

Curriculum Vitae

Yuriy S. Polyakov

Dr. Yuriy S. Polyakov
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Citizenship: U.S.A.
Date of birth: September 3, 1980

Brief Research Biography

Author of 32 publications in refereed journals (more than 60 publications in total). 7 years of post-PhD scientific research experience. Prepared the first journal paper at the age of 17 (first-year university student). Performed scientific studies in mathematical physics, statistical physics, computer science, chemical/environmental engineering, neuroscience, environmental sustainability, geophysics, nanotechnology, and astrophysics. Defended the habilitation thesis for the Doctor of Sciences in Physics and Mathematics in Russia at the age of 27 (with the national average defending age of 45-50). Invented several novel concepts and processes in environmental engineering and sustainability. Reviewer for 11 scholarly journals and U.S. Civilian Research and Development Foundation, and Editorial Board member for the International Journal of Communications, Network and System Sciences. Recipient of Moscow Mayor's Young Scientist award.

Education

- 2007 D.Sc. (Dr. habil.), Physics & Mathematics, Karpov Institute of Physical Chemistry, Moscow, Russia
- 2004 Ph.D., Chemical & Environmental Engineering, Moscow State University of Environmental Engineering, Russia
- 2003 M.Sc., Computer Science, New Jersey Institute of Technology (GPA 4.00, National Dean's List)
- 2002 B.Sc., Computer Information Systems, Excelsior College, University of the State of New York (GPA 4.00, Summa Cum Laude)

Professional Experience

- 2008-present Senior Research Scientist, USPolyResearch, USA
- 2007 Visiting Researcher, Moscow State University of Environmental Engineering, Russia
- 2005-2008 Research Scientist, USPolyResearch, USA
- 2003-2004 Visiting Researcher, Moscow State University of Environmental Engineering, Russia
- 2002-present Senior R&D Engineer/Consultant, multiple telecommunications and medical corporations, USA (DiagnosisPlus, BlueWater Communications Group, MasTec Inc., Envision Technologies Inc., etc.)
- 2002-2005 Research Affiliate, Cryptography & Telecommunications Laboratory, Computer Science Department, New Jersey Institute of Technology
- 1999-2001 Network Engineer/Software Engineer, Envision Technologies Inc., USA
- 1999-2001 Network Administrator/Software Engineer, MasTec North America Inc., USA
- 1998-1999 Field Engineer, Cross Country Land Services Inc., USA
- 1997-1998 Research Assistant, Moscow State University of Environmental Engineering, Russia
- 1997-1998 Technical Translator, Interperiodica Publishing, Russia

Awards and Honors

- 2011 Editorial Board of International Journal of Communications, Network and System Sciences
- 2008 D.Sc. (Dr. habil.) thesis is selected by the Higher Attestation Commission of the Russian Federation for its year 2008 list of outstanding habilitation theses
- 2007 A paper on membrane filtration in Journal of Membrane Science is recognized as a new research trend in the field (Membrane Technology, 2007, Issue 1)

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| 2005 | Moscow Mayor's Young Scientist Award, Russia |
| 2002-2003 | The National Dean's List |
| 2002 | Summa Cum Laude, Excelsior College, University of the State of New York |
| 2001 | President's List, Wenatchee Valley College |

Research Interests (by application field)

Chemical & Environmental Engineering (Mathematical Physics)

- Electrokinetic mechanisms of adsorption and cake deposition on collectors, semipermeable membrane surface, and membrane pore walls
- Theory of mass transfer in depth membrane filtration and its application to membrane chromatography and other membrane techniques that can be used for cell, DNA, RNA, and protein treatment and separation
- Theory of mass transfer in microfiltration/ultrafiltration
- Theory of mass transfer in deep bed filtration
- Theory of coupled heat and mass transfer in fast polymerization processes

Environmental Sustainability

- Development of a systems approach to designing efficient closed environments for hot deserts using the space life science experience in bioregenerative life support systems for long-duration flights and orbital space stations

Neuroscience (Medical Physics)

- Development of diagnostic methods for photosensitive epilepsy based on the analysis of magnetoencephalograms
- Development of diagnostic methods for schizophrenia based on the analysis of electroencephalograms

