



**Ural Federal
University**

named after the first President
of Russia B.N.Yeltsin



DOCTORAL PROGRAMS

MATHEMATICS & INFORMATICS

NATURAL SCIENCES

ENGINEERING

SOCIAL SCIENCES & HUMANITIES

ECONOMICS & MANAGEMENT

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Economics



Vladimir Kruzhaev

UrFU Vice-rector for Research

High-quality education has always been of value, today it remains an important asset all over the globe. The level of development of the country is directly dependent on the level of scientific cognition of the nature and the society, as well as on the broad use of scientific achievements in engineering and technology. Thus the need for specialists with experience in research will only grow in the years to come.

We invite all researchers interested in the mysteries of the Universe and the organic and inorganic nature, the development of technology, economic and social spheres of life, to pursue their doctoral studies at Ural Federal University. Being one of the leading Russian universities in terms of research activities, Ural Federal University possesses all necessary facilities for doctoral students to pursue their studies in such fields as Natural Sciences, Mathematics, Engineering, Human Sciences, and Economics. Scientific advisors working with doctoral students have broad experience of working in the leading universities of the world.

A handwritten signature in blue ink, appearing to be the signature of Vladimir Kruzhaev.

Cover photo: UrFU doctoral students: Aftab Alam Mohammad (India), Ni Wayan Radita Novi Puspitasari (Indonesia), Fatemeh Haj Khalili (Iran) and Ebenezer Agbozo (Ghana).

We express our gratitude to all UrFU doctoral candidates and professors for the permission to use their pictures and testimonials in this brochure.

Mathematics & Informatics



A PostDoc Azeef Muhammed Parayil Ajmal (India) and a PhD candidate in Mathematics and Mechanics Hanan Magdy Darwish Shabana (Egypt) sharing ideas about their research directions

Duration of study: 4 years

Language: English or Russian

Entry requirements:

- Master's degree (or equivalent) in the related field
- B2 level of English or Russian
- Interview

Entrance exams:

- Foreign language (English/German/French)
- Mathematics and mechanics

Government scholarship is available.

See more information at:

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Research



Doctoral Programs in English



Research supervisor:
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THE FINITE BASIS PROBLEM FOR SEMIGROUPS

Research goal:

The research focuses on one of the major open problems on the edge between the semigroup theory and the universal algebra: Tarski's problem for finite semigroups. This fundamental problem reveals surprising connections to the modern computer science, in particular, to the complexity theory.

Aspects studied:

- Computational complexity of deciding the finite basis property for finite semigroups
- The finite basis problem for "graph-generated" semigroups, like Hecke-Kiselman monoids
- Relatively inherently non-finitely based J-trivial and R-trivial semigroups

Research highlights:

Students willing to enroll in this program will work within a very international network of algebraists and computer scientists.

Career opportunities:

Specialists working on the edge between classical algebra and modern computer science are highly demanded in academia.

Supervisor's specific requirements:

Basic knowledge of semi group theory, universal algebra, and computational complexity.

Main publications:

- Auinger, K., Dolinka, I., and Volkov, M.V. (2012), "Matrix identities involving multiplication and transposition", J. Europ. Math. Soc., vol. 14, no. 3, pp. 937–969. DOI: 10.4171/JEMS/323
- Auinger, K., Dolinka, I., and Volkov, M.V. (2012), "Equational theories of semigroups with involution", J. Algebra, vol. 369, pp. 203–225. DOI: 10.1016/j.jalgebra.2012.06.021
- Auinger, K., Chen, Y., Hu, X., Luo, Y., and Volkov, M.V. (2015), "The finite basis problem for Kauffman monoids", Algebra Universalis, vol. 74, no. 3–4, pp. 333–350. DOI: 10.1007/s00012-015-0356-x



Research supervisor:
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SYNCHRONIZING AUTOMATA AND THE ČERNÝ CONJECTURE

Research goal:

The research is related to a longstanding conjecture in the theory of finite automata: the Černý conjecture. It deals with so-called synchronizing automata that are of both theoretical interest and practical value.

Aspects studied:

- Connections between synchronizing automata and the theory of nonnegative matrices
- New upper and lower bounds for the reset threshold within some important classes of synchronizing automata
- Road coloring games

Research highlights:

The automata research team at Ural Federal University is very active and maintains many international contacts.

Career opportunities:

Specialists in automata theory are in demand in both industry and academia.

Supervisor's specific requirements:

- Knowledge of some basics of automata theory, formal languages, and computational complexity
- Programming skills will be an advantage

Main publications:

- Volkov, M.V. (2008), "Synchronizing Automata and the Černý Conjecture" in Martin-Vide, C., Otto, F., Fernau, H. (eds.), *Language and Automata Theory and Applications*, Springer-Verlag, Berlin-Heidelberg-N.Y., Germany, pp. 11–27.
DOI: 10.1007/978 3540 88282 4_4
- Ananichev, D. S., Gusev, V. V., and Volkov, M. V., (2013), "Primitive digraphs with large exponents and slowly synchronizing automata", *J. Math. Sci.*, vol. 192, no. 3, pp. 263–278.
DOI: 10.1007/s10958013 1392 8
- Fominykh, F.M., Martyugin, P.V., and Volkov, M.V. (2013), "P(1)aying for synchronization", *Int. J. FoundationsComp.Sci.*, vol. 24, no. 6, pp. 765–780.
DOI: 10.1142/S0129054113400170.
- Volkov, M. V. (2009), "Synchronizing automata preserving a chain of partial orders", *Theor. Comput. Sci.*, vol. 410, no. 37, pp. 3513–3519.
DOI: 10.1016/j.tcs.2009.03.021



Research supervisor:
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MATHEMATICAL MODELING IN PHYSIOLOGY AND MEDICINE

Research goal:

The study focuses on mathematical modeling in medical research.

Aspects studied:

- Mathematical modeling in physiology and medicine. Personalized models in cardiology
- Numerical methods for solving ordinary differential equations and partial differential equations in life sciences
- Software developing for complex systems, finite element methods, and parallel computing
- Image analysis in medical researches

Research highlights:

Projects dealing with heart functions (normal and pathological) using mathematical models, including personalized models.

Career opportunities:

- Research activity
- Teaching
- Biomedical technologies
- Biomedical engineering

Supervisor's specific requirements:

Basic knowledge of dynamic systems, basic skills in numerical calculations, and programming (within the scope of the successfully completed undergraduate program).

Main publications:

- Khokhlova, A., Iribe, G., Katsnelson, L., Naruse, K. and Solovyova, O. (2018), "The effects of load on transmural differences in contraction of isolated mouse ventricular cardiomyocytes", *J. Mol Cell Cardiol*, vol. 114, pp. 276–287.
DOI: 10.1016/j.yjmcc.2017.12.001
- Di Achille, P., Harouni, A., Khamzin, S., Solovyova, O., John Rice, J. and Gurev, V. (2018), "Gaussian Process regressions for inverse problems and parameter searches in models of ventricular mechanics", *Frontiers in Physiology*, vol. 9, issue AUG, 1002.
DOI: 10.3389/fphys.2018.01002
- Chumarnaya, T.V., Kraeva, O.A., Tsyvian, P.B. and Solovyova, O.E. (2018), "Functional geometry of the left ventricle in term newborns with different birth weights", *Human Physiology*, vol. 44, no. 5, pp. 565–573.
DOI: 10.1134/S0362119718030040



Research supervisor:
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COMBINATORIAL OPTIMIZATION AND MACHINE LEARNING

Research goal:

The main object of the research is studying the problems being on the border between two closely related fields of modern theoretical computer science: 'Combinatorial Optimization' and 'Machine Learning'. The main topics are computational complexity and polynomial time approximation of combinatorial problems, design and implementation of learning algorithms of high generalization ability.

Aspects studied:

- Combinatorial optimization: complexity, polynomial time approximation algorithms with performance guarantees, approximation schemes, thresholds, etc.
- Machine learning: statistical learning theory, ensembles of classifiers, performance guarantees

Supervisor's specific requirements:

- Master degree in applied mathematics or computer science
- The experience of independent research in the sphere of computational complexity of algorithms and/or theory of algorithmic (machine) learning

Main publications:

- Khachay, M., Neznakhina, K. (2016), "Approximability of the minimum-weight k -size cycle cover problem", *J. of Global Optimization*, vol. 66, issue 1, pp. 65–82. DOI: 10.1007/s10898-015-0391-3
- Khachay, M., Dubinin, R. (2016), "PTAS for the Euclidean Capacitated Vehicle Routing Problem in R^d ", *LNCS9869*, pp. 193–205. DOI: 10.1007/978-3-319-44914-2_16
- Khachay, M., (2015) "Committee polyhedral separability: complexity and polynomial Approximation" *Machine Learning*, vol. 101, issue 1–3, pp. 231–251. DOI: 10.1007/s10994-015-5505-0
- Khachai, M., Neznakhina, K. (2015), "Approximability of the problem about a minimum weight cycle cover of graph", *Doklady Mathematics*, vol. 91, no. 2, pp. 240–245. DOI: 10.1134/S1064562415020313
- Khachai, M., Neznakhina, K. (2015), "A polynomial-time approximation scheme for the Euclidean problem on a cycle cover of a graph", *Proc. of Steklov Inst. of Math*, vol. 289, s. 1, pp. 111–125. DOI: 10.1134/S0081543815050107



Research supervisor:
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STOCHASTIC DYNAMICS

Research goal:

The research focuses on the challenging problem of the analysis of noise-induced phenomena in nonlinear dynamic systems. This problem is connected with the mathematical bifurcation theory, probabilistic analysis, computer simulation, and applications to the various domains of the nonlinear science.

Aspects studied:

- Theoretical study of the scenario of local and global bifurcations in nonlinear systems with regular and chaotic dynamics
- Computer modeling and visualization of stochastic dynamics and probabilistic phenomena
- Asymptotic and approximations of the stochastic attractors

Research highlights:

The goal is to train specialists able to solve the problems of modern stochastic analysis with applications in neurodynamics, population biology, macroeconomic dynamics, and biochemistry.

Supervisor's specific requirements:

Basic knowledge of differential equations, probability theory, and numerical methods.

Main publications:

- Bashkirtseva, I., Chen, G. and Ryashko, L. (2013), "Stabilizing stochastically-forced oscillation generators with hard excitation: a confidence-domain control approach", *Eur. Phys. J. B*, vol. 86, p. 437. DOI: 10.1140/epjb/e2013-40592-2
- Bashkirtseva, I., Neiman, A.B. and Ryashko, L. (2015), "Stochastic sensitivity analysis of noise-induced suppression of firing and giant variability of spiking in a Hodgkin-Huxley neuron model", *Phys. Rev. E*, vol. 91, p. 052920. DOI: 10.1103/PhysRevE.91.052920
- Bashkirtseva, I. and Ryashko, L. (2017), "Stochastic sensitivity analysis of noise-induced order-chaos transitions in discrete-time systems with tangent and crisis bifurcations", *Physica A*, vol. 467, pp. 573. DOI: 10.1016/j.physa.2016.09.048

**Research supervisor:**

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COMBINATORICS AND ALGORITHMIC PROPERTIES OF WORDS AND RELATED OBJECTS

Research goal:

The study focuses on the structural, numerical and algorithmic properties of sequences of symbols, together with the related properties of trees and graphs.

Aspects studied:

- Combinatorics of words
- Automata and formal languages
- Stringology
- Graph theory

Research highlights:

The research team you will join is young, very active, and highly involved in international collaboration.

Career opportunities:

Getting PhD degree from the Ural Federal University opens the way to postdoc positions in many universities.

Supervisor's specific requirements:

- A sufficient background in discrete mathematics and theoretical computer science: algorithms and complexity, automata and formal languages, graphs, combinatorics and discrete probability
- Programming skills are highly desirable

Main publications:

- Shur, A.M. (2012), "Growth properties of power-free languages", *Computer Science Review*, vol. 6, no. 5, pp. 187–208. DOI: 10.1016/j.cosrev.2012.09.001
- Rubinchik, M. and Shur, A.M. (2018), "EERTREE: An efficient data structure for processing palindromes in strings", *European Journal of Combinatorics*, vol. 68, pp. 249–265. DOI: 10.1016/j.ejc.2017.07.021
- Borozdin, K., Kosolobov, D., Rubinchik, M. and Shur, A.M. (2017), "Palindromic Length in Linear Time", 28th Annual Symposium on Combinatorial Pattern Matching (CPM 2017), Warsaw, Poland, July 4–6, vol. 78, pp. 23:1–23:12. DOI: 10.4230/LIPIcs.CPM.2017.23
- Kärkkäinen, J., Kempa, D., Nakashima, Y., Puglisi, S.J. and Shur, A.M. (2017), "On the Size of Lempel-Ziv and Lyndon Factorizations", 34th Symposium on Theoretical Aspects of Computer Science (STACS2017), Hannover, Germany, March 8–11, pp. 45:1–45:13. DOI: 10.4230/LIPIcs.STACS.2017.45
- Gourdel, G., Kociumaka, T., Radoszewski, J., Rytter, W., Shur, A. and Walen, T. (2018), "String Periods in the Order-Preserving Model", 35th Symposium on Theoretical Aspects of Computer Science (STACS2018), Caen, France, February 28 – March 3, vol. 96, pp. 38:1–38:16. DOI: 10.1016/j.ic.2019.104463

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MATHEMATICAL MODELING OF THE PROPERTIES OF FERROFLUIDS

Research goal:

The research is focused on the theoretical description of the static and dynamic properties of ferrofluids with the help of the mathematical methods of statistical mechanics, the computer simulations and the methods of the numerical solutions of the differential equations.

Aspects studied:

- Statistical mechanics of ferrofluids
- Structural, thermodynamic and magnetic properties of the ferrofluids
- Influence of the inter-particle interactions on the static and dynamic properties of the ferrofluids

Research highlights:

Students from this program will have an opportunity to be involved in international collaborations, present the results of the research work on the scientific conferences.

Career opportunities:

Graduated students will be specialists in the field of the theoretical and numerical methods of the description of the complex fluids. The acquired skills can be used to obtain a post-doctoral position in Universities and Research Centers in Russia and abroad.

Supervisor's specific requirements:

- Basic knowledge of thermodynamics and statistical physics
- Skills in numerical methods of computer simulations
- Skills in numerical methods of solutions of differential and non-linear equations

Main publications:

- Batrudinov, T.M., Nekhoroshkova, Yu.E., Paramonov, E.I., Zverev, V.S., Elfimova, E.A., Ivanov, A.O. and Camp, P.J. (2018), "Dynamic magnetic response of a ferrofluid in a static uniform magnetic field", *Physical Review E*, vol. 98, art. 052602. DOI: 10.1103/PhysRevE.98.052602
- Ivanov, A.O., Kantorovich, S.S., Elfimova, E.A., Zverev, V.S., Sindt, J.O. and Camp, P.J. (2017), "The influence of interparticle correlations and self-assembly on the dynamic initial magnetic susceptibility spectra of ferrofluids", *Journal of Magnetism and Magnetic Materials*, vol. 431, pp. 141–144. DOI: 10.1016/j.jmmm.2016.09.119
- Elfimova, E.A., Ivanov, A.O., Lakhtina, E.V., Pshenichnikov, A.F. and Camp, P.J. (2016), "Sedimentation equilibria in polydisperse ferrofluids: critical comparisons between experiment, theory, and computer simulation", *Soft Matter*, vol. 12, pp. 103–112. DOI: 10.1039/C6SM00304D



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NUMERICAL METHODS FOR THE SOLUTION OF THE FUNCTIONAL DIFFERENTIAL EQUATIONS

Research goal:

Many mathematical models in various scientific fields can be described by differential equations (ordinary or partial) and have the effect of heredity. As far as these objects are difficult for analytical research, the relevant problem is the development of effective numerical methods, the verification of their stability and convergence, the development and testing of the corresponding software.

Aspects studied:

- Numerical methods for the solution of the functional differential equations, the partial differential equations with delay and the fractional functional differential equations
- Theory of the positional control of systems with delay
- Theory, ensembles of classifiers, and performance guarantees

Research highlights:

The study is aimed at training specialists to be aware of theoretical and computer methods of a research of dynamic systems with heredity.

Supervisor's specific requirements:

Basic knowledge of numerical methods.

Main publications:

- Pimenov, V. and Lekomtsev, A. (2015), "Convergence of the scheme with weights for the numerical solution of a heat conduction equation with delay for the case of variable coefficient of heat conductivity", Applied Mathematics and Computation, vol. 256, pp. 83–93.
DOI: 10.1016/j.amc.2014.12.149
- Pimenov, V. G. and Hendy, A. S. (2015), "Numerical studies for fractional functional differential equations with delay based on BDF-type shifted Chebyshev approximations", Abstract and Applied Analysis, 510875, pp.1–12.
DOI: 10.1155/2015/510875
- Pimenov, V.G. and Tashirova, E.E. (2013), "Numerical methods for solving a hereditary equation of hyperbolic type", Proceedings of the Steklov Institute of Mathematics, vol. 281, s. 1, pp. 126–136.
DOI: 10.1134/S008154381305012X



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PARALLEL NUMERICAL METHODS FOR DIFFERENTIAL EQUATIONS

Research goal:

The research is related to elaboration of parallel numerical methods for differential equations in partial derivatives, differential equations with time delay, and fractional differential equations.

Aspects studied:

- Parallel numerical methods for differential equations in partial derivatives with time delay
- Parallel in time numerical methods for differential equations fractional differential equations
- Domain decomposition and parallel multigrid methods

Research highlights:

Skills and qualifications in parallel numerical methods are of high demand in industry. Designing aircraft fuselages, aerodynamics, and modeling of the heart muscle. This is far from a complete list of tasks where it is required to use parallel numerical methods.

Career opportunities:

Academic institutes, The Boeing Company, Intel Corporation, NASA, and many others.

Supervisor's specific requirements:

Basic knowledge of numerical methods and parallel programming.

Main publications:

- Solodushkin, S. I., Yumanova, I. F. and De Staelen, R. H. (2015), "First order partial differential equations with time delay and retardation of a state variable", Journal of Computational and Applied Mathematics, vol. 289, pp. 322–330.
DOI: 10.1016/j.cam.2014.12.032
- Solodushkin, S. I., Sagoyan, A. A. and Yumanova, I. F. (2017), "One Parallel Method for Solving the Multidimensional Transfer Equation with Aftereffect", Lecture Notes in Computer Science book series, vol. 10187, pp. 617–624.
DOI: 10.1007/978 3319 57099 0_70
- Solodushkin, S. I., Yumanova, I. F. and De Staelen, R. H. (2017), "A difference scheme for multidimensional transfer equations with time delay", Journal of Computational and Applied Mathematics, vol. 318, pp. 580–590.
DOI: 10.1016/j.cam.2015.12.011



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THEORETICAL STUDIES AND MATHEMATICAL MODELING OF SOFT MAGNETIC MATERIALS

Research goal:

The research is focused on studying the properties and the behavior of the new type of materials for advanced industrial and bio-medical technologies - compositions of nano- and micro-sized magnetic particles in the polymeric environment. The goal of the theoretical studies is the development of theoretical models that allow predicting the properties of these systems basing on the information about the characteristics, the form and the concentration of the particles, as well as the characteristics of the matrix containing them.

Aspects studied:

Theoretical study of phase transitions and non equilibrium phenomena in complex fluids and soft matters – polymers, colloids, magnetic colloids and compositions of these materials.

Research highlights:

The study is aimed at training specialists to be aware of theoretical and computer methods of the description of the complex composite media and materials. The research work is performed in close collaborations with scientific groups of the Dresden Technical University (Germany), Granada University (Spain), and University of Nice-Sophia Antipolice (France).

Career opportunities:

Work in the field of theoretical study and computer modeling of soft and heterogeneous materials, their industrial and biomedical applications.

Supervisor's specific requirements:

- Basic knowledge of thermodynamics and statistical physics
- Skills in numerical methods of solutions of differential and non-linear equations

Main publications:

- Lopez-Lopez, M. T., Rodriguez-Arco, L., Zubarev, A., Kuzhir, P. and Iskakova, L., "Fernando Gonzalez-Caballero, N-like rheograms of concentrated suspensions of magnetic particles", *J. Rheology*, vol. 60, no. 2, pp. 267–274.
DOI: <http://dx.doi.org/10.1122/1.4942232>
- Orlandi, G., Kuzhir, P., Izmaylov, Y., Alves Marins, J., Ezzaier, H., Robert, L., Doutre, F., Noblin, X., Lomenech, C., Bossis, G., Meunier, A., Sandoz, G. and Zubarev, A. (2016), "Microfluidic separation of magnetic nanoparticles on an ordered array of magnetized micropillars", *Physical Review E*, vol. 93, 062604.
DOI: [10.1103/PhysRevE.93.062604](https://doi.org/10.1103/PhysRevE.93.062604)

- Ezzaier, H., Alves Marins, J., Razvin, I., Abbas, M., Ben Haj Amara, A., Zubarev, A. and Kuzhir, P. (2017), "Two-stage kinetics of field-induced aggregation of medium-sized magnetic nanoparticles", *The Journal of Chemical Physics*, vol. 146, 114902.
DOI: <http://dx.doi.org/10.1063/1.4977993>
- Bonhome-Espinosa, B., Campos, F., Rodriguez, I. A., Carriel, V., Marins, J. A., Zubarev, A., Duran, J. D. G. and Lopez-Lopez, M. T. (2017), "Effect of particle concentration on the microstructural and macromechanical properties of biocompatible magnetic hydrogels", *Soft Matter* 13, 2928.
DOI: [10.1039/c7sm00388a](https://doi.org/10.1039/c7sm00388a)



Research supervisor:
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MODELING AND STUDY OF STOCHASTIC PROBLEMS

Research goal:

The research is devoted to study of stochastic problems, that is initial and boundary problems for equations that are modeled with allowance for random perturbations. Such equations are called stochastic. The huge interest to the problems is related to the important role of random factors in the processes surrounding us, especially, in physics, biology, and financial mathematics. Models that give an accurate description of these processes lead to stochastic equations in finite and infinite dimensional spaces.

Aspects studied:

- Modeling and investigations of the Cauchy problem for stochastic equations
- Application of semigroup, regularization, and distribution methods for solving well-posed and ill-posed stochastic problems
- Application of interrelations between stochastic problems and PDEs for probabilistic characteristic of random processes that are described by stochastic equations

Research highlights:

The research is focused on training specialists in mathematical methods for modeling and solving stochastic problems that take in consideration different random perturbations in physics, biology, and financial mathematics.

Supervisor's specific requirements:

Basic knowledge of functional analysis and probability theory (within the scope of the successfully completed undergraduate program).

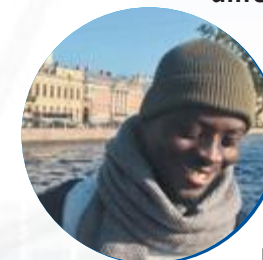
Main publications:

- Melnikova, I.V. and Filinkov, A. I. (2001), The Cauchy problem. Three approaches Monographs and Surveys in Pure and Applied Mathematics, 120, Washington: Chapman & Hall/CRC, London, New York, UK, 260 p. ISBN 9780367397470
- Melnikova, I.V. (2015), "Generalized Solutions to Stochastic problems as Regularized in a Broad Sense", 10th ISAAC Congress, 3–8 August 2015, Macau, China, pp. 51–57. DOI: 10.1007/978-3-319-48812-7_7
- Melnikova, I.V. (2016), Stochastic Cauchy Problems in Infinite Dimensions. Regularized and Generalized Solutions, CRC Press: London–New York, UK. ISBN 9781482210507
- Melnikova, I. V. and Alekseeva, U. A. (2018), "Semigroup Classification and Gelfand–Shilov Classification of Systems of Partial Differential Equation", Mathematical Notes, vol. 104, no. 6, pp. 98–111. DOI: 10.1134/S0001434618110329

James Okrah (Ghana)

It has been a **tremendous experience** for me so far doing my Phd in Ural Federal University. The **Department of Regional and international Economics** with its plans and policies has made research very interesting for me as a phd student and a **Junior research Fellow**.

My **supervisor** has been a **great source of inspiration** and he has exposed me to a greater height of good research. Because of my Supervisor, I have the **opportunity to learn from different professors from different countries** who share my passion for innovation and education. To me it is a **blessing to be working with such a man who has passion and love for research and has a great desire for knowledge**.





*Adven Masih (Pakistan) and
Haula Kitonsa (Uganda)
PhD candidates in Computer Science
and Facilities brainstorming*

Duration of study: 4 years

Language: English or Russian

Entry requirements:

- Master's degree (or equivalent) in the related field
- B2 level of English or Russian
- Interview

Entrance exams:

- Foreign language (English/German/French)
- Computer science and computer facilities

Government scholarship is available.

See more information at:

urfu.ru



Research



Doctoral Programs in English



Research supervisor:

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MACHINE LEARNING AND BIG DATA PROCESSING

Research goal:

The research is related to applications of machine learning and big data analysis algorithms to various field including computer vision, medical imaging, natural language processing, digital humanities and so on.

Aspects studied:

- Social networks data analysis
- Classification and segmentation of medical images
- Machine learning in Finance and FinTech
- Data driven decision making

Research highlights:

- Research in natural language processing is conducted in cooperation with Max Planck Institute for Mathematics, Germany
- The partner for research in FinTech is Sberbank, the biggest Russian bank.

Career opportunities:

- International Internet companies
- Banks and Finance Industry
- Telecom Companies
- Machine Learning and Artificial Intelligence Startups

Supervisor's specific requirements:

Basic knowledge of machine learning and deep learning, experience in computer vision, natural language processing or time series analysis. Fluency in Python (preferred), C++ or Java.

Main publications:

- Sozykin, A. and Epanchintsev, T. (2015), "MIPr – a framework for distributed image processing using Hadoop", 9th IEEE International Conference on Application of Information and Communication Technologies, AICT 2015, 14–16 October, Rostov-on-Don, Russia, pp. 35–39.
- Sozykin, A., Epanchintsev, T., Zverev, V., Khamzin, S. and Bersenev, A. (2016), "Automated Parallel Simulation of Heart Electrical Activity Using Finite Element Method", Lecture Notes in Computer Science, vol. 10049, pp. 365–372.
- Krasnobaev, A. and Sozykin, A. (2016), "An Overview of Techniques for Cardiac Left Ventricle Segmentation on Short-Axis MRI", ITM Web of Conferences, vol. 8.



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MATHEMATICAL MODELING, NUMERICAL METHODS AND PROGRAM COMPLEXES MANAGEMENT IN SOCIAL AND ECONOMIC SYSTEMS

Research goal:

The research focuses on quantitative approach to problems of decision-making and control under uncertainty and risk.

Aspects studied:

The research area covers problems of mathematical modeling in decision making and of cooperative dynamics in organizational systems by means of theory of guaranteed control-estimation under uncertainty.

Research highlights:

- Information structure appropriate for route planning of team (formation) consisting of objects with constrained dynamics. Research is inspired by problems of guidance and navigation for autonomous surface vehicles aimed at development of algorithms and software for navigation in complicated circumstances
- Explicit description of Modernization Management procedures for industrial enterprises in high-tech engineering branch. Chaotic effects of market behaviour determine relevance of research in terms of uncertainty. Long cycles of design and manufacturing as a feature of engineering industry allow to formulate an optimization problem in terms of guaranteed approach

Career opportunities:

- Innovative enterprises in high-tech industry and engineering
- Governmental and financial analysis institutions

Supervisor's specific requirements:

Sufficient level of Math.

Main publications:

- Kruglikov, S. V. (2011), "Structural Properties of Guaranteed Control-Estimation Problems for Hierarchical Systems", The 5th International Conference on Physics and Control (PhysCon 2011), September 5–8, León, Spain.
<http://lib.physcon.ru/doc?id=0838a557d81f>
- Kruglikov, S. V. and Kruglikov, A. S. (2014), "An A Priori Planning of Joint Motions for USV as a Problem of Guaranteed Control/Estimation", Applied Mechanics and Materials, vol. 494–495, pp. 1110–1113.
DOI: 10.4028/www.scientific.net/AMM.494–495.111
- Podluzhnyy, S. and Kruglikov, S. (2015), "Searching for the Credit Portfolio Structure and Building Portrait of Prospective Borrower", 16th IFAC Workshop on Control Applications of Optimization (CAO 2015), 6–9 October, Garmisch-Partenkirchen, Germany, vol. 48, Issue 25, pp. 231–235.
DOI: 10.1016/j.ifacol.2015.11.092



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SYSTEMS ANALYSIS, INFORMATION PROCESSING AND CONTROL IN ECONOMIC, SOCIAL AND ECOLOGICAL SYSTEMS

Research goal:

The research is devoted to the problems of development and use of the methods of systems analysis of complex applied subjects of study, information processing, human influence on the subjects of study including the issues of analysis, modeling, optimization, improving management, and decision-making.

Aspects studied:

- Optimization
- Econophysics
- Ecology
- Agent-based models
- Financial networks
- Local payment systems
- Blockchain technique
- Big Data

Research highlights:

- Practical applications
- Interdisciplinary program

Career opportunities:

- Local cooperative community development
- Improvement of corporate culture
- FinTech and Big Data opportunity

Supervisor's specific requirements:

- Data analysis experience
- Skills in programming
- Blockchain experience
- Scientific publications (any 3 of 4 points)

Main publications:

- Berg, D. B. and Zvereva, O. M. (2015), "Identification of autopoietic communication patterns in social and economic networks", Communications in Computer and Information Science, vol. 542, pp. 286–294.
DOI: 10.1007/978-3-319-26123-2_28
- Berg, D. B., Shelomentsev, A. G., Khatmullina, O. I. and Taubayev, A. (2016) "Negative Interest Rates Policy, Economic Crisis and Environmental Management", 16th International Multidisciplinary Scientific GeoConference SGEM 2016, Albena, Bulgaria, June 28 – July 6, 2016, book 5, vol. 3, pp. 389–396.
DOI: 10.5593/SGEM2016/B53/S21.050. 15.02.17.
- Berg, D. B. and Simos, T. E. (2017), "High order computationally economical sixstep method with vanished phase-lag and its derivatives for the numerical solution of the Schrödinger equation", Journal of Mathematical Chemistry, vol. 55, pp. 987–1013.
DOI: 10.1007/s10910-016-0714-8
- Berg, D. B. and Zvereva, O. M. (2014), The program complex "Agent-based model of communication" (Communication model), Russian Federation, Pat. № 014618909.



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MATHEMATICAL MODELING, NUMERICAL METHODS AND PROGRAM COMPLEXES

Research goal:

The research is devoted to the development of fundamental principles and use of mathematical modeling, numerical methods and program complexes for solving fundamental and applied research problems in economics, technology and other areas. All works prepared within the frames of the research are to contain the original results from three areas: mathematical modeling, numerical methods and program complexes.

Aspects studied:

- Boundary-initial problems
- Nonlinear partial differential equations
- Series, heat transfer
- Permafrost
- Stefan problem

Research highlights:

Research is carried out in close cooperation with oil and gas industry enterprises.

Career opportunities:

The research carried out during the writing of the thesis will allow graduate students to work in scientific subdivisions of enterprises associated with the development of oil and gas fields and construction in the permafrost zone and also work in enterprises that are engaged in the design of geothermal stations.

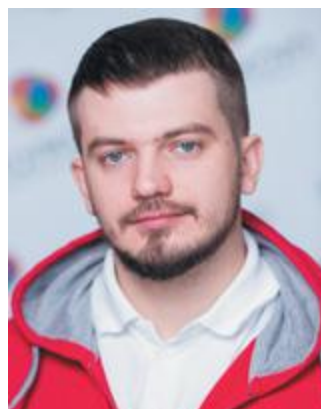
Supervisor's specific requirements:

- Knowledge in computational mathematics and in theory of partial differential equations
- Programming skills in C++

Main publications:

- Filimonov, M. Yu. and Vaganova, N. A. (2019), "Simulation of Influence of Special Regimes of Horizontal Flare Systems on Permafrost", Lecture Notes in Computer Science, vol. 11386, pp. 233–240.
DOI: 10.1007/978-3-030-11539-5_25
- Vaganova, N. A. and Filimonov, M. Yu. (2019), "Simulation of Cooling Devices and Effect for Thermal Stabilization of Soil in a Cryolithozone with Anthropogenic Impact", Lecture Notes in Computer Science, vol. 11386, pp. 580–587.
DOI: 10.1007/978-3-030-11539-5_68

- Filimonov, M. Yu. (2019), "Representation of solutions of boundary value problems for nonlinear evolution equations by special series with recurrently calculated coefficients", Journal of Physics: Conf. Series, vol. 1268, pp. 012071.
DOI: 10.1088/1742-6596/1268/1/012071
- Filimonov, M. Yu. and Vaganova, N. A. "Simulation of Technogenic and Climatic Influences in Permafrost", Lecture Notes in Computer Science, vol. 9045, pp. 178–185.
DOI: 10.1007/978 3319 20239 6_18
- Vaganova, N. A. and Filimonov, M. Yu. (2015), "Computer simulation of nonstationary thermal fields in design and operation of northern oil and gas fields", AIP Conf. Proc., vol. 1690, 020016.
DOI: 10.1063/1.4936694
- Filimonov, M. Yu. and Vaganova, N. A. (2016) "Simulation of permafrost changes due to technogenic influences of different engineering constructions used in northern oil and gas fields", Journal of Physics: Conference Series, vol. 754, 112004.
DOI: 10.1088/1742-6596/754/11/112004
- Vaganova, N. A. and Filimonov, M. Yu. (2017), "A General Model of an Open Geothermal System", IOP Conf. Series: Journal of Physics: Conf. Series, vol. 820, 012010.
DOI: m10.1088/1742-6596/820/1/012010
- Filimonov, M. and Vaganova, N. (2017), "Numerical Simulation of Technogenic and Climatic Influence on Permafrost", Advances in Environmental Research, vol. 54, pp. 117–142.
ISBN: 978-1-53610-667-1



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SIGNAL PROCESSING FOR BIOMEDICAL ENGINEERING

Research goal:

Development of methods and software of different modality signals joint assessment for functional human research.

Aspects studied:

- Biomedical engineering
 - Processing of biomedical signals
 - Intelligent interfaces
- Nonlinear dynamics

Research highlights:

Investigation of the biomedical signals which are formed by functional processes of the human using functional diagnostics devices.

Development of software and algorithmic solutions to ensure the detection and quantitative evaluation of information patterns of biomedical signals.

Career opportunities:

An opportunity to acquire skills suitable for a research career in the exciting and growing field of information technologies for human health and wellness.

Supervisor's specific requirements:

- Basic knowledge of biomedical engineering or medical physics.
- Programming skills.

Main publications:

- Borisov, V., Syskov, A., and Kublanov, V. (2019), "Functional state assessment of an athlete by means of the brain-computer interface multimodal metrics", IFMBE Proceedings, vol. 68, no. 3, pp. 71–75.
DOI: 10.1007/978-981-10-9023-3_13
- Kublanov, V.S., Borisov, V.I., and Dolganov, A.Y. (2016), "Application of Multifractal Formalism in Study of the Role of Autonomic Regulation in Formation of Intrinsic Electromagnetic Radiation of the Brain", Biomedical Engineering, vol. 50, no. 1, pp. 30–34.
DOI: 10.1007/s10527-016-9581-7
- Borisov, V., Minin, A., Syskov, A. and Basko, V. (2018), "FHIR Data Model for Intelligent Multimodal Interface", 26th Telecommunications Forum – TELFOR2018, 20–21 November, Belgrade, Serbia, pp. 699–702.
DOI: 10.1109/TELFOR.2018.8611918



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SYSTEMS ANALYSIS, INFORMATION MANAGEMENT AND PROCESSING

Research goal:

The studies carried out within the frames of this research result in the development of new and improvement of existing methods and means of analysis of information processing and managing complex systems, as well as increasing efficiency of reliability and quality of technical systems.

