A.N., Neiman A.B., Anishchenko V.S., "Reconstruction of dynamical and geometrical properties of chaotic attractors from threshold-crossing interspike intervals", *Physical Review E* **58**, pp. R4-R7 (1998).
15. Anishchenko V.S., Pavlov A.N., "Global reconstruction in application to multi-channel communication", *Physical Review E* **57**, pp. 2455-2457 (1998).

16. Pavlov A.N., Pavlova O.N., Mohammad Y.K., Kurths J., “Quantifying chaotic dynamics from integrate-and-fire processes”, *Chaos* **25**, pp. 013118 (2015).
17. Semyachkina-Glushkovskaya O., Pavlov A., Kurths J., Borisova E., Gisbrecht A., Sindeeva O., Abdurashitov A., Shirokov A., Navolokin N., Zinchenko E., Gekalyuk A., Ulanova M., Zhu D., Luo Q., Tuchin V. “Optical monitoring of stress-related changes in the brain tissues and vessels associated with hemorrhagic stroke in newborn rats”, *Biomedical Optics Express* **7**, pp. 4088-4097 (2015).
18. Semyachkina-Glushkovskaya O., Borisova E., Abakumov M., Gorin D., Avramov L., Fedosov I., Namykin A., Abdurashitov A., Serov A., Pavlov A., Zinchenko E., Lychagov V., Navolokin N., Shirokov A., Maslyakova G., Zhu D., Luo Q., Chekhonin V., Tuchin V., Kurths J. “The stress and vascular catastrophes in newborn rats: mechanisms preceding and accompanying the brain hemorrhages”, *Frontiers in Physiology* **7**, pp. 210 (2016).
19. Maksimenko V.A., Pavlov A.N., Runnova A.E., Nedaivozov V.O., Grubov V.V., Koronovskii A.A., Pchelintseva S.V., Pitsik E., Pisarchik A.N., Hramov A.E. “Nonlinear analysis of brain activity, associated with motor action and motor imaginary in untrained subjects”, *Nonlinear Dynamics* **91**, pp. 2803-2817 (2018).
20. Semyachkina-Glushkovskaya O.V., Kurths J., Pavlov A.N., Borisova E.G., Abdurashitov A., Zhu D., Li P., Luo Q., Tuchin V.V. “Silent vascular catastrophes in the brain in term newborns: strategies for optical imaging”, *IEEE Journal of Selected Topics in Quantum Electronics* **22**, 6802514 (2016).
21. Pavlova O.N., Abdurashitov A.S., Ulanova M.V., Shushunova N.A., Pavlov A.N. “Effects of missing data on characterization of complex dynamics from time series”, *Communications in Nonlinear Science and Numerical Simulation* **66**, pp. 31-40 (2019).
22. Pavlova O.N., Pavlov A.N. “Improving the quality of extracting dynamics from interspike intervals via a resampling approach”, *Communications in Nonlinear Science and Numerical Simulation* **57**, pp. 221-230 (2018).
23. Pavlov A.N., Pavlova O.N., Abdurashitov A.S., Sindeeva O.A., Semyachkina-Glushkovskaya O.V., Kurths J. “Characterizing scaling properties of complex signals with missed data segments using the multifractal analysis”, *Chaos* **28**, pp. 013124 (2018).
24. Pavlov A.N., Pavlova O.N., Koronovskii A.A., Hramov A.E. “Effect of measuring noise on scaling characteristics in the dynamics of coupled chaotic systems”, *Chaos, Solitons and Fractals* **116**, pp. 106-113 (2018).
25. Pavlov A.N., Semyachkina-Glushkovskaya, O.V., Pavlova, O.N., Abdurashitov, A.S., Shihalov, G.M., Rybalova, E.V., Sindeev, S.S. “Multifractality in cerebrovascular dynamics: An approach for mechanisms-related analysis”, *Chaos, Solitons and Fractals* **91**, pp. 210-213 (2016).
26. Bir A.S., Grishin S.V., Moskalenko O.I., Pavlov A.N., Zhuravlev M.O., Ruiz D.O. “Experimental observation of ultrashort hyperchaotic dark multisoliton complexes in a magnonic active ring resonator”, *Physical Review Letters* **125**, pp. 083903 (2020).
27. Frolov N.S, Grubov V.V., Maksimenko V.A., Lüttjohann A., Makarov V.V., Pavlov A.N., Sitnikova E., Pisarchik A.N., Kurths J., Hramov A.E. “Statistical properties and predictability of extreme epileptic events”, *Scientific Reports* **9**, pp. 7243 (2019).
28. Pavlov A.N., Abdurashitov A.S., Koronovskii Jr. A.A., Pavlova O.N., Semyachkina-Glushkovskaya O.V., Kurths J. “Detrended fluctuation analysis of cerebrovascular responses to abrupt changes in peripheral arterial pressure in rats”, *Communications in Nonlinear Science and Numerical Simulation* **85**, pp. 105232 (2020).
29. Pavlov A.N., Dubrovsky A.I., Koronovskii Jr. A.A., Pavlova O.N., Semyachkina-Glushkovskaya O.V., Kurths J. “Extended detrended fluctuation analysis of electroencephalograms signals during sleep and the opening of the blood-brain barrier”, *Chaos* **30**, pp. 073138 (2020).

30. Pavlov A.N., Pavlova O.N., Semyachkina-Glushkovskaya O.V., Kurths J. “Enhanced multiresolution wavelet analysis of complex dynamics in nonlinear systems”, *Chaos* **31**, pp. 043110 (2021).
31. Pavlov A.N., Pitsik E.N., Frolov N.S., Badarin A., Pavlova O.N., Hramov A.E. “Age-related distinctions in EEG signals during execution of motor tasks characterized in terms of long-range correlations”, *Sensors* **20**, pp. 5843 (2020).
32. Pavlov A.N., Pavlova O.N., Semyachkina-Glushkovskaya O.V., Kurths J. “Extended detrended fluctuation analysis: effects of nonstationarity and application to sleep data”, *European Physical Journal Plus* **136**, ID 10 (2021).
33. Pavlov A.N., Pitsik E.N., Guyo G.A., Frolov N.S., Grubov V.V., Pavlova O.N., Wang Z., Hramov A.E. “Effects of healthy aging on electrical activity of the brain during motor tasks characterized with wavelets”, *European Physical Journal Plus* **136**, 408 (2021).
34. Pavlov A.N., Pavlova O.N. “Enhanced multiresolution wavelet analysis of cerebrovascular dynamics”, *Chaos, Solitons and Fractals* **146**, pp. 110924 (2021).
35. Pavlov A.N., Dubrovsky A.I., Koronovskii Jr. A.A., Pavlova O.N., Semyachkina-Glushkovskaya O.V., Kurths J. “Extended detrended fluctuation analysis of sound-induced changes in brain electrical activity”, *Chaos, Solitons and Fractals* **139**, pp. 109989 (2020).