Geophysics

- Identification of earthquake precursors in the hydrogeochemical and geoaoustic data for the Kamchatka peninsula
- Analysis of transitions between glacial and interglacial periods using the climate proxy data from Antarctic ice cores

Nanotechnology

- Development of nanometrological methods for parameterizing nanosurfaces imaged by atomic force microscopy

Astrophysics

- Analysis of stochastic variability in the dynamics of X-ray emission from black hole system GRS 1915+105

Reviewer for Scholarly Journals

Chemical Engineering Communications; Chemical Engineering Journal; Desalination; Ecological Engineering; Industrial & Engineering Chemistry Research; International Journal of Communications, Network and System Sciences; Journal of Engineering Mathematics; Journal of Membrane Science; Physica A; Separation Science and Technology; Theoretical Foundations of Chemical Engineering

Grant Proposal Reviewer

U.S. Civilian Research and Development Foundation

Professional Society Membership

American Filtration Society; American Institute of Chemical Engineers; North American Membrane Society

Teaching Experience

2011 Guest Lecture: Design Principles and Challenges of Sustainable Projects; Graduate Class: BUS 9700 – Sustainable Business: Perspectives, Theories, and Practices; Baruch College, City University of New York

- 2009 Guest Lecture: Sustainable Development of Hot Deserts; Seminar: Columbia Water Center Seminar; Columbia Water Center, Earth Institute, Columbia University
- 2008-2009 Series of Corporate Lectures: Open-Source Network Monitoring Tools; BlueWater Communications Group, Hauppauge, NY
- 2007 Invited Lecture: Nonlinear Models of Mass Transfer in Pressure-Driven Processes; Seminar: Nonlinear Dynamics of Chemical Reactions, Processes, and Reactors; Chemistry Department, Moscow State University, Russia
- 2007 Invited Lecture: Nonuniform Particle Deposition on External and Internal Surface of Semipermeable Membranes; Russian University of Chemical Technology, Russia
- 2007 Invited Lecture: Nonuniform Particle Deposition on External and Internal Surface of Semipermeable Membranes; Moscow State University of Environmental Engineering, Russia
- 2002 Teaching Assistant (graduate course in Computer Science), Computer Science Department, New Jersey Institute of Technology

Graduate Student Supervision

Valeria Kotenko (2007)

Master's Thesis Title: Design of Telecommunications Infrastructure for Internet Service Providers
Defended at Saint-Petersburg State University of Telecommunications, Russia

Conference and Forum Organizer

- 2009 Organizer of a conference (with I. Musaev): *Sustainable Development of Hot Deserts*, Columbia University, October 31 – November 1, 2009.
- 2009 Organizer of a forum (with I. Musaev): *Global Eco-Innovation Forum*, <http://www.globalecoinnovation.org>, Ashland, PA, 2009.

Other Corporate Experience

- 2010-present MIS Director, BlueWater Communications Group LLC, New York, NY
- 2008-present Member, GreenField Scientific Advisors LLC, Ashland, PA
- 2008-present Member, WebHealthAdvisor LLC, Ashland, PA

Scientific Achievements

Chemical & Environmental Engineering

- Developed a mathematical model for deep bed filtration (New Jersey Institute of Technology)
- Developed a mathematical model for studying fast polymerization processes (USPolyResearch)
- Developed a novel water filtration process – depth membrane filtration (USPolyResearch)
- Developed an enhanced mathematical model for dead-end outside-in hollow fiber membrane modules (USPolyResearch)
- Developed an enhanced mathematical model for the standard blocking of microfiltration and ultrafiltration membranes (USPolyResearch)
- Developed an integrated mathematical model for the design of microfiltration modules, which incorporates the processes of complete blocking, standard blocking, and cake filtration (Moscow State University of Environmental Engineering)
- Developed several mathematical models for depth membrane filtration (USPolyResearch)

Environmental Sustainability

- Developed an interdisciplinary systems approach for revitalizing and commercializing hot deserts using systems thinking and space technology experience in designing life-support systems for long-duration flights (USPolyResearch)

Neuroscience

- Demonstrated that the disruption of spatial correlations in the magnetoencephalogram responses of patients with photosensitive epilepsy is an indicator of pathological changes leading to photosensitive epilepsy (USPolyResearch)
- Discovered a diagnostic sign of schizophrenia using quantitative estimates of cross-correlations between electroencephalogram signals recorded in different cortex areas (USPolyResearch)