Aspects studied:

- Fundamental and applied research on the system integration
- Expert systems and knowledge management systems
- Knowledge-based technologies
- Data science, big data, analytics, data acquisition, and management.
- Nanotechnology and neural networks

Research highlights:

- The studies are conducted in cooperation with the leading universities of South Korea and Kazakhstan
- Our research group seeks to conduct multi-disciplinary pre-competitive research in system analysis, information management, and processing

Career opportunities:

- We support your research skills and professional development through a range of training initiatives, resources and courses. For research students, our study offers the necessary skills to further your career, including courses such as scientific writing, presentation skills, project management, entrepreneurship, and communicating science to the public. Professional bodies organize various events and courses, some of which are aimed at postgraduate students. You may also be able to take advantage of opportunities to network with potential future employers, or train to become a graduate teaching assistant
- Rigorous academic standards ensure that your qualifications will be recognized and valued by professional organizations and employers throughout the world

Main publications:

- Kim, A., Kormyshev, V., Kwon, H., Safronov, M., and Tarasyev, A. (2015), "HIVinfection modeling", IFAC-Prociding Volumes, pp. 206–209.
DOI: 10.1016/j.ifacol.2015.11.086
- Kim, A., Kormyshev, V., Kwon, H., Safronov, M., and Tarasyev, A. (2015), "Results of HIV-infection model stabilization", IFAC-Prociding Volumes, pp. 210–213.
DOI: 10.1016/j.ifacol.2015.11.087
- Kim, A., Kormyshev, V., Kwon, H., Safronov, M., and Tarasyev, A. (2015), "HIVinfection model stabilization", IFAC-Prociding Volumes, pp. 214–217.
DOI: 10.1016/j.ifacol.2015.11.088
- Kormyshev, V. M., Medvedeva, M. A., Naboychenko, E. S., Prisyazhnyy, A. V., and Shamanov, A. P. (2016), "Detection of Failures in a Stator of Turbo-Generator on Early Stages of Their Evolution", AIP Conference Proceedings, vol. 1738.
DOI: 10.1063/1.4951877



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MATHEMATICAL MODELING, NUMERICAL METHODS AND PROGRAM COMPLEXES

Research goal:

Development of mathematical probabilistic models of economic and social processes.

Aspects studied:

- Modeling of competitive markets
- Modeling of consumer behavior
- Valuation of intangible capital
- Evaluation of the effectiveness of IT services
- Optimization of HFT trading strategies

Research highlights:

- Extensive use of mathematical methods and computer modeling
- Orientation on the practical use of the results obtained

Career opportunities:

Practical use of the results obtained within the framework of real consulting projects.

Supervisor's specific requirements:

- A good knowledge of higher mathematics (in particular, probability theory, differential equations, and statistics)
- Good computer skills
- Programming skills are welcomed

Main publications:

- Nizovtseva, I. and Sinitsyn, E. (2014), "Automated methodology combining assessments and developing solutions about interaction", Applied Mathematical Sciences, vol. 8, no. 61, pp. 3035–3041.
DOI: 10.12988/ams.2014.44254
- Bostrem, I. G., Ovtchinnikov, A. S., Sinitsyn, E. V. (2004), "Topological stripelike coreless textures with inner incommensurability in two-dimensional Heisenberg antiferromagnet", Phys. Rev. B, vol. 70, issue 18, 184406.
DOI: 10.1103/PhysRevB.70.184406



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MATHEMATICAL MODELING OF STOCHASTIC SYSTEMS

Research goal:

The aim is to train specialists in the field of mathematical modeling and monitoring of complex stochastic systems (including in economics and medicine), in applied statistics and multidimensional statistical analysis.

Aspects studied:

- Entropy modeling and control of multidimensional stochastic systems
- Methods of multivariate statistical analysis and diagnostics of complex system
- Methods of dependencies identification
- Risk-analysis of complex multidimensional systems

Research highlights:

- Entropy modeling for multidimensional stochastic systems
- Recognition of dependencies on the basis of structural differential schemes and inverse mapping.
- Robust method of diagnostic model identification on the basis of the least absolute deviations method.
- Diagnostics of complex systems using multidimensional statistical analysis methods
- Monitoring and risk management models in multidimensional stochastic systems

Supervisor's specific requirements:

- Knowledge of mathematics according to the university course
- Programming skills

Main publications:

- Tyrsin, A. N. (2016), Entropy modeling of multidimensional stochastic systems, Voronezh, Russian Federation, 156 p.
ISBN: 978-5-98222-890-1
- Panyukov, A. V. and Tyrsin, A. N. (2008), "Stable parametric identification of vibratory diagnostics objects", Journal of Vibroengineering, vol. 10, no. 2, pp. 142–146.
<https://www.jvejournal.com/article/10181>
- Tyrsin, A. N. and Serebryanskii, S. M. (2015), "Dependence identification in a time series on the basis of structural difference schemes", Optoelectronics, Instrumentation and Data Processing, vol. 51, no. 2, pp. 149–154.
DOI: 10.3103/S8756699015020077
- Tyrsin, A. N. and Gevorgyan, G. G. (2017), "Entropy management of Gaussian stochastic systems", Journal of Computational and Engineering Mathematics., vol. 4, no. 4, pp. 38–52.
DOI: 10.14529/jcem170404
- Tyrsin, A. N. and Surina, A. A. (2018), "Monitoring of risk of multidimensional stochastic system as tools for a research of sustainable development of regions", IOP Conference Series: Earth and Environmental Science, vol. 177, 012005, pp. 1–8.
DOI: 10.1088/1755-1315/177/1/012005



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RADIO SYSTEMS OF MICROWAVE AND MM-WAVE RANGES

Research goal:

Obtain knowledge and skills for independent research.

Aspects studied:

- Short-range radar, self-oscillating systems and autodynes
- Theory of self-oscillations in radio engineering
- Receiving and transmitting devices in the communication and radar systems

Research highlights:

The results of the research can be prepared in the form of a completed dissertation related to the development of microwave receiving modules and their application for short-range radar tasks, non-contact measurement of process parameters and communications.

Career opportunities:

Future scientific career is connected with the possibility of independently continuing the development of this direction.

Supervisor's specific requirements:

Knowledge of the theory and technology of microwave, as well as possess experience in calculation and design of microwave circuits using modern computer programs.

Main publications:

- Noskov, V. Ya., Ignatkov, K. A. and Chupahin, A. P. (2016), "Application of Two-Diode Autodynes in Devices for Radiowave Control of Product Dimensions", *Measurement Techniques*, vol. 59, no 7, pp. 715–721.
DOI: 10.1007/s11018-016-1035-9.
- Noskov, V. Ya., Vasiliev, A. S., Ermak, G. P., Ignatkov, K. A. and Chupahin, A. P. (2017), "Fluctuation Features of Autodyne Radar with Frequency Modulation", *Radioelectronics and Communications Systems*, vol. 60, no. 3, pp. 123–131.
DOI: 10.20535/S0021347017030049
- Noskov, V. Ya., Ignatkov, K. A., Chupahin, A. P., Vasiliev, A. S., Ermak, G. P. and Smolskiy, S. M. (2017), "Signals of Autodyne Sensors with Sinusoidal Frequency Modulation", *Radioengineering: Proceedings of Czech and Slovak Technical Universities and URSI Committers*, vol. 26, no. 4, pp. 1182–1190.
DOI: 10.13164/re.2017.1182.
- Noskov, V. Ya., Ignatkov, K. A. and Chupahin, A. P. (2018), "Autodyne Effect of the System Involving Two Mutually Synchronized Oscillators under Strong Coupling", *Journal of Communications Technology and Electronics*, vol. 63, no. 2, pp. 180–188.
DOI: 10.1134/S1064226918020080.
- Noskov, V. Ya. and Ignatkov, K. A. (2016), "Noise characteristics of autodynes with frequency stabilization by means of an external high-Q cavity", *Journal of Communications Technology and Electronics*, vol. 61, no. 9, pp. 1052–1063.
DOI: 10.1134/S1064226916090102



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SYSTEM ANALYSIS AND MODELING

Research goal:

The study is aimed at formulating theoretical foundations, models, methods and software packages for decision-making in various areas.

Aspects studied:

- Decision support of business processes
- Logistics and manufacturing based on system analysis
- Simulation and intelligent systems
- Artificial intelligence
- Scheduling and control

Research highlights:

- Applying methods of system analysis and synthesis, decision-making, calculation experiments, and numerical methods
- Research and design of hybrid modeling and decision-making methods
- Big Data processing, knowledge processing

Career opportunities:

Obtaining skills of business analytics, consultants, task-setters, interdisciplinary project researchers

Supervisor's specific requirements:

- Skills for programming and design of databases, experience of working with data analysis systems, imitation modeling and decision-making systems.

Main publications:

- Aksyonov, K. A., Bykov, E. A., Aksyonova, O. P., Nevolina, A. L. and Goncharova, N. V. (2016), "Extension of the multi-agent resource conversion processes model: Implementation of agent coalitions", *International Conference on Advances in Computing, Communications and Informatics*, Jaipur, India, September 21–24, 2016, 7732110, pp. 593–597.
DOI: 10.1109/ICACCI.2016.7732110
- Aksyonov, K. A., Bykov, E. A., Aksyonova, O. P., Goncharova, N. V. and Nevolina, A. L. (2016), "Application of the hybrid agents technology for control of the construction company", *WCECS2016 – World Congress on Engineering and Computer Science 2016*, San Francisco, USA, 19–21 October, 2016, vol. 2225, pp. 159–164.
ISBN: 978-988140471-8



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PARALLEL ALGORITHMS FOR SOLVING THE GEOPHYSICAL PROBLEMS ON MULTIPROCESSOR COMPUTING SYSTEMS

Research goal:

The study is aimed at constructing fast direct and iterative methods and parallel algorithms for solving systems of linear and nonlinear equations applied to inverse geophysical problems and multicomponent diffusion problem with implementation for parallel computing systems and the development of software packages for efficient computing on parallel computing systems.

Aspects studied:

- Parallel direct algorithms for solving linear systems with block matrices on multicore and graphic processors
- Iterative gradient methods and parallel algorithms for solving inverse geophysical problems on parallel computing systems

Research highlights:

- Efficient methods and parallel algorithms for solving the SLAE with special block matrices in the geoelectrics and diffusion problems
- Fast and memory efficient gradient type methods for solving the inverse geophysical problems
- Parallel algorithms and software package for multicore CPUs and graphics GPUs processors incorporated in the Uran supercomputer on the basis of constructed methods

Career opportunities:

Computer science and solving applied problems in various spheres.

Supervisor's specific requirements:

It is necessary to be skilled in programming multicore CPUs and graphics GPUs processors.

Main publications:

- Akimova E. N., Belousov D. V. (2012), "Parallel algorithms for solving linear systems with block-tridiagonal matrices on multicore CPU with GPU", *Journal of Computational Science*, vol. 3, issue 6, pp. 445–449.
DOI: 10.1016/j.jocs.2012.08.004
- Akimova E. N., Belousov D. V., Misilov V. E. (2013), "Algorithms for solving inverse geophysical problems on parallel computing systems", *Numerical Analysis and Applications*, vol. 6, issue 2, pp. 98–110.
DOI: 10.1134/S199542391302002X

- Akimova E. N., Martyshko P. S., Misilov V. E. (2013), "Algorithms for solving the structural gravity problem in a multilayer medium", *Doklady Earth Sciences*, vol. 453, issue 2, pp. 1278–1281.
DOI: 10.1134/S1028334X13120180
- Akimova E. N., Martyshko P. S., Misilov V. E., Kosivets R. A. (2016), "An efficient numerical technique for solving the inverse gravity problem of finding a lateral density", *Applied Mathematics and Information Sciences*, vol. 10, no. 5, pp. 1681–1688.
DOI: 10.18576/amis/100506



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SYSTEM ANALYSIS, INFORMATION PROCESSING, SIMULATIONS, SOFTWARE ENGINEERING

Research goal:

In-depth study and understanding of system analysis, information processing, simulations, software engineering in various spheres

Aspects studied:

- System analysis, information management and processing
- Mathematics and software of computers complexes and computer networks
- Mathematical modeling, numerical methods and software complexes
- Theoretical foundations of informatics

Research highlights:

- focusing on both scientific research works and applications
- scientific cooperation with leading foreign scientists
- training of highly qualified scientific personnel in demand in science, education, industry and finance sphere

Career opportunities:

Employment in scientific, educational, industrial and financial structures of the Russian Federation.

Supervisor's specific requirements:

- Dedication, discipline, hard work
- Knowledge of programming languages and database management
- Experience of working in the field of data analysis
- Knowledge of software tools for modeling complex systems and processes.

Main publications:

- Kleeorin, Y., Safullin, N., Kleeorin, N., Porshnev, S., Rogachevskii, I. and Sokoloff, D. (2016), "The dynamics of Wolf numbers based on nonlinear dynamos with magnetic helicity: Comparisons with observations", Monthly Notices of the Royal Astronomical Society, vol. 460, no. 4, pp. 3960–3967. DOI: 10.1093/mnras/stw1267
- Zyuzin, V. V., Porshnev, S. V., Bobkova, A. O. and Bobkov, V. V (2016), "Studying features characterizing signatures of medical contours of the left ventricle on ultrasound images", Pattern Recognition and Image Analysis, vol. 26, no. 3, pp. 665–672. DOI: 10.1134/S1054661816030251
- Borodin, A., Mirvoda, S., Kulikov, I. and Porshnev, S. (2017), "Optimization of memory operations in generalized search trees of PostgreSQL", Communications in Computer and Information Science, vol. 716, pp. 224–232. DOI: 10.1007/978-3-319-58274-0_19
- Kiselev, Y., Ustalov, D. and Porshnev, S. (2016), "Eliminating fuzzy duplicates in crowdsourced lexical resources", The 8th Global WordNet Conference, Bucharest, Romania, January 27–30, 2016, pp. 161–167. ISBN: 978-973020728-6



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HIGH FREQUENCY DEVICES AND ANTENNAS

Research goal:

The study is aimed at obtaining a broad range of knowledge and skills related to high frequency devices and antennas.

Aspects studied:

- Electromagnetic theory and techniques
- Microstrip antennas and antenna arrays
- Antenna radomes
- Metamaterials utilization in microwave devices
- Electromagnetic scattering

Research highlights:

- Significant decrease of MW devices by means of usage of meta-structures
- Software with significantly higher productivity as compared to traditional software
- Designing effective antennas for various purposes

Career opportunities:

Companies related to designing software, devices, equipment and systems for microwave technology.

Supervisor's specific requirements:

Knowledge of electrodynamics and mathematics at an adequate level.

Main publications:

- Knyazev, S., Korotkov, A., Panchenko, B. and Shabunin, S. (2016), "Investigation of spherical and cylindrical Luneburg lens antennas by the Green's function method", Conference Series: Materials Science and Engineering, vol. 120, no. 1, 012011. DOI: 10.1088/1757-899X/120/1/012011
- Karpov, A., Knyazev, S., Lesnaya, L. and Shabunin, S. (2016), "Sandwich spherical and geodesic antenna radomes analysis", 10th European Conference on Antennas and Propagation, EuCAP 2016, Davos, Switzerland, 10–15 April 2016, 7481389. DOI: 10.1109/EuCAP.2016.7481389
- Abdullin, R., Mitelman, Yu. and Shabunin, S. (2014), "Radiation Pattern of Leaky-Wave Antenna Based on Partially-Filled Rectangular Waveguide", 2014 Loughborough Antennas and Propagation Conference (LAPC), Loughborough, UK, 10–11 November 2014, pp. 516–518. DOI: 10.1109/LAPC.2014.6996438



Natural Sciences

*Aftab Alam Mohammad (India)
a doctoral candidate in Physics
and Astronomy and his supervisor
Professor Vladimir Ya. Shur
working on the research*

Duration of study: 4 years

Language: English or Russian

Entry requirements:

- Master's degree (or equivalent) in the related field
- B2 level of English or Russian
- Interview

Entrance exams:

- Foreign language (English/German/French)
- Physics and astronomy

Government scholarship is available.

See more information at:

urfu.ru

Research

Doctoral Programs in English



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THERMOPHYSICS AND THEORETICAL THERMOTECNICS

Research goal:

Development of physics and mathematical models of transport phenomena in gas mixtures and motion of highly disperse aerosols in inhomogeneous gases.

Aspects studied:

- The kinetic theory of motion of rarefied single-component gases and gas mixtures in capillaries under the influence of pressure, temperature and concentration gradients, as well as resonant optical radiation
- Kinetic theory of motion of fine aerosols in inhomogeneous gases

Research highlights:

Within the research we will be using analytical and numerical methods for solving the Boltzmann equation.

Career opportunities:

Defense of the thesis and further advancement in the field of science and education. The obtained knowledge can be applied in the development of vacuum technology, the design of separation of gas mixtures and monitoring of the state of the atmosphere.

Supervisor's specific requirements:

- Basic knowledge of hydrodynamics and kinetic theory of gases
- Basic knowledge of numerical methods for solving differential equations

Main publications:

- Chernyak, V. G. and Sograbi, T. V. (2019), "The role of molecule-surface interaction in thermophoresis of an aerosol particle", J. Aerosol Sci., vol. 128, pp. 62–71. DOI: 10.1016/j.jaerosci.2018.11.012
- Chernyak, V. G. and Polikarpov, A. P. (2010), "Light induced drift and heat transfer of onecomponent gas in a capillary", Journal of Statistical Physics, vol. 140, pp. 504–517. DOI: 10.1007/s10955-010-0001-1
- Chermyaninov, I.V. and Chernyak, V.G. (2014), "Thermo-optical pressure difference in onecomponent gas", Physics of Fluids, vol. 26, no. 9, pp. 092001. DOI: 10.1063/1.4894200
- Chermyaninov, I.V. and Chernyak, V.G. (2016), "Light-induced phenomena in one-component gas: The transport phenomena", Physics of Fluids, vol. 28, no 9, pp. 092007. DOI: 10.1063/1.4963114

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RADIATION PHYSICS AND SPECTROSCOPY OF ION BEAM SYNTHESIZED MATERIALS AND NANOCOMPOSITES FOR OPTOELECTRONIC APPLICATIONS

Research goal:

The study is aimed at training specialists in the field of condensed matter physics, especially the optical and luminescent properties of insulators containing point defects and nanoclusters.

Aspects studied:

Radiation physics and spectroscopy of ion-beam synthesized materials and nanocomposites for optoelectronic applications.

Research highlights:

A scientific group (Photonics & Optoelectronics) studies radiation physics and spectroscopy of disordered and low-sized systems (glasses, single crystals, thin films, quantum dots). In the framework of an international collaboration project, the team performs world-class research on optical, luminescent and electron emission properties of various host matrices containing nanometer scale particles formed by high-energy pulsed ion-beam irradiation. The host Institute of Physics and Technology offers access to IR-X-Ray range spectrometers, XRD, XPS and UPS characterization instruments, electron microscopy laboratory and ionizing radiation sources.

Career opportunities:

Upon achieving a candidate of science degree, the applicant has wide career opportunities in the institute including participation in many scientific projects and/or giving courses for students. In future, it is possible to occupy associate/full professor position.

Supervisor's specific requirements:

- MSc degree in experimental physics
- Theory/computer modeling background is also appreciated

Main publications:

- Zatsepin, A., Kuznetsova, Y., Zatsepin, D., Boukhvalov, D., Gavrilov, N. and Koubisy, M. (2019), "Electronic Structure and Optical Absorption in Gd-Implanted Silica Glasses", *Physica Status Solidi (a)*, vol. 216, no. 3, pp. 1800522. DOI: 10.1002/pssa.201800522

- Zatsepin, A. F., Zatsepin, D. A., Boukhvalov, D. W., Kuznetsova, Yu. A., Gavrilov, N. V., Shur, V. Ya., and Esin, A. A. (2019), "Local atomic configurations, energy structure, and optical properties of implantation defects in Gd-doped silica glass: An XPS, PL, and DFT study", *Journal of Alloys and Compounds*, vol. 796, pp. 77–85. DOI: 10.1016/j.jallcom.2019.04.303
- Zatsepin, A., and Kuznetsova, Y. (2018), "Down-conversion of UV radiation in erbium-doped gadolinium oxide nanoparticles", *Applied Materials Today*, vol.12, pp. 34–42. DOI: 10.1016/j.apmt.2018.04.001
- Zatsepin, A. F. and Biryukov, D. Yu. (2017), "The temperature behavior and mechanism of exciton luminescence in quantum dots", *Physical Chemistry Chemical Physics*, 19,28, pp. 18721–18730. DOI: 10.1039/C7CP03357E
- Zatsepin, A. F., and Buntov, E. A. (2013), "Synchrotron-Excited Photoluminescence Spectroscopy of Silicon- and Carbon-Containing Quantum Dots in Low Dimensional SiO₂ Matrices", *Silicon-based nanomaterials*, pp. 89–117. DOI: 10.1007/978-1-4614-8169-0_5
- Zatsepin, A. F., Biryukov, D. Y., and Slesarev, A. I. (2016), "Disordering effect on electronic mechanism of thermal destruction of GeE'-centers in glassy GeO₂", *Journal of Non-Crystalline Solids*, vol. 441, pp. 16–21. DOI: 10.1016/j.jnoncrysol.2016.03.008



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PHYSICS OF FERROELECTRICS AND RELATED MATERIALS

Research goal:

This research focuses on the experimental study of the ferroelectric domain structure, kinetics of the phase transformations and domain engineering, among other topics.

Aspects studied:

- Experimental study of the ferroelectric domain structure and its evolution in single crystals and ceramics
- Kinetics of the phase transformations
- Micro- and nanodomain engineering

Research highlights:

- The students will have access to modern analytical and technological equipment
- Wide collaboration with leading international scientific centers
- The research is supported by several grants of national foundations
- The Department staff is very friendly and you will have the opportunity to try over a hundred different types of green tea
- Publications of the obtained results in high-impact scientific journals

Career opportunities:

Postdoc positions at the universities all over the world due to work in world famous scientific group.

Supervisor's specific requirements:

Experience in experimental research in the field of materials science.

Main publications:

- Levlev, A. V., Jesse, S., Morozovska, A. N., Strelcov, E., Eliseev, E. A., Pershin, Y. V., Kumar, A., Shur, V. Ya. and Kalinin, S. V. (2014), "Intermittency, Quaziperiodicity, and Chaos during Scanning Probe Microscopy Tip-induced Ferroelectric Domain Switching", *Nature Physics*, vol. 10, pp. 59–66.
DOI: 10.1038/nphys2796
- Levlev, A. V., Morozovska, A. N., Eliseev, E. A., Shur, V. Ya. and Kalinin, S. V. (2014), "Ionic Field Effect and Memristive Phenomena in Single-point Ferroelectric Domain Switching", *Nature Communications*, vol. 5, 4545.
DOI: 10.1038/ncomms5545

- Levlev, A. V., Alikin, D., Morozovska, A. N., Varenyk, O. V., Eliseev, E. A., Kholkin, A. L., Shur, V. Ya. and Kalinin, S. V., (2015) "Symmetry Breaking and Electrical Frustration during Tip-Induced Polarization Switching in the Non-Polar Cut of Lithium Niobate Single Crystals", *ACS Nano*, vol. 9, no. 1, pp. 769–777.
DOI: 10.1021/nn506268g
- Shur, V. Ya., Akhmatkhanov, A. R. and Baturin, I. S. (2015), "Micro- and Nano-domain Engineering in Lithium Niobate", *Appl. Phys. Rev.*, vol. 2, pp. 040604 1–22.
DOI: 10.1063/1.4928591
- Shur, V. Ya., Esin, A. A., Alam, M. A. and Akhmatkhanov, A. R. (2017), "Superfast domain walls in KTP single crystals", *Appl. Phys. Lett.*, vol. 111, pp. 152907 1–5.
DOI: 10.1063/1.5000582



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WO-DIMENSIONAL SYSTEMS AND SEMI-CONDUCTOR HETERO-STRUCTURES

Research goal:

The research focuses on the experimental study of energy spectrum and electron transport in the quantum wells based on the HgTe/CdTe semi-conductor hetero-structures.

Aspects studied:

- The Shubnikov-de Haas oscillations
- The quantum Hall effect
- Quantum corrections to the conductivity
- Electron energy spectrum

Research highlights:

- Wide collaboration with leading national and international scientific centers
- We use modern cryogenic equipment

Career opportunities:

Researchers have a possibility to take postdoc position in many institutions of Russia and other countries.

Supervisor's specific requirements:

Experience of conducting experimental research in the area of semiconductor physics.

Main publications:

- Minkov, G. M., Aleshkin, V. Ya., Rut, O. E., Sherstobitov, A. A., Germanenko, A. V., Nestoklon, M. O., Dvoretzki, S. A., and Mikhailov, N. N. (2017), "Valence band energy spectrum of HgTe quantum wells with an inverted band structure", Phys. Rev. B., vol. 96, no. 3, 035310-1-8.
DOI: 10.1103/PhysRevB.96.035310
- Minkov, G. M., Germanenko, A. V., Rut, O. E., Sherstobitov, A. A., Nestoklon, M. O., Dvoretzki, S. A., and Mikhailov, N. N. (2016), "Spin-orbit splitting of valence and conduction bands in HgTe quantum wells near the Dirac point", Phys. Rev. B., vol. 93, 155304-1-10.
DOI: 10.1103/PhysRevB.93.155304
- Minkov, G. M., Germanenko, A. V., Rut, O. E., Sherstobitov, A. A., Dvoretzki, S. A., and Mikhailov, N. N. (2015), "Weak antilocalization of holes in HgTe quantum wells with a normal energy spectrum", Phys. Rev. B., vol. 91, 205302-1-8.
DOI: 10.1103/PhysRevB.91.205302



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HIGH PRESSURE RESEARCH ELECTROPHYSICAL PROPERTIES OF MULTICOMPONENT SEMICONDUCTORS AND DIELECTRICS

Research goal:

obtaining in-depth understanding of extreme influence (low temperatures, high-pressures, intense heat fluxes) on physical properties of solids

Aspects studied:

- Solid state physics, extreme influence on physical properties of solids
- Supervisor's specific requirements: fluence in English

Research highlights:

Scientific interests related to experimental solid state physics, the study of the extreme influence (low temperatures, high-pressures, intense heat fluxes) on physical properties of solids.

Career opportunities:

After graduate school, it is possible to work in scientific positions through grants and programs

Supervisor's specific requirements:

Fluence English. Russian language proficiency as part of the requirement for scientific communications. Experimental research. Experience in measuring electrical and magnetic characteristics of materials is desirable.

Main publications:

- Melnikova, N. V., Tebenkov, A. V., Sukhanova, G. V., Babushkin, A. N., Saipulaeva, L. A., Zakhvalinskii, V. S., Gabibov, S. F., Alibekov, A. G., and Mollaev, A. Yu. (2018), "Thermoelectric Properties of a Ferromagnetic Semiconductor Based on a Dirac Semimetal (Cd₃As₂) under High Pressure", Physics of the Solid State, vol. 60, no. 3, pp. 499–503.
DOI: 10.1134/S1063783418030174
- Melnikova, N. V., Kurochka, K. V., Tebenkov, A. V., and Babushkin, A. N. (2018), "Relative magnetoresistance in polycrystalline In-Cu chalcogenides under high pressure up to 50 GPa", Journal of Physics: Conference Series, vol. 946, 012088, pp. 1–7.
DOI: 10.1088/1742-6596/946/1/012088



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THE PHASE AND STRUCTURE TRANSFORMATIONS IN EXTRATERRESTRIAL SUBSTANCES (meteorite, lunar soil and dust).

Research goal:

In-depth study and understanding of phase and structure transformations in extraterrestrial substances

Aspects studied:

- Physical and mechanical properties of the meteoroids
- Protoplanetary matter in primitive meteorites
- Materials science problems in the asteroid and cometary impacts
- The structure and spectroscopy of minerals in meteorites
- Experimental simulation of impact processes

Research highlights:

- The study is conducted in collaboration with an international research group and supported by grants.

Career opportunities:

The job in planetary science laboratories around the world.

Supervisor's specific requirements:

Basic skills in analytic equipment and field experience

Main publications:

- Grokhovsky, V. J. and Bevan, A. W. R. (1983), "Plessite formation by discontinuous precipitation reaction from γ -Fe, Ni in Richardton (H5) ordinary chondrite", *Nature*, vol. 301, no. 5898, pp. 322–324.
DOI: 10.1038/301322a0
- Grokhovsky, V. I., Oshtrakh, M. I., Petrova, E. V. et al. (2009), "Mössbauer Spectroscopy with High Velocity Resolution in the Study of Iron-Bearing Minerals in Meteorites", *Eur. J. Mineral*, vol. 21, pp. 51–63.
DOI: 10.1127/0935-1221/2009/0021-1904
- Grokhovsky, V. I and Gladkovsky, S. V. (2010), "The Impact Mechanical Tests of Meteorites", *Meteorit. & Planet. Sci*, S1, vol. 45, A69.
DOI: 10.1111/j.1945-5100.2010.01051.x
- Popova, O. P., Jenniskens, P., Grokhovsky, V. I. et al. (2013), "Chelyabinsk Airburst, Damage Assessment, Meteorite Recovery, and Characterization" *Science*, vol. 342, no. 6162, pp. 1069–1073.
DOI: 10.1126/science.1242642

- Kohout, T., Gritsevich, M., Grokhovsky, V. et al. (2014), "Mineralogy, Reflectance Spectra, and Physical Properties of the Chelyabinsk LL5 Chondrite – Insight into Shock-Induced Changes in Asteroid Regoliths", *ICARUS*, vol. 228, pp. 78–85.
DOI: 10.1016/j.icarus.2013.09.027
- Kohout, T., Haloda, J., Halodová, P. et al. (2017), "Annama H chondrite – Mineralogy, physical properties, cosmic ray exposure, and parent body history", *Meteorit. & Planet. Sci*, vol. 52, pp. 1525–1541.
DOI: 10.1111/maps.12871

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REMOTE SENSING

Research goal:

Remote sensing of the atmosphere using high resolution infrared Fourier Transform satellite-based and ground-based spectrometers

Aspects studied:

- Radiative transfer
- Forward and inverse problems of atmospheric optics
- Radiation balance of the atmosphere
- Monitoring of GHGs and their isotopologues in the atmosphere

Research highlights:

The study is conducted in frame of collaboration with the international research groups: Atmosphere and Ocean Research Institute of the University of Tokyo (Prof. R. Imasu), Institute of Environmental Physics of the University of Bremen (Prof. J. Notholt) and supported by RFBR and RSF grants.

Career opportunities:

- Employee in the Ural Federal University
- Postdoc positions at overseas research centers in field of remote sensing of the atmosphere

Supervisor's specific requirements:

- Good skills in programming and computations using FORTRAN
- Good English

Main publications:

- Zakharov, V. I., Imasu, R., Griбанov, K. G., Hoffmann, G. and Jouzel, J. (2004), "Latitudinal distribution of deuterium to hydrogen ratio in the atmospheric water vapor retrieved from IMG/ADEOS data", *Geophysical research letters*, vol. 31, no. 12, L12104.

DOI: 10.1029/2004GL019433.

- Zakharov, V. I. (2009), "Regarding Greenhouse Explosion", in Cracknell, A., Krapivin, V. and Varotsos, C. (eds.), *Global climatology and ecodynamics – Anthropogenic changes to Planet Earth*, Springer/PRAXIS, Chichester, UK, pp. 107–132.

DOI: 10.1007/978-3-540-78209-4_6

- Rokotyan, N. V., Zakharov, V. I., Griбанov, K. G., Schneider, M., Bréon, F.-M., Jouzel, J., Imasu, R., Werner, M., Butzin, M., Petri, C., Warneke, T. and Notholt, J. (2014), "A posteriori calculation of $\delta^{18}\text{O}$ and δD in atmospheric water vapour from ground-based near-infrared FTIR retrievals of H_2^{16}O , H_2^{18}O , and HD^{16}O ", *Atmospheric Measurement Techniques*, vol. 7, pp. 2567–2580.

DOI: 10.5194/amt-7-2567-2014.

- Chesnokova, T. Yu., Chentsov, A. V., Rokotyan, N. V. and Zakharov, V. I. (2016), "Impact of difference in absorption line parameters in spectroscopic databases on CO_2 and CH_4 atmospheric content retrievals", *Journal of Molecular Spectroscopy*, vol. 327, pp. 171–179.

DOI: 10.1016/j.jms.2016.07.001

- Dantec-Nedelec, S., Oettle, C., Wang, T., Guglielmo, F., Maignan, F., Delbart, N., Valdayskikh, V., Radchenko, T., Nekrasova, O., Zakharov, V., and Jouzel, J. (2017), "Testing the capability of ORCHIDEE land surface model to simulate Arctic ecosystems: Sensitivity analysis and site-level model calibration", *Journal of Advances in Modeling Earth Systems*, vol. 9, pp. 1212–1230.

DOI: 10.1002/2016MS000860.



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MODELING STRONGLY CORRELATED ELECTRON SYSTEMS

Research goal:

Elucidation of the mechanisms of formation of unusual physical properties of strongly correlated systems based on d- and f-elements

Aspects studied:

- Theory of high-temperature superconductivity
- Microscopic theory of exchange and exchange-relativistic interactions.
- Origin of optical and magnetic properties of strongly correlated compounds based on d- and f- elements.
- Modeling the phase transitions and topological structures

Research highlights:

- Elaboration of novel theoretical methods, mechanisms and nontrivial scenarios for unconventional physical properties of strongly correlated systems.
- The studies are conducted in collaboration with international research groups.

Career opportunities:

Successful graduates may proceed in their career in research labs of institutes of RAS, academic institutions and universities. They can apply for post-doc positions both in Russia and abroad.

Supervisor's specific requirements:

Computer skills and experience, knowledge of English, creativity and hard work.