Computational Mathematics

- Developed a method for solving complex nonlinear differential and integrodifferential equations (USPolyResearch)
- Developed a numerical algorithm for solving the nonlinear differential problem of mass and heat transfer in a system with chemical conversions (USPolyResearch)
- Developed an iterative algorithm for solving large linear systems of equations (New Jersey Institute of Technology)
- Developed an efficient algorithm for the continuous single-facility minisum (Fermat-Weber) problem (New Jersey Institute of Technology)

Computer Science

- Developed efficient algorithms for the optimal location of switches on a network (New Jersey Institute of Technology)

Statistical Physics

- Developed Flicker-Noise Spectroscopy, a phenomenological theory for the analysis of natural time and spatial series with stochastically varying components (USPolyResearch)
- Discovered the presence of anomalous diffusion in many natural signals (USPolyResearch)

Geophysics

- Developed a systems approach for locating earthquake precursors based on the analysis of time signals of different types in the same geographical region (USPolyResearch)

Nanotechnology

- Developed an analytical method for parameterizing the random profile components of nanosurfaces imaged by atomic force microscopy (USPolyResearch)

Selected R&D Achievements

- Designed and developed the Alpha version of *OsteoFile*, novel computer-aided artificial intelligence diagnosis solution for collecting and analyzing patient data on osteoporosis, visualization of the information, and generation of treatment recommendations – patent pending (DiagnosisPlus)
- Architected, developed, and implemented an integrated NOC-based managed services solution (new multimillion service line with Cisco Managed Services Master Certification) to monitor WANs and LAN segments of leading NYC organizations, such as Ford Foundation, New York Jets, Barnes & Noble, Heineken Americas, SUNY at Stony Brook, Yonkers Racing Corporation (BlueWater Communications Group)
- Developed a nanometrological software package for Atomic Force Microscopy (AFM) setups to characterize the texture of nanosurfaces imaged by AFM (USPolyResearch)
- Architected one of the first U.S. internet service providers with wireless Internet access (1999, Envision Technologies, Inc.)
- Developed a complex multiple-shipment e-commerce site with several novel technologies (2000, Liberty Orchards, Inc.)

Past Research Grants

2002-2010 Co-Pi for 7 grants funded by Russian Foundation for Basic Research

Other Skills

Information Systems Certificates

- Certified Computing Professional, *ICCP*, 2005 & 2008 & 2011 (Renewed);
- Certified Computing Professional, *ICCP*, 01/2002;

- Microsoft Certified Systems Engineer (Windows 2000 Track – Early Achiever Certificate), 06/2001;
- Cisco Wireless Point-to-Point Product Training, 09/2000;
- Cisco Wireless Point-to-Multipoint Product Training, 09/2000;
- ORINOCO certification, *Lucent*, 07/2000;
- Course #1579: Accelerated Training in Windows 2000, *Microsoft*, 10/1999;
- Microsoft Certified Systems Engineer (Windows NT 4.0 Track), 04/1999;
- AutoCAD Customization / 3D Draw & Model, *AutoDesk*, 04/1999;
- ProXR with Asset Surveyor & Pathfinder Office, *Trimble*, 04/1999.

Programming Skills

MatLab, Mathematica, Maple, COMSOL, C#, Python, VB.NET, ASP.NET, C++, Java, Visual Basic, VBScript, T-SQL, JavaScript, HTML, C, Perl, Turbo Pascal.

Refereed Journal Papers

1. Ryabinin, G., Gavrilov, V. A., Polyakov, Yu. S., and Timashev, S. F., Cross-Correlation Earthquake Precursors in the Hydrogeochemical and Geoacoustic Signals for the Kamchatka Peninsula, *Acta Geophysica*, 2012, in press.
2. Timashev, S. F., Panishev, O. Yu., Polyakov, Yu. S., Demin, S. A., and Kaplan, A. Ya., "Analysis of Cross-Correlations in Electroencephalogram Signals as an Approach to Proactive Diagnosis of Schizophrenia", *Physica A*, 2012, Vol. 391, No. 4, pp. 1179-1194.
3. Ryabinin, G., Polyakov, Yu. S., Gavrilov, V. A., and Timashev, S. F., "Identification of Earthquake Precursors in the Hydrogeochemical and Geoacoustic Data for the Kamchatka Peninsula by Flicker-Noise Spectroscopy", *Natural Hazards and Earth System Sciences*, 2011, Vol. 11, pp. 541-548.
4. Mirsaidov, U., Timashev, S. F., Polyakov, Yu. S., Misurkin, P. I., Musaev, I., and Polyakov, S. V., "Analytical Method for Parameterizing the Random Profile Components of Nanosurfaces Imaged by Atomic Force Microscopy", *Analyst*, 2011, pp. 570-576.
5. Timashev, S. F., Polyakov, Yu. S., Lakeev, S. G., Misurkin, P. I., and Danilov, A. I., "Fundamentals of Fluctuation Metrology", *Russian Journal of Physical Chemistry A*, 2010, Vol. 84, No. 10, pp. 1807-1825.
6. Polyakov Y. S., Musaev I., and Polyakov S. V., "Closed Bioregenerative Life Support Systems: Applicability to Hot Deserts", *Advances in Space Research*, 2010, Vol. 46, No. 6, pp. 775-786.
7. Kholpanov, L. P., Polyakov, Yu. S., and Berlin, A. A., "Coupled Turbulent Heat and Mass Transfer in Fast Polymerization Processes in a Tubular Reactor", *Theoretical Foundations of Chemical Engineering*, 2010, Vol. 44, No. 3, pp. 236-248.
8. Timashev, S. F., Polyakov, Yu. S., Misurkin, P. I., and Lakeev, S. G., "Anomalous Diffusion as a Stochastic Component in the Dynamics of Complex Processes", *Physical Review E*, 2010, Vol. 81, No. 4, 041128.
9. Timashev, S. F., Polyakov, Yu. S., Yulmetyev, R. M., Demin, S. A., Panishev, O. Yu., Shimojo, S., and Bhattacharya, J., "Frequency and Phase Synchronization in Neuromagnetic Cortical Responses to Flickering-Color Stimuli", *Laser Physics*, 2010, Vol. 20, No. 3, pp. 604–617.
10. Polyakov, Yu. S., "Assessment of the Effect of Operating Parameters and Membrane Characteristics on the Dynamics of Permeate Rate and Selectivity for Ultrafiltration and Microfiltration Membranes using the Depth Filtration Model", *Theoretical Foundations of Chemical Engineering*, 2009, Vol. 43, No. 6, 926-935.
11. Timashev, S. F., Polyakov, Yu. S., Yulmetyev, R. M., Demin, S. A., Panishev, O. Yu., Shimojo, S., and Bhattacharya, J., "Analysis of Biomedical Signals by Flicker-Noise Spectroscopy: Identification of Photosensitive Epilepsy using Magnetoencephalograms", *Laser Physics*, 2009, Vol. 19, No. 4, pp. 836–854.
12. Timashev, S. F. and Polyakov, Yu. S., "Analysis of Discrete Signals with Stochastic Components using Flicker Noise Spectroscopy", *International Journal of Bifurcation and Chaos*, 2008, Vol. 18, No. 9, pp. 2793-2797.
13. Polyakov, Yu. S., "Depth Filtration Approach to the Theory of Standard Blocking: Prediction of Membrane Permeation Rate and Selectivity", *Journal of Membrane Science*, 2008, Vol. 322, pp. 81-90.
14. Polyakov, Yu. S., "Nonuniform Particle Deposition Inside the Pores of Semipermeable Membranes", *Theoretical Foundations of Chemical Engineering*, 2008, Vol. 42, No. 1, pp. 77-84.
15. Kholpanov, L. P. and Polyakov, Yu. S., "Turbulent Conjugate Heat-and Mass Transfer in Chemical Conversions in a Tubular Reactor", *Journal of Engineering Physics and Thermophysics*, 2007, Vol. 80, No. 6, pp. 1140-1153.
16. Polyakov, Yu. S., "Use of Cake Deposition to Increase the Efficiency of Ultra- and Microfiltration Plants", *Theoretical Foundations of Chemical Engineering*, 2007, Vol. 41, No. 5, pp. 475-482.
17. Timashev, S. F. and Polyakov, Yu. S., "Review of Flicker Noise Spectroscopy in Electrochemistry", *Fluctuation and Noise Letters*, 2007, Vol. 7, No. 2, R15-R47.