Main publications:

- Moskvin, A. S. (2011), "True charge transfer gap in parent insulating cuprates", *Phys. Rev. B*, vol. 84, 075116. DOI: 10.1103/PhysRevB.84.075116
- Moskvin, A. S. et al. (2012), "Direct evidence of the non-Zhang-Rice Cu^{3+} centers in $\text{La}_2\text{Li}_{0.5}\text{Cu}_{0.5}\text{O}_4$ ", *Phys. Rev. B*, vol. 86, 241107(R). DOI: 10.1103/PhysRevB.86.241107
- Moskvin, A. S. (2013), "Perspectives of disproportionation driven superconductivity in strongly correlated 3d compounds", *J. Phys.: Condens. Matter*, vol. 25, 085601, pp. 1–16. DOI: 10.1088/0953-8984/25/8/085601
- Moskvin, A. S. (2016), "Microscopic theory of Dzyaloshinskii-Moriya coupling and related exchange-relativistic effects", *JMMM*, vol. 400, pp. 117–120. DOI: 10.1016/j.jmmm.2015.07.054
- Moskvin, A. S. and Panov, Yu. D. (2018), "Topological structures in a model cuprate", *J Supercond Nov Magn*, vol. 31, pp. 677–682. DOI: 10.1007/s10948-017-4352-6



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ELECTRONIC EXCITATIONS AND RADIATION PHYSICS OF LUMINESCENT MATERIALS

Research goal:

Characterization of luminescent and optical materials (BeO , Y_2O_3 , LiB_3O_5 , $\text{Li}_2\text{B}_4\text{O}_7$, $\beta\text{-BaB}_2\text{O}_4$, $\text{CsLiB}_6\text{O}_{10}$, $\text{Li}_6\text{Re}(\text{BO}_3)_3$ (Re=Gd, Y, Eu), KB_5 , KABO, KBBF, APb_2X_5 (A=K, Rb; X=Cl, Br), SrAlF_5 , SrI_2 , LiF, NaF, ADP, KDP, DKDP and so on) undoped and doped with rare-earth ions

Research highlights:

Optical and luminescence spectroscopy with nanosecond time-resolution under excitation with photons (visible-UV-VUV-XUV), electron and ion beams, x-rays; thermo luminescence; ESR, EPR; computer simulations of actual processes; nuclear physics methods of analysis, see in detail at: <https://publons.com/researcher/2810362/igor-n-ogorodnikov/>

Career opportunities:

Work in Russian and foreign universities, scientific institutes of the Russian Academy of Sciences, post-doc abroad.

Supervisor's specific requirements:

Fluency in both English and Russian language, culture, knowledge of computer software.

Main publications:

- Pustovarov, V. A., Ogorodnikov, I. N., Isaenko, L. I., Lobanov, S. I., Goloshumova, A. A. and Naumov, D. Yu. (2018), "A luminescence spectroscopy study of new $\text{Li}_2\text{BaAl}_2\text{F}_{10}$ single crystal", *Optical Materials*, vol. 76, pp. 1–10. DOI: 10.1016/j.optmat.2017.12.017
- Ogorodnikov, I. N., Petrenko, M. D. and Ivanov, V. Yu. (2018), "Low-Temperature Luminescence and Thermally Stimulated Luminescence of BeO : Mg Single Crystals", *Phys. Solid State*, vol. 60, no. 1, pp. 134–146. DOI: 10.1134/S106378341801016X
- Ogorodnikov, I. N., Kiseleva, M. S., Vostrov, D. O. and Yakovlev, V. Yu. (2015), "Cathodoluminescence kinetics of $\text{Li}_6\text{GdB}_3\text{O}_9$ crystals", *J. Lumin*, vol. 158, pp. 252–259. DOI: 10.1016/j.jlumin.2014.10.011
- Yavetskiy, R. P., Baumer, V. N., Danylenko, M. I., Doroshenko, A. G., Ogorodnikov, I. N., Petrusha, I. A., Tolmachev, A. V. and Turkevich, V. Z. (2014), "Transformation-assisted consolidation of Y_2O_3 : Eu^{3+} nanospheres as a concept to optical nanograin ceramics", *Ceram. Int.*, vol. 40, pp. 3561–3569. DOI: 10.1016/j.ceramint.2013.09.072



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ELECTRONIC EXCITATIONS, LUMINESCENCE AND DEFECTS IN NEW FUNCTIONAL MATERIALS

Research goal:

Experimental study of electronic excitations (electrons, holes and excitons) in wide-gap inorganic functional materials using the methods of optical and time-resolved luminescence spectroscopy, synchrotron radiation

Aspects studied:

- Luminescent spectroscopy of rare-earth ions
- Energy conversion in scintillation detectors, materials of non-linear optics
- Fast radiation processes

Research highlights:

Collaboration with foreign colleagues, the use of advance equipment of Russian and foreign synchrotron radiation centers

Career opportunities:

Work in Russian and foreign universities, scientific institutes of the Russian Academy of Sciences and post-doc abroad

Supervisor's specific requirements:

Fluency in both English and Russian language, culture and knowledge of PC software

Main publications:

- Pustovarov, V. A., Ogorodnikov, I. N. and Omel'kov, S. I. (2018), "Luminescence of Impurity Ce^{3+} Centers in KH_2PO_4 : Ce Crystals", *Physics of the Solid State*, vol. 60, no. 1, pp. 147–152.
DOI: 10.1134/S1063783418010201
- Pustovarov, V. A., Trofimova, E. S., Kuznetsova, Yu. A. and Zatsepin, A. F. (2018), "Up-conversion Luminescence of Gd_2O_3 Nanocrystals Doped with Er^{3+} and Yb^{3+} Ions", *Technical Phys. Letters*, vol. 44, no. 7, pp. 622–625.
DOI: 10.1134/S106378501807026X
- Pustovarov, V. A., Ivanovskikh, K. V., Shi, Q., Huang, Y. and Bettinelli, M. (2018), "Impurity and Defect-related Luminescence of Ce^{3+} Doped $LiLa_3(SiO_4)_6O_2$ Crystals upon UV–VUV, X-ray and Cathode Ray Excitation", *Optical materials*, vol. 84, pp. 66–72.
DOI: 10.1016/j.optmat.2018.06.051
- Pustovarov, V. A., Smirnova, T. P., Lebedev, M. S., Gritsenko, V. A. and Kirm, M. (2016), "Intrinsic and defect related luminescence in double oxide films of Al–Hf–O system under soft X-ray and VUV excitation", *Journal of Luminescence*, vol. 170, part 1, pp. 161–167.
DOI: 10.1016/j.jlumin.2015.10.053



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ASTROCHEMISTRY

Research goal:

We study chemical evolution of star and planet forming regions of our Galaxy as well as in other stellar systems. Our goal is to understand the key mechanisms that drive the build-up of chemical complexity in the Universe and ultimately lead to the formation of complex organic and prebiotic matter.

Aspects studied:

Numerical simulations of chemistry in star and planet forming regions. Studies of molecular content of the interstellar medium via radio and infrared observations. Simulations of laboratory experiments of chemical processes carried out under physical conditions similar to that in the interstellar medium.

Research highlights:

We use state of the art theoretical approaches as well as world class observational facilities (IRAM 30m, NOEMA, ALMA, IRTF etc.) to conduct world class research. As of 2019, our lab is the only Max Planck Partner Group in Russia. Our academic partner is Center for Astrochemical Studies at the Max-Planck-Institute for Extraterrestrial Physics (CAS@MPE) in Munich, Germany.

Career opportunities:

Scientific career in world leading research institutions all over the World

Supervisor's specific requirements:

Fluent English is a must. Background in chemistry or astrophysics is highly desirable.

Main publications:

- Shingledecker, Ch. N., Vasyunin, A. I., Herbst, E., Caselli, P. (2019), "On Simulating the Proton-irradiation of O_2 and H_2O Ices Using Astrochemical-type Models, with Implications for Bulk Reactivity", *The Astrophysical Journal*, vol. 876, issue 2, article id., pp. 140, 10.
DOI: 10.3847/1538-4357/ab16d5
- Vasyunin, A. I., Caselli, P., Dulieu, F., Jiménez-Serra, I. (2017), "Formation of Complex Molecules in Prestellar Cores: A Multilayer Approach", *The Astrophysical Journal*, vol. 842, issue 1, article id., pp. 33, 18.
DOI: 10.3847/1538-4357/aa72ec
- Rivilla, V. M., Fontani, F., Beltrán, M. T., Vasyunin, A. I., Caselli, P., Martín-Pintado, J., Cesaroni, R. (2016), "The First Detections of the Key Prebiotic Molecule PO in Starforming Regions", *The Astrophysical Journal*, vol. 826, issue 2, article id., pp. 161, 8.
DOI: 10.3847/0004-637X/826/2/161

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- Vasyunin, A. I., Herbst, E. (2013), "Reactive Desorption and Radiative Association as Possible Drivers of Complex Molecule Formation in the Cold Interstellar Medium", *The Astrophysical Journal*, vol. 769, issue 1, article id., pp. 34, 9.
DOI: 10.1088/0004-637X/769/1/34
- Vasyunin, A. I., Herbst, E. (2013), "A Unified Monte Carlo Treatment of Gas-Grain Chemistry for Large Reaction Networks. II. A Multiphase Gas-surface-layered Bulk Model", *The Astrophysical Journal*, vol. 762, issue 2, article id., pp. 86, 21.
DOI: 10.1088/0004-637X/762/2/86



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MAGNETISM OF CHIRAL HELIMAGNETS

Research goal:

This research focuses on studying magnetic and optical properties of monoaxial chiral helimagnets and carry out theoretical analysis of their functionality in spintronics applications.

Aspects studied:

- Magnetism of low-dimensional magnetic systems
- Chiral helimagnets
- Renormalization group
- Electrodynamics

Research highlights:

- The study is carried out in close collaboration with the Center of Chiral Science (Hiroshima, Japan) and the University of Glasgow (UK)
- The study is supported by the Russian Fund of Basic Research

Career opportunities:

A possibility to proceed a career in Europe, United Kingdom, Canada and Japan.

Supervisor's specific requirements:

- Sufficient knowledge in mathematical analysis, mathematical physics and linear algebra
- Knowledge of computer is also crucial

Main publications:

- Tereshchenko, A. A., Ovchinnikov, A. S., Proskurin, I., Sinitsyn, E. V. and Kishine, J. (2018), "Theory of magnetoelastic resonance in a monoaxial chiral helimagnet", *Physical Review B*, vol. 97, Id. 184303.
DOI: 10.1103/PhysRevB.97.184303
- Goncalves, F. J. T., Sogo, T., Shimamoto, Y., Proskurin, I., Sinitsyn, V. E., Kousaka, Y., Bostrem, I. G., Kishine, J., Ovchinnikov, A. S. and Togawa, Y. (2018), "Tailored resonance in micrometer-sized monoaxial chiral helimagnets", *Physical Review B*, vol. 98, Id. 144407.
DOI: 10.1103/PhysRevB.98.144407
- Proskurin, I., Ovchinnikov, A. S., Kishine, J. and Stamps, R. L. (2018), "Excitation of magnon spin photocurrents in antiferromagnetic insulators", *Physical Review B*, vol. 98, Id. 134422.
DOI: 10.1103/PhysRevB.98.134422
- Proskurin, I., Ovchinnikov, A. S., Kishine, J. and Stamps, R. L. (2018), "Cavity optomechanics of topological spin textures in magnetic insulators", *Physical Review B*, vol. 98, Id. 220411.
DOI: 10.1103/PhysRevB.98.220411
- Togawa, Y., Kishine, J., Nosov, P. A., Koyama, T., Paterson, G. W., McVitie, S., Kousaka, Y., Akimitsu, J., Ogata, M. and Ovchinnikov, A. S. (2019), "Anomalous Temperature Behavior of the Chiral Spin Helix in CrNb₃S₆ Thin Lamellae", *Physical Review Letters*, vol. 122, Id. 017204.
DOI: 10.1103/PhysRevLett.122.017204



Research supervisor:
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RELATIONSHIP BETWEEN STRUCTURE AND DEFORMATION BEHAVIOR OF NATURAL MATERIALS (ROCKS, HARD TISSUES)

Research goal:

The research focuses on the study of the relationship between hierarchical structure and deformation behaviour of natural materials (REFRACTORY METALS, rocks and hard tissues).

Aspects studied:

- Mechanisms of stress accommodation in natural materials
- Evolution of hierarchical structure of rocks and hard tissues

Research highlights:

- Mechanical testing (compression, tension, bending, shearing, and indentation)
- Structure characterization (metallography, SEM, TEM, XRD)
- Crack growth and fracture surfaces

Career opportunities:

Research laboratories, universities, and commercial companies.

Supervisor's specific requirements:

Recommendation letter from MS supervisor and interview with expert or recommendation letter from community.

Main publications:

- Zaytsev, D. and Panfilov, P. E. (2014), "Deformation behavior of human enamel and dentin-enamel junction under compression", *Materials Science & Engineering*, vol. 34, pp. 15–21.
DOI: 10.1016/j.msec.2013.10.009
- Zaytsev, D. and Panfilov, P. E. (2014), "Deformation behavior of human dentin in liquid nitrogen: A diametral compression test", *Materials Science & Engineering C*, vol. 42, pp. 48–51.
DOI: 10.1016/j.msec.2014.05.011
- Zaytsev, D. and Panfilov, P. E. (2015), "Anisotropy of the mechanical properties of human enamel", *Materials Letters*, vol. 159, pp. 428–431.
DOI: 10.1016/j.matlet.2015.07.057
- Zaytsev, D. and Panfilov, P. E. (2016), "The strength properties of human dentinoenamel junction", *Materials Letters*, vol. 178, pp. 107–110.
DOI: 10.1016/j.matlet.2016.04.211

- Panfilov, P. E., Kabanova, A. A., Guo, J. and Zhang, Z. (2017), "Transmission electron microscopical study of teenage crown dentin on the nanometer scale", *Materials Science & Engineering C*, vol. 71, pp. 994–998.
DOI: 10.1016/j.msec.2016.11.016
- Zaytsev, D. V., Kochanov, A. N., Panteleev, I. A. and Panfilov, P. E. (2017), "Influence of the Scale Effect in Testing the Strength of Rock Samples", *Bulletin of the Russian Academy of Sciences: Physics*, vol. 81, no. 3, pp. 337–340.
DOI: 10.3103/S1062873817030406
- Borodin, E. N., Gutkin, M. Yu, Mikaelyan, K. N. and Panfilov, P. E. (2017), "Theoretical model of the plastic zone at the I-mode crack tip in dentin", *Scripta Materialia*, vol. 133, pp. 45–48.
DOI: 10.1016/j.scriptamat.2017.02.007



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DYNAMICAL EVOLUTION OF PLANETARY SYSTEMS

Research goal:

Research of orbital evolution of planetary systems, small bodies of the Solar System and artificial satellites of the Earth.

Aspects studied:

- Construction of semi-analytical theories of motion
- Research of long-time evolution and stability of planetary systems
- Research of dynamical evolution of small bodies of the Solar System
- Determination of stochastic properties of motion
- Application of the obtained results to real extrasolar systems

Research highlights:

- Research of dynamical evolution of planetary systems is made in collaboration with the Saint-Petersburg University
- Research of dynamical evolution of small bodies of the Solar System is made in collaboration with Adam Mickiewicz University in Poznan

Career opportunities:

Observational projects, numerical simulations as well as theoretical investigations can be carried out. Experimental in the fields of astrometric and photometric observations of small bodies of the Solar System, are also available.

Supervisor's specific requirements:

- Knowledge in Celestial Mechanics
- Programming skills in Fortran or C++

Main publications:

- Kuznetsov, E. D. and Avvakumova, E. A. (2019), "Dynamical evolution of space debris in the vicinity of GNSS regions", *Acta Astronautica*, vol. 158, pp. 140–147. DOI: 10.1016/j.actaastro.2018.02.001
- Kuznetsov, E. and Safronova, V. (2018), "Application of metrics in the space of orbits to search for asteroids on close orbits", *Planetary and Space Science*, vol. 157, pp. 22–27. DOI: 10.1016/j.pss.2018.04.011
- Perminov, A. S. and Kuznetsov, E. D. (2018), "Orbital Evolution of the Sun–Jupiter–Saturn–Uranus–Neptune Four-Planet System on Long-Time Scales", *Solar System Research*, vol. 52, no. 3, pp. 241–259. DOI: 10.1134/S0038094618010070



Research supervisor:
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EARLY STAGES OF STELLAR EVOLUTION AND MASERS

Research goal:

The research is focused on the theoretical modelling and analysis of observational data obtained with state of art instruments on the early stages of star formation.

Aspects studied:

- Masers, molecular lines, and radiative transfer
- Star formation and early stages of stellar evolution
- Stellar spectroscopy
- Astrophysical space projects

Research highlights:

The group has high experience in the data interpretation and theoretical modelling of star forming regions and young stars. We use cutting-edge instruments of the modern astronomy including Russian ones, take part in scientific programs of astrophysical space projects like flying RadioAstron, planned Millimetron, WSO-UV, and of course, use the instruments based in Kourvka astronomical observatory.

Career opportunities:

After PhD courses at UrFU, a successful researcher can stay here or take postdoc position in many astronomical institutions of Russia and other countries.

Supervisor's specific requirements:

Experience of conducting scientific research and writing scientific papers.

Main publications:

- Sobolev, A. M., Shakhvorostova, N. N., Alakoz, A. V., and Baan, W. A. (2017), "RadioAstron Maser Observations: a Record in Angular Resolution", *Astronomical Society of the Pacific Conference Series*, 510, pp. 20–31. ISBN: 978-1-58381-904-3
- Parfenov, S. Yu., Semenov, D. A., Henning, Th., Shapovalova, A. S., Sobolev, A. M., and Teague, R. (2017), "On the methanol emission detection in the TW Hya disc: the role of grain surface chemistry and non-LTE excitation", *Monthly Notices of the Royal Astronomical Society*, vol. 468, issue 2, pp. 20124–2031. DOI: 10.1093/mnras/stx624
- Ladeyschikov, D. A., Kirsanova, M. S., Tsivilev, A. P. and Sobolev, A. M. (2016), "Molecular emission in dense massive clumps from the star-forming regions S231-S235", *Astrophysical Bulletin*, vol. 71, Issue 2, pp. 208–224. DOI: 10.1134/S1990341316020085
- Gray, M. D., Baudry, A., Richards, A. M. S., Humphreys, E. M. L., Sobolev, A. M., and Yates, J. A. (2016), "The physics of water masers observable with ALMA and SOFIA: model predictions for evolved stars", *Monthly Notices of the Royal Astronomical Society*, vol. 456, Issue 1, pp. 374–404. DOI: 10.1093/mnras/stv2437

**Research supervisor:**

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MAGNETIC STRUCTURES AND MAGNETIC PHASE TRANSITIONS

Research goal:

The objective of the researches is focused on the study of magnetic structures and phase transitions in magnetoelectric, multiferroics and rare earth-3d-transition metal compounds using neutron diffraction and reflectometry.

Aspects studied:

- The TbNi_3 intermetallic compound undergoes two magnetic phase transitions. One is the second order transition from a paramagnetic state to an incommensurate phase. The other is the “commensurate – incommensurate first order transition.
- In the LiNiP_4 magnetoelectric the transitions from a commensurate phase to an incommensurate structure and further to a paramagnetic state, are accompanied by two peaks on the temperature dependence of the heat capacity.

Research highlights:

Students will carry out neutron experiments with devices installed on Joint Institute Nuclear Researches (Dubna, Russia), National Center “Kurchatovski Institute (Moscow, Russia), Korea Atomic Energy Research Institute (Daejeon, Korea Republic) and Paul Scherer Institute (Willigen, Switzerland).

Career opportunities:

The high flux reactor “Pik” will be operated in 2–3 years. This reactor is located in Gatchina (about 40 km from Saint-Petersburg). The high neutron flux is allowed to perform wide class of neutron experiments. PhD graduate students have a chance to work with horizontal neutron beams of the reactor “Pik”.

Supervisor’s specific requirements:

Knowledge of background of solid state physic, magnetism, X-ray, nuclear, and magnetic neutron scattering.

Main publications:

- Lee, S., Pirogov, A., Kang, M., Jang, K.-H., Yonemura, M., Kamiyama, T., Cheong, S.W., Gozzo, F., Shin, N., Kimura, H., Noda, Y. and Park, J.-G. (2008), “Giant magneto-elastic coupling in multiferroic hexagonal manganites”, *Nature*, 451, pp. 805–809.
DOI: 10.1038/nature06507
- Lee, H.-J., Choi, Y.-N., Lukoyanov, A. V., Gerasimov, E. G. and Pirogov, A. N. (2019), “Spontaneous and induced magnetic phase transitions in $\text{Tb}_{0.9}\text{Er}_{0.1}\text{Ni}_5$ ”, *J. Magn. Magn. Mat.*, 475, pp. 593–601.
DOI: 10.1016/j.jmmm.2018.12.004

**Research supervisor:**

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EXCHANGE COUPLED COMPOSITE HARD MAGNETIC MATERIALS

Research goal:

The research is focused on fundamental and hysteresis magnetic properties of modern hard magnetic materials and new methods of production of permanent magnets of arbitrary shapes.

Aspects studied:

- Synthesis of hard magnetic materials, including the use of additive technologies.
- Development of experimental methods of estimation and estimation of the intergranular exchange interaction constant in nanostructured hard magnetic materials.
- Development of models of magnetization reversal of modern hard magnetic materials.

Research highlights:

The research is carried out jointly with employees of the University of Bremen (UNI Bremen, Bremen, Germany), the Institute of Material Science and Condensed State Physics (IFW Dresden, Dresden, Germany), POZ-Progress LLC (Verkhnyaya Pyshma, Russia).

Career opportunities:

Specialists in the field of hard magnetic materials are in high demand in universities and research institutes, as well as in production.

Supervisor’s specific requirements:

Knowledge of the basics of magnetism, magnetism of solids, experience in measuring the magnetic properties of materials in a closed and open magnetic circuit.

Main publications:

- Bolyachkin, A. S., Ruta, S., Chantrell, R. W., Woodcock, T. G., Andreev, S. V., Selezneva, N. V. & Volegov, A. S. 2019, “Characterisation of high-anisotropy nanocrystalline alloys based on magnetic susceptibilities in the remanent state”, *Journal of Magnetism and Magnetic Materials*, vol. 486. 165270
DOI: 10.1016/j.jmmm.2019.165270
- Neznakhin, D. S., Andreev, S. V., Semkin, M. A., Selezneva, N. V., Volochaev, M. N., Bolyachkin, A. S., Kudrevatykh, N. V. & Volegov, A. S. 2019, “Structure and magnetic properties of $(\text{Sm}_{0.9}\text{Zr}_{0.1})\text{Fe}_{11}\text{Ti}$ alloys with ThMn_{12} -type structure”, *Journal of Magnetism and Magnetic Materials*, vol. 484, pp. 212–217.
DOI: 10.1016/j.jmmm.2019.04.030
- Bolyachkin, A. S., Volegov, A. S. & Kudrevatykh, N. V. 2015, “Intergrain exchange interaction estimation from the remanence magnetization analysis”, *Journal of Magnetism and Magnetic Materials*, vol. 378, pp. 362–366.
DOI: 10.1016/j.jmmm.2014.11.064

**Research supervisor:**

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MAGNETIC AND MAGNETORESISTIVE PROPERTIES OF FILM NANOSTRUCTURES

Research goal:

The research focuses on the study of the formation mechanisms of the magnetic and magnetoresistive properties of film nanostructures

Aspects studied:

- Conditions for the formation of exchange bias in the ferromagnetic – antiferromagnetic film structures.
- Mechanisms of formation and control of induced anisotropy.

Research highlights:

- Measurement of magnetic properties (hysteresis properties and their temperature dependences)
- Study of magnetization reversal processes using a Kerr magnetometer.
- Analysis of crystal structure and surface film structure.

Career opportunities:

Research laboratories, universities, commercial companies

Supervisor's specific requirements:

Recommendation letter from MS supervisor and interview with expert or recommendation letter from community.
Knowledge of Solid state physics at master level.

Main publications:

- Savin, P. A., Lepalovskij, V. N., Svalov, A. V., Vas'kovskiy, V. O., and Kurlyandskaya, G. V. (2014) "Effect of phase separation in an $\text{Fe}_{20}\text{Ni}_{80}/\text{Fe}_{50}\text{Mn}_{50}$ structure with exchange coupling," *Phys. Met. Metallograph.*, vol. 115, no. 9, pp. 856–863. DOI: 10.1134/S0031918X14070096
- Savin, P. A., Guzman, J. A., Lepalovskij, V. N., Svalov, A. V., Kurlyandskaya, G. V., Asenio, A. B., Vas'kovskiy, V. O., Vazques, M. V. (2016) "Exchange bias in sputtered FeNi/FeMn systems: effect of short low-temperature heat treatments", *JMMM*, vol. 402, pp. 49–54. DOI: 10.1016/j.jmmm.2015.11.027
- Yuvchenko, A. A., Lepalovskij, V. N., Savin, P. A., Gorkovenko, A. N., Kulesh, N. A., Vas'kovskiy, V. O. (2015), "Optimization of Functional Parameters of Magnetoresistive $\text{Fe}_{20}\text{Ni}_{80}/\text{Fe}_{50}\text{Mn}_{50}/\text{Fe}_{20}\text{Ni}_{80}$ Films", *IEEE Trans. Magn.*, vol. 51, 2500304. DOI: 10.1109/TMAG.2014.2362817

**Research supervisor:**

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MAGNETOACOUSTIC AND LOW TEMPERATURE ULTRASONIC PHENOMENA IN SOLIDS

Research goal:

The study is aimed at training specialists in the fields of condensed matter, physical acoustics (ultrasonics), low temperature physics, magnetism, physics of dielectrics and semiconductors.

Aspects studied:

- Ultrasonic analogue of the Faraday effect
- The Jahn-Teller effect in crystals with point defects: impurities and vacancies. Mechanisms of relaxation, parameters and symmetry properties of adiabatic potential energy surface
- Thermodynamic properties of dielectrics and semiconductors

Research highlights:

Experiments are done with the use of unique ultrasonic technique which can be found in a few international research centers (e. g., National High Magnetic Field Laboratory, Tallahassee, USA; Dresden High Magnetic Field Laboratory in the Helmholtz-Zentrum Dresden-Rossendorf, Germany).

Career opportunities:

Research centers, high-tech industry, and university staff.

Supervisor's specific requirements:

Knowledge of Solid state physics at master level.

Main publications:

- Averkiev, N. S., Bersuker, I. B., Gudkov, V. V., et al. (2019), "The Jahn-Teller Effect in Elastic Moduli of Cubic Crystals: General Theory and Application to Strontium Fluorite Doped with Chromium Ions", in van Asten M. (ed.), *Fluorites*, Nova Science Publishers Inc., New York, U.S., pp. 111–159. ISBN: 978-1-53615-205-0 (eBook); ISBN: 978-1-53615-204-3.
- Gudkov, V. V., Bersuker, I. B. (2012), "Experimental Evaluation of the Jahn-Teller Effect Parameters by Means of Ultrasonic Measurements. Application to Impurity Centers in Crystals", in Atanasov, M., Daul, C., Tregenna-Piggot, Ph. L. W. (ed.), in *Vibronic Interactions and the Jahn-Teller Effect: Theory and Applications*, Springer, Heidelberg, Germany, pp. 143–162. DOI: 10.1007/978-94-007-2384-9_7
- Gudkov, V. V. (2009), "Ultrasonic consequences of the Jahn-Teller effect", in Koppel, H., Yarkony, D. R., Barentzen, H. (ed.), *The Jahn-Teller Effect, Fundamentals and Implications for Physics and Chemistry*, Springer, Heidelberg, Germany, pp. 743–766. DOI: 10.1007/978-3-642-03432-9_23

Research supervisor:

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- Gudkov, V. V. and Gavenda, J. D. (2000), "Magnetoacoustic Polarization Phenomena in Solids", Springer-Verlag, New York, U.S., 218 p.
DOI: 10.1007/978-1-4612-1168-6
- Averkiev, N. S., Bersuker, I. B., Gudkov, V. V., et al. (2017), "Magnetic field induced tunnelling and relaxation between orthogonal configurations in solids and molecular systems", Physical Review B, vol. 96, 094431.
DOI: 10.1103/PhysRevB.96.094431

**Dominique Savio
Nsengiyumva
(Rwanda)**



I have chosen to study in Russia because I saw an **interesting program** which will help me to contribute to **improve human being life** as well as the environment.



Laboratory of chemical design
of new multifunctional oxide
materials



Duration of study: 4 years

Language: English or Russian

Entry requirements:

- Master's degree (or equivalent) in the related field
- B2 level of English or Russian
- Interview

Entrance exams:

- Foreign language
- Chemistry

Government scholarship is available.

See more information at:

urfu.ru



Research



Doctoral Programs in English



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MICROHETEROGENEITY AND CONDITIONS OF CRYSTALLIZATION OF METAL MELTS

Research goal:

Gaining better understanding of various physical and chemical aspects of metallurgical processes

Aspects studied:

- Physico-chemical aspects of metallurgical processes.
- Quality management of metal products in the chain "technology - structure - property".
- Microstructure, crystalline structure, phase composition and nanomechanical properties of highly entropic, nanocrystalline and volumetric amorphous alloys.

Research highlights:

- mental and theoretical study of the liquid - liquid phase transition conditions in liquid alloys.
- Physical metallurgy about the connection "technology - structure - property".
- Influence of the melting temperature on microstructure, crystalline structure, phase composition and nanomechanical properties of the ingot.

Career opportunities:

Preparation and defense of a dissertation, scientific articles in indexed journals, presentation of research results at scientific conferences and participation in grant activities.

Supervisor's specific requirements:

Knowledge of the basics of physical and colloidal chemistry; understanding of the methods for studying the properties of materials (physical, chemical and mechanical); interest in pursuing career opportunities.

Main publications:

- Chikova, O. A., Sinitsin, N. I., V'yukhin, V. V. (2019) "Parameters of the Microheterogeneous Structure of 110G13L Liquid Steel", Russian Journal of Physical Chemistry A, vol. 93, no. 8, pp. 1435–1442. DOI: 10.1134/S0036024419080065
- Chikova, O. A., Nikitin, K. V., Moskovskikh, O. P., Tsepelev, V. S. (2016), "Viscosity and electrical conductivity of liquid hypereutectic alloys Al-Si", Acta Metallurgica Slovaca, vol. 22, no. 3, pp. 153–163 DOI: 10.12776/ams.v22i3.774
- Finkelstein, A., Schaefer, A., Chikova, O. A., Borodianskiy, K. (2017) "Study of Al-Si alloy oxygen saturation on its microstructure and mechanical properties", Materials, vol. 10, no. 7, art. № 786. DOI: 10.3390/ma10070786
- Shmakova, K. Yu., Chikova, O. A., Tsepelev, V. S. (2016), "Viscosity of liquid Cu-Sn alloys", Physics and Chemistry of Liquids, vol. 56, no. 1, pp. 1–8. DOI: 10.1080/00319104.2016.1233184

Sawfan Abo Saleh (Syria) a doctoral candidate in Chemical Sciences working on his research



Duration of study: 4 years

Language: English or Russian

Entry requirements:

- Master's degree (or equivalent) in the related field
- B2 level of English or Russian
- Interview

Entrance exams:

- Foreign language (English/German/French)
- Chemical sciences

Government scholarship is available.

See more information at:

urfu.ru



Research



Doctoral Programs in English



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ATOM-EFFICIENT METHODOLOGIES IN ORGANIC CHEMISTRY. SYNTHESIS OF COMPOUNDS POSSESSING ANTIVIRAL ACTIVITY AND CATALYSTS

Research goal:

Fundamental and applied research in the field of heterocyclic compounds functionalization using atom-efficient approaches. Synthesis of organic substances possessing antiviral activity and chiral catalysts.

Aspects studied:

- Organic synthesis
- Heterocyclic compounds
- C-H Functionalization methodology
- Green chemistry
- Chiral ligands
- Biological activity

Research highlights:

- Atom-effective, highly selective and environmentally benign methods of organic and organometallic synthesis of drugs, chiral catalysts, and organic materials, on the basis of heterocyclic compounds, mainly azines and azoloazines
- Application of highly selective and atom-efficient reactions: (hetero)condensation reactions, direct metal-catalysed functionalizations of the C(sp²)-H bond in (hetero)aromatics (including the formation of new C-X, X=C, N, O, P, S chemical bonds), metal-catalysed cross-coupling reactions, non-catalysed by transition metals oxidative cross-coupling reactions of n-deficient (hetero)aromatic compounds (SNH reactions), asymmetric synthesis reactions

Career opportunities:

Graduates will be in high demand in research laboratories involved in the study of novel biologically active compounds, ligands for asymmetric synthesis and novel organic materials.

Supervisor's specific requirements:

- Well knowledgeable in organic and medicinal chemistry, methods for identification of organic compounds
- Sufficient skills in synthesis

Research supervisor:

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Main publications:

- Charushin, V. and Chupakhin, O., (2014), "Metal Free C-H Functionalization of Aromatics. Nucleophilic Displacement of Hydrogen" in Maes, B. U. W., Cossy, J., Polanc, S., (Eds.), the series Topics in Heterocyclic Chemistry, Springer, Switzerland, vol. 37, 283 p.
DOI: 10.1007/978 3319 07019 3
- Khalymbadzha, I. A., Chupakhin, O. N., Fatykhov, R. F., Charushin, V. N., Schepochkin, A. V., and Kartsev, V. G. (2016), "Transition-Metal-Free Cross-Dehydrogenative Coupling of Triazines with 5,7-Dihydroxycoumarins", *Synlett*, vol. 27, no. 18, pp. 2606–2610.
DOI: 10.1055/s 0035–1562794
- Utepova, I. A., Trestsova, M. A., Chupakhin, O. N., Charushin, V. N., and Rempel, A. A. (2015), "Aerobic oxidative C-H/C-H coupling of azaaromatics with indoles and pyrroles in the presence of TiO₂ as a photocatalyst", *Green Chem.*, vol. 17, pp. 4401–4410.
DOI: 10.1039/C5GC00753D

**Research supervisor:**

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ATOM-EFFICIENT METHODOLOGIES IN ORGANIC CHEMISTRY. SYNTHESIS OF COMPOUNDS POSSESSING ANTIBACTERIAL ACTIVITY

Research goal:

Fundamental and applied research in the field of heterocyclic compounds functionalization using atom-efficient approaches. Synthesis of organic substances possessing antibacterial activity.

Aspects studied:

- Organic synthesis
- Heterocyclic compounds
- C-H Functionalization methodology
- Green chemistry
- Ligands
- Biological activity

Research highlights:

- Effective methods of targeted organic and organometallic synthesis of high-tech knowledge-based functional materials, drugs and their precursors on the basis of heterocyclic compounds, mainly azines and benzazines, including fluorinated, chiral and annulated ones
- Application of selective atom-efficient reactions, such as but not limited to: addition reactions, (hetero) condensation reactions, Diels-Alder reactions, C–C and C–X crosscoupling reactions, including catalytic

Career opportunities:

Graduates will be in demand in research laboratories involved in the study of novel biologically active molecules and components for advanced optical materials.

Supervisor's specific requirements:

- Well knowledgeable in organic and medical chemistry, and methods for identification of organic compounds
- Sufficient skills in synthesis

Main publications:

- Sarkar, A., Santra, S., Kundu, S. K., Hajra, A., Zyryanov, G. V., Chupakhin, O. N., Charushin, V. N., and Majee, A. (2016), "A decade update on solvent and catalyst-free organic neat reactions: a step forward towards sustainability", *Green Chemistry*, vol. 18, no. 16, pp. 4475–4525.
DOI: 10.1039/c6gc01279e
- Lipunova, G. N., Nosova, E. V., Charushin, V. N., and Chupakhin, O. N. (2016), "Synthesis and antitumour activity of 4-aminoquinazoline derivatives", *Russian Chemical Reviews*, vol. 85, pp. 759–793.
DOI: 10.1070/RCR4591



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ATOM-EFFICIENT METHODOLOGIES IN ORGANIC CHEMISTRY. SYNTHESIS OF COMPOUNDS POSSESSING ANTIVIRAL ACTIVITY

Research goal:

Fundamental and applied research in the field of heterocyclic compounds functionalization using atom-efficient approaches. Synthesis of organic substances possessing anti-viral activity.

Aspects studied:

- Organic synthesis
- Heterocyclic compounds
- C-H Functionalization methodology
- Green chemistry
- Ligands
- Biological activity

Research highlights:

Development of original bioactive compounds based on the heterocyclic scaffold – antiviral drug candidates.

Career opportunities:

The graduates acquire expertise in organic chemistry and can be employed in both research laboratories and R&D centers in Russia and abroad.

Supervisor's specific requirements:

Profound knowledge in organic and medicinal chemistry, methods for the synthesis, purification, and identification of organic compounds.

Main publications:

- Rusinov, V. L., Sapozhnikova, I. M., Bliznik, A. M., Chupakhin, O. N., Charushin, V. N., Spasov, A. A., Vassiliev, P. M., Kuznetsova, V. A., Rashchenko, A. I., and Babkov, D. A. (2017), "Synthesis and Evaluation of Novel [1,2,4]Triazolo[5,1-c][1,2,4]-triazines and Pyrazolo[5,1-c][1,2,4]triazines as Potential Antidiabetic Agents", *Archiv der Pharmazie*, vol. 350, no. 5, 1600361.
DOI: 10.1002/ardp.201600361
- Savateev, K. V., Ulomsky, E. N., Fedotov, V. V., Rusinov, V. L., Sivak, K. V., Lyubishin, M. M., Kuzmich, N. N., and Aleksandrov, A. G. (2017), "6- itrotriazolo[1,5-a] pyrimidines as promising structures for pharmacotherapy of septic conditions", *Russian Journal of Bioorganic Chemistry*, vol. 43, no. 4, pp. 421–428.
DOI: 10.1134/S1068162017040094

- Gorbunov, E. B., Rusinov, G. L., Ulomsky, E. N., Rusinov, V. L., Charushin, V. N., and Chupakhin, O. N. (2016), "C-H functionalization of triazolo[a]-annulated 8-azapurines", *Tetrahedron Letters*, vol. 57, no. 21, pp. 2303–2305.
DOI: 10.1016/j.tetlet.2016.04.052
- Khalymbadzha, I. A., Shestakova, T. S., Subbotina, J. O., Eltsov, O. S., Musikhina, A. A., Rusinov, V. L., Chupakhin, O. N., Karpenko, I. L., Jasko, M. V., Kukhanova, M. K., Deev, S. L. (2014), "Synthesis of acyclic nucleoside analogues based on 1,2,4-triazolo[1,5-a]pyrimidin 7- ones by one-step Vorbrüggen glycosylation", *Tetrahedron*, vol. 70, no. 6, pp. 1298–1305.
DOI: 10.1016/j.tet.2013.12.051



Research supervisor:
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HETEROCYCLIC CHEMISTRY

Research goal:

The research focuses on the syntheses of heterocycles on the basis of CF₃-containing synthons.

Aspects studied:

- Synthesis and reactivity of trifluoromethylated oxygen-containing heterocycles and nitroalkenes
- Reactions of 1, 3-dipolar cycloaddition

Research highlights:

The students will have access to modern synthetic and analytical equipment.

Career opportunities:

Work in the field of synthetic organic chemistry at scientific institutions and pharmaceutical firms.

Supervisor's specific requirements:

- Deep knowledge of organic chemistry
- Good experimental skills: synthesis of organic substrates and organization of chemical experiment

Main publications:

- Obydenov, D. L., Pan'kina, E. O. and Sosnovskikh, V. Y. (2016), "Synthesis of Diketohexenoic Acid Derivatives by Alkenylation of Indoles and Pyrroles with 4-Pyrone", *Journal of Organic Chemistry*, vol. 81, pp. 12532–12539. DOI: 10.1021/acs.joc.6b02364
- Buev, E. M., Moshkin, V. S. and Sosnovskikh, V. Y. (2016), "Reagents for Storage and Regeneration of Nonstabilized Azomethine Ylides: Spiroanthraceneoxazolidines", *Organic Letters*, vol. 18, pp. 1764–1767. DOI: 10.1021/acs.orglett.6b00475
- Sosnovskikh, V. Y., Korotaev, V. Y., Kutyashev, I. B., Barkov, A. Y. and Safrygin, A. V. (2016), "One-pot synthesis of functionalized benzo[c]coumarins and their precursors via the reaction of 2-(polyfluoroalkyl)chromones with 4-alkyl-3-cyanocoumarins", *RSC Advances*, vol. 6, pp. 58188–58202. DOI: 10.1039/C6RA12492E



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TECHNOLOGY FOR ORGANIC SYNTHESIS

Research goal:

Study in the area of organic chemistry, synthesis of five-membered heterocyclic compounds based on the reaction of azides, enamines and thioamides.

Aspects studied:

- Organic chemistry
- Heterocyclic compounds
- Biological activity

Research highlights:

Synthesis of biologically active compounds including compounds with anticancer and antiviral activities.

Career opportunities:

After graduating from PhD courses you will gain expertise in organic chemistry and can be employed by laboratories in Russia and other countries.

Supervisor's specific requirements:

Well knowledgeable in organic chemistry.

Main publications:

- Beryozkina, T., Bakulev, V., Dianova, L., Berseneva, V., Slepukhin, P., Leban, J., Kalaba, P., Aher, N. Y., Ilic, M., Sitte, H. H. and Lubec, G. (2016), "Design and Synthesis of N-Sulfonylamidines of Modafinil Acid", *Synthesis*, vol. 48, no. 7, pp. 1046–1054. DOI: 10.1055/s-0035-1561350
- Belyaev, N. A., Beryozkina, T. V., Bakulev, V. A., Eltsov, O. S. and Lubec, G. (2018), "Diastereoselective synthesis of 1,2,3-triazolines fused with pentane and dihydropyran rings", *Chemistry of Heterocyclic Compounds*, vol. 54, pp. 984–988. DOI: 10.1007/s10593-018-2382-z
- Belskaya, N. P., Eliseeva, A. I., and Bakulev, V. A. (2015), "Hydrazones as substrates for cycloaddition reactions", *Russian Chemical Reviews*, vol. 84, no. 12, pp. 1226. DOI: 10.1070/RCR4463
- Richter, J., Ullah, K., Xu, P. F., Alschner, V., Blatz, A., Peifer, C., Halekotte, J., Leban, J., Vitt, D., Holzmann, K., Bakulev, V., Pinna, L. A., Henne-Bruns, D., Hillenbrand, A., Kornmann, M., Leithauser, F., Bischof, J. and Knippschild, U. (2014), "Effects of altered expression and activity levels of CK1 delta and epsilon on tumor growth and survival of colorectal cancer patients", *International Journal of Cancer*, vol. 136, no. 12, pp. 2799–2810. DOI: 10.1002/ijc.30114
- Filimonov, V. O., Dianova, L. N., Galata, K. A., Beryozkina, T. V., Novikov, M. S., Berseneva, V. S., Eltsov, O. S., Lebedev, A. T., Slepukhin, P. A. and Bakulev, V. A. (2017), "Switchable Synthesis of 4,5-Functionalized 1,2,3-Thiadiazoles and 1,2,3-Triazoles from 2-Cyanothioacetamides under Diazo Group Transfer Conditions", *J. Org. Chem.*, vol. 82, 4056. DOI: 10.1021/acs.joc.6b02736



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PHYSICAL CHEMISTRY OF OXIDE SYSTEMS: THERMODYNAMICS, STRUCTURE, PROPERTIES

Research goal:

Study of synthesis routes, stability, crystal structure and functional properties of complex oxides by means of both experimental and theoretical approaches.

Aspects studied:

- Objects of study
Complex oxides perspective for various applications, such as: electrodes in electrochemical devices, catalysts for oxidation-reduction processes, membrane for oxygen separation, sensor materials, semiconductors, and so on
- Areas of investigations
Thermodynamic stability, phase equilibria, crystal and defect structure, oxygen non-stoichiometry and functional properties

Research highlights:

- Phase equilibria in oxide systems and thermodynamic stability of oxides
- Crystal structure of complex oxides
- Oxygen non-stoichiometry and defect structure of complex oxides (experimental study and modeling)
- Measurements of functional properties (electrical conductivity, Seebeck coefficient, thermal expansion, oxygen permeability)

Career opportunities:

Obtained skills can be applied in future research activities, engineering of solid oxide fuel cells, semiconductors, thermoelectrics, etc. Also received knowledge can serve as a basis for future teaching activity.

Supervisor's specific requirements:

- Good experimental skills: synthesis of solid materials and organization of physicochemical experiment
- Basic knowledge of crystal chemistry, chemical thermodynamics, chemical kinetics, and electrochemistry
- Thoroughness, reliability and efficiency

Main publications:

- Volkova, N. E., Mychinko, M. Yu., Golovachev, I. B., Makarova, A. E., Bazueva, M. V., Zyaikin, E. I., Gavrilova, L. Ya. and Cherepanov, V. A. (2019), "Structure and properties of layered perovskites $Ba_{1-x}Ln_xFe_{1-y}Co_yO_{3-\delta}$ (Ln = Pr, Sm, Gd)", *Journal of Alloys and Compounds*, vol. 784, pp. 1297–1302.
DOI: 10.1016/j.jallcom.2018.12.391
- Gilev, A. R., Kiselev, E. A., Mychinko, M. Yu. and Cherepanov, V. A. (2019), "Topotactic synthesis, crystal structure and oxygen non-stoichiometry of ordered $NdBaMnFeO_{6-\delta}$ ", *Materials Research Bulletin*, vol. 113, pp. 1–5.
DOI: 10.1016/j.materresbull.2018.12.037



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ATOM-EFFICIENT METHODOLOGIES IN ORGANIC SYNTHESIS AND MATERIALS SCIENCE

Research goal:

Fundamental research in the field of synthesis of new organic functional materials, chemosensors and bioactive compounds.

Aspects studied:

- Synthetic, organic and biomolecular chemistry
- Highly reactive organic intermediates
- Photoluminescent detection of bioactive compounds and technogenic waste
- Photochemistry
- Supramolecular chemistry and Molecular recognition
- Coordination chemistry

Research highlights:

Dr. Prof. Grigoriy V. Zyryanov has often adopted unconventional synthetic approaches and methods in his research and this has led to the development of new synthetic strategies in the synthesis of new and efficient chemosensors, ligands for metal cations, photonic materials and biologically active compounds.

Career opportunities:

Positions are open for post-docs and PhD students.

Supervisor's specific requirements:

- Good knowledge in synthetic organic, physical or applied chemistry
- Good analytical and problem-solving skills
- Good experience in using physico-chemical methods of analysis of organic compounds

Main publications:

- Palacios, M. A., Wang, Z., Montes, V. A., Zyryanov, G. V. and Anzenbacher, Jr. P. (2008), "Rational design of a minimal size sensor array for metal ion detection", *Journal of American Chemical Society*, vol. 130, pp. 10307–10314.
DOI: 10.1021/ja802377k
- Zyryanov, G. V., Palacios, M. A. and Anzenbacher, Jr. P. (2007), "Rational design of a fluorescence turn-on sensor array for phosphates in blood serum", *Angewandte Chemie International Edition*, vol. 46, pp. 7849–7852.
DOI: 10.1002/anie.200702611
- Esipenko, N. A., Koutnik, P., Minami, T., Mosca, L., Lynch, V. M., Zyryanov, G. V. and Anzenbacher, Jr. P. (2013), "First supramolecular sensors for phosphonate anions", *Chemical Science*, vol. 135, pp. 7705–7712.
DOI: 10.1039/C3SC51407B.

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- Kovalev, I. S., Taniya, O. S., Slovesnova, N. V., Kim, G. A., Santra, S., Zyryanov, G. V., Kopchuk, D. S., Majee, A., Charushin, V. N. and Chupakhin, O. N. (2016), "Fluorescent Detection of 2,4-DNT and 2,4,6-TNT in Aqueous Media by Using Simple Water-Soluble Pyrene Derivatives", Chemistry – An Asian Journal, vol. 11, pp. 775–781.
DOI: 10.1002/asia.201501310
- Sarkar, A., Santra, S., Kundu, S. K., Hajra, A., Zyryanov, G. V., Chupakhin, O. N., Charushin, V. N. and Majee, A. (2016), "A decade update on solvent and catalyst-free neat organic reactions: A step forward towards sustainability", Green Chemistry, vol. 18, pp. 4475–4525.
DOI: 10.1039/c6gc01279e

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SYNTHESIS OF NEW MONO-, POLY- AND MACROCYCLIC ORGANIC PHOTOSENSITIVE MATERIALS (ORGANIC PHOTONICS)

Research goal:

Design and synthesis of new organic materials for molecular electronics.

Aspects studied:

- Reactions of heterocyclization of functional hydrazones, enamines and ylidenes
- Investigation of the mechanism of organic reactions using theoretical and experimental methods
- Synthesis and investigation of the organic compounds with photoactive properties

Research highlights:

- New efficient synthetic methods have been developed and a series of new heterocyclic compounds possessing biological activity (fungicidal activity, compounds trigger apoptosis) and interesting optical properties (fluorescence) have been obtained
- The behavior of small molecular fluorophores (2-aryl-1,2,3-triazoles, 4,5-dihydrotriazoles, arylhydrazonothiazoles, etc.) under excitation was studied by the experimental methods and quantum mechanical calculations
- A new approach leading to the generation of azomethine ylides under mild conditions was proposed and a series of analogous of natural alkaloids (pyrrolo[3,4-a]pyrrolizines, etc) were synthesized efficiently by 1,3-dipolar cycloaddition
- A novel reaction electrocyclization which represents a new approach for the synthesis of heterocyclic systems on the basis of bicyclic tetrahydro-1,2,4-triazines have been discovered

Career opportunities:

After graduating from the PhD program, you will obtain expertise in organic synthesis, spectroscopy and organic photoactive materials and be employed by research centers in Russia and other countries.

Supervisor's specific requirements:

- Theoretical knowledge in aspects of organic chemistry
- Fundamental knowledge and skills for the spectral investigation of the structural features of organic molecules and organic reaction mechanisms
- Good experimental skills applicable in synthesis of organic compounds, their separation and purification

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Main publications:

- Lugovik, K. I., Eltyshev, A. K., Benassi, E., and Belskaya, N. P. (2017), "Synthesis of 5-Acyl 2-Amino 3-Cyanothiophenes: Chemistry and Fluorescent Properties", Chem. – An Asian J., vol. 12, pp. 2410–2415.
DOI: 10.1002/asia.201700721
- Lugovik, K. I., Popova, A. V., Eltyshev, A. K., Benass, I. E., and Belskaya, N. P. (2017), "Synthesis of Thiazoles Bearing Aryl Enamine/Aza-enamine Side Chains: Effect of the π -Conjugated Spacer Structure and Hydrogen Bonding on Photophysical Properties", Eur. J. Org. Chem., pp. 4175–4187.
DOI: 10.1002/ejoc.201700518
- Eliseeva, A. I., Nesterenko, O. O., Slepukhin, P. A., Benassi, E., and Belskaya, N. P. (2017), "Synthesis and Fluorescent Behaviour of 2-Aryl-4, 5-dihydro-1H-1,2,4-triazoles", J. Org. Chem., vol. 1, pp. 86–100.
DOI: 10.1021/acs.joc.6b02144
- Belskaya, N. P., Lugovik, K. I., Bakulev, V. A., Bauer, J., Kitanovic, I., Holenya, P., Zakhartsev, M., and Wöfl, S. (2016), "The new facile and straightforward method for the synthesis of 4H-1,2,3-thiadiazolo[5,4-b]indoles and determination of their antiproliferative activity", Eur. J. Med. Chem., vol. 108, pp. 245–257.
DOI: 10.1016/j.ejmech.2015.11.011

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MODERN SYNTHETIC METHODS IN THE DESIGN OF HETEROCYCLE-BASED ADVANCED MATERIALS

Research goal:

Development of the C (sp^2)-H bond functionalization methodology in (hetero) aromatic and non-aromatic systems as an atom-efficient approach towards novel advanced organic materials.

Aspects studied:

- Comprehensive study of structure and reactivity for heterocyclic compounds
- Atom- and stage-efficient methodologies for C–C and C–N bonds formation in the design of bi- and polyfunctional heterocyclic compounds
- Synthesis and application of organometallic reagents in prospective retrosynthetic schemes

Research highlights:

- Effective synthetic approaches towards novel heterocyclic derivatives of ferrocene, calixarene, carborane, nitroxide radicals have been developed. In particular, a number of 2H-imidazole motif-based biheterocyclic ensembles that are of interest in medical chemistry and materials science have been synthesized.

Career opportunities:

Research activities in leading scientific and educational centers, as well as in industrial companies, specializing in the field of organic synthesis and related areas.

Supervisor's specific requirements:

- Deep knowledge of the organic chemistry theoretical aspects
- Skills of modern methods for the isolation and spectral identification of organic substances
- Practice of organic synthesis and laboratory equipment handling
- Scientific literature sources and data bases application skills

Main publications:

- Mampuys, P., Moseev, T. D., Varaksin, M. V., De Houwer, J., Vande Velde, C. M. L., Chupakhin, O. N., Charushin, V. N. and Maes, B. U. W. (2019), "Synthesis of Functionalized Pyrazin-2(1H)-ones via Tele-Nucleophilic Substitution of Hydrogen Involving Grignard Reactants and Electrophiles", Organic Letters, vol. 21, no. 8, pp. 2699–2703.
DOI: 10.1021/acs.orglett.9b00681
- Akulov, A. A., Varaksin, M. V., Charushin, V. N. and Chupakhin, O. N. (2019), "Direct Functionalization of C (sp^2)-H Bond in Nonaromatic Azaheterocycles: Palladium-Catalyzed Cross-Dehydrogenative Coupling (CDC) of 2H-Imidazole 1-Oxides with Pyrroles and Thiophenes", ACS Omega, vol. 4, no. 1, pp. 825–834.
DOI: 10.1021/acsomega.8b02916

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- Varaksin, M., Moseev, T., Chupakhin, O., Charushin, V. and Trofimov, B. (2017), "Metal-free C-H functionalization of 2H-imidazole 1-oxides with pyrrolyl fragments in the design of novel azaheterocyclic ensembles", *Organic and Biomolecular Chemistry*, vol. 15, no. 39, pp. 8280–8284. DOI: 10.1039/c7ob01999h
- Galliamova, L. A., Varaksin, M. V., Chupakhin, O. N., Slepukhin, P. A. and Charushin, V. N. (2015), "Heterocyclic and Open-Chain Carboranes via Transition-Metal-Free C-H Functionalization of Mono- and Diazine-N-oxides", *Organometallics*, vol. 34, no. 21, pp. 5285–5290. DOI: 10.1021/acs.organomet.5b00736
- Varaksin, M. V., Utepova, I. A., Chupakhin, O. N. and Charushin, V. N. (2012), "Palladium(II)-catalyzed oxidative C-H/C-H coupling and eliminative S_N^H reactions in direct functionalization of imidazole oxides with indoles", *Journal of Organic Chemistry*, vol. 77, no. 20, pp. 9087–9093. DOI: 10.1021/jo301618b

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BENZAZINES DERIVATIVES POSSESSING BIOLOGICAL ACTIVITY AND LUMINESCENT PROPERTIES

Research goal:

Fundamental and applied research in the field of benzazine derivatives (quinolones, quinazolines, quinoxalines, benzothiazines). Development of effective synthetic approaches to heterocyclic compounds possessing luminescent properties and biological activity.

Aspects studied:

- Synthesis of new benzazines including fluorine-containing derivatives
- Synthesis of new materials for optoelectronic devices
- Ligands
- Difluoroboron and metal complexes
- Tuberculostatic and antiviral activity

Research highlights:

- Effective methods synthesis of structural fragments in functionalized π -conjugated systems on the basis of benzazines
- Development of fluorinated benzazines possessing biological activity

Career opportunities:

Graduates will be in demand in research laboratories involved in the study of novel biologically active molecules and components for advanced optical materials.

Supervisor's specific requirements:

- Well knowledgeable in organic and medical chemistry and methods for identification of organic compounds
- Sufficient skills in synthesis

Main publications:

- Lipunova, G. N., Nosova, E. V., Charushin, V. N. and Chupakhin, O. N. (2018), "Functionalized quinazolines and pyrimidines for optoelectronic materials", *Current Organic Synthesis*, vol. 15, no. 6, pp. 793–814. DOI:10.2174/1570179415666180622123434
- Moshkina, T. N., Nosova, E. V., Lipunova, G. N., Valova, M. S. and Charushin, V. N. (2018), "New 2, 3-Bis (5-arylthiophen-2-yl)quinoxaline Derivatives: Synthesis and Photophysical Properties", *Asian Journal of Organic Chemistry*, vol. 7, no. 6, pp. 1080–1084. DOI: 10.1002/ajoc.201800217
- Nosova, E. V., Batanova, O. A., Lipunova, G. N., Kotovskaya, S. K., Slepukhin, P. A., Kravchenko, M. A. and Charushin, V. N. (2019), "Synthesis and antitubercular evaluation of fluorinated 2-cycloalkylimino substituted 1,3-benzothiazin-4-ones", *Journal of Fluorine Chemistry*, vol. 220, pp. 69–77. DOI: 10.1016/j.jfluchem.2019.02.009

**Research supervisor:**

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SOLID STATE CHEMISTRY, PHYSICAL CHEMISTRY

Research goal:

The primary focus of this research is to the study of structure, physical-chemical properties of solid electrolyte and electrode materials.

Aspects studied:

- Bismuth containing compounds
- Structural studies
- Impedance spectroscopy

Research highlights:

The research team you will join is young, tolerant, joint and helpful; and involved in international collaboration (UK, Belarus).

Career opportunities:

Getting postgraduate degree from the Ural Federal University opens the way to postdoc positions in many universities.

Supervisor's specific requirements:

- Sufficient background in physical chemistry
- Readiness to manage working by hands (electrodes, furnaces – teaching is included)

Main publications:

- Kaimieva, O. S., Danilova, V. V., Kruzikov, D. A., Buyanova, E. S. and Petrova, S. A. (2017), "The Solid Solutions Based on Lanthanum Manganite as the Cathod Materials for Bismuth-Containing Solid Electrolytes", Russian Journal of Electrochemistry, vol. 53, no. 8, pp. 852–858.
DOI: 10.1134/S1023193517080080
- Buyanova, E. S., Mikhailovskaya, Z. A., Emel'yanova, Yu. V., Levina, A. A., Morozova, M. V., Petrova, S. A. and Tarakina, N. V. (2017), "Production and Characteristics of Substituted Lanthanum Niobate $\text{LaNb}_{1-x}\text{W}_x\text{O}_{4+6}$ ", Russian Journal of Inorganic Chemistry, vol. 62, no. 2, pp. 211–217.
DOI: 10.1134/S0036023617020048
- Buyanova, E. S., Emel'yanova, Yu. V., Morozova, M. V., Krylov, A. A. and Nikolaenko, I. V. (2018), "BIFEVOX Composites: Manufacture and Characterization", Russian Journal of Inorganic Chemistry, vol. 63, no. 10, pp. 1297–1302.
DOI: 10.1134/S0036023618100042
- Mikhaylovskaya, Z. A., Petrova, S. A., Abrahams, I., Buyanova, E. S., Morozova, M. V. and Kellerman, D. G. (2018), "Structure and conductivity in iron-doped $\text{Bi}_{26}\text{Mo}_{10}\text{O}_{69-6}$ ", Ionics, vol. 24, no. 12, pp. 3983–3994.
DOI: 10.1007/s11581-018-2543-1
- Mikhaylovskaya, Z. A., Petrova, S. A., Buyanova, E. S. and Morozova, M. V. (2019), " $\text{Bi}_{26}\text{Mo}_{10}\text{O}_{69}$ -based solid solution with nonmetal dopants: synthesis and properties", Solid State Ionics, vol. 331, pp. 30–36.
DOI: 10.1016/j.ssi.2018.12.014



Aws Ghanem (Syria)

I am grateful that my scientific supervisor, and the department of ecology provided me with **all necessary tools, analysis, modern devices** and also in **coordinating with advisers and experts from other organizations.**

I am living a **great and a unique** stage of my life in the Ural Federal University and I am **really happy and satisfied** to live and study in Russia.

*Dominique Savio Nsengiyumva
(Rwanda) doing his research in the
program 'Biosciences'*

Duration of study: 4 years

Language: English or Russian

Entry requirements:

- Master's degree (or equivalent) in the related field
- B2 level of English or Russian
- Interview

Entrance exams:

- Foreign language (English/German/French)
- Biosciences

Government scholarship is available.

See more information at:

urfu.ru



Research



Doctoral Programs in English



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IMMUNOCHEMISTRY, BIOCHEMISTRY AND IMMUNOBIO TECHNOLOGY

Research goal:

Development of scientific research in the field of immunochemistry, biochemistry, immunobiotechnology, and implementation of their results in practice.

Aspects studied:

- Development of test systems for immunochemical analysis methods in medicine, pharmacy, biotechnology
- Study of the biochemical and immunological mechanisms in the development of experimental pathology and search of ways of their pharmacological correction
- Development of theoretical bases of biotechnology immunobiological preparations

Research highlights:

Development of immunochemical test systems for the determination of chemical compounds in biological material and environmental objects. In vitro testing of immunotropic properties of new chemical compounds – potential medicines.

Career opportunities:

After graduating from the PhD program you get expertise on biochemistry, immunochemistry and immunobiotechnology and can be employed in laboratories and plants of Russia and other countries

Supervisor's specific requirements:

- A university degree in chemistry, biology, biotechnology or pharmacy
- Research experience in the above mentioned areas
- Knowledge of the methods used in immunology, molecular genetics, genetic engineering, proteomics, separation and purification of biopolymers is recommended

Main publications:

- Gankovskaya, L. V., Svitich, O. A., Chereshnev, V. A., Karaulov, A. V., Chereshneva, M. V., Guseva, M. R., Gavrilova, T. V., Grechenko, V. V., Miroshnichenkova A. M., and Zverev V. V. (2014), "Diverse Expression of Toll-Like Receptor-9 and β -Defensin-2 in Corneal Cells during Herpes Simplex Virus-1 Keratitis", International Trends in Immunity, vol. 2, no. 3, pp. 128–133.
[HTTP://researchpub.org/journal/iti/number/vol2-no3/vol2-no3-5.pdf](http://researchpub.org/journal/iti/number/vol2-no3/vol2-no3-5.pdf)

- Baeva, T. A., Gein, S. V., Kuyukina, M. S., Ivshina, I. B., Kochina, O. A., and Chereshnev, V. A. (2014), "Effect of Glycolipid Rhodococcus Biosurfactant on Secretory Activity of Neutrophils In Vitro", Bulletin of Experimental Biology and Medicine, vol. 157, no. 2, pp. 238–242.

DOI: 10.1007/s10517-014-2534-9

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PLANT PHYSIOLOGY AND BIOCHEMISTRY

Research goal:

Researches focused on the physiological, biochemical and molecular mechanisms of plant growth and development in normal and stress conditions and elaboration of fundamental basis for plant biotechnologies.

Aspects studied:

- Sink-source relations in plants
- Developmental and ecological aspects of photosynthesis
- Plant tolerance
- Molecular physiology of plants

Research highlights:

- The study includes both theoretical and practical courses in plant molecular physiology and biotechnology.
- The students will have the opportunity to conduct research for their thesis in the Center for Fundamental Biotechnology and Bioengineering headed by the supervisor and will participate in laboratory and field studies, as well as field trips.
- The students will pursue their research in international team with the opportunity to do a part of their research in foreign partner universities.

Career opportunities:

The graduates can be demanded both in research institutions and industry dealing with plant biology and biotechnology, innovative agriculture and food biotechnology in Russia and abroad.

Supervisor's specific requirements:

Advanced knowledge in plant physiology and biochemistry, as well as skills in molecular technics.

Main publications:

- Kalinina, T. A., Shakhmina, Yu. S., Glukhareva, T. V., Morzherin, Yu. Yu., Fan, Z. J., Borzenkova, R. A., Skolobanova, E. S. and Kiseleva, I. S. (2014), "1,2,3-thiadiazolyl isocyanates in the synthesis of biologically active compounds. Study of the cytotoxic activity of N-(4-methyl-1,2,3-thiadiazolyl-5-yl)-N-(4-methylphenyl)urea", *Chemistry of Heterocyclic Compounds*, vol. 50, no. 7, pp. 1039–1046.
DOI: 10.1007/s10593-014-1561-9
- Ermoshin, A., Shatunova, S. and Kiseleva, I. (2015), "White clover cell culture tolerance to copper ions", *Journal of Biotechnology*, vol. 208, no. 20, pp. 115.
DOI: 10.1016/j.jbiotec.2015.06.362

- Mukhin, V. A., Patova, E. N., Kiseleva, I. S., Neustroeva, N. V. and Novakovskaya, I. V. (2016), "Mycetobiont symbiotic algae of wood-decomposing fungi", *Russian Journal of Ecology*, vol. 47, no. 2, pp. 133–137.
DOI: 10.1134/S1067413616020089
- Ermoshin, A. A., Kiseleva, I. S., Bortsova, S. A., Sanaeva, Y. V. and Alekseeva, V. V. (2016), "Morphological features of the transgenic tobacco plant shoot expressing the 3-hydroxy-3-methylglutaryl-CoA reductase (HMG1) gene in the direct and reverse orientations towards the promoter", *Russian Journal of Developmental Biology*, vol. 47, no. 1, pp. 216–222.
DOI: 10.1134/S1062360416040044
- Darkazanli, M., Kiseleva, I. and Darkazanli, K. (2018), "Genetic Diversity of E. coli O157: H7 Isolated from Some Leafy Greens, Irrigated by Aleppo River, Using Random Amplified Polymorphic DNA (RAPD) Marker", *Russ. Agricult. Sci.*, vol. 44, p. 146.
DOI: 10.3103/S1068367418020039



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AMPHIBIAN FUNCTIONAL ECOLOGY IN NATURAL AND MAN-TRANSFORMED ENVIRONMENT

Research goal:

The main objective of the research is to improve and develop a new methodology based on ecological functional analysis of amphibian ecophysiology, morphogenesis specific and its ecological mechanisms in natural populations of amphibians under effect of natural and anthropogenic environmental factors. The general theoretical significance of this area can be briefly described as functional amphibian ecology. This approach allows using the new parameters in the assessment of potential risks to human and animal populations under the effect of pollution and urbanization.

Aspects studied:

- Population ecology of amphibian
- Effects of environmental changes on populations and ecosystems
- Ecological physiology
- Problems of adaptation
- Morphogenesis
- Ontogenetic stability
- Problems of evolution in natural and man-transformed environment
- Urban ecology

Research highlights:

Making complex of researches on the different hierarchic levels of structural organization (organism, population, community) and functional specificity in natural amphibian populations as a central point of investigations. Possibility of cooperation with Helmholtz center (Germany, Leipzig), Institute of cytology and genetics RAS, Siberian division (Novosibirsk), and Institute of Plant and Animal Ecology RAS, Ural division (Ekaterinburg).

Career opportunities:

- Experience of research realization in the field of urban ecology, morphogenesis diversification in natural populations, functional ecology, coevolution, bioindication, ecological monitoring, and conservation of amphibian populations
- The results can be used as a basement for developing an optimal strategy of biodiversity conservation, monitoring and environmental health evaluation

Supervisor's specific requirements:

Knowledge on animal ecology, evolution, and morphogenesis.

Main publications:

- Baitimirova, E. A., Vershinin, V. L. (2017), "Interpopulation Variability in Growth and Puberty Rates in Male Moor Frogs (*Rana arvalis* Nilsson, 1842)", *Contemporary Problems of Ecology*, vol. 10, issue 1, pp. 9–16.
DOI: 10.1134/S1995425517010024
- Vershinin, V. L., Bersin, D. L., Vershinina, S. D. (2016), "Amphibian teratology – possible adaptive and evolutionary interpretations", *Vestnik of St. Petersburg State University, Series 3 – Biology*, issue 3, pp. 36–40. (in Russian).
DOI: 10.21638/11701/spbu03.2016.307
- Vershinin, V. L., Vershinina, S. D., Berzin, D. L., Zmeeva, D. V., Kinev, A. V. (2015), "Longterm observation of amphibian populations inhabiting urban and forested areas in Yekaterinburg, Russia", *Sci. Data* 2, article id. 150018
DOI: 10.1038/sdata.2015.18
- Vershinin, V. L. and Vershinina, S. D. (2013), "Physiological similarity of morphs due to homologous alleles in representatives of the Ranidae family", *Uspekhi sovremennoi Biologii*, vol. 113, no. 5, pp. 516–523. (in Russian).
<http://elibrary.ru/item.asp?id=20819522>
- Vershinin, V. L. and Vershinina, S. D. (2013), "Comparative Analysis of Hemoglobin Content in Four Species of Anurans from the Ural Uplands", *Doklady Biological Sciences*, vol. 450, issue 1, pp. 155–157.
DOI: 10.1134/S0012496613030137



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BIODIVERSITY AND ECOLOGY OF PLANT AND FUNGI IN A CHANGING WORLD

Research goal:

The research focuses on training specialists in Botany, Mycology, Ecology of Plants and Fungi, familiar with classical methods of field researches as well as high-tech experimental methods.

Aspects studied:

- Mycology: fungi biodiversity, geography, ecology, physiology
- Botany: plant biodiversity, ecology, ethnobotany
- Ecology: carbon and nitrogen cycles of the forest ecosystem, greenhouse gases, emission
- Biotechnology: medicinal fungi, biodiversity, molecular genetics

Research highlights:

Work involves a combination of field and experimental studies.

Career opportunities:

After graduating from the PhD program you got expertise on the ecology of fungi and plants, plant pathology, biodeterioration of woody plant and woody substances, using of fungi in biotechnology and can find a job in Russia and other countries.

Supervisor's specific requirements:

University degree in Botany, Mycology, Ecology.