18. Polyakov, Yu. S., "Phenomenological Theory of Depth Membrane Filtration", *Chemical Engineering Science*, 2007, Vol. 62, pp. 1851-1860.
19. Polyakov, Yu. S. and Kazenin, D. A., "Selection of Membranes for Deadend Micro- and Ultrafiltration Outside-In Hollow Fiber Filters", *Theoretical Foundations of Chemical Engineering*, 2007, Vol. 41, No. 1, pp. 56-65.
20. Timashev, S. F. and Polyakov, Yu. S., "Flicker Noise Spectroscopy: Extraction of Information from Chaotic Signals Generated by Complex Systems", *Nauka - Proizvodstvu* (Science for Industry), 2007, No. 1, pp. 54-63 [In Russian].
21. Polyakov, Yu. S. and Dil'man, V. V., "Approximate Method for Nonlinear Differential and Integrodifferential Equations", *AIChE Journal*, 2006, Vol. 52, No. 11, pp. 3813-3824.
22. Kholpanov, L. P. and Polyakov, Yu. S., "Mathematical Modeling of Turbulent Heat and Mass Transfer with Chemical Conversions", *Theoretical Foundations of Chemical Engineering*, 2006, Vol. 40, No. 5, pp. 454-464.
23. Polyakov, Yu. S., "Hollow Fiber Membrane Adsorber: Mathematical Model", *Journal of Membrane Science*, 2006, Vol. 280, pp. 610-623.
24. Polyakov, Yu. S., "Deadend Outside-In Hollow Fiber Membrane Filter: Mathematical Model", *Journal of Membrane Science*, 2006, Vol. 279, pp. 615-624.
25. Polyakov, Yu. S., "Particle Deposition in Outside-In Hollow Fiber Filters and Its Effect on Their Performance", *Journal of Membrane Science*, 2006, Vol. 278, pp. 190-198.
26. Polyakov, Yu. S., "Membrane Separation in Deadend Hollow Fiber Filters at Constant Transmembrane Pressure", *Theoretical Foundations of Chemical Engineering*, 2005, Vol. 39, No. 5, pp. 471-477.
27. Polyakov, Yu., "Membrane Fouling at the Service of UF/MF: Hollow Fiber Membrane Adsorber", *Membrane Quarterly*, 2005, Vol. 20, No. 3, pp. 7-11.
28. Polyakov, Yu. S. and Kazenin, D. A., "Membrane Filtration with Reversible Adsorption: The Effect of Transmembrane Pressure, Feed Flow Rate, and Geometry of Hollow Fiber Filters on Their Performance", *Theoretical Foundations of Chemical Engineering*, 2005, Vol. 39, No. 4, pp. 402-406.
29. Polyakov, Yu. S. and Kazenin, D. A., "Membrane Filtration with Reversible Adsorption: Hollow Fiber Membranes as Collectors of Colloidal Particles", *Theoretical Foundations of Chemical Engineering*, 2005, Vol. 39, No. 2, pp. 118-128.
30. Polyakov, Yu. S., Kazenin, D. A., Maksimov, E. D., and Polyakov, S. V., "Kinetic Model of Depth Filtration with Reversible Adsorption", *Theoretical Foundations of Chemical Engineering*, 2003, Vol. 37, No. 5, pp. 439-446.
31. Verkhovsky, B. S. and Polyakov, Yu. S., "Feedback Algorithm for the Single-Facility Minisum Problem", *Annals of the European Academy of Sciences*, 2003, Vol. 1, pp. 127-136.
32. Polyakov, Yu. S., Maksimov, E. D., and Polyakov, V. S., "On the Design of Microfilters", *Theoretical Foundations of Chemical Engineering*, 1999, Vol. 33, No. 1, pp. 64-71.

Book Chapters

1. Timashev, S. F., Nivin, V. A., Syvorotkin, V. L., and Polyakov, Yu. S., "Flicker-Noise Spectroscopy Analysis of Hydrogen Gas Release Dynamics in Khibiny and Lovozerovo Massifs (Kola Peninsula)", *Dynamic Phenomena in Complex Systems*, A. V. Mokshin, S. A. Demin, R. M. Khusnutdinov, O. Yu. Panishev (Eds.), MOiN RT, Kazan, 2011, pp. 263-278 [In Russian].
2. Timashev, S. F., Panishev, O. Yu., Demin, S. A., Polyakov Yu. S., and Kaplan, A. Ya, "Dynamics of Cross-Correlations in Human Electroencephalograms for Diagnostics of Psychiatric Disorders", *Dynamic Phenomena in Complex Systems*, A. V. Mokshin, S. A. Demin, R. M. Khusnutdinov, O. Yu. Panishev (Eds.), MOiN RT, Kazan, 2011, pp. 279-296 [In Russian].
3. Timashev, S. F. and Polyakov, Yu. S., "Review of Flicker-Noise Spectroscopy: Information in Chaotic Signals", *Simultaneity: Temporal Structures and Observer Perspectives*, S. Vrobel, O. E. Rössler, T. Marks-Tarlow (Eds.), World Scientific Publishing, Singapore, 2008, pp. 270-285.
4. Verkhovsky, B. S. and Polyakov, Yu. S., "Non-Linear Algorithms for Parametric Markov Programming", *Current Computing Developments in E-Commerce, Security, HCI, DB, Collaborative and Cooperative Systems*, P. Petratos (Ed.), Athens Institute for Education and Research, Athens, Greece, 2006, pp. 179-194.
5. Verkhovsky, B. S. and Polyakov, Yu. S., "Highly Efficient Algorithm for Two-Switch Location Problem", *Advances in Decision Technology and Intelligent Information Systems, Volume IV*, K.J. Engemann and G.E. Lasker (Eds.), The International Institute for Advanced Studies in Systems Research and Cybernetics, Windsor, Canada, 2003, pp. 51-55.
6. Verkhovsky, B. S. and Polyakov, Yu. S., "Algorithms for Optimal Switch Location: Concave Cost Functions", *Advances in Decision Technology and Intelligent Information Systems, Volume IV*, K.J. Engemann and G.E. Lasker (Eds.), The International Institute for Advanced Studies in Systems Research and Cybernetics, Windsor, Canada, 2003, pp. 16-20.