Main publications:

- Mukhin, V. A., Neustroeva, N. V., Patova, E. N., Novakovskaya, I. V. and Kiseleva, I. S. (2016), "Mycetobiont symbiotic algae of wood-decomposing fungi", *Russian Journal of Ecology*, T. 47, no. 2, pp. 133–137.
DOI: 10.1134/S1067413616020089
- Voronin, P. Yu., Mukhin, V. A., Velivetskaya, T. A., Ignat'ev, A. V. and Kuznetsov, V. V. (2017), "Isotope composition of carbon and nitrogen in tissues and organs of *Betula pendula*", *Russian Journal of Plant Physiology*, T. 64, no. 2, pp. 184–189.
DOI: 10.1134/S102144371701017
- Gitarskiy, M. L., Zamolodchikov, D. G., Mukhin, V. A., Grabar, V. A., Diyarova, D. K. and Ivashchenko, A. I. (2017), "Carbon Fluxes from Coarse Woody Debris in Southern Taiga Forests of the Valdai Upland", *Russian Journal of Ecology*, vol. 48, no. 6, pp. 539–544.
DOI: 10.1134/S1067413617060030

- Mukhin, V. A., Neustroeva, N. V., Patova, E. N. and Novakovskaya I. V. (2018), "Lichen-like Symbiotic Associations of Wood-decaying Fungi and Algae. I. Biodiversity and Ecology of Photobionts", *The fourth International Scientific Conference on Ecology and Geography of Plants and Plant Communities*, 16–19 April, 2018, Ekaterinburg, Russia, pp. 134–142.
DOI: 10.18502/cls.v4i7.3231
- Mukhin, V. A., Knudsen, H., Kotiranta, H., Corfixen, P. and Kostitsina, M. V. (2018), "Wood-decaying Basidiomycetes Associated with Dwarf Siberian Pine in Northeast Siberia and the Kamchatka Peninsula", *The fourth International Scientific Conference on Ecology and Geography of Plants and Plant Communities*, 16–19 April, 2018, Ekaterinburg, Russia, pp. 125–133.
DOI: 10.18502/cls.v4i7.3230
- Mukhin, V. A., Zhuykova, E. V. and Badalyan, S. M. (2018), "Genetic Variability of the Medicinal Tinder Bracket Polypore, *Fomes fomentarius* (Agaricomycetes), from the Asian Part of Russia", *International Journal of Medicinal Mushrooms*, vol. 20, no. 6, pp. 561–568.
DOI: 10.1615/IntJMedMushrooms.2018026278.
- Mukhin, V. A., Patova, E. N., Sivkov, M. D., Novakovskaya, I. V. and Neustroeva, N. V. (2018), "Diversity and Nitrogen-Fixing Activity of Phototrophic Mycetobionts of Xylotrophic Fungi", *Russian Journal of Ecology*, vol. 49, no. 5, pp. 406–412.
DOI: 10.1134/S1067413618050090



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PLANT BIODIVERSITY, BIOGEOGRAPHY, BIOLOGICAL INVASIONS, URBAN ECOLOGY AND WEEDS

Research goal:

In-depth study of various aspects of plant biodiversity, biogeography, biological invasions, urban ecology and weeds

Aspects studied:

Biodiversity: Research on plant biodiversity, determinative factors (geographical, climatic, anthropogenic), quantitative evaluation of these factors according to their importance with the use of mathematical and statistical data processing methods.

Biogeography: Research on spatial structure of biodiversity, regional floras comparison, biotic homogenization and differentiation analysis.

Biological Invasions: Study on invasive species, their dispersal in secondary area and intrusion into natural plant communities and invasive plants pathway analysis.

Urban ecology: Research on biodiversity, patterns of formation and ecological importance of urban ecosystem plant component.

Weed plants: Research on biodiversity of weeds, its regional and latitudinal variations and weeds ecobiological features.

Research highlights:

Work involves a combination of field and experimental studies.

Career opportunities:

Botany and Ecology.

Supervisor's specific requirements:

University degree in Botany and Ecology.

Main publications:

- Tretyakova, A.S. (2016), "Regularities of distribution of alien plants in anthropogenic habitats of Sverdlovsk oblast", *Rus. J. of Biol. Invasions*, vol. 7, no. 1, pp. 77–83.
DOI: 10.1134/S2075111716010100

DOI: 10.1134/S2075111716010100

- Veselkin, D. V., Tretyakova, A. S., Senator, S. A., Saksonov, S. V., Mukhin, V. A. and Rozenberg, G. S. (2017), "Geographical Factors of the Abundance of Flora in Russian Cities", *Doklady Earth Sciences*, vol. 476, part 1, pp. 1113–1115.
DOI: 10.1134/S1028334X1709029X

DOI: 10.1134/S1028334X1709029X

- Tretyakova, A. S., Veselkin, D. V., Senator, S. A. and Golovanov, Ya. M. (2018), "Factors of Richness of Urban Floras in the Ural-Volga Region", *Russian Journal of Ecology*, vol. 49, no. 3, pp. 201–208.
DOI: 10.1134/S1067413618030098

DOI: 10.1134/S1067413618030098



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SYSTEMATICS AND ECOLOGY OF LICHENISED ASCOMYCETES

Research goal:

The research is focused on studies of biodiversity and systematics of lichens and revealing interactions of lichens and rocky substrate on the level of species and communities.

Aspects studied:

- Diversity, taxonomy and nomenclature of selected groups of lichens
- Diversity of lichen species on different rock types
- Ecological requirements of species and structure of saxicolous communities
- Role of secondary lichen metabolites
- Taxonomy and nomenclature of separate groups of lichens
- Substrate endemism in lichens

Research highlights:

The study is conducted in collaboration with an international research group within International Society on Serpentine Ecology (ISES) and supported by RFBR grants.

Career opportunities:

Due to experience in obtaining systematically meaningful information and field ecological data as well as using diverse software, a successful graduate may proceed his or her career in systematics of particular groups of lichenised ascomycetes, ecological monitoring, and environmental assessment.

Supervisor's specific requirements:

Elementary skills in determination of lichens, TLC and field experience.

Main publications:

- Paukov, A. G. (2009), "The Lichen Flora of Serpentine Outcrops in the Middle Urals of Russia", *Northeastern Naturalist*, vol. 16, special Issue 5, pp. 341–350.
DOI: 10.1656/045.016.0525

DOI: 10.1656/045.016.0525

- Paukov, A. G., Teptina, A. Yu., and Pushkarev, E. V. (2015), "Heavy metal uptake by chemically distinct lichens from *Aspicilia* spp. growing on ultramafic rocks", *Australian Journal of Botany*, vol. 63, pp. 111–118.
DOI: 10.1071/BT14255

DOI: 10.1071/BT14255

- Paukov, A., Nordin, A., Roux, C., Moon, K. H., and Davydov, E. (2017), "Lectotypification and synonymization of some *Aspicilia* species (Megasporeaceae, Ascomycota) described by A. Hue from Korea and Japan", *Phytotaxa*, vol. 291, no. 1, pp. 94–98.
DOI: 10.11646/phytotaxa.291.1.10

DOI: 10.11646/phytotaxa.291.1.10



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ENVIRONMENTAL BIOTECHNOLOGY FOR NATURAL AND TECHNOGENIC ENVIRONMENT

Research goal:

The research focuses on obtaining and sharing a broad range of knowledge for utilization of beneficial microbes, plants and organic amendments for remediation and restoration of natural and technogenic disturbed sites.

Aspects studied:

- Environmental pollution
- Microbial biotechnology
- Environmental monitoring and assessment
- Health impact due to metal pollution
- Organic amendments
- Bioremediation using high biomass plant

Research highlights:

- Phytoremediation of water and soil
- Environmental Microbiology
- Heavy metal assessment
- Solid and Hazardous waste management
- Environmental stress in plants
- Sustainable waste management

Career opportunities:

Graduates can work at leading international technical universities, research institutions and industrial companies dealing with preparation of bioformulation/biofertilizer, pollution control board, and environmental impact assessment companies.

Supervisor's specific requirements:

- Fluent in English
- Skills in using academic literature databases
- Knowledge of biotechnological and environmental equipments.
- Working experience with MS-EXCEL/statistical software.
- Basic knowledge of plant, soil and water contamination.

Main publications:

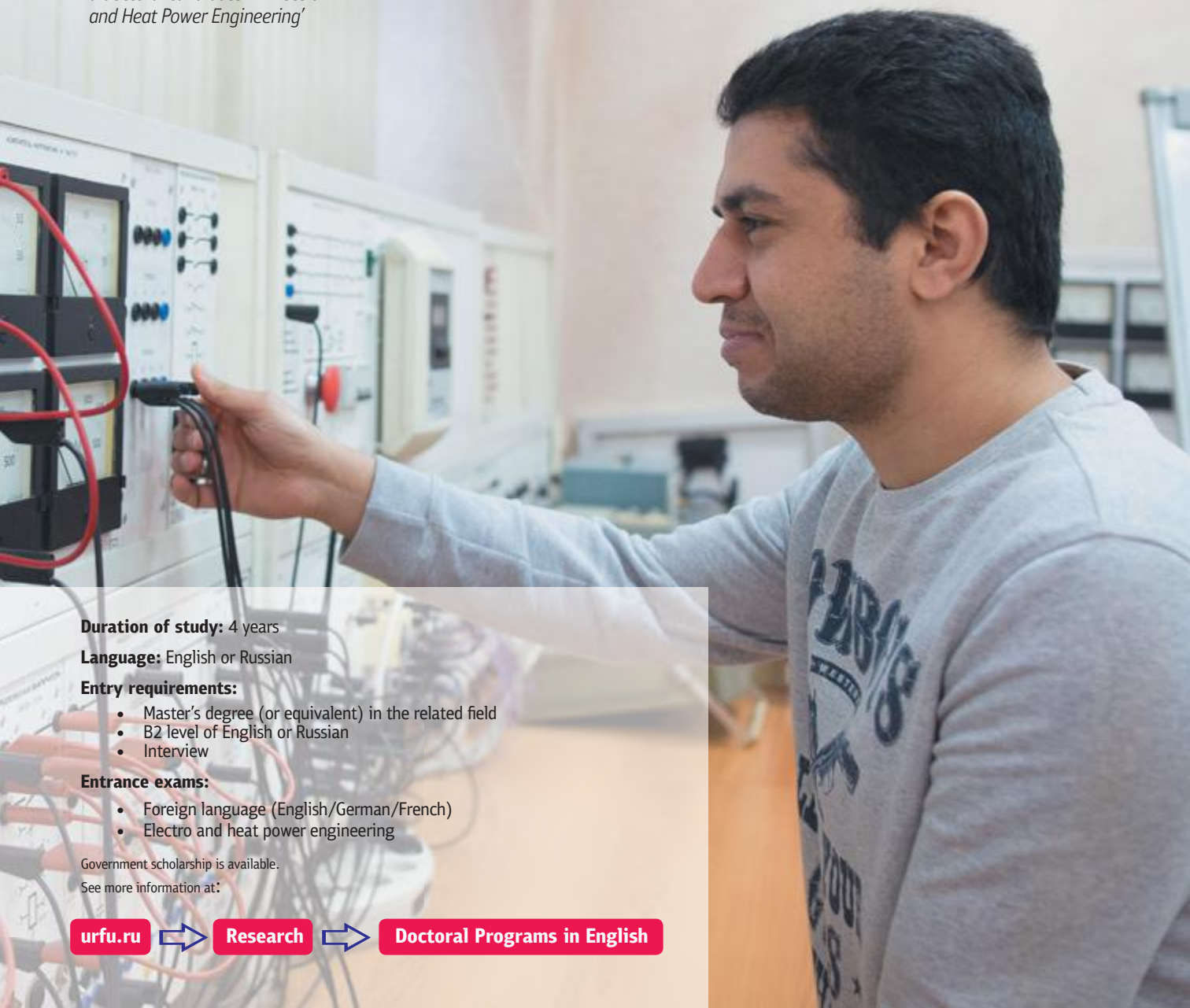
- Kumar, A., Tripti, Maleva, M., Kiseleva, I., Maiti, S.K., and Morozova, M. (2019), "Toxic metal(loid)s contamination and potential human health risk assessment in the vicinity of century-old copper smelter, Karabash, Russia", *Environmental Geochemistry and Health*. In-Press
DOI: 10.1007/s10653-019-00414-3

- Kumar, A. and Tripti (2018), "High ACC deaminase producing copper and nickel tolerant rhizobacteria enhances metal tolerance and seedling growth of Indian mustard plant", *New Biotechnology*, vol. 44, 90.
DOI: 10.1016/j.nbt.2018.05.944
- Tripti, Kumar, A., Usmani, Z., Kumar, V., and Anshumali (2017), "Biochar and flyash inoculated with plant growth promoting rhizobacteria act as potential biofertilizer for luxuriant growth and yield of tomato plant", *Journal of Environmental Management*, vol. 190, pp.20–27.
DOI: 10.1016/j.jenvman.2016.11.060
- Kumar, A., Maiti, S.K., Tripti, Prasad, M.N.V., and Singh, R.S. (2017), "Grasses and legumes facilitate phytoremediation of metalliferous soils in the vicinity of an abandoned chromite-asbestos mine", *Journal of Soils and Sediments*, vol. 17, no. 5, pp. 1358–68.
DOI: 10.1007/s11368-015-1323-z
- Kumar, A. and Maiti, S.K. (2015), "Effect of organic manures on the growth of *Cymbopogon citratus* and *Chrysopogon zizanioides* for the phytoremediation of chromite-asbestos mine waste: a pot scale experiment", *International Journal of Phytoremediation*, vol. 17, no. 5, pp. 437–447.
DOI: 10.1080/15226514.2014.910174
- Kumar, A. and Maiti, S.K. (2015), "Assessment of potentially toxic heavy metal contamination in agricultural fields, sediment, and water from an abandoned chromiteasbestos mine waste of Roro hill, Chaibasa, India", *Environmental Earth Sciences*, vol. 74, no. 3, pp. 2617–2633.
DOI: 10.1007/s12665-015-4282-1
- Ahirwal, J., Kumar, A., Pietrzykowski, M. and Maiti, S.K. (2018), "Reclamation of coal mine spoil and its effect on Technosol quality and carbon sequestration: a case study from India", *Environmental Science and Pollution Research*, vol. 25, no. 28, pp. 27992–28003.
DOI: 10.1007/s11356-018-2789-1
- Maleva, M., Borisova, G., Chukina, N., and Kumar, A. (2017), "Urea increased nickel and copper accumulation in the leaves of *Egeria densa* (Planch.) Casp. And *Ceratophyllum demersum* L. during short-term exposure", *Ecotoxicology and Environmental Safety*, vol. 148, pp. 152–159.
DOI: 10.1016/j.ecoenv.2017.10.012

Engineering



Mahmoud Mahrous Amery Aref (Egypt)
a doctoral candidate in 'Electro
and Heat Power Engineering'



Duration of study: 4 years

Language: English or Russian

Entry requirements:

- Master's degree (or equivalent) in the related field
- B2 level of English or Russian
- Interview

Entrance exams:

- Foreign language (English/German/French)
- Electro and heat power engineering

Government scholarship is available.

See more information at:

urfu.ru



Research



Doctoral Programs in English



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ENERGY-INFORMATIONAL MODELS OF FUNCTIONING AND DEVELOPMENT OF POWER SUPPLY SYSTEMS FOR MEGALOPOLISES

Research goal:

The study is aimed at training specialists in the field of constructing and monitoring technical conditions of power supply systems.

Aspects studied:

- Adaptive and multi-level information systems, decision support for management tasks and objectives of the development of power supply systems of large cities
- Structures of storing information about objects and the individual elements of the urban power grid
- Methods indicative analysis of the functional state of electrical equipment and assessment modes of power supply systems in general

Research highlights:

Development of systematic and analytical thinking, ability to predict situation development and decision outcomes, ability to think realistically and on a large scale.

Career opportunities:

Employment and research in the field of technologies, which involve creating energy-efficient systems for power transporting, distribution and use.

Main publications:

- Manusov, V., Matrenin, P. and Kokin, S. (2017), "Swarm intelligence algorithms for the problem of the optimal placement and operation control of reactive power sources into power grids", International Journal of Design and Nature and Ecodynamics, vol. 12, no. 1, pp. 101–112.
DOI: 10.2495/DNE-V12-N1-101-112
- Djararov, N., Grozdev, Z., Bonev, M., Djararova, J., Pazderin, A. and Kokin, S. (2016), "Adaptive control of wind PMSG", 17th International Scientific Conference on Electric Power Engineering, Prague, Czech Republic, May 16–18, 2016, 7521828.
DOI: 10.1109/EPE.2016.7521828

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HIGHLY EFFICIENT ENERGY CONVERSION AND GENERATION TECHNOLOGIES BASED ON FOSSIL FUELS

Research goal:

The aim of the research is to create highly effective and ecological technologies for energy generation using fossil and industrial fuels.

Aspects studied:

- Solid fuels combustion and gasification technologies
- Complex thermodynamic calculations for IG CCo power plants
- CFD modeling for the entire gasifier processes
- Kinetics experiments with coal and biomass
- High-temperature air heating technologies
- GT operating on LCV syngas

Research highlights:

- Analysis of modern academic literature with the use of major international databases: Web of Science, Scopus, ScienceDirect, etc.
- Conducting experimental research using university facilities as well as best equipment in Russia and foreign countries
- Calculating heat schemes for electric power plants using advanced specialized software: Aspen Plus, Thermoflow, Epsilon, etc.
- 3D modeling of perspective heat and energy processes using calculation hydrodynamics methods (CFD) with high – productive computers
- Joint research (collaboration) with the leading national and foreign scientific centers (IT SB RAS, TU Freiberg, HIT)

Career opportunities:

- International energy generation companies
- Leading international technical universities and research centers

Supervisor's specific requirements:

- Fluent English (basic Russian language will be an advantage)
- Skills in using academic literature databases
- Awareness of modern power technologies and trends in heating and power technologies development
- Mastering main experimental methods including thermal analysis (thermogravimetric analysis, etc.)
- Ability to calculate basic heat schemes for electric power stations
- Skills in modeling heat and power devices using calculation hydrodynamics methods (CFD)
- Experience in publishing articles in high – rating journals and presenting reports at international conferences

Main publications:

- Ryzhkov, A., Bogatova, T. and Gordeev, S. (2018), "Technological solutions for an advanced IGCC plant", Fuel, vol. 214, pp. 63-72.
DOI: 10.1016/j.fuel.2017.10.099
- Ryzhkov, A. F., Abaimov, N. A., Donskoi, I. G. and Svishchev, D. A. (2018), "Modernization of Air-Blown Entrained-Flow Gasifier of Integrated Gasification Combined Cycle Plant", Combustion, Explosion and Shock Waves, vol. 54, no. 3, pp. 337-344.
DOI: 10.1134/S0010508218030103



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ELECTROMECHANICAL MOTION CONTROL SYSTEM

Research goal:

The study is aimed at training specialists in the field of modern automated electric drives, simulation mathematic modeling and design of electro-mechanic of AC/DC systems.

Aspects studied:

- Simulation of electric drives and technological machines and mechanisms, including real-time simulation
- Analysis and optimization of the electric drive behavior for energy datum
- Development and research of electrified transport systems
- Development of expert systems for the assessment of the state of machine units on the basis of the variables of the electric drive

Research highlights:

Available equipment allows to create program simulators of electro-mechanic systems with semi-conductor converters of variable complexity and topology (AC/DC, AC/AC, DC/AC, DC/DC). The use of FPGA in controllers allows to use «hardware-in-the-loop» (HIL) technology, returning object variables from the simulation model at a frequency of no less than 1 MHz. The use of such simulators is the most effective in conducting and adjusting control systems of electric drives of complex technological machines and equipment such as metallurgical machines electric drives, transportation and hoisting machines, traction devices, etc.

Career opportunities:

Research and employment in the field of energy effective electric drives, power supply and electromagnetic compatibility, electric drive systems modeling, design, and regulation (using National Instruments equipment), electric drives testing, cost minimization, etc.

Supervisor's specific requirements:

- Knowledge of Si, VHDL
- Experience with Matlab and LabVIEW
- Knowledge of electro-mechanics, power converters and automation control theory

Main publications:

- Zyuzev, A. M., Mudrov, M. V., and Nesterov, K. E. (2016), "PHIL-system for electric drives application", 9th International Conference on Power Drives Systems, ICPDS2016. DOI: 10.1109/ICPDS.2016.7756687



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TECHNOLOGICAL TRANSPORT SYSTEM BASED ON LINEAR ELECTRIC DRIVE

Research goal:

The study is aimed at training specialists in the field of construction and operation of linear electric motors in industry and transportation.

Aspects studied:

- Constructions and modes of operation of transport systems on the basis of linear synchronous and asynchronous electric motors
- Induction systems of technological transport of conductive fluids (molten metals)
- Electrodynamic processes in multi-layer massive conductive secondary elements
- Calculations of thermal processes and design of cooling systems in unequally loaded linear motors
- Numerical modeling of electromagnetic and thermal processes in induction devices with non-continuous magnet cores on the basis of detailed equivalent circuit

Research highlights:

Study of linear electric motor types, their theory, mathematic models and methods of calculating their characteristics as well as exploitation peculiarities.

Career opportunities:

Graduates can work at teaching, research institutions and industrial companies dealing with linear electric motors for industry and transport.

Supervisor's specific requirements:

Applicant must have master degree in the field of electromechanics or electric motors.

Main publications:

- Dmitrievskii, V., Goman, V., Sarapulov, F., Prakht, V. and Sarapulov, S. (2016), "Choice of a numerical differentiation formula in detailed equivalent circuits models of linear induction motors", International Symposium on Power Electronics, Electrical Drives, Automation and Motion, SPEEDAM 2016, 28 July 2016, pp. 458–463 DOI: 10.1109/SPEEDAM.2016.7525888
- Sarapulov, F.N., Sarapulov, S.F., and Frizen, V.E. (2015), "Use of detailed equivalent circuit method for investigation of electromagnetic, thermal and hydrodynamic processes in induction electric engineering units", Acta Technica CSAV (Ceskoslovensk Akademie Ved), vol. 60, no. 2, pp. 131–153.



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MODERNIZATION OF DESIGN AND OPERATIONAL PROCESSES FOR STEAM TURBINES EQUIPMENT BASED ON MODERN IT

Research goal:

The study is aimed at training specialists in the design and operation of steam turbine equipment. The second goal is to explore the possibilities of using “smart” technologies, such as the Internet of Things (IoT) to optimize the effectiveness of steam turbine equipment.

Aspects studied:

- Problems of aerohydrodynamical vibration initiation of turbine elements during operation
- Modernization of design methods for layout of the equipment based on modern technologies
- Modernization of design methods for steam turbines equipment based on modern technologies
- CAD, CAM and CAE applications for design and operation processes improvement

Research highlights:

- In accordance with the life cycle methodology support, a conceptual model of the information support system during life cycle main stages of steam turbine unit is suggested
- A system for designing water heaters of steam–turbine installations based on uniting standards, reference information and some numerical procedures with design procedures via wide use of parameterization is developed
- A system for the automated design of oil coolers for steam turbines is developed

Career opportunities:

Specialists in the field of CAD/CAM/CAE-technologies for the design of machinery are in high demand in industry, science and business.

Supervisor’s specific requirements:

Knowledge in the field of thermodynamics, CAD – technologies (Autocad, Creo Parametric), CAE-technologies (Creo Simulate, Ansys Fluent) is necessary.

Main publications:

- Brezgin, V. I., Brodov, Yu. M. and Kultishev, A. Yu. (2017), “Improvement of Steam Turbine Operational Performance and Reliability with using Modern Information Technologies”, International Conference on Problems of Thermal Physics and Power Engineering (PTPPE2017), 9–11 October 2017, Moscow, Russia, 012246.
DOI: 10.1088/1742–6596/891/1/012246

- Aronson, K. E., Brezgin, V. I., Brodov, Y. M., Gorodnova, N. V., Kultyshev, A. Y., Tolmachev, V. V. and Shablova, E. G. (2016), “Development of requirements on safety cases of machine industry products for power engineering”, Thermal Engineering, vol. 63, no. 14, pp. 1003–1015.
DOI: 10.1134/S0040601516140032
- Brezgin, V. I., Brodov, Y. M. and Brezgin, D. V. (2015), “Increasing reliability of system water heaters for steam–turbine installations at the design stage”, Thermal Engineering (Teploenergetika), vol. 62, no. 14, pp. 1032–1037.
DOI: 10.1134/S0040601515140037

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MANAGED DYNAMICAL SYSTEMS WITH INCOMPLETE INFORMATION IN ENGINEERING AND ECONOMICS

Research goal:

The study is focused on training highly qualified specialists in the field of mathematical modeling of technical and economics objects for solving control problems.

Aspects studied:

- Minimax observation and control problems for dynamical systems
- Numerical methods of forming solutions for control problems
- Adaptive control systems for mechanical objects
- Information systems for economics dynamical systems
- Intellectual information systems for technical objects

Research highlights:

- Training highly qualified specialists capable of developing dynamic models and methods for solving problems of optimal estimation and control for complex technical and economic objects
- Training highly qualified specialists capable of developing intelligent information systems for optimizing management decisions for complex dynamical technical and economic objects
- Studying several academic disciplines on educational programs for training specialists in the field of mathematical modeling and management processes

Career opportunities:

- Researcher in a large corporation to design and develop navigation and control systems of complex dynamical objects
- Specialist in the design and development of computer software systems to solve optimal control problems of complex technical and economic objects in large IT-firms
- Teaching students in educational programs for training specialists in mathematical modeling and control processes

Supervisor's specific requirements:

A degree in the field of Applied Mathematics or Engineering.

Main publications:

- Shorikov, A. F. and Butsenko, E. V. (2017), Prognozirovanie i optimizatsiya rezultata upravleniya investitsionnykh proektirovaniyem [Forecasting and optimization of the result of investment project management], URSS, Moscow, Russian Federation, 272 p. (in Russian)
ISBN: 978-5-9710-4771-1

- Shorikov, A. F. (2017), "Algorithm for solving of two-level hierarchical minimax program control problem of final state the regional socio-economic system in the presence of risks", The 9th International Conference: «Application of Mathematics in Technical and Natural Sciences (AMiTaNS'17)», Albena, Bulgaria, June 21–26, 2017, vol. 1985, pp. 050012-1-11.
DOI: 10.1063/1.5007384
- Shorikov, A. F. (2018), "Minimax Program Terminal Control in Two-Level Hierarchic Nonlinear Discrete Dynamical System", Journal of Mathematical Sciences, vol. 230, no. 5, pp. 808–812.
DOI: 10.1007/s10958-018-3795-z
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DOI: 10.1016/j.ifacol.2018.11.441
- Shorikov, A. F. (1996), "An Algorithm for a Posteriori Minimax Estimation of States of Discrete Dynamic Systems. II", Automation and Remote Control, vol. 57, no. 9, pp. 1335–1343.
<https://elibrary.ru/item.asp?id=13234236>
- Shorikov, A. F. (2004), "Problem of Adaptive Minimax Control for Pursuit-Evasion Process", Information Processing: Recent Mathematical Advances in Optimization and Control, Mathematical and Computational Sciences, pp. 1–10.
DOI: 10.1016/S1474-6670(17)35159-5
- Shorikov, A. F. (2005), "An Algorithm of Adaptive Minimax Control for Pursuit-Evasion in Discrete Dynamical Systems with Several Pursuers", Journal of Computer and Systems Sciences International, vol. 44, no. 5, pp. 761–776.
<https://elibrary.ru/item.asp?id=13475768>
- Shorikov, A. F. (2014), "Minimax program control for the approach process in a two-level hierarchical discrete dynamical system", Automation and Remote Control, vol. 75, no. 3, pp. 458–469.
DOI: 10.1134/S0005117914030047



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ELECTROTECHNOLOGIES IN METALLURGY

Research goal:

Finding solution for electromagnetic and heat tasks using modern digital modeling packages

Aspects studied:

- Electrotechnology
- Electromagnetic field theory
- Magnetic hydrodynamics
- Transformation technology

Research highlights:

Extensive experience in modern digital packages for modeling electromagnetic and heat tasks.

Career opportunities:

Companies dealing with electrometallurgy

Supervisor's specific requirements:

Knowledge of electromagnetic fields theory. Ability to work with CAD software

Main publications:

- Sarapulov, S., Kazakbaev, V., Prakht, V., Dmitrievskii, V., Oshurbekov, S. (2019), "Efficiency analysis of low electric power drives employing induction and synchronous reluctance motors in pump applications", *Energies*, vol. 12, issue 6, 1144. DOI: 10.3390/en12061144
- Sarapulov, S., Dmitrievskii, V., Prakht, V., Kazakbaev, V. (2018), "Optimal design of a high-speed single-phase flux reversal motor for vacuum cleaners", *Energies*, vol. 11, issue 12, 3334. DOI: 10.3390/en11123334
- Sarapulov, S. F., Frizen, V. E., Smolianov, I. A. (2018), "Induction crucible furnace with reactive power nonsymmetrical compensation of inductor sections", *Proceedings of 2018 20th International Symposium on Electrical Apparatus and Technologies (SIELA)*. DOI: 10.1109/SIELA.2018.8447132
- Sarapulov, S., Sarapulov, F., Smolyanov, I. (2017), "Research of thermal regimes of linear induction motor", *Proceedings of 2017 18th International Conference on Computational Problems of Electrical Engineering (CPEE)*. DOI: 10.1109/CPEE.2017.8093079
- Sarapulov, S., Sarapulov, F., Smolyanov, I. (2017), "Compensated linear induction motor characteristics research by detailed magnetic equivalent circuit", *Proceedings of 2017 International Conference on Industrial Engineering, Applications and Manufacturing (ICIEAM)*. DOI: 10.1109/ICIEAM.2017.8076314



Sawfan Abo Saleh
(Syria)

Ural Federal could not have provided me with a better experience of university life. The staff and students are all friendly, the **course is brilliant**, the social life is great and the campus provides a **safe and friendly environment** to live in!



Duration of study: 4 years

Language: English or Russian

Entry requirements:

- Master's degree (or equivalent) in the related field
- B2 level of English or Russian
- Interview

Entrance exams:

- Foreign language (English/German/French)
- Nuclear, Thermal and Renewable Energy and Related Technologies

Government scholarship is available.

See more information at:

urfu.ru → **Research** → **Doctoral Programs in English**

*Akram Hamzah Abed Al-Janabi (Iraq)
a doctoral candidate in 'Nuclear, Thermal
and Renewable Energy and Related
Technologies'*



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COMPLEX ENERGY SYSTEMS

Research goal:

The study is aimed at training specialists in the field of improving and introducing equipment for using renewable energy sources and two-phase flows in power machines pipelines.

Aspects studied:

- Dosimetry and protection from ionizing radiation
- Vibration of pipelines with two-phase flows in NPP equipment
- Main and auxiliary equipment of renewable energy sources
- Heat pumps, biogas plants, solar PV system and vacuum collectors, wind turbines
- Optimization of energy systems based on renewable energy sources

Research highlights:

- Research and improvement of RES equipment functioning modes
- Creation of software for optimizing complex energy systems based on RES
- Participation in innovation projects aimed at implementing RES
- Researching two-phase flows using experimental vibro-diagnostic stand
- Designing effective passive devices for decreasing pipeline vibrations at power plants

Career opportunities:

- Implementing projects of power industry objects based on renewable energy sources (RES)
- Management of small innovation enterprises dealing with RES, designing power industry objects and infrastructure with the use of RES
- Managing power industry objects (heat and power supply) of an object, company, area, region
- Managing municipal, regional and republican sectors of implementing and developing RES
- Organization of international cooperation in the field of introducing innovative power objects using RES

Supervisor's specific requirements:

- Knowledge of physics, peculiar features of design, installation and exploitation of all main renewable energy sources (on the basis of wind, solar, hydro and geothermal energy)
- Ability to use methods of RES calculation
- Skills in reading heat and electric schemes
- Experience in using applied software for calculating power supply objects on RES

Main publications:

- Velkin, V. I. and Shcheklein, S. E. (2017), "Influence of RES Integrated Systems on Energy Supply Improvement and Risks", Problemy Ekorozwoju, vol. 12, no. 1, pp. 123–129.
<https://elibrary.ru/item.asp?id=29468408>
- Arbuzova, E., Shcheklein, S. and Velkin, V. (2015), "Features of biogas technology application in severe climatic conditions", Energy And Sustainability V: Special Contributions, pp. 347–359.
DOI: 10.2495/ESS140311

Kingsley Duru (Nigeria) a doctoral candidate in Chemical Technology working on his research

Duration of study: 4 years

Language: English or Russian

Entry requirements:

- Master's degree (or equivalent) in the related field
- B2 level of English or Russian
- Interview

Entrance exams:

- Foreign language (English/German/French)
- Chemical Technology

Government scholarship is available.

See more information at:

urfu.ru



Research



Doctoral Programs in English



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CHEMICAL TECHNOLOGIES FOR THE SYNTHESIS OF NANOSTRUCTURED FILMS OF SEMICONDUCTOR AND OTHER FUNCTIONAL MATERIALS

Research goal:

The study is aimed at training specialists in the field of chemical technology of synthesis of thin-film functional materials for electronic engineering, micro- and nanoelectronics, photonics, and sensor technology.

Aspects studied:

- Synthesis of new thin-film materials sensitive to the IR spectral domain
- Synthesis of new materials for efficient solar energy conversion
- Synthesis of new materials for chemical sensors and environmental monitoring
- Colloidal chemical synthesis of quantum dots
- Investigation of the effect of water solution history on chemical reactions

Research highlights:

The conditions of the hydrochemical synthesis of thin films on various nature substrates for more than 40 binary and ternary compounds of sulphides and selenides of metals of various functional purposes have been developed. For the first time, films of the perovskite and kesterite structure for solar radiation converters were obtained by chemical bath deposition.

Career opportunities:

Graduates will be in demand in research laboratories and in enterprises of optoelectronics and nanoelectronics, as well as sensor technology.

Supervisor's specific requirements:

Deep knowledge of physical and colloid chemistry, as well as analytical reasoning.

Main publications:

- Markov, V. F., Tretyakova, N. A., Maskaeva, L. N., Bakanov, V. M. and Muhamedzyanov, H. N. (2012), "Hydrochemical synthesis, structure, semiconductor properties of films of substitutional $Pb_{1-x}Sn_xSe$ solid solutions", *Thin Solid Films*, vol. 520, no. 16, pp. 5227–5231.
DOI: 10.1016/j.tsf.2012.03.100
- Markov, V. F. and Maskaeva, L. N. (2014), "Nucleation and mechanism of metal sulfide film growth using deposition by thiocarbamide", *Russian Chemical Bulletin*, vol. 63, no. 7, pp. 1523–1532.
DOI: 10.1007/s11172014 0630
- Smirnova, Z. I., Maskaeva, L. N., Markov, V. F., Voronin, V. I. and Kuznetsov, M. V. (2015), "Incubation of PbSe Thin Films in a Tin(II) Salt Aqueous Solution: Modification and Ion-Exchange Reactions", *J. of Materials Science and Technology*, vol. 31, no. 1, pp. 790–797.
DOI.org/10.1016/j.jmst.2015.06.003



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MULTI-COMPONENT REACTIONS AT INTERFACES: A PROMISING TECHNOLOGY FOR ORGANIC SYNTHESIS

Research goal:

Fundamental and applied research in the field of multi-component reactions and colloidal chemistry. Preparation of polysaccharide microgels, liposomes and complex drug delivery systems.

Aspects studied:

- Acceleration of the Passerini and Ugi reactions in aqueous emulsions and micellar solutions
- Finding of novel MCRs in multi-phase aqueous systems
- Formation of polysaccharide microgels via MCRs
- Preparation of novel drug delivery carriers including composite liposomes

Research highlights:

Creation of novel drug delivery systems using multicomponent reactions in aqueous solutions. Synthesis of microgels on the basis of cellulose, pectin, chitosan and other polysaccharides. Preparation of liposomes coated with modified polysaccharides.

Career opportunities:

Graduates will be in demand in university research laboratories as well as corporate R&D departments involved in the pharmaceutical development and technology.