Selected Conference Papers

1. Polyakov Yu. S., Neilsen J., and Timashev S. F., "Anomalous Diffusion in the Dynamics of X-ray Emission of Astrophysical Objects", *21st International Conference on Noise and Fluctuations*, Toronto: Ryerson University, June 12-16, 2011, pp. 115-118, DOI: 10.1109/ICNF.2011.5994277.
2. Timashev S. F., Polyakov Yu. S., and Lakeev, S. G., "Fluctuation Metrology and Parameterization of Time Signals", *Proceedings of the 41th International Seminar on Fluctuation and Degradation Processes in Semiconductor Devices*, Moscow: MNTORES im. A.S. Popova, Moscow Power Engineering Institute, November 2010 [In Russian].
3. Timashev S.F., Polyakov Yu.S., Solovieva A.B., and Misurkin, P.I., "Nanometrology of the Surfaces in Biological Systems", *2nd International Conference "Nanooncology"*, Tyumen, September 26 - 28, 2010; published in *Rossiyskiy Bioterapevticheskiy Zhurnal (Russian Biotherapeutic Journal)*, Vol. 9, No. 3, pp. 25-26 [In Russian].
4. Timashev S.F. and Polyakov Yu.S., "Flicker-Noise Spectroscopy as a Tool for the Personalized Medicine of the Future", *3rd Eurasian Congress on Medical Physics and Engineering "Medical Physics - 2010"*, Moscow: Moscow State University, June 21 - 26, 2010, Vol. 3, pp. 64-68 [In Russian].
5. Timashev S. F., Polyakov Yu. S., Misurkin P. I., and Lakeev, S. G., "Anomalous Diffusion in the Dynamics of Complex Processes", *Proceedings of the 40th International Seminar on Fluctuation and Degradation Processes in Semiconductor Devices*, Moscow: Moscow Power Engineering Institute, November 24 - 25, 2009 [In Russian].
6. Timashev S.F., Yulmetyev R.M., Demin S.A., Panishev O.Yu., and Polyakov Yu.S., "Flicker-Noise Spectroscopy in the Analysis of Magnetoencephalograms: Photosensitive Epilepsy", *Almanac of Clinical Medicine: Proceedings of the 3rd Troitsk Conference on Medical Physics and Innovations in Medicine*, Moscow: MONIKI, June 3 - 6, 2008, Vol. XVII, No. 1, pp. 233-237 [In Russian].
7. Polyakov, Yu. S., "Depth Filtration Model for Standard Pore Blocking in Ultra- and Microfiltration Membranes", *Proceedings of the 21th International Scientific Conference "Mathematical Methods in Engineering"*, Saratov: Saratov State Technical University, May 27 - May 31, 2008, Vol. 3, pp. 102-106.
8. Polyakov, Yu. S., Optimal Organization of Ultra- and Microfiltration in Hollow Fiber Membrane Filters, *Proceedings of the All-Russian Scientific Conference "Membranes 2007"*, Moscow, October 1 – 4, 2007, p. 85 [In Russian].
9. Kholpanov, L. P., Zakiev, S. E., and Polyakov, Yu. S., Turbulent Heat and Mass Transfer with Exothermic Reactions, *Proceedings of the International Conference "The XVIII session of the International School on the Models of Continuum Mechanics"*, Saratov: Saratov State University, August 28 - 31, 2007 [In Russian].
10. Timashev, S. F. and Polyakov, Yu. S., "Phenomenological Analysis of Medical Time Series with Regular and Stochastic Components", *Noise and Fluctuations in Biological, Biophysical, and Biomedical Systems (Proceedings of "Fluctuations and Noise 2007", Florence, Italy)*, S.M. Bezrukov (Ed.), SPIE, Bellingham, WA, 2007, Vol. 6602.
11. Polyakov, Yu. S., "Mathematical Modeling of Standard Blocking in Semipermeable Membranes", *Proceedings of the 20th International Scientific Conference "Mathematical Methods in Engineering"*, Yaroslavl: Yaroslavl State Technical University, May 29 - June 1, 2007, Vol. 3, pp. 216-217 [In Russian].
12. Kholpanov, L. P. and Polyakov, Yu. S., "Numerical Analysis of the Hyperbolic Model for Turbulent Heat and Mass Transfer with Chemical Conversions", *Proceedings of the 20th International Scientific Conference "Mathematical Methods in Engineering"*, Yaroslavl: Yaroslavl State Technical University, May 29 - June 1, 2007, Vol. 1, pp. 202-204 [In Russian].
13. Kholpanov, L.P. and Polyakov, Yu. S. "Coupled Turbulent Heat and Mass Transfer with Chemical Conversions", *Proceedings of the 4th Russian National Conference on Heat Transfer*, Moscow: Moscow Power Institute, October 23 - 27, 2006, Vol. 3, pp. 329-332 [In Russian].
14. Polyakov, Yu. S. and Kholpanov, L.P. "Coupled Turbulent Heat and Mass Transfer with Chemical Conversions", *Proceedings of the 9th All-Russian Congress on Theoretical and Applied Mechanics*, Nizhniy Novgorod: Nizhniy Novgorod State University, August 22 - 28, 2006, Vol. 2, pp. 146-147 [In Russian].
15. Kholpanov, L. P. and Polyakov, Yu. S., "Numerical Simulation of Fast Polymerization Processes", *Proceedings of the 19th International Scientific Conference "Mathematical Methods in Engineering"*, Voronezh: Voronezh State Technological Academy, May 30 - June 2, 2006, Vol. 1, pp. 113-116 [In Russian].
16. Polyakov, Yu. S. and Dil'man V.V., "Approximate Method for Solving Unsteady Nonlinear Mass Transfer Problems", *Proceedings of the 19th International Scientific Conference "Mathematical Methods in Engineering"*, Voronezh: Voronezh State Technological Academy, May 30 - June 2, 2006, Vol. 1, pp. 94-96.
17. Polyakov, Yu. S., "Phenomenological Model of Depth Membrane Filtration", *Proceedings of the 19th International Scientific Conference "Mathematical Methods in Engineering"*, Voronezh: Voronezh State Technological Academy, May 30 - June 2, 2006, Vol. 1, pp. 88-93.