Supervisor's specific requirements:

- Knowledgeable in organic and colloidal chemistry, methods for identification of organic compounds
- Good skills in organic synthesis
- Experience in pharmaceutical technology

Main publications:

- Shulepov, I. D., Kozhikhova, K. V., Panfilova, Y. S., Ivantsova, M. N., and Mironov, M. A. (2016), "One-pot synthesis of cross-linked sub-micron microgels from pure cellulose via the Ugi reaction and their application as emulsifiers", *Cellulose*, vol. 23, pp. 2549–2559.
DOI: 10.1007/s10570016 0957 3
- Kozhikhova, K. V., Ivantsova, M. N., Tokareva, M. I., Shulepov, I. D., Tretiyakov, A. V., Shaidarov, L. V., Rusinov, V. L., and Mironov, M. A. (2016), "Preparation of chitosan-coated liposomes as a novel carrier system for the antiviral drug Triazavirin", *Pharmaceutical Development and Technology*, pp. 1–9.
DOI: 10.1080/10837450.2016.1242624
- Kovaleva, E. G., Molochnikov, L. S., Venkatesan, U., Marek, A., Stepanova, D. P., Kozhikhova, K. V., Mironov, M. A., and Smirnov, A. I. (2016), "Acid-Base Properties of Nanoconfined Volumes of Anodic Aluminum Oxide Pores by EPR of pH-Sensitive Spin Probes", *Journal of Physical Chemistry C*, vol. 120, no. 5, pp. 2703–2711.
DOI: 10.1021/acs.jpcc.5b10241



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PRODUCTION OF NEW MATERIALS FOR ELECTROCHEMICAL POWER ENGINEERING

Research goal:

The research is aimed at obtaining new materials by electrolysis of molten mediums.

Aspects studied:

The study of the thermodynamics and kinetics of electrode processes in molten salts.

Research highlights:

- Solubility and electrode potential of alkaline earth metals, kinetics of electrode processes in halide melts
- Kinetic parameters of electrode processes on different materials in aluminum melts

Career opportunities:

Research activities in the field of high-temperature electrochemistry.

Supervisor's specific requirements:

Fundamental knowledge of electrochemical system thermodynamics and main methods of electrochemical processes investigation.

Main publications:

- Arkhipov, P., Kholkina, A., and Zaykov, Y. (2016), "EMF measurements in the Liquid Pb/PbCl₂-KCl/Pb-Sb-Bi system", *Journal of the Electrochemical Society*, vol. 163, no. 2, pp. H30-H35.
DOI: 10.1149/2.0511602jes
- Galashev, A. E., Rakhmanova, O. R., and Zaikov, Y. P. (2016), "Defect silicene and graphene as applied to the anode of lithium-ion batteries: Numerical experiment", *Physics of the Solid State*, vol. 58, no. 9, pp. 1850–1857.
DOI: 10.1134/S1063783416090146
- Pershin, P., Khalimullina, Yu., Arkhipov, P., and Zaikov, Yu. (2014), "The electrodeposition of lead in LiCl-KCl-PbCl₂ and LiCl-KCl-PbCl₂-PbO melts", *Journal of the Electrochemical Society*, vol. 161, no. 14, pp. D824-D830.
DOI: 10.1149/2.0051501jes
- Zaykov, Yu. P., Isakov, A. V., Zakiryanova, I. D., Reznitskikh, O. G., Chemezov, O. V. and Redkin, A. (2014) "Interaction between SiO₂ and a KF-KCl-K₂SiF₆ Melt", *Journal of Physical Chemistry B*, vol. 118, pp. 1584–1588.
DOI: 10.1021/jp4086816
- Zaikov, Yu. P., Batukhtin, V. P., Shurov, N. I., Ivanovskii, L. E., and Suzdaltsev, A. V. (2014), "Calcium production by the electrolysis of molten CaCl₂ – Part I. Interaction of calcium and copper-calcium alloy with electrolyte", *Metallurgical and Materials Transactions B*, vol. 45, pp. 961–967.
DOI: 10.1007/s11663-013-9990-x



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ELECTROCRYSTALLIZATION OF METALS IN COMPACT AND DISPERSED FORM

Research goal:

The research is aimed at studying the structure and regularities in formation of dendritic and spongy metal deposits with special properties for the creation of a new electrode materials and technologies (3D prototype).

Aspects studied:

- Research on the influence of electrolysis conditions on the structural and morphological characteristics of the dispersed deposits
- Study of regularities of anode processes on active metal

Research highlights:

- Prediction of dynamics of the electrodeposition and properties of dendritic deposits of metals depending on the conditions and modes of electrolysis
- Analysis of the mechanism of anodic dissolution of metals and zinc-rich composite coatings

Career opportunities:

Research activities in the field of electrochemical processes and corrosion protection.

Supervisor's specific requirements:

- Knowledge of the fundamentals of electrochemical kinetics
- Knowledge of the elements of mathematical statistics
- Good experimental skills, experience in application of general methods of the study of electrochemical processes

Main publications:

- Ostanina, T. N., Rudoi, V. M., Nikitin, V. S., Darintseva, A. B. and Demakov, S. L. (2017), "Change in the physical characteristics of the dendritic zinc deposits in the stationary and pulsating electrolysis", *Journal of Electroanalytical Chemistry*, vol. 784, pp. 13–24.
DOI: 10.1016/j.jelechem.2016.11.063
- Ostanina, T. N., Rudoi, V. M., Patrushev, A. V., Darintseva, A. B. and Farlenkov, A. S. (2015), "Modelling the dynamic growth of copper and zinc dendritic deposits under the galvanostatic electrolysis conditions", *Journal of Electroanalytical Chemistry*, vol. 750, pp. 9–18.
DOI: 10.1016/j.jelechem.2015.04.031
- Ostanina, T. N., Rudoi, V. M., Darintseva, A. B., Cheretaeva, A. O., Demakov, S. L. and Patrushev, A. V. (2014), "Effect of the polarization conditions on structural properties of zinc dendritic deposits", *Powder Metallurgy and Metal Ceramics*, vol. 52 (9–10), pp. 489–497.
DOI: 10.1007/s11106014 9551 0
- Ostanina, T. N., Rudoi, V. M., Ovsyannikova, A. N., Malkov, V. B. (2010), "Magnesium alloys spontaneous dissolution features under external anodic polarization in presence of inhibitors", *Russian Journal of Electrochemistry*, vol. 46, no. 6, pp. 707–713.
DOI: 10.1134/S1023193510060169



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SURFACE CHEMISTRY OF HYDRATED POROUS AND NANOSTRUCTURES MATERIALS; ADSORPTION AND HETEROGENEOUS CATALYSIS INCLUDING ENZYMATIC CATALYSIS FOOD CHEMISTRY AND BIO- AND CHEMICAL TECHNOLOGY FOR FUNCTIONAL FOODSTUFFS DESIGN AND BIOMEDICINE

Research goal:

The research focuses on production and electro surface characterization of different hydrated pure and composite organic, bioorganic and inorganic porous and nanostructured materials using EPR spectroscopy and pH sensitive nitroxide radicals as spin probes and labels. It is also aimed at studying a relationship between electrostatic, acid-base, adsorption and catalytic properties of these materials in a variety of processes for the purpose of optimizing functionalized materials for different applications including processing the natural polysaccharides by enzymes immobilized on oxide systems. Food science- and biotechnology-related research involves chemical extraction and biotechnological production of valuable biologically active substances (BAS) from industrial wastes and plant raw materials, their characterization as well as design of new foodstuffs with fortified BAS and application in preventive medicine of socially significant deceases and for wellbeing.

Aspects studied:

- Surface electrochemistry of hydrated nanoporous and nanostructured materials
- EPR spectroscopy of transition metal ions complexes and nitroxides as spin probes and labels in solid-state objects
- Sorption and catalytic studies of ion-exchange resins, cellulose – inorganic hydrogels composites and nanoporous oxides of Al, Ti, Zr, Si in different processes
- Homogenous and heterogeneous enzymatic catalysis
- Food Chemistry of biologically active substances and Biotechnology
- Foodstuffs enriched with biologically active substances

Research highlights:

Production and characterization of heterogeneous catalysts, EPR spectroscopy of pH sensitive nitroxide radicals as spin probes and labels, acidic and enzymatic catalysis of organic compounds and natural polysaccharides, Food chemistry of isoflavones, chaga mushroom-containing BAS, Chlorella algae growth factor etc., Design of food stuffs based on brewing wastes, isoflavones, astaxanthin, bioiodine and bio selenium etc.

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Career opportunities:

Employment as a researcher in research institutes and public and private universities, employment in the industries related to the production of functional materials including nanomaterials, as well as in the companies dealing with manufacturing heterogeneous catalysts such as Haldor Topsoe A/O (Denmark), UOP (USA), Axens (France), Johnson Matthey (UK), OOO «NIAP-Catalyst» (Russia) etc. Ph.D. holders in food chemistry and biotechnology can seek for a job in production quality control, product and new biotechnologies development and innovation in food and drink industries Danone, Heineken etc.).

Supervisor's specific requirements:

- Strong motivation and creativity;
- Basic knowledge in inorganic, physical chemistry, homogeneous and heterogeneous catalysis including enzymatic catalysis/ food chemistry, biotechnology, food technology; any knowledge and skills in medicine is highly desired
- Good experimental chemical/biotechnological skills

Main publications:

- Duru, K., Kovaleva, E. G., Danilova, I. G. and van der Bijl, P. (2019), "The pharmacological potential and possible molecular mechanisms of action of *Inonotus obliquus* from preclinical studies", *Phytotherapy Research*, ptr.6384. DOI: 10.1002/ptr.6384
- Duru, K. C., Kovaleva, E. G., Danilova, I. G. and Belousova, A. V. (2019), "Production and Assessment of Novel Probiotic Fermented Oat Flour Enriched with Isoflavones", *LWT*, vol. 111, pp. 9–15. DOI: 10.1016/j.lwt.2019.04.102
- Duru, K. C., Kovaleva, E. G., Danilova, I. G., van der Bijl, P. and Belousova, A. V. (2018), "The potential beneficial role of isoflavones in Type 2 Diabetes mellitus", *Nutrition Research*, vol. 59, pp. 1–15. DOI: 10.1016/j.nutres.2018.06.005
- Kovaleva, E. G., Molochnikov, L. S., Antonov, D. O., Tambasova (Stepanova), D. P., Hartmann, M., Tsmokalyuk, A. N., Marek, A. and Smirnov, A. I. (2018), "Proton Activity in Nanochannels Revealed by Electron Paramagnetic Resonance of Ionizable Nitroxides: A Test of the Poisson–Boltzmann Double Layer Theory", *J. Phys. Chem. C*, vol. 122, no. 35, pp. 20527–20538. DOI: 10.1021/acs.jpcc.8b04938
- Duru K. C., Kovaleva, E. G., Danilova, I. G., van der Bijl, P. and Belousova, A. V. (2018), "The potential beneficial role of isoflavones in Type 2 Diabetes mellitus", *Nutrition Research*, vol. 59, pp. 1–15. DOI: 10.1016/j.nutres.2018.06.005

- Kovaleva, E. G., Molochnikov, L. S., Stepanova, D. P., Pestov, A. V., Trofimov, D. G., Kiriluyuk, I. A. and Smirnov, A. I. (2017), "Interfacial Electrostatic Properties of Hydrated Mesoporous and Nanostructured Alumina Powders by Spin Labeling EPR", *Cell Biochemistry and Biophysics*, vol. 75, pp. 159–170. DOI: 10.1007/s12013-016-0767-0
- Adadi, Parise, Kovaleva, E. G., Glukhareva, T. V., and Shatunova, S. A. (2017), "Biotechnological production of non-traditional beer", *AIP Conference Proceedings*, vol. 1886, 020098, pp. 1–13. DOI: 10.1063/1.5002995
- Kovaleva, E. G., Molochnikov, L. S., Venkatesan, U., Marek, A., Stepanova, D. P., Kozhikhova, K. V., Mironov, M. A. and Smirnov, A. I. (2016), "Characterization of Acid-base Properties of Low Cost Nanoporous Anodic Aluminum Oxide Membranes by EPR of pH-sensitive Spin Probes", *J. Phys. Chem. C*, vol. 120, pp. 2703–2711. DOI: 10.1021/acs.jpcc.5b10241
- Kovaleva, E. G., Molochnikov, L. S., Golovkina, E. L., Hartmann, M., Kirilyuk, I. A. and Grigoriev, I. A. (2015), "Electrical potential near hydrated surface of ordered mesoporous molecular sieves assessed by EPR of molecular pH-probes", *Microporous & Mesoporous Materials*, vol. 203, pp. 82. DOI: 10.1007/s00723-015-0704-1

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DEVELOPMENT OF NONENZYMATIC METHODS OF ELECTROCHEMICAL IMMUNOASSAY AND DETERMINATION OF DIAGNOSTICALLY SIGNIFICANT PARAMETERS

Research goal:

The research is aimed at studying and investigating the synthesis of nanomaterials as well as their application as signal forming labels and elements, sensitive components of transducers in developments of new nonenzymatic electrochemical methods and sensors for quantitative determination of infectious agents and diagnostically significant parameters (urea, creatinine, cholesterol, etc.). The study of interactions of different nanomaterials with living cells.

Aspects studied:

- Nanomaterials
- Electrochemically active nanocomposites
- Voltammetry
- Electrocatalysis
- Immunoassay

Research highlights:

Theoretical and practical principles for creating new nonenzymatic electrochemical immunoassay method and sensor using magnetic nanocomposites/nanoparticles acting as a signal-forming label are formulated. Optimal conditions for obtaining magnetic electrochemically active nanocomposites were chosen. On the experimental data basis an algorithm for a hybrid immunoelectrochemical analysis method of various bacteria content determination in real objects using synthesized electroactive nanocomposite particles / nanoparticles as a signal-forming label has been developed. Studies on the use of inorganic electrocatalysts in the oxidation of cholesterol in water-organic and aprotic media have been carried out. A nonenzymatic electrochemical method for the determination of cholesterol using inorganic electrocatalysts (gold and silver nanoparticles, as well as potassium thiocyanate and nickel (II) and cobalt (II) chlorides) as a sensitive element and molecular imprinted polymers synthesized on the surface of magnetite and silicon oxide nanoparticles was developed. A hardware platform for express analysis based on a milli-fluid slide was developed.

Career opportunities:

- Work in the research laboratory
- Participation in the implementation of scientific projects
- Teaching Analytical Chemistry

Supervisor's specific requirements:

- Basic knowledge in analytical and physical chemistry
- Experimental skills
- High motivation for the scientific creative activities
- Conscientiousness

Main publications:

- Malakhova, N., Tsmokalyuk, A., Ivoilova, A., Tumashov, A., Rusinov, V., Ivanova, A. and Kozitsina, A. (2019), "Development and Validation of Voltammetric Method for Quantitation of New Antiviral Drug Triazavirin using Bare Carbon Screen-Printed Electrodes", *Analytical and Bioanalytical Electrochemistry*, vol. 11, no. 3, pp. 292–303. [http://www.abechem.com/No.%203-2019/2019,%2011\(3\),%20292-303.pdf](http://www.abechem.com/No.%203-2019/2019,%2011(3),%20292-303.pdf)
- Kozitsina, A. N., Svalova, T. S., Malysheva, N. N., Okhokhonin, A. V., Vidrevich, M. B. and Brainina, K. Z. (2018), "Sensors based on bio and biomimetic receptors in medical diagnostic, environment, and food analysis (Review)", *Biosensors*, vol. 8, no. 2, № 35. DOI: 10.3390/bios8020035
- Okhokhonin, A. V., Domanskyi, S., Filipov, Y., Gamella, M., Kozitsina, A. N., Privman, V. and Katz, E. (2018), "Biomolecular Release from Alginate-modified Electrode Triggered by Chemical Inputs Processed through a Biocatalytic Cascade – Integration of Biomolecular Computing and Actuation", *Electroanalysis*, vol. 30, no. 3, pp. 426–435. DOI: 10.1002/elan.201700810
- Malysheva, N. N., Svalova, T. S., Zhdanovskikh, V. O., Glazyrina, Yu. A., Kozitsina, A. N. and Matern, A. I. (2014), "Nonenzymatic electrochemical method for determination of the measles virus antigen using the synthesized IgG-(Fe₃O₄-SiO₂) conjugate as the signal label", *Russian chemical bulletin*, vol. 7, no. 63, pp. 1633–1638. DOI: 10.1007/s11172-014-0646-z
- Kozitsina, A. N., Malysheva, N. N., Utepova, I. A., Glazyrina, Yu. A., Matern, A. I., Brainina, Kh. Z. and Chupakhin, O. N. (2015), "An enzyme free electrochemical method for the determination of E. coli using Fe₃O₄ nanocomposites with a SiO₂ shell modified by ferrocene", *Journal of Analytical Chemistry*, vol. 70, no. 5, pp. 540–545. DOI: 10.1134/S1061934815050068
- Kozitsina, A. N., Okhokhonin, A. V. and Matern, A. I. (2016), "Amperometric detection of cholesterol using cobalt (II) chloride as an electrocatalyst in aprotic media", *Journal of Electroanalytical Chemistry*, vol. 772, pp. 89–95. DOI: 10.1016/j.jelechem.2016.04.029
- Okhokhonin, A. V., Saraeva, S. Yu., Matern, A. I. and Kozitsina, A. N. (2017), "Enzymeless Determination of Cholesterol Using Gold and Silver Nanoparticles as Electrocatalysts", *Journal of Analytical Chemistry*, vol. 72, no. 5, pp. 296–304. DOI: 10.1134/S1061934817040116

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INVESTIGATION OF ANTIOXIDANT AND ANTIRADICAL ACTIVITY

Research goal:

Research and development of new approaches for the determination of the integral parameter of antioxidant (AOA) and antiradical activity (ARA) of the individual compounds and samples with complex matrix (food, pharmaceuticals, biological objects, etc.), by electrochemical methods and EPR spectroscopy.

Aspects studied:

- Antioxidants and free radicals
- Antioxidant activity
- Antiradical activity
- Electrochemical methods of analysis
- EPR spectroscopy

Research highlights:

- A potentiometric method of determining AOA and ARA of solutions is based on measuring the electrode potential shift observed when the analyzed sample is inserted into the medium containing a mediator system
- General principles and theoretical and practical approaches to the use of potentiometry in order to measure integrated AOA and ARA substantiated. Confirmed the choice of the oxidizer as a mediator of electron transfer in the antioxidant/oxidant system and the conditions required for a chemical reaction between antioxidants and the components of the mediator system
- The data obtained by using the potentiometric method and other methods described in the literature have shown good correlation, high self-descriptiveness, and reliability. The data have demonstrated the feasibility and prospects for using potentiometry for measuring AOA and ARA in a variety of materials, including individual antioxidants → nutritional → Supplements → food → bio-substrates
- New approaches to the study of ARA using EPR spectroscopy

Career opportunities:

- Work in the research laboratory
- Participation in the implementation of scientific projects
- Teaching Analytical Chemistry

Supervisor's specific requirements:

Knowledge of analytical chemistry, physical chemistry and fundamental biochemistry.

Main publications:

- Ivanova, A. V., Gerasimova, E. L., Gazizullina, E. R., Okulova, Ya. A., Matern, A. I. and Rusinov, V. L. (2018), "Investigation of the antioxidant and antiradical activity of drugs intended for the treatment of ophthalmic disorders", *Pharmaceutical Chemistry Journal*, vol. 52, no. 8, pp. 694–699.
DOI: 10.1007/s11094-018-1883-5
- Ivanova, A. V., Gerasimova, E. L. and Gazizullina, E. R. (2019), "New antiradical capacity assay with the use potentiometric method", *Analytica Chimica Acta*, vol. 1046, pp. 69–76.
DOI: 10.1016/j.aca.2018.09.025
- Ivanova, A. V., Gerasimova, E. L., Gazizullina, E. R., Popova, K. G., and Matern, A. I. (2017), "Study of the Antioxidant Activity and Total Polyphenol Concentration of Medicinal Plants", *Journal of Analytical Chemistry*, vol. 72, no. 4, pp. 415–420.
DOI: 10.1134/S1061934817040049
- Ivanova, A. V., Gerasimova, E. L., Gazizullina, E. R., Kozitsina, A. N. and Matern, A. I. (2016), "Kinetics of the thermal decomposition of 2,2'-azobis(2-methylpropionamide) dihydrochloride studied by the potentiometric method using metal complexes", *Journal Russian Chemical Bulletin*, vol. 65, no. 2, pp. 419–424.
DOI: 10.1007/s11172-016-1315-1
- Ivanova, A. V., Gerasimova, E. L. and Brainina, Kh. Z. (2015), "Potentiometric Study of Antioxidant Activity: Development and Prospects", *Critical Reviews in Analytical Chemistry*, vol. 45, no. 4, pp. 311–322.
DOI: 10.1080/10408347.2014.910443
- Ivanova, A. V., Gerasimova, E. L., Kravets, I. A. and Matern, A. I. (2015), "Potentiometric Determination of Water-Soluble Antioxidants Using Metal Complexes", *Journal of Analytical Chemistry*, vol. 70, no. 2, pp. 173–177.
DOI: 10.1134/S1061934815020069
- Brainina, Kh. Z., Gerasimova, E. L., Kasaikina, O. T. and Ivanova, A. V. (2011), "Antioxidant Activity Evaluation Assay Based on Peroxide Radicals Generation and Potentiometric Measurement", *Analytical Letters*, vol. 44, no. 8, pp. 1405–1415.
DOI: 10.1080/00032719.2010.512687
- Brainina, Kh. Z., Alyoshina, L. V., Gerasimova, E. L., Kazakov, Ya. E., Beykin, Ya. B., Belyaeva, S. V., Usatova, T. I., Inzhevatova, O. V., Ivanova, A. V. and Khodos, M. Ya. (2009), "New Electrochemical Method of Determining Blood and Blood Fractions Antioxidant Activity", *Electroanalysis*, vol. 21, pp. 618–624.
DOI: 10.1002/elan.200804458
- Brainina, Kh. Z., Ivanova, A. V., Sharafutdinova, E. N., Lozovskaya, E. L. and Shkarina, E. I. (2007), "Potentiometry as a method of antioxidant activity investigation", *Talanta*, vol. 71, pp. 13–18.
DOI: 10.1016/j.talanta.2006.03.018



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MID-INFRARED FIBER-OPTICAL MATERIALS AND DEVICES

Research goal:

- The research is aimed at training of high-skilled specialists in mid-infrared material science, optics and photonics
- New elemental base of photonics: crystals, fibers, optical products and optical layers

Aspects studied:

- Hydrochemical synthesis of high-purity metal halides
- Crystal growth by Bridgman technique
- IR fiber photonic structure simulation
- Development of crystalline fiber scintillators
- Development of mid-infrared fiber-optical devices

Research highlights:

- Investigation of new phase diagram
- Crystal growth
- Simulation and fabrication of the photonic structure of IR fibers
- Fabrication of optical elements

Career opportunities:

- Work in the innovation and implementation center "Center of Infrared Fiber Technologies"
- High-tech production in the field of fiber optics and photonics in MID-IR region
- Work at the largest enterprises in Russia and abroad

Supervisor's specific requirements:

- Decent experimental skills in material synthesis
- Basic knowledge of fiber optics and photonics
- Diligence and responsibility

Main publications:

- Zhukova, L., Korsakov, A., Korsakova, E. and Zharikov, E. (2014), "Structure modeling and growing $\text{AgClBr}_x\text{Br}_{1-x}$, $\text{Ag}_{1-x}\text{TlBr}_x\text{I}$, and $\text{Ag}_{1-x}\text{TlCl}_x\text{Br}_{1-y-z}$ crystals for infrared fiber optics", Journal of Crystal Growth, vol. 386 pp. 94–99. DOI: 10.1016/j.jcrysgro.2013.09.045
- Korsakov, A., Vrublevsky, D., Korsakov, V. and Zhukova, L. (2015), "Investigating the optical properties of polycrystalline $\text{AgCl}_{1-x}\text{Br}_x$ ($0 \leq x \leq 1$) and $\text{Ag}_{0.95}\text{Tl}_{0.05}\text{Br}_{0.95}\text{I}_{0.05}$ for IR engineering", Applied Optics, vol. 54, no. 26, pp. 8004–8009. DOI: 10.1364/AO.54.008004

- Salimgareev, D. D., Lvov, A. E., Korsakova, E. A., Korsakov, A. S. and Zhukova, L. V. (2019), "Crystals of $\text{AgBr} - \text{TlBr}_{0.46}\text{I}_{0.54}$ system: Synthesis, structure, properties, and application", Materials Today Communications, 100551. DOI: 10.1016/j.mtcomm.2019.100551
- Korsakova, E., Lvov, A., Salimgareev, D., Korsakov, A., Markham, S., Mani, A., Silien, C., Syed, T. A. M. and Zhukova, L. (2018), "Stability of MIR transmittance of silver and thallium halide optical fibres in ionizing β - and γ -radiation from nuclear reactors", Infrared Physics and Technology, vol. 93, pp. 171–177. DOI: 10.1016/j.infrared.2018.07.031
- Lvov, A., Salimgareev, D., Korsakov, M., Korsakov, A. and Zhukova, L. (2017), "Structure modeling and manufacturing PCFs for the range of 2–25 μm ", Optical Materials, vol. 73, pp. 337–342. DOI: 10.1016/j.optmat.2017.08.033
- Korsakov, A. S., Lvov, A. E., Vrublevsky, D. S. and Zhukova, L. V. (2016), "Investigating the light stability of solid-solution-based AgCl-AgBr and AgBr-TlI crystals", Chinese Optics Letters, vol. 14, no. 2, 020603. DOI: 10.3788/COL201614.020603



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CHEMICAL TECHNOLOGIES FOR THE SYNTHESIS OF NANOSTRUCTURED FILMS OF SEMICONDUCTOR AND OTHER FUNCTIONAL MATERIALS

Research goal:

The study is aimed to train highly qualified engineers for semiconductor materials industry and academic researchers in the field of chemical technology of creating new functional materials for photovoltaics and infrared detectors.

Aspects studied:

- Hydrochemical synthesis of nanostructured binary chalcogenide thin solid films and their supersaturated substitutional solid solutions for photovoltaic absorbers and infrared detectors.
- Thermodynamic and kinetic aspects of hydrochemical deposition of new chalcogenide semiconductor materials for generating electric power by using solar energy.
- Research of effects of synthesis conditions on the mechanisms underlying the growth of nanostructured chalcogenide thin solid films.
- Investigation of structural, morphological, photoelectrical and optical properties of hydrochemically deposited chalcogenide thin solid films.

Research highlights:

- The development of understanding the conditions of the hydrochemical synthesis also called chemical bath deposition for producing high-quality thin solid films at relatively low temperatures (usually lower than 80 °C) on various substrates such as glass slides and crystalline glass-ceramic plates for optoelectronic and photovoltaic applications.
- Suggesting, for the first time, the layer-by-layer chemical bath deposition with further annealing for obtaining thin solid films with perovskite and kesterite structure for solar cell applications.

Career opportunities:

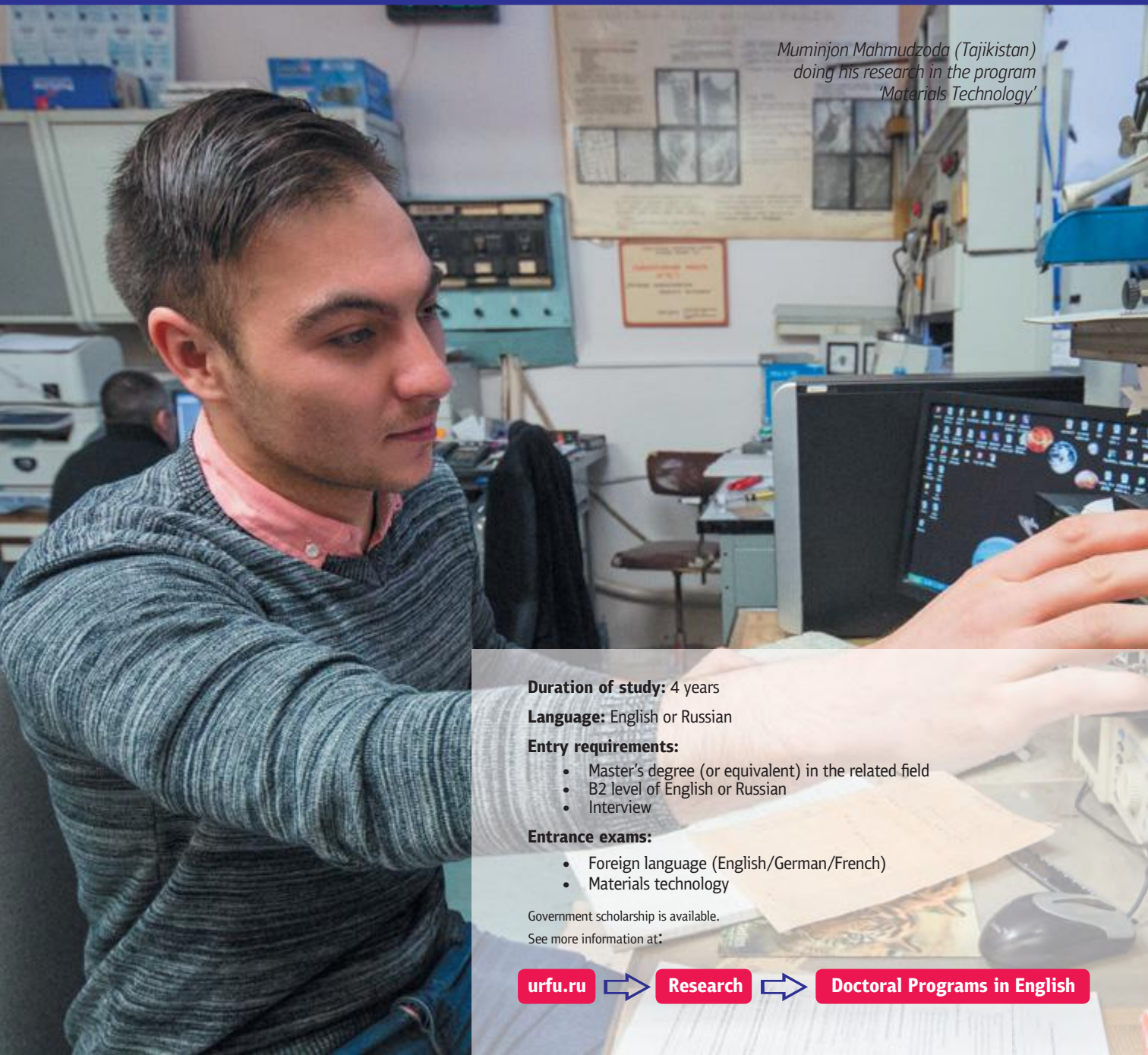
Students, who have successfully completed the training program and have participated in the original research activities, can work for modern high-tech laboratories and enterprises developing research-intensive products for photovoltaics, optoelectronics and nanoelectronics.

Supervisor's specific requirements:

- Deep knowledge in the field of physical and colloid chemistry.
- Experience in organizing and monitoring scientific research work process.

Main publications:

- Maskaeva, L. N., Markov, V. F., Mostovshchikova, E. V., Voronin, V. I. Pozdin, A. V. and Sougata Santra (2018), "Influence of calcium doping on structural, morphological and optical properties of chemically deposited PbS films", J. of alloys and compounds, vol. 766, pp. 402–409.
DOI: 10.1016/j.jallcom.2018.06.263
- Forostyanaya, N. A., Maskaeva, L. N., Smirnova, Z. I., Markov, V. F. and Kuznetsov, M. V. (2018), "Formation of Solid Solutions via Solid-State Lead Diffusion in Chemically Deposited CdS Films", Thin solid films, vol. 657, pp. 101–109.
DOI: 10.1016/j.tsf.2018.04.031
- Vaganova, I. V., Maskaeva, L. N., Voronin, V. I., Markov, V. F. and Bamburov, V. G. (2019), "A New Approach in X-ray Diffraction Study of the Microstructure of Films of Supersaturated Substitutional Solid Solutions $Cd_xPb_{1-x}S$ ", Doklady Chemistry, vol. 484, no. 2, pp. 37–40.
DOI: 10.1134/S0012500819020071
- Maskaeva, L. N., Fedorova, E. A., Markov, V. F., Kuznetsov, M. V., Lipina, O. A. and Pozdin, A. V. (2018), "Copper(I) Selenide Thin Films: Composition, Morphology, Structure, and Optical Properties", Semiconductors, vol. 52, no. 10, pp. 1334–1341.
DOI: 10.1134/S1063782618100111
- Maskaeva, L. N., Markov, V. F., Fedorova, E. A., Berg, I. A., Samigullina, R. F. and Voronin, V. I. (2017), "Structure and Thermal Stability of Nanostructured Precursor Powders of Copper (I) Sulfide and Selenide", Russ. J. of Applied Chemistry, vol. 90, no. 10, pp. 1572–1578.
DOI: 10.1134/S1070427217100032



Muminjon Mahmudzoda (Tajikistan)
doing his research in the program
'Materials Technology'

Duration of study: 4 years

Language: English or Russian

Entry requirements:

- Master's degree (or equivalent) in the related field
- B2 level of English or Russian
- Interview

Entrance exams:

- Foreign language (English/German/French)
- Materials technology

Government scholarship is available.

See more information at:

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Research



Doctoral Programs in English



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PHASE AND STRUCTURAL TRANSFORMATIONS IN METAL ALLOYS

Research goal:

The study is aimed at obtaining qualifications of a researcher capable of formulating and solving academic and industrial tasks in the field of material sciences and new materials technologies.

Aspects studied:

- Effect of alloying, external factors (deformation, including intensive, heat treatment, surface hardening treatment) on the regularities of the structure and properties formation
- Developing metallic alloys with high strength-to-weight ratio and heat resistance

Research highlights:

Combination of fundamental and modern research methods.

Career opportunities:

Due to their qualification, graduates can be employed in academic, industrial or civil spheres.

Supervisor's specific requirements:

Basic knowledge in demography and data analysis (SPSS or others) Responsibility in performing stated tasks.

Main publications:

- Popov, A. A., Rossina, N. G. and Popova, M. A. (2013), "The effect of alloying on the ordering processes in near-alpha titanium alloys", Materials Science and Engineering A, vol. 564, pp. 284–287.
DOI: 10.1016/j.msea.2012.11.043
- Popov, A. A. and Popova, M. A (2017), "Isothermal diagrams of precipitation of silicide and aluminide phases in refractory titanium alloys", Metal Science and Heat Treatment, vol. 58, 11–12, pp. 662–666.
DOI: 10.1007/s11041-017-0075-3
- Lobanov, M. L., Danilov, S. V., Pastukhov, V. I., Khrunyk, Y. Y. and Popov, A. A. (2016), "The crystallographic relationship of molybdenum textures after hot rolling and recrystallization", Materials and Design, vol.109, pp. 251–255.
DOI: 10.1016/j.matdes.2016.06.103



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THE COMPLEX OF TECHNOGENIC WASTES PROCESSING TECHNOLOGIES BY PYROMETALLURGICAL METHOD FOR STEEL AND CONSTRUCTION INDUSTRIES RESOURCE BASE EXPANSION AND ENVIRONMENT STRESS REDUCTION

Research goal:

Analyzing various aspects of processing technologies for steel and construction industries.

Aspects studied:

- Steel modification, alloying, deoxidation, ferroalloys
- Alkaline earths, rare earths, ferroaluminum, iron aluminide alloy
- Phase composition, structure, mechanical properties, removal of nonmetallic inclusions, vacuumization, slag heterogenization

Research highlights:

Opportunity to work with unique equipment, use original calculation methods, master new knowledge on the influence of components on physical and structural state of slab and metal alloys.

Career opportunities:

Employment at industrial companies, research institutions.

Main publications:

- Leontiev, L. I., Sheshukov, O. Y., Mikheenkova, M. A. and Nekrasov, I. V. (2016), "Yegiazaryan Optimization of the phase composition of high-calcium-content slag for stabilization and the obtaining of hydraulic properties", *International Journal of Materials Research*, vol. 107, no. 3, pp. 269–276. DOI: 10.3139/146.111334
- Sivtsov, A. V., Sheshukov, O. Y., Tsymbalist, M. M., Nekrasov, I. V. and Egiazar'yan, D. K. (2015), "The Valve Effect of an Electric ARC and Problems in Controlling Electric-ARC Furnaces", *Metallurgist*, vol. 59, no. 3, pp. 380–385. DOI: 10.1007/s11015 015 0113 6
- Ermakova, V. P., Smirnova, V. G., Kataev, V. V., Sheshukov, O. Y., Konashkov, V. V., Ovchinnikova, L. A. and Marshuk, L. A. (2014), "Effect of aluminum-containing additives on the homogeneity of melt and structure of aluminum cast iron", *Metal Science and Heat Treatment*, vol. 56, no. 3–4, pp. 118–123. DOI: 10.1007/s11041-014-9716-y



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MATERIAL SCIENCE

Research goal:

Structural materials with special physicochemical properties.

Aspects studied:

- Nitrogen-containing steel with high physicomechanical and corrosion properties
- Severe plastic deformation, surface modification during ion implantation and laser welding of high-nitrogen steels.

Research highlights:

- Comprehensive study of the structure of materials using modern methods of physical metallurgy, as well as electrochemistry.
- Cooperation with colleagues from other cities of Russia and countries of Europe and Asia

Career opportunities:

Scientific activity and management of research teams in industrial enterprises or teaching science to students.

Supervisor's specific requirements:

- Passion for science and the desire to learn new things.
- Possession of any skills and ability to learn new.

Main publications:

- Berezovskaya, V. V., Raskovalova, Yu. A., Merkushkin, E. A. and Valiev, R. Z. (2016), "TWIP-Effect in Nickel-Free High-Nitrogen Austenitic Cr – Mn Steels", *Metal Science and Heat Treatment*, vol. 57, no. 11, pp. 656–662. DOI: 10.1007/s11041-016-9938-2
- Berezovskaya, V. V., Ozerets, N. N. and Ovchinnikov, V. V. (2017), "Study of the structure and properties of austenitic steels upon nitrogen implantation" *Actual problems of strength: LIX International Conference, Tolyatti, Russian Federation, September 05–08, 2017*, pp. 60–61. (in Russian) <http://www.issp.ac.ru/ebooks/conf/Toliatti-2017.pdf>
- Merkushkin, E. A., Berezovskaya, V. V. and Shpaidel, M. (2017), "Prediction of Corrosive Characteristics of High-Nitrogen Austenite Steels Based on Correlation Equation of Pitting Potential" *Inorganic Materials: Applied Research*, vol. 8, no. 4, pp. 491–493. DOI: 10.1134/S2075113317040189
- Berezovskaya, V., Raskovalova, Yu. and Uimin, M. (2018), "Effect of the Structural State of High-Nitrogen Cr-Mn-Mo Steel on Mechanical and Magnetic Properties" in Syngellakis, S. and Connor, J. J. (eds.), *Advanced Methods and Technologies in Metallurgy in Russia, Innovation and Discovery in Russian Science and Engineering* Springer, Cham, Switzerland, pp. 35–42. DOI: 10.1007/978-3-319-66354-8_5

Social Sciences & Humanities



Duration of study: 3 years

Language: English or Russian

Entry requirements:

- Master's degree (or equivalent) in the related field
- B2 level of English or Russian
- Interview

Entrance exams:

- Foreign language (English/German/French)
- Psychological sciences

Government scholarship is available.

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DEVELOPMENTAL COGNITIVE NEUROSCIENCE

Research goal:

Longitudinal investigation of neurocognitive development in children at risk for autism and ADHD (attention deficit and hyperactivity disorder), premature infants and typically developing children.

Aspects studied:

- Developmental cognitive neuroscience
- Child Neuropsychology
- Neuroimaging

Research highlights:

- Our Laboratory for Brain and Neurocognitive Development uses multidisciplinary approach for investigation of neurocognitive development – EEG, ERP, eye-tracking, behavioral assessment (Bayley Scale, ADOS-2) and questionnaires
- Our Laboratory is engaging in collaborative research with Centre for Brain and Cognitive Development (London) and Uppsala Child and Baby Lab (Sweden)
- We are involved in the European project for investigation of infants at risk of ASD and ADHD

Career opportunities:

- Research centers and laboratories in the field of cognitive neuroscience
- Centers for Neurorehabilitation. Children's hospitals

Main publications:

- Kiselev, S. et al. (2017), "Impact of preterm birth on early cognitive development in infants at 5 months of corrected age", *Brain Injury*, vol. 31, no. 6–7, pp. 1000, 0712 <https://www.tandfonline.com/doi/full/10.1080/02699052.2017.1312145>
- Kiselev, S. et al. (2016), "The assessment of neurocognitive functions in premature infants in the first year of life using Bayley Scales", *Zhurnal Nevrologii i Psikiatrii imeni S.S. Korsakova* (peer-reviewed Russian journal), vol. 116, 4, Issue. 2, 62. (In Russian)
DOI: 10.17116/jnevro20161163262–67
- Kiselev, S. et al. (2016), "Comprehensive approach in assessment of neurocognitive functions in children at risk for autistic spectrum disorders", *Izvestia of the Ural Federal University* (peer-reviewed Russian journal), series 1, vol. 147, 1, pp. 113–121 (in Russian)
<https://elibrary.ru/item.asp?id=25922169>
- Kiselev, S. (2016), "Deficit in executive abilities as a risk factor for emerging weakness in grammar understanding in Russian-speaking children", *European Psychiatry*, vol. 33, s. 131.
DOI: 10.1016/j.ijpsycho.2014.08.850
- Kiselev, S., "ADHD children", *European Journal of Paediatric Neurology*, vol. 19, s. 1, s. 95.
DOI: 10.1016/S1090–3798(15)30316–0



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BEHAVIORAL ECONOMY

Research goal:

- To describe and compare subjective criteria of trust in business partnership between Europeans and Russians
- To identify implicit beliefs as an impact factor on decision making about the bargain (behavioral economy)

Aspects studied:

- Behavioral economy: implicit beliefs in decision making in business relationships
- Efficiency and effectiveness of professional performance
- Work experience as a competitive advantage in the labor market
- Career management for aged specialists
- Career and professional orientation for Russian and EU undergraduates

Research highlights:

- Research is cross-cultural and comparative
- The main subjects are entrepreneurs, experts and managers, who are oriented towards international business collaboration

Career opportunities:

Results of research have theoretical significance (for development of cross-cultural business communications) and practical implication (may be applied in lectures at Business schools). Thus, the researcher may develop his/her career either at Universities and Business schools, or at Departments of Strategy Development at enterprises and companies, or running an international business.

Main publications:

- Ismagilova, F. S. (2013), "Effectiveness: Managerial Work Experience and Its Consequences", *Procedia – Social and Behavioral Sciences*, vol. 86, pp. 441–447. DOI: 10.1016/j.sbspro.2013.08.594
- Ismagilova, F. S. (2016), "Strategies of Decision Making in the Conditions of Aged Professionals' Competitiveness Reduction", *Izvestia Ural Federal University Journal, Series 3 Social and Political Sciences*, vol. 11, no. 3 (155), pp. 100–105. (in Russian) <http://elibrary.ru/item.asp?id=27196646>
- Boštjančič, E., Ismagilova, F. S., Mirolyubova, G. S. and Jansha, N. (2016), "Subjective criteria of self-activity control of the Russian and Slovenian managers: comparative analysis of professional competence", *The Education and Science Journal*, vol. 1, no. 8, pp. 66–85. (in Russian) DOI: 10.17853/1994-5639-2016-8-66-85
- Ismagilova, F. S. (2013), *Professional Counseling: Problems & Approaches*, Academic Publishing, Palmarium, Germany, 205 p. ISBN: 978 3 659 98635 2

- Boštjančič, E., Ismagilova, F. S., Mirolyubova, G. and Janza, N. (2017), "Comparative Study of Russian and Slovenian Managers Using Subjective Criteria to Control Their Professional Performance", *Changing Societies & Personalities*, vol. 1, Issue 3, pp. 284–299. DOI: 10.15826/csp.2017.1.3.020
- Ismagilova, F. S. (2019), "Cluster Analysis of the Problems of Middle Managerial Activity in the Russian Organizations", *38th International Conference on Organizational Science Development: Ecosystem of Organizations in the Digital Age*, 20–22 March 2019, Portorož, Slovenia, pp. 365–378. DOI: 10.18690/978-961-286-250-3.29

Duration of study: 3 years

Language: English or Russian

Entry requirements:

- Master's degree (or equivalent) in the related field
- B2 level of English or Russian
- Interview

Entrance exams:

- Foreign language (English/German/French)
- Philosophy
- Sociological science

Government scholarship is available.

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UrFU doctoral candidates from China, Iran and Thailand and Associate Professor in Sociological Science Victoria V. Polyakova



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SOCIOLOGY OF EDUCATION, SOCIOLOGY OF MANAGEMENT, SOCIOLOGY OF CULTURE, SOCIOLOGY OF TIME

Research goal:

The fields studied are general theories of sociology, sociology of education, sociology of social time, and theory of social community.

Aspects studied:

- General theories of sociology
- Sociology of education
- Sociology of social time
- Theory of social community

Research highlights:

Researches are supported by Russian Foundation for Basic Research and the Russian Science Foundation.

Career opportunities:

The results of scientific work can be applied in the elaboration of management models for educational, non-profit organizations, and the management of temporal behavior strategies of social groups.

Supervisor's specific requirements:

Candidates need in-depth knowledge in the field of sociology of management, sociology of education and sociology of time.

Main publications:

- Zborovsky, G. E. and Ambarova, P. A. (2016), "Transformation of goals and objective field of governance and administration sociology: new challenges", *Sociologicheskie Issledovania*, no. 7, pp. 48–57. (in Russian)
<https://elibrary.ru/item.asp?id=26497551>
- Zborovsky, G. E. and Ambarova, P. A. (2016), "Time perspective of educational communities", *Sociologicheskie Issledovania*, no. 10, pp. 3–13. (in Russian)
<https://elibrary.ru/item.asp?id=27115498>
- Zborovsky, G. E. and Ambarova, P. A. (2016), "Conceptual foundations of transition to nonlinear models of higher education in the region", *Economy of Region*, vol. 12, no. 4, pp. 1157–1166.
DOI: 10.17059/2016-4-17
- Zborovsky, G. E. and Ambarova, P. A. (2016), "The temporal dimension of professors' human Capital", *The 10th International Days of Statistics and Economics*, Prague, Czech Republic, September 8–10, 2016, pp. 2107–2116.
URL: <https://msed.vse.cz/online>.
- Zborovsky, G. E. (2016), "Postulates and problems of the non-linear conception of higher education in Russian macro-region", *University Management: Practice and Analysis*, no. 5, pp. 15–27; no. 6, pp. 120–134. (in Russian)
<https://elibrary.ru/item.asp?id=27390747>
<https://elibrary.ru/item.asp?id=27634836>

Preeprang Thanomsakchai and Somkamnerd Navapat (Thailand) doctoral candidates in Political Sciences and Area Studies



Duration of study: 3 years

Language: English or Russian

Entry requirements:

- Master's degree (or equivalent) in the related field
- B2 level of English or Russian
- Interview

Entrance exams:

- Foreign language (English/German/French)
- Philosophy
- Sociological science

Government scholarship is available.

See more information at:

urfu.ru



Research



Doctoral Programs in English



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INTERNATIONAL RELATIONS

Research goal:

To analyze myths and stereotypes about contemporary Russian-American relations that prevail in Russian political discourse after the demise of the Soviet Union (1991–2017).

Aspects studied:

- Myths and stereotypes of the Russian society about US political goals, intentions, and actions
- US goals, intentions, and actions in the same areas as expressed in American sources
- Historical heritage and political context that helped shape and reinforce Russian myths about the USA

Research highlights:

- Analysis of public opinion only in the Urals, the home base of Yeltsin, rather than in the whole Russia
- Using theoretical and methodological tools of both Russian and international scholars
- Analysis of political developments in Russian-American relations that could help us understand if there are any correlations between fluctuations in Russian-American politics and development of Russian political mythology about the USA

Career opportunities:

- Foreign policy analyst
- Policy advisor for a company/organization that deals with Russia
- University lecturer specializing in Political Science or contemporary Russia

Supervisor's specific requirements:

Fluent English.

Main publications:

- Pobedash, D. (2017), "Chapter 1. Nuclear Weapons: History and Meaning through IR Theories" in Deriglazova, L. (ed.), Nuclear Nonproliferation, Tomsk, Russian Federation. ISBN: 978-5-7511-2496-0
- Pobedash, D. (2017), "Chapter 2. Regime Theory about Nuclear Nonproliferation Regime" in Deriglazova, L. (ed.), Nuclear Nonproliferation, Tomsk, Russian Federation. ISBN: 978-5-7511-2496-0
- Khudoleyeva, A. and Pobedash, D. (2017), "Chapter 5. International Control of Nuclear Energy and IAEA Safeguards" in Deriglazova, L. (ed.), Nuclear Nonproliferation, Tomsk, Russian Federation. ISBN: 978-5-7511-2496-0
- Pobedash, D. and Piksayeva, K. (2016), "Guam and Puerto Rico. Struggle of US Colonies for Self-Determination", Izvestia Ural Federal University Journal, Series 3 Social and Political Sciences, t. 11, vol. 3, no. 155, pp. 206–216. (In Russian) <https://elibrary.ru/item.asp?id=27196661>
- Pobedash, D. and Kalinin, D. (2016), "The Personal and Political: Mikhail Gorbachev through the Eyes of His Contemporaries", Quaestio Rossica, vol. 4, no. 1, pp. 120–136. (in Russian)
DOI: 10.15826/QR.2016.1.144

Duration of study: 3 years

Language: English or Russian

Entry requirements:

- Master's degree (or equivalent) in the related field
- B2 level of English or Russian
- Interview

Entrance exams:

- Foreign language (English/German/French)
- Linguistics and literary studies

Government scholarship is available.

See more information at:

urfu.ru



Research



Doctoral Programs in English



*Hossein Daneshianshahrbaf
(Iran) a doctoral candidate in
Linguistics and Literary Studies*



Research supervisor:

Prof. Irina T. Vepreva,
Doctor of Science

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RELEVANT LEXICAL AND SEMANTIC PROCESSES IN THE MODERN RUSSIAN LANGUAGE

Research goal:

Modification of lexical semantics in the modern Russian language is the core interest. The aim defines the aspect nature of the research object: value increments in word semantics during its functioning in speech, development of multitask lexical units, characteristics of units that become “fashionable” words, puns at lexical level, meta-language reflection about word use and characteristics of words relevant for the present time period.

Aspects studied:

- Lexical semantics
- Linguo-axiological aspects of the Russian language study
- Cognitive research

Research highlights:

Design of heuristic procedure of linguo-axiological analysis of spoken language.

Career opportunities:

- Employment at universities and other educational institutions in Ekaterinburg and Sverdlovsk region
- Employment at research institutions of Ural branch of RAS

Supervisor's specific requirements:

Responsibility and diligence

Main publications:

- Vepreva, I. T. and Patsio-Vlazlovskaya, D. (2018), “What spouse advertising about modern women (on the example of the Russian and Polish languages) can tell”, *Rusin*, vol. 52, no. 2, pp. 177–192.
DOI: 10.17223/18572685/52/13
- Vepreva, I. T. (2018), “The axiological potential of the adjective “Ural”, *Przegląd wschodnioeuropejski*, no. IX/2, pp. 177–186. (in Russian)
<https://czasopisma.uwm.edu.pl/index.php/pw/article/view/3124>
- Vepreva, I. T., Itskovich, M. M., Kupina, N. A. and Shalina, I. V. (2016), “Value preferences of modern students in the linguistic-cognitive and socio-psychological aspect”, *Aspects of cognitive linguistics*, pp. 62–73.
DOI: 10.20916/1812-3228-2016-2-62-73
- Vepreva, I. T., Mustayoki, A. and Walter, H. (2016), “The phenomenon of the actual word in 2015”, *Quaestio Rossica*, vol. 4, no. 4, pp. 121–133.
DOI: 10.15826 / qr.2016.4.195
- Vepreva, I. T. and Kupina, N. A. (2016), “The line for Serov: the phenomenon of being Russian”, *Quaestio Rossica*, t. 4, no. 2, pp. 95–108.
DOI: 10.15826 / qr.2016.2.160



Research supervisor:
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SEMANTICS

Research goal:

Semantics of words, sentences and texts

Aspects studied:

- Cognitive research
Text linguistics
- Theoretical and practical lexicography
- Comparative lexicology

Research highlights:

Preservation of traditions and innovations, academic search and efficacy.

Career opportunities:

Employment at universities in Ekaterinburg and the region, at research institutions, Mass Media and cultural institutions.

Supervisor's specific requirements:

Commitment, enthusiasm, creative potential.

Main publications:

- Babenko, L. G. (2004), "Philological analysis of the text. Main theories, principles and aspects of analysis", Moscow, Academic project; Delovaya kniga, 464 p. ISBN: 5-8291-0431-8
- "Concept sphere of the Russian language: key concepts and their representation in the language and speech (as exemplified in lexis, phraseology and paremiology): Dictionary", (2018), in L. G. Babenko (ed.), Azbukovnik, Moscow, Russia. ISBN: 978-5-91172-128-2
- Babenko, L. G., Zui Yan (2019), "Lexic and semantic field of "kindness": general and national specific features (as exemplified in Russian and Chinese languages)", Philological class, no. 1, issue 55, pp. 58-66. (in Russian) DOI: 10.26170/fk19-01-0
- Babenko, L. G. (2018), "Integration of the mental spaces in lexicographic interpretation (As exemplified in the lexis of emotions in ideographic dictionaries)", Aspects of cognitive lexis, no. 4, issue 57, pp. 67-77. (in Russian) DOI: 10.20916/1812-3228-2018-4-67-77
- Babenko, L. G. (2017), "Ural ideographic lexicographics: stages of formation, results and perspectives", Journal for Slavonic Philology, vol. 86, issue 4, pp. 457-468. <https://www.ceeol.com/search/article-detail?id=636703>
- Babenko, L. G. (2014), "Mechanism of forming "sadness" concept (as exemplified in poetry by A. A. Barkova)", Acta neophilologica, vol. 16, no. 1, pp. 127-139. http://bazhum.muzhp.pl/media/files/Acta_Neophilologica/Acta_Neophilologica-r2014-t16-n1/Acta_Neophilologica-r2014-t16-n1-s127-139/Acta_Neophilologica-r2014-t16-n1-s127-139.pdf



Research supervisor:
Associate Prof.
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WORLD LITERATURE

Research goal:

Through a balanced combination of critical play analysis and theoretical principles of drama studies, this course allows you to examine historical, political, and cultural contexts relevant to the American theatre of the 20th century.

Aspects studied:

The course is primarily focused on studying ideological, thematic and poetic aspects of American drama, the way the theatre has impacted the American society, encouraging new modes of thinking. Such inter-cultural reception aspects as interpretation of English-language drama by the Russian reader are also of primary interest.

Research highlights:

The course develops conceptual, problem-solving and collaborative skills associated with critical theatre reviewing and arts management; as well as training in critical thinking, independent project work, group theatrical production for public performance, and work experience opportunities.

Career opportunities:

University lecturer, researcher in the field of arts management and theater reviewing.

Supervisor's specific requirements:

Basic knowledge of drama studies and its principles.

Main publications:

- Nazarova, L. A. (2015), "The study of Roman and German literatures in Russia 2012-2014: analytical essay", News of the Ural Federal University, Series 2: The humanities, no. 1 (136), pp. 236-242. (in Russian) <https://elibrary.ru/item.asp?id=23168827>
- Nazarova, L. A. (2014), "Artistic experiment as a creative failure (on M. Anderson's play "The accession of winter")", Studying foreign languages and literatures: theory, history, practice. Conference proceedings, Ekaterinburg, Russia, pp. 62-69. (in Russian) ISBN: 978-5-91256-204-4
- Nazarova, L. A. (2014), "Dynamics of female images in the playwright T. Williams 1940-50-ies of the twentieth century", Pavermanovskie readings. Literature. Music. Theater. Conference proceedings, Ekaterinburg, Russia, pp. 142-148. (in Russian) ISBN: 978-5-91256-212-9



Research supervisor:
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RUSSIAN AND SLAVIC ETYMOLOGY, ONOMASTICS, ETHNOLINGUISTICS

Research goal:

In-depth analysis of Russian and Slavic etymology, onomastics and ethnolinguistics

Aspects studied:

- Etymology of Russian dialect words
- Semantic-motivational reconstruction of Russian lexis and phraseologies
- Different categories of onomastics in the Russian folklore language tradition
- Ethnolinguistic analysis of thematic lexical groups in Russian and other Slavic languages

Research highlights:

- The work of Ural school of onomastics, ethnolinguistics and etymology is constructed around its own field material.

Supervisor's specific requirements:

It is desirable for future postgraduate student to possess skills in filed work or intend to obtain those.

Main publications:

- Berezovitch, E. L. (2007), "Language and traditional culture", Indrik, Moscow, 600 p. (in Russian)
ISBN: 978-5-85759-419-3
- Berezovitch, E. L. (2009), "Russian toponymy in ethno-linguistic aspect: space and a human", Librokom, Moscow, 328 p. (in Russian)
ISBN: 978-5-397-05278-8
- Berezovitch, E. L. (2010), "Russian toponymy in ethno-linguistic aspect: mythological and epic image of space", Comkniga, Moscow, 240 p. (in Russian)
ISBN: 978-5-484-01166-7
- Berezovitch, E. L. (2014), "Russian lexis in general Slavonic background: semantic and motivational reconstruction", Russian Foundation for Supporting Education and Science, 488 p. (in Russian)
ISBN: 978-5-91244-133-2

Lubna Saeed (Pakistan)

My experience as Philosophical scholar is really **wonderful and thought provoking**. My all teachers are experts in their specific field. Most important I learnt **systematic and critical thinking in philosophy**. I am feeling lucky to study here!





Sun Yanan (China) a doctoral candidate in History and Archeology working on her research

Duration of study: 3 years

Language: English or Russian

Entry requirements:

- Master's degree (or equivalent) in the related field
- B2 level of English or Russian
- Interview

Entrance exams:

- Foreign language (English/German/French)
- History and archeology
- Philosophy

Government scholarship is available.

See more information at:

urfu.ru



Research



Doctoral Programs in English



Research supervisor:

Prof. Elena M. Glavatskaya,
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HISTORY OF RUSSIA

Research goal:

The research is focused on ethnic, religious and demographic dynamics in the Ural territory since the end of XIX century until the present time. Creation of cultural and historical atlases, as well as historical GIS. Research deals with different ethnic and religious communities, their history and modern state. Significant portion of the research will be devoted to the history of medicine in the Ural region at the end of XIX – beginning from the XX centuries.

Aspects studied:

- Religious studies
- Historical demography
- Ethnology
- Anthropology

Research highlights:

- Ability to work with a huge amount of nominative sources (end of XIX – beginning of XX century), such as metric books and Near – Polar registrar, conducting field research among ethnic and religious minorities of the Ural region, including Finno – Ugric peoples, migrant communities, religious communities, etc.
- Research is conducted in close cooperation with academic teams from UrFU and similar universities and centers such as Umea, Minnesota Population center, Norwegian historical data at the Tromso University, Demographic center at the Autonoma University of Barcelona and demographic Center and many other
- This research implies active participation in international conferences and publishing activities

Career opportunities:

Obtained skills and knowledge allow for successful activities in different academic and research institutions and teaching activities at different national and international centers.

Supervisor's specific requirements:

Knowledge of English and Russian languages (to be able to read books and sources in Russian).

Main publications:

- Glavatskaya, E. (2016), "Polygamy among indigenous people of northern West Siberia in ethnographic and early census materials", The History of the Family, vol. 21, issue 1, pp. 87–100.
DOI: 10.1080/1081602X.2015.1046487
- Glavatskaya, E. and Borovik, J. (2016), "Death and Marriage: World War I Catholic Prisoners in the Urals", Transylvanian Review, vol. XXV, no. 4. pp. 28–40.
<https://elibrary.ru/item.asp?id=35717343>
- Glavatskaya, E. M. and Starostin, A. N. (2016), "Ekaterinburg Muslim community in the second half of XIX – beginning of XX centuries: numbers and institutions", Ural University News, Humanities, series 2, t. 18, no. 4(155), pp. 244–254. (in Russian)
DOI: 10.15826/izv2.2016.18.4.078



Research supervisor:
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HISTORY OF INTERNATIONAL RELATIONS AND FOREIGN POLICY

Research goal:

The study is aimed at preparing a dissertation on the basis of research in the relevant field.

Aspects studied:

- History of International Relations and the Policy of Great Powers in the Near and Middle East
- Relations of the USSR and Russia with the countries of Asia
- History of the countries of Asia and Africa
- History of Foreign Policy of the USSR and Russia

Career opportunities:

- Graduates can work as international relations and external policy experts at different organizations
- Diplomatic services employees
- Conducting research and teaching activities at universities

Supervisor's specific requirements:

- Good command of one or several foreign languages
- Computer skills
- Experience in working with databases and search mechanisms, library and archive funds
- Analytic and research skills and the ability to use them in working on the thesis

Main publications:

- Kuzmin, V. A. (2019), "Israel from the Outside and Inside", Cambridge Scholars Publishing, 299 p.
ISBN: 978-1-5275-2801-7
- Kuzmin, V. A. (2018), "Orta Dogu'da Suudi Arabistan'la Iran arasindaki Cephelesme: Suriye ve Yemen'deki Catismalar Ornegi", International Journal of Kurdish Studies, vol. 4, no. 1, pp. 288–293.
DOI: 10.21600/ijoks.383410
- Kuzmin, V. A. (2018), "Iki Dunya Savasi Arasindaki Donemde Bolgesel Siyasi Entegrasyonun bir Ornegi Olarak 1937 Sadabad Pakti", International Journal of Kurdish Studies, vol. 4, no. 2, pp. 622–625.
DOI: 10.21600/ijoks.454581

- Kuzmin, V. A. (2017), "Confrontation between Saudi Arabia and Iran in the Persian Gulf area in the end of XX – beginning of XXI centuries", Academic dialogue, no. 8, pp. 241–260. (in Russian)
DOI: 10.24224/2227-1295-2017-8-241-260
- Kuzmin, V. A. (2018), "The beginning of Sino-Japanese war: the first days", China: history and modern times, Ekaterinburg: Publishing house of the Ural Federal University, pp. 203–210. (in Russian)
ISBN: 978-5-7996-2423-1
- Kuzmin, V. A. (2017), "Confrontation between Saudi Arabia and Iran in the Middle East during "Arabian spring", Muslim world, no. 3, pp. 19–29. (in Russian)
<https://elibrary.ru/item.asp?id=35312085>
- Kuzmin, V. A. (2018), "British Ministry of Foreign Affairs on international relations in the Arabian East and the problem of Arabian unity in the end of 1920s – beginning of 1930s of XX century", Ural Oriental studies, vol. 8, pp. 26–33. (in Russian)
<https://elibrary.ru/item.asp?id=36300599>
- Kuzmin, V. A. (1992), «Preparation and conclusion of the Saadabad Pact of 1937», Yekaterinburg, 224 p. (in Russian)
ISBN: 5-7525-0333-7
- Kuzmin, V. A. (2001), «Soviet Foreign Policy in the biographies of the People's Commissars and Foreign Ministers», Yekaterinburg, 520 p. (in Russian)



Research supervisor:
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alex_antoshin@mail.ru



HISTORY OF RUSSIAN EMIGRATION

Research goal:

The research is aimed at studying the main “waves” of Russian emigration, specific characteristics of Russian diaspora in different regions of the world, cultural and political activity of Russian emigrants in the XIX – XX centuries

Aspects studied:

- Russian diaspora
- Russian emigration legislation
- Russian immigration legislation

Research highlights:

- Cultural impact of Russian diaspora
- Russian diaspora in the Cold War
- Russian diaspora in the World War II

Career opportunities:

Research activities in the field of diaspora studies.

Supervisor’s specific requirements:

- Knowledge of Russian language (to be able to read books and sources in Russian)
- Basic education in History

Main publications:

- Antoshin, A. V. (2012), “While there is no war...” Letters of Mark Aldanov”, Russian emigration in the USA, The New Review Publishing, New York, USA, pp. 32–39.
- Antoshin, A. V. (2014), “On the fronts of the Second and Cold Wars: Russian emigrants in 1939 – the beginning of 1950s”, Moscow: AIRO-XXI, Russia. (in Russian). ISBN: 978-5-91022-242-1
- Antoshin, A. V. (2014), “From Russian Monmartre to Brighton Beach: Evolution of the “Russian world” in 1950–1980s”, Moscow: AIRO-XXI, Russia. (in Russian). ISBN: 978-5-91022-244-5
- Antoshin, A. V. (2008), “Russian emigrants in Cold War”, Ekaterinburg, Russia. (in Russian). ISBN: 978-5-7996-0375-5



Research supervisor:
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WORLD HISTORY – MODERN HISTORY OF THE MIDDLE EASTERN COUNTRIES; HISTORY OF INTERNATIONAL RELATIONS AND FOREIGN POLICY

Research goal:

The study is aimed at revealing the specifics of the development of the Middle Eastern countries as well as features of the formation of institutions and mechanisms of their interaction with the outside world. Significant aspects of the research could be the history of oil industry of the region and energy diplomacy in the Middle East.

Aspects studied:

- Middle East Studies
- The Middle East in the foreign policy of Russia, USA, European and Asian countries (China, India, Republic of Korea, Japan, etc.) in the XX–XXI centuries.
- Energy Diplomacy Studies

Research highlights:

- Research employs up-to-date interdisciplinary methods and approaches
- The topics of the dissertations are formulated according to student needs and career aspirations
- Research is conducted in close cooperation with academic teams from UrFU and similar universities and centers of Russia and other countries

Career opportunities:

Researcher and lecturer at national and international educational and academic institutions.

Supervisor’s specific requirements:

- Good command of one or several foreign languages
- Analytic and research abilities and skills

Main publications:

- Valiakhmetova, G. N. (2010), “Iraqi oil in the great powers’ policy in the Middle East, 1932–1941”, Institute of Oriental Studies, Russian Academy of Sciences, Moscow, Russian Federation, 444 p. (in Russian) ISBN: 978-5-89282-425-5
- Valiakhmetova, G. N. (2014), “Iraqi oil and “Big Game” in the Middle East”, Palmarium Academic Publishing, Saarbrücken, Germany, 457 p. (in Russian) ISBN: 978-3-639-61476-3
- Valiakhmetova, G. N. and German, M. A. (2018), “From ideological confrontation to strategic partnership: the specificity of the evolution of China-Saudi relations”, Proceedings of Ural University, vol. 13, no. 3, pp. 192–203. (in Russian) <https://www.elibrary.ru/item.asp?id=36289246>
- Valiakhmetova, G. N. (2013), “Soviet factor in Anglo-Saudi relations, 1939–1940”, Proceedings of Ural University, no. 4, pp. 20–29. (in Russian) <https://elibrary.ru/item.asp?id=21165731>



Research supervisor:
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SOCIAL AND ECONOMIC HISTORY OF RUSSIAN AND THE URALS

Research goal:

The program is aimed at studying the social and economic history of Russia and Urals, the industrial history and the industrial heritage.

Aspects studied:

- History of the industry and the industrial heritage of the Russia and Urals
- The history of science and technology
- Higher education in Russia at the present time

Research highlights:

- The history of metallurgy in the Urals for three hundred years
- The history of science and technology
- Modernization of higher education in Russia at the present time

Career opportunities:

- As the head of research projects, grants, etc.
- Lecturing at universities in Russia and other countries

Supervisor's specific requirements:

- Conducting classes in the history of science and technology
- Knowledge of History of Russia, industrial heritage, etc. with the use of information technology

Main publications:

- Zapariy, V.V., Zapariy, Vas.VI. (2013), "Modernization of the Ural metallurgy during the Great Patriotic War (1941–1945)", *Bylye Gody*, vol. 29, no. 3, pp. 47–52. http://ejournal52.com/journals_n/1378693841.pdf
- Zaitseva, E. and Zapariy, V. (2016), "Demographic Consequences of Economic Modernization in Russia in the Past Thirty Years in the Demographic Transformation Theory", 10th International Days of Statistics and Economics, pp. 2077–2088. ISBN:978-80-87990-10-0
- Shaposhnikov, G.N. and Zapariy, V.V. (2014), "On the problem of periodization of the national telecommunication complex history", 24th International Crimean Conference Microwave and Telecommunication Technology, 6959283, pp. 41–42. (in Russian)
DOI: 10.1109/CRMICO.2014.6959283
- Zapariy, V.V., Kamynin, V.D., and Guanshan, Ch. (2015), "Ural economy of the XX century by historians", *Economy of Region*, vol. 2, pp. 85–94 (in Russian)
DOI: 10.17059/2015-2-7s

- Zapariy, V.V. and Nosirev, V.B. (2017), "Raw material resources of the Ural metallurgical industry in the 1990 s.", *Gornyi Zhurnal*, no. 6, pp. 95–99. (in Russian)
DOI: 10.17580/gzh.2017.06.19
- Zapariy, V.V., Zapariy, V.V., and Guanshan, C. (2017), "Formation of Protoclusters in the Tank Industry of the Urals in 1941–1945", *Ekonomika regiona [Economy of Region]*, vol. 13, no. 3, pp. 883–894.
DOI: 10.17059/2017-3-20
- Zapariy, V.V., (2017), "Industrial Heritage As A Component of The Urals' Attractive Image", *International Days of Statistics and Economics Conference Proceedings*, September 14–16, Prague, Czech Republic, pp. 1893–1902. ISBN:978-80-87990-12-4



Research supervisor:
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RUSSIA AND AFRICA

Research goal:

The research is aimed at studying historical aspects of relations between Russia and Africa, the Russian version of “colonial style” in culture and way of living, contemporary political, economic and cultural contacts between Russia and Africa. Significant aspects of the research will be the history of Russian diaspora in Africa and Russian-African humanitarian contacts.

Aspects studied:

- Political cooperation
- Economic cooperation
- Military-technical cooperation
- Humanitarian contacts

Research highlights:

- Russia and contemporary conflicts in Africa
- Russian economic projects in Africa
- Russian diaspora in Africa

Career opportunities:

Research activities in the field of international relations.

Supervisor's specific requirements:

- Knowledge of Russian language (books and sources in Russian)
- High level of English language

Main publications:

- Antoshin, A. V. (2012), “While there is no war...” Letters of Mark Aldanov”, Russian emigration in the USA, The New Review Publishing, New York, USA, pp. 32–39.
- Antoshin, A. V. (2014), “On the fronts of the Second and Cold Wars: Russian emigrants in 1939 – the beginning of 1950s”, Moscow: AIRO-XXI, Russia. (in Russian). ISBN: 978-5-91022-242-1
- Antoshin, A. V. (2014), “From Russian Monmartre to Brighton Beach: Evolution of the “Russian world” in 1950–1980s”, Moscow: AIRO-XXI, Russia. (in Russian). ISBN: 978-5-91022-244-5
- Antoshin, A. V. (2008), “Russian emigrants in Cold War”, Ekaterinburg, Russia. (in Russian). ISBN: 978-5-7996-0375-5



Research supervisor:
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WORLD HISTORY – THE EASTERN MEDITERRANEAN IN THE MIDDLE AGES

Research goal:

The study is aimed at the research of cross-cultural and inter-confessional communication in the Eastern Mediterranean of the Late Middle Ages.

Aspects studied:

- Byzantine Studies
- Mediterranean Studies
- Intellectual History

Research highlights:

- This study is focused on the analysis of diplomatic, religious and cultural relations between Byzantium and the West, as well as religious, military and political confrontation between Byzantium and the Ottoman Empire in 14th-15th centuries
- Special attention will be paid to the contacts in Christianity and Islamic world

Career opportunities:

- Researcher of high quality standards in humanities
- Lecturer at all levels of education

Supervisor's specific requirements:

Basic knowledge of Old Greek or Latin.

Main publications:

- Kushch, T. (2017), “At Sunset of Empire: the Intellectual Milieu of the Late Byzantium”, Moscow; Yekaterinburg, 410 p. (in Russian) ISBN: 978-5-7996-0828-6
- Kushch, T. (2014), “Dèmètrios Kydonès, source pour l'histoire du mouvement zélote / Thessalonique au temps des Zélotés (1342–1350)”, in par M.-H. Congourdeau (ed.). Paris, pp. 89–98. (In French) ISBN: 9782916716480
- Kushch, T. (2016), “The Co-Rulership and the Problem of the Succession to the Throne in the Context of Dynastic Struggle in Fourteenth-Century Byzantium”, Byzantine Essays. St. Petersburg, pp. 121–133. (In Russian) ISBN: 978-5-906860-51-4



Research supervisor:
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HISTORY OF RUSSIA

Research goal:

The program focuses on the social and political aspects of Russian history during the first half of the XXth century.

Aspects studied:

- Russia in the First World War
- Social and Cultural History of Russia and Urals in the second part of the 19th – beginning of the 20th century

Research highlights:

- Study of socio-cultural processes in Russia and the Urals during pre – revolution and Soviet modernization
- Influence of the World War I on the revolution crisis in Russia and its outcomes
- Historiography of the early Soviet society
- Historical imagology

Career opportunities:

- Researcher
- Lecturer

Main publications:

- Porshneva, O. S. and Feldman, M. A. (2018), “Ascent of the historian: S. V. Yarov and the study of industrial workers in Russia”, Russian history, no. 2, pp. 130–134. (in Russian)
<https://elibrary.ru/item.asp?id=32677204>
- Porshneva, O. (2018), “The jubilee to the anniversary: interpretation of the war-revolutionary crisis of 1914–1921 in the context of two significant dates”, Dialogue With Time Intellectual History Review, Issue 64, pp. 248–261. (in Russian)
<https://elibrary.ru/item.asp?id=35533366>
- Porshneva, O. S. (2018), “The nature of the social development of Soviet Russia. USSR in the 1917–1930s: assessments and discussions in modern Russian historiography. The Centenary of the 1917 Russian Revolution(s): its Significance in World History”, the International Conference at the Centre for Russian Studies, 15–16 May, 2017, Budapest, Hungary, pp. 229–238. (in Russian)
ISBN: 978-615-5651-05-2
- Porshneva, O. (2018), Part 1. Chapter 2, 2.1; Part 2. Chapter 8, 8.5; Chapter 9, 9.2, 9.3 and 9.5 in Mazur, L. (ed.), Early Soviet Society As A Social Project, 1917–1930s. In 2 parts, Publishing House of the Ural Federal University, Ekaterinburg, Russian Federation.
ISBN: 978-5-7996-2468-2

- Porshneva, O. (2017), “Russian people in 1917 revolution in the memoirs of a Britain’s military attaché Alfred Knox”, Dialog so Vremenem, Issue 59, pp. 204–217. (in Russian)
<https://elibrary.ru/item.asp?id=29436315>
- Porshneva, O. S. and Darenskaia, I. V. (2017), “Protest actions & moods of the ural’s urban population in the “Great Break” period (1928–1932)”, Ural Historical Journal, vol. 56, Issue 3, pp 101–109. (in Russian)
<https://elibrary.ru/item.asp?id=29867276>
- Porshneva, O. S. (2017), “Contemporary Early Soviet Society Studies In The Context Of Changing Paradigms”, Vestnik Tomskogo gosudarstvennogo universiteta [Tomsk State University Journal], 423, pp. 150–156. (in Russian)
DOI: 10.17223/15617793/423/21
- Porshneva, O. (2016), “Letters of authority in the era of revolution and civil war (March 1917-May 1924)”, Rossiiskaya Istoriya, Issue 6, pp. 203–206. (in Russian)
<https://elibrary.ru/item.asp?id=28150629&>



Research supervisor:
Prof. Anton S. Mokhov,
Doctor of Science

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WORLD HISTORY

Research goal:

The study analyses aspects of military and administrative structures including military reforms in the countries of Near East and Western Europe in VII–XI centuries.

Aspects studied:

- History of Byzantium
- History of Later Roman Empire
- Military and administrative reforms
- The art of war in antiquity and middle Ages
- Sigillography
- Prosopography

Research highlights:

- Working with historical sources, translation and publication of historical sources
- Publication of research results in Scopus and Web of Science
- Working with grants and academic projects as part of a research team

Career opportunities:

Employment at research and educational institutions.

Supervisor's specific requirements:

- Awareness of late – Antiquity military history (III–V centuries)
- Basic knowledge of Latin and/or Ancient Greek languages

Main publications:

- Mokhov, A. (2013), "Byzantine army in the middle 8th – middle 9th century: evolution of the military-administrative structures", Ural Federal University, Ekaterinburg, Russian Federation, 278 p. (in Russian)
ISBN: 978-5-7996-1035-7
- Mokhov, A. (2011), "The department of the οξὺς δρόμος in the 10th – 11th Centuries", Vizantiyskiy Vremennik, vol. 70, no. 95, pp. 25–36. (In Russian).
<https://elibrary.ru/item.asp?id=18196782>
- Mokhov, A. (2013), "Varangians in the Orient: Pilgrimage of the Norwegian king Haraldr III Sigurdarson to Jerusalem", Ural historical bulletin, vol. 1, no. 38, pp. 102–111. (In Russian).
<https://elibrary.ru/item.asp?id=18869729>
- Mokhov, A. (2014), "Studies of the Byzantine army: theory and terminology", Dialogue with time: Intellectual History Review, vol. 48, pp. 45–58. (In Russian).
<https://elibrary.ru/item.asp?id=22752885>



Research supervisor:
Associate Prof.
Yulia E. But,
Candidate of Science

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EARLY MODERN AND MODERN HISTORY

Research goal:

The study is aimed at revealing key processes and tendencies in European societies, transnational contacts and interrelations in different political and cultural contexts of the 18th and 19th centuries.

Aspects studied:

- History and culture of the Habsburg monarchy
- National movements in the 19th Century
- Political history of German territories in 1700–1900
- European high culture and everyday life in 1700–1900
- History of European universities and national schooling
- Education policies as an instrument of achieving political goals (historical cases)

Research highlights:

- Research employs up-to-date interdisciplinary methods and approaches
- The fundamental concepts include those of collective identity, cultural memory, memory spaces, history politics, transnationalism, multiculturalism and multilingualism

Career opportunities:

Good knowledge of the above stated material provide perfect career opportunities as a researcher, teacher, adviser or consultant in universities, academia, politics, media, museums, archives, galleries, heritage funds, etc.

Supervisor's specific requirements:

Good knowledge of English language. At least basic level of German language is welcome.

Main publications:

- But, Y. (2019), "The Transfer of European Educational Practices into the Russian Empire in the 19th Century: The Main Channels and Elite Reflections", Quaestio Rossica, vol. 7, no. 1, pp. 68–84. (In Russian)
DOI: 10.15826/qr.2019.1.363
- But, I. and Kruchinina, N. (2019), "English and German Modern Artistic Culture: A manual", Ekaterinburg: Ural University Press, 164 p. (In Russian)
<https://elibrary.ru/item.asp?id=37120823>
- But, I. (2017), "Revolt for Human Dignity in Imperial Russia: The Student Strike of 1899. Student Revolt, City and Society in Europe – From the Middle Ages to the Present", in (ed.) by Dhondt P. and Boran E., London: Routledge. pp. 184–202.
DOI: 10.4324/9781315170145

Duration of study: 3 years

Language: English or Russian

Entry requirements:

- Master's degree (or equivalent) in the related field
- B2 level of English or Russian
- Interview

Entrance exams:

- Foreign language (English/German/French)
- Philosophy, ethics and religious studies
- Philosophy

Government scholarship is available.

See more information at:

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Research



Doctoral Programs in English

Basem Atieh (Syria) a doctoral candidate in Philosophy, Ethics and Religious Studies



Research supervisor:

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POLITICAL PHILOSOPHY

Research goal:

The study is aimed at preparing a dissertation on the basis of research in the field of relevant political and philosophic aspects of modernity.

Aspects studied:

- Social theory and social anthropology
- Urban theory and neoliberal urban restructuring
- Post-Soviet social and cultural processes and statecraft
- Mega-projects and mega-events as questionable drivers of development
- Neoliberalism, including neoliberal nationalism
- Collective memory and cultural policy

Research highlights:

- The topics of the dissertations are formulated according to student needs and career aspirations
- Working together towards a research degree in philosophy, political and social theory

Career opportunities:

Researcher and lecturer at national and international educational and academic institutions.

Main publications:

- Trubina, E., Turoma, S., Ratilainen, S., and Trubina, E. (2018) "At the intersection of globalization and 'civilizational originality': cultural production in Putin's Russia", *Cultural Studies*, vol. 32, no. 5, pp. 651–675.
DOI: 10.1080/09502386.2018.1428645
- Trubina, E. (2018), "Street art in non-capital urban centres: between exploiting commercial appeal and expressing social concerns", *Cultural Studies*, vol. 32, no. 5, pp. 676–703.
DOI: 10.1080/09502386.2018.1429002
- Trubina, E. (2018), "The spaces of spirits: rethinking spirituality (a review of the book "Spaces of Spirituality". Ed. by Bartoloni, N., MacKian, S., and Pile., S., Routledge, 2018)", *Sibirskie istoricheskie issledovania [Siberian Historical Research]*, vol. 2, pp. 257–263. (in Russian)
DOI: 10.17223/2312461X/20/15
- Trubina, E. (2018), "Philosophical and "non-philosophical anthropology: epistemological privileges and appropriations", *Etnograficheskoe obozrenie [Ethnographic Review]*, vol. 5, pp. 5–12. (in Russian)
DOI: 10.31857/S086954150001473-0

Research supervisor:

Prof. Elena G. Trubina,
Doctor of Science

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- Trubina, E. (2018), "Philosophy in anthropology: taking concepts from life", *Etnograficheskoe obozrenie [Ethnographic Review]*, vol. 5, pp. 59–77. (in Russian)
DOI: 10.31857/S086954150001477-4
- Trubina, E. (2019), "Recalling the conversations with Hayden White in Santa Cruz: "Not Everything Was Thought Through", *NLO*, vol. 1, pp. 54–64. (in Russian)
<https://elibrary.ru/item.asp?id=37710879>
- Trubina, E. (2019), "The Sochi 2014 olympics: nationalism, globalized placemaking and multiscale legitimacy", *Urban Geography*, vol. 40, no. 4, pp. 387–408
DOI: 10.1080/02723638.2017.1395601

**Research supervisor:**

Associate Prof.
Sergey A. Nikitin,
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RHETORICAL CONTEXT OF THE SOCIAL CONSTRUCTION PROCESS

Research goal:

The research is aimed at studying the structure and regularities in formation of phenomena of social reality with special properties for the creation of the new horizon of the socially constructed world.

Aspects studied:

- Research in classical phenomenology and social phenomenology
- Study of the relationship between the phenomena and intentional structure

Research highlights:

- Research in phenomenological theory of social constructing of reality
- Posing the questions about the role of the gaze and the rhythm in the social constructing of reality
- Discussing the rhetorical character of the context of social constructing

Career opportunities:

Research activities in the field of pure phenomenology and phenomenological philosophy.

Main publications:

- Nikitin, S. A. (2015), "Contexts of the social imagination", *Sociems*, no. 21, pp. 5–17. (in Russian)
ISBN: 5-7525-1804-0
- Nikitin, S. A. (2015), "Two political strategies of generalization: Type and Isotype // *Annals of the Urals University*, no. 1(137). (in Russian)
<https://elibrary.ru/item.asp?id=23495478>
- Nikitin, S. A. (2014), "Method of clarification and Figurative Language", *Journal of Siberian federal University*, vol. 7, no. 8, pp. 1252–1261.
<https://www.elibrary.ru/item.asp?id=13855424>
- Nikitin, S. A. (2014), "Professional philosophical discourse and rhetoric", *Scientific notes of Kazan University*, vol. 156, book 1, pp. 124–133. (in Russian)
<https://elibrary.ru/item.asp?id=21593678>
- Nikitin, S. A. (2012), "Say it on time: towards historical rhetoric", *Annals of the Urals university*, no. 4(109) (in Russian)
<https://elibrary.ru/item.asp?id=18634953>

**Research supervisor:**

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THE PHILOSOPHY OF MEDIA, MEDIA CULTURE AND MEDIA ART

Research goal:

The aim of the research is to identify the essence, features of being and functioning of art and culture, formed in a real and virtual environment with the help of new media.

Aspects studied:

- The essence and characteristics of media culture as a new way of human existence in the world
- Research of features of language and genre-species nature, new expressive possibilities of media art
- Identification of the interconnection and interdependence between media and gender, especially the presence of gender issues and imagery in new media

Research highlights:

- Existence of developed multi-level media environment in Yekaterinburg and access to it for conducting qualitative and quantitative research
- Yekaterinburg is a center for media art, realized and studied in the creative spaces of the Ural Industrial Biennale, the Ural Branch of the National Center for Contemporary Art, and the Yeltsin Center Art Gallery

Career opportunities:

- Curatorial activity and promotion of art projects in the field of media art or techno-art, cooperation with the Ural Biennale of Contemporary Art, the Ural branch of the NCCA and the Art Gallery of the Yeltsin Center
- Expert activity in the field of media culture and media art, cooperation with television and radio channels, information and social networks

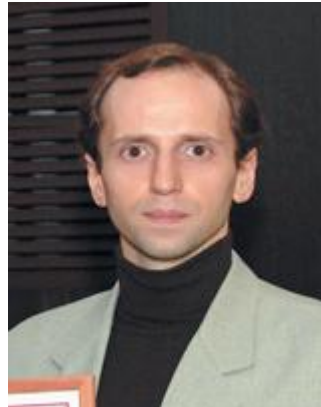
Supervisor's specific requirements:

- Knowledge of the philosophy of culture and art
- Experience of theoretical studies in the field of culture and art

Main publications:

- Gudova, M., Kiseleva, N., and Kiselev, E. (2017), "The projects method in the culture of region discipline in the tourist education", 4th International Conference On Education And Social Sciences (Intcess 2017), 6–8 February, Istanbul, Turkey, pp. 739–742.
DOI: 10.18768/ijaedu.309801
- Gudova, M. and Lisovetc, I. (2017), "Synesthetic artistic perception in the era of post literacy", ADVED2017: 3rd international conference on advances in education and social science, pp. 958–961.
DOI: 10.18769/ijasos.367269

- Gudova, M., Lisovetc, I., and Tapilina, E. (2016), "The Formation of Sensual Synesthesia Abilities in Contemporary Art Education", Iceepsy 2016–7th International Conference on Education and Educational Psychology.
DOI: 10.15405/epsbs.2016.11.73
- Gudova, M., Rubtsova, E., and Forteza, F.R.F. (2015), "Multimedia Resources as Examples of Polymorphic Educational Hypertexts in the Post-Literacy Era", Worldwide Trends in the Development of Education and Academic Research.
DOI: 10.1016/j.sbspro.2015.11.679
- Gudova, M. (2014), "The Women's Reading in Social Network", International Conference on Education and Social Sciences (Intcess14), vol. I and II.
ISBN:978-605-64453-0-9

**Research supervisor:**

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**PHILOSOPHY****Research goal:**

The study is aimed at the conceptualization of processes that can be treated as the anthropological turn in development of contemporary scientific knowledge, society and the global human civilization as a whole.

Aspects studied:

- Social Philosophy
- Epistemology
- Philosophy and methodology of science

Research highlights:

- Among the most important aspects of the research are: to show what is an anthropogenic vector of contemporary civilization development, to prove the thesis about an anthropological turn in development of postmodern society and to identify cognitive-axiological structures underlying cultural and historical transformations we deal with in our life
- The concept of anthropological cognitive model is being worked out and due to be used as a categorical basis for inquiring unstudied mechanisms coordinating and integrating different historically evident types of thinking and world outlook into the (meta)cultural code of the contemporary civilization
- An explanatory scheme is tested, according to which a human being is experiencing a phase of transition to a new state, a new cultural-historical type of person is being born. There are civilizational changes that affect all of humanity and rebuild deep structures of human existence. This work is carried out in line with studies aimed at identifying the underlying cognitive-axiological structures of such processes. The solution of the scientific problem is directed to the development of a post-nonclassical methodology of civilizational analysis. This work helps to give an integrative framework for epistemological, socio-philosophical and philosophical-anthropological bases of the modern social-humanitarian knowledge

Career opportunities:

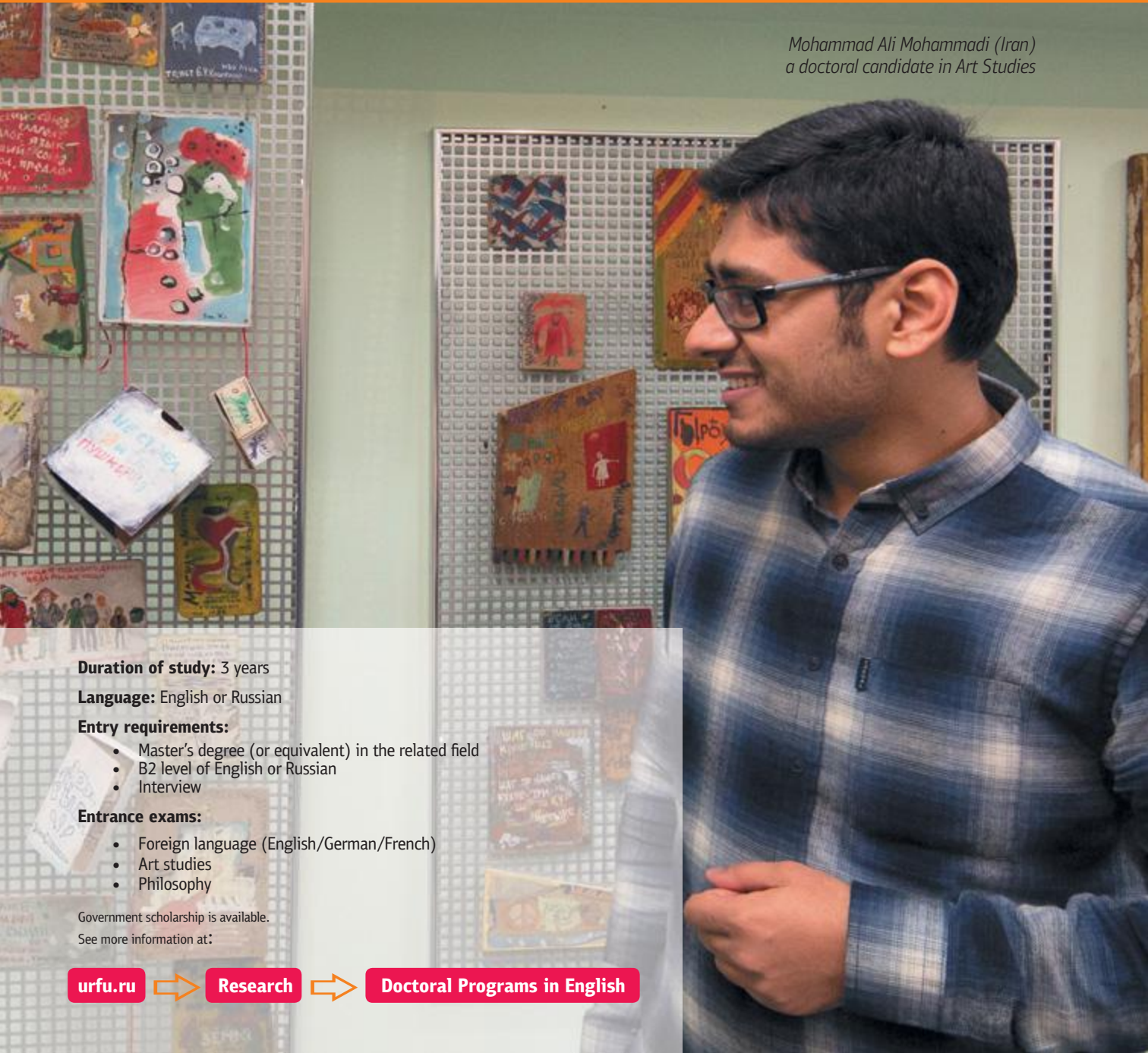
In the context of complicating processes of globalization, accelerating social development, increasing uncertainty of social and cultural transformation such work becomes an essential condition for building effective social forecasts, the methodological basis of cross-cultural interdisciplinary research and important foundation of strategic planning.

Supervisor's specific requirements:

A master's degree in philosophy, social sciences or humanities.

Main publications:

- Medvedyev, V. A. (2014), "Theoretical and Methodological Trends in Contemporary Social Humanitarian Cognition", *Sociological Studies*, no. 9, pp. 3–12. (In Russian) <https://elibrary.ru/item.asp?id=22026902>
- Medvedyev, V. A. (2010), "On the Trends of Methodological Culture of Thinking Development", *Russian Studies in Philosophy*, no. 2, pp. 161–164. (In Russian) <https://www.elibrary.ru/item.asp?id=13855424>
- Medvedyev, V. A. (2010), "Development of Methodological Culture of Thinking: Types of Methodological Reflection of a Subject of Cognition", Saarbrücken: Lambert Academic Publishing, 140 p. (In Russian) ISBN: 3843302367



Mohammad Ali Mohammadi (Iran)
a doctoral candidate in Art Studies

Duration of study: 3 years

Language: English or Russian

Entry requirements:

- Master's degree (or equivalent) in the related field
- B2 level of English or Russian
- Interview

Entrance exams:

- Foreign language (English/German/French)
- Art studies
- Philosophy

Government scholarship is available.

See more information at:

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Research



Doctoral Programs in English

THE ART OF XX CENTURY

Research goal:

Identifying the processes of interaction between different national artistic schools at their crossroads, parallels and opposites.

Aspects studied:

- The history of Russian emigration
- Interaction of national schools
- Modern artistic process

Research highlights:

- Using resources of UrFU laboratory for expertise and restoration: ability to work with high – precision equipment for technical and technological analysis of art objects
- The use of practical basis for art development: close cooperation with Russian artistic and museum centers (Modern Center for Modern Art, Ural Industrial Biennale of Modern Art, Yeltzin Center Art Gallery, etc.)

Career opportunities:

Professional activities in the field of art, museum studies, exhibition structures.

Supervisor's specific requirements:

- Basic knowledge of the history of arts
- Publications and participation in academic conferences in the relevant field

Main publications:

- Galeeva, T. A., (2016), "Modern art, and it should be mentioned more often, compensates for the lack of modernity in the society", Discussion, vol. 11 pp. 6–14. (in Russian)
<http://elibrary.ru/item.asp?id=28357169>
- Galeeva, T. A., (2017), "Alternative artistic practices of late socialist period and perestroika in the regions of Russia: the case of Sverdlovsk/Yekaterinburg", Survival and Sustainability: Contemporary Studies in Humanities, no. 314, pp. 6–20.
<https://opac.ll.chiba-u.jp/da/curator/103062/S18817165-313-P007-GAL.pdf>



Research supervisor:

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Tamara A. Galeeva,
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Research supervisor:
Associate Prof.
Victoria V. Demenova,
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INTERACTION IN THE ART OF THE EAST AND THE WEST

Research goal:

Analysis of interaction in the art of the East, Russia and the West (Central and Eastern Europe); interaction between their artistic schools, styles in historical context and in terms of universal foundations.

Aspects studied:

- Buddhism and Islamic art in Russia
- Oriental influence on Russian art
- The problem of perception and influence of Western – European art in the Oriental countries

Research highlights:

- Using resources of UrFU laboratory for expertise and restoration: ability to work with high – precision equipment for technical and technological analysis of art objects
- Close cooperation with religious and cultural centers from Buryatia, staff of State Hermitage (St. Petersburg), Museum of the Orient (Moscow)
- Conducting international academic symposium “Buddhist art: traditions and innovations”

Career opportunities:

Professional activities in the field of art, museum studies, exhibition structures, expert activities in the field of oriental art.

Supervisor’s specific requirements:

- Basic knowledge of the history of arts
- Publications and participation in academic conferences in the relevant field

Main publications:

- Demenova, V. V. (2013), “Sacral art of Nepal in the light of artistic processes in XX century”, *Ural Oriental Studies*, issue 5, pp. 61–65. (in Russian)
<https://elibrary.ru/item.asp?id=30638660>
- Demenova, V. V. and Urozhenko, O. A. (2012), “Wisdom and compassion. Collection of Buddhist bronze of Sverdlovsk Regional Museum of Region Studies”, *Culture and time*, no. 2 (44), pp. 128–152. (in Russian)
<http://www.icr.su/rus/departments/magazine/about/index.php>
- Demenova, V. V. (2011), “Modern research in Buddhist art”, *Journal of Himalayan research and cultural foundation, NGO in Special Consultative Status with ECOSOC, United Nations*, vol. 15, no. 4, pp. 61–63.
<http://www.himalayanresearch.org/pdf/2011/Vol15%20N4.pdf>



Duration of study: 3 years

Language: English or Russian

Entry requirements:

- Master's degree (or equivalent) in the related field
- B2 level of English or Russian
- Interview

Entrance exams:

- Foreign language (English/German/French)
- Cultural studies
- Philosophy

Government scholarship is available.

See more information at:

urfu.ru



Research



Doctoral Programs in English

*Tao Mengting (China)
a doctoral candidate
in Cultural Studies*



Research supervisor:

Prof. Konstantin M. Olkhovikov,
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THEORY AND PHILOSOPHY OF CULTURE, SOCIAL REGULATION, SOCIAL MORES, SUBCULTURES

Research goal:

Methodological and historical contexts of cultural studies carry a very special mission in our global world. The mission brings to limelight sometimes unique and evading phenomena and tools that allow interpreting them. Frames of social regulation and cultural variations could also be a subject of advanced and unprecedented comparative and case studies. Social regulation consists in the widest imaginable forms of rationality and emotionality. The international context is the engine of such numerous facts and notions.

Aspects studied:

- Mythological aspects of actual culture
- Cultural variations as life worlds and group mores
- Subcultures in the globalized world

Research highlights:

Realizing multi-dimensional aspects of social regulation to contact key social institutions with a differing measure of formality; from federal ministries to regional and municipal departments and also from centralized social movements to local civil initiatives here in Russia.

Career opportunities:

Administrative and expert positions within all hierarchical levels of social institutions and cultural communities.

Supervisor's specific requirements:

- Degree in social sciences, arts, humanities, law, history, and management
- Basic skills in social empirical or applied research methods

Main publications:

- Olkhovikov, K. M. (2016), "Reloading Vocational Ethics in International Management", Russian Regions on the Move, pp. 38–46. ISBN: 978-5-8295-0419-9
- Olkhovikov, K. M. (2009), "Sociology of morality, European Society or European Societies: A View from Russia", 9th Conference of the European Sociological Association, Lisbon, Portugal, September 02–05, 2009, pp. 365–367. ISBN: 978-5-91146-210-9
- Olkhovikov, K. M. and Olkhovikova, S. V. (2007), "Sociology of Spiritual Life: Textbook", Ural Federal University, Yekaterinburg, 203 p. (in Russian) ISBN: 978-5-321-01105-8
- Olkhovikov, K. M. and Orlov, G. P. (2004), "Categories of Sociology: Way of Thinking and Dictionary of Research", Sociological Researches, no. 2, pp. 3–12. (in Russian) <https://elibrary.ru/item.asp?id=17670209>
- Olkhovikov, K. M. (2003), "Sociology of Morals: questions of theory and choosing investigation strategy", Russian Vocational Pedagogical University, 139 p. (in Russian) ISBN: 5–8050–0121–7

**Research supervisor:**

Prof. Tatyana Yu. Bystrova,
Doctor of Science

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OPEN CITY: FROM THEORETICAL CONCEPTS TO INNOVATIVE DESIGN

Research goal:

practical testing of humanities approaches in the field of design, culture studies, urban projects, facilitating subject area for different groups of people.

Aspects studied:

- Design thinking, design practice,
- Social design, humane centered design, sustainable design and architecture, design for people with disabilities,
- Harmonious urban space,
- Culture representations in physical artefacts and objects,
- Cultural study of architecture and design,
- City processes, city image.

Research highlights:

Unique combination of modern theoretical approaches and humanitaristics (phenomenology, semiotics, discourse studies, psychology) with project practices. Prevalence of social and socio-cultural research and design topics. Inclusion into current social and urban projects.

Career opportunities:

- design agencies;
- educational and research institutions;
- municipal and regional administrative structures;
- advertising and PR agencies;
- exhibition centers, museums, other cultural institutions;
- editorial offices of publishing houses and magazines;
- non-profit organization related to design, urban studies, cultural studies

Main publications:

- Bystrova, T. (2015), "Philosophy of Design", Ural Federal University, Yekaterinburg, 128 p. (in Russian)
ISBN 978-5-7996-1559-8
- Bystrova, T. (2017), "Object, Form, Style: the introduction to Philosophy of Design", Armchair Scientist, Moscow, Yekaterinburg, 374 p. (in Russian)
ISBN: 978-5-9909375-0-5
- Bystrova, T. (2006), "Art Philosophy: Essays on History of Architecture, Art and Design", Architecton, Yekaterinburg, 223 p. (in Russian)
ISBN: 5-7408-0095-1
- Bystrova, T., Khismatulin, A. (2009), "Souvenir it's a serious matter: the social and communicative analysis of souvenir", brand studio RA4.ru, Yekaterinburg, 96 p. (in Russian)
ISBN: 978-5-9901842-1-3

- Bystrova, T. (2017), "From modernism to neo-rationalism: the creative concepts of the architects in the XX-XXI century", Armchair Scientist, Moscow, Yekaterinburg, 400 p. (in Russian)
ISBN: 978-5-7584-0349-5
- Bystrova, T. Yu., Tokarskaya, L. V., Vukovich, D. (2017), "Visual Perception Specifics of Children with ASD as a Determinant for Educational Environment Outlines", International Journal of Cognitive Research in Science, Engineering and Education (IJCRSEE), vol. 5, no. 1, pp. 75-84.
DOI: 10.5937/IJCRSEE1701075B
- Bystrova, T. (2017), "From the City-Plant to the Socialist City: Losses and Acquisitions of Human and Architecture", ISPS Convention 2017 "Modernization and Multiple Modernities", pp. 190-202.
DOI: 10.18502/kss.v3i7.2474
- Bystrova, T. Historical legacy of industrial towns in the Urals: urbanistic and sociocultural aspects // SGEM Vienna Art 2018. 5th International multidisciplinary scientific conference on social sciences and art. Conference Proceedings. Volume 5. Architecture & Design. P. 145-155.
ISBN: 978-619-7408-33-1
- Vukovich, D., Bystrova, T., Larionova, V. (2018), "The Process of Agglomeration in Big Cities: the Case of the Yekaterinburg", Proceedings of the 1st International Conference on Contemporary Education and Economic Development (CEED2018)
DOI: 10.2991/ceed-18.2018.49
- Bystrova, T., Tokarskaja, L. (2017), "Psychological Feasibility of design planning peculiarities for children with autism spectrum disorders", Lifestyle and Health Ed. by Fengli Lan, Friedrich G. Wallner, Gerhard Klunger. Verlag Traugott Bautz GmbH, Germany, pp. 223-233.
ISBN: 978-3-95948-235-6
- Bystrova, T. (2018), "Settlement system density as a basis for the cultural regeneration in Urals small industrial towns", A World of Flows – Labour Mobility, Capital and Knowledge in an Age of Global Reversal and Regional Revival. Regional Studies Association Annual Conference 2018, Università della Svizzera Italiana, Lugano, Switzerland.
ISBN: 978-1-897721-66-7
- Bystrova, T. (2019), "Concept of Organic Architecture in the Second Half of the XXth Century in the Context of Sustainable Development", IOP Conference Series: Materials Science and Engineering. Volume 481, no. 1.
DOI: 10.1088/1757-899X/481/1/012020
- Bystrova, T. Ju, "Fractal Properties of Settlement System as a Factor of its Sustainability: Ural in the 18th-20th centuries", IOP Conference Series: Materials Science and Engineering, vol. 687.
<https://iccats.susu.ru/index.html>

The background is a teal color with various white and light blue graphical elements. There are several line graphs with data points, some of which are highlighted with red lines. The graphs show fluctuating trends. In the upper left, there are three data points: 467.2483, 345.7475, and 225.0043. In the middle right, there is a data point 117.2457. The overall aesthetic is clean and modern, typical of a business or academic presentation.

Economics & Management

Duration of study: 3 years

Language: English or Russian

Entry requirements:

- Master's degree (or equivalent) in the related field
- B2 level of English or Russian
- Interview

Entrance exams:

- Foreign language (English/German/French)
- Economics

Government scholarship is available.

See more information at:

urfu.ru



Research



Doctoral Programs in English

Armine Amiryan (Armenia)
a doctoral candidate
in Economics



Research supervisor:

Prof. Liudmila S. Ruzhanskaya,
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CORPORATE GOVERNANCE AND STRATEGY

Research goal:

The issues of Corporate Governance in Russian Firms, Acceptance of CG Standards, Corporate Strategy in Transition Economy, Corporate Governance, and Corporate Finance.

Aspects studied:

- Behavioral models of large and medium-sized companies
- Applying corporate finance tools to designing a company development strategy
- Evaluation of the effectiveness of mergers and acquisitions
- Dividend policy of corporations
- Market strategy of companies

Research highlights:

- Features of the formation of the Russian corporate model
- Determinants of dividend policy of Russian corporations
- The role of the state in the development of Russian large companies

Career opportunities:

- Opportunity to study and apply research methods of company behavior
- Modeling of various aspects of behavior of large companies in the Russian and international markets
- Evaluation of the effectiveness of the implementation of business models

Main publications:

- Ruzhanskaya, L. S. (2009), "Corporate Governance in Russian Regions: Urals Companies' Experience" Chapter 