18. Polyakov, Yu. "Beneficial Effect of Particle Adsorption in UF/MF Outside-In Hollow Fiber Filters" , *Proceedings of the 2005 Annual Meeting of the North American Membrane Society*, Providence, Rhode Island, June 11-15, 2005, pp. 66-67.
19. Polyakov, Yu. S. and Kazenin, D. A. "Nonlinear Mass Transfer with Reversible Adsorption on Semipermeable Membranes in Membrane Adsorbers", *Proceedings of the 18th International Scientific Conference "Mathematical Methods in Engineering"*, Kazan: Kazan State Technical University, May 31 - June 2, 2005, Vol. 1, pp. 156-160 [In Russian].
20. Polyakov, Yu. S. and Kazenin, D. A. "Nonlinear Mass Transfer with Reversible Adsorption on Semipermeable Membranes in Deadend Filters", *Proceedings of the 18th International Scientific Conference "Mathematical Methods in Engineering"*, Kazan: Kazan State Technical University, May 31 - June 2, 2005, Vol. 1, pp. 146-151 [In Russian].
21. Polyakov, Yu. S. and Kazenin, D. A. "Features of the Process Flow Diagram and Parameter Selection for Closed-Loop Wastewater Ultrafiltration Hollow-Fiber Plants", *Proceedings of the 2nd International Scientific & Industrial Conference "Environmental Problems of Industrial Megapolises"*, Moscow: Moscow State University of Environmental Engineering, May 24-27, 2005, pp. 147-148 [In Russian].
22. Polyakov, Yu. S. and Kazenin, D. A. "Design of Novel Hollow Fiber Membrane Filters for Closed-Loop Wastewater Plants Treating Paint, Power Plant, and Car Repair Effluents", *Proceedings of the 1st International Scientific & Industrial Conference "Environmental Problems of Industrial Megapolises"*, Donetsk: Donetsk State Technical University, June 1-4, 2004, Vol. I, pp. 221-226 [In Russian].

Selected Conference and Symposium Presentations

1. Timashev, S. F., Polyakov, Yu. S., and Solovieva, A. B., "Nanometrology of Polymeric Surfaces", *19th POLYCHAR World Forum on Advanced Materials*, Kathmandu, Nepal, March 20-24, 2011.
2. Timashev, S. F., Polyakov, Yu. S., and Solovieva, A. B., "Nanometrology of Biological Surfaces", *8th International Symposium on Photodynamic Therapy and Photodiagnosis in Clinical Practice*, Brixen/Bressanone (South Tyrol), Italy, October 6 - 9, 2010.
3. Timashev, S. F., Polyakov, Yu. S., Demin, S. A., Panischev, O. Yu., Shimojo, S., and Bhattacharya, J., "Flicker-Noise Spectroscopy as a Tool for the Individual Medicine of the Future", *Advanced Laser Technologies Conference ALT'10*, Egmond aan Zee, The Netherlands, September 11 - 16, 2010.
4. Timashev S.F., Polyakov Yu.S., and Lakeev S.G., "Anomalous Diffusion in the Dynamics of Complex Processes", *3rd International Conference (CHAOS2010) on Chaotic Modeling, Simulation and Applications*, Chania, Crete (Greece), June 1 - 4, 2010.
5. Polyakov Yu.S., "Design Principles for Sustainable Settlements in Hot Deserts", *Interdisciplinary Conference "Sustainable Development of Hot Deserts"*, Columbia University, New York, NY, October 31 - November 1, 2009.
6. Kostyuchenko I.G., Polyakov Yu.S., and Timashev S.F., "On the Peculiarities of the Chaotic Dynamics of Strong Solar Magnetic Fields", *VIII International Crimean Conference "Cosmos and Biosphere"*, Sudak, Crimea, Ukraine, September 28 - October 3, 2009.
7. Timashev S.F., Polyakov Yu.S., Yulmetyev R.M., Demin S.A., and Panischev O.Yu., "Analysis of Cross-Correlations in Magnetoencephalogram Responses to Color-Flickering Stimuli with Application to Individual Medicine", *18th International Laser Physics Workshop*, Barcelona, Spain, July 13 - 17, 2009.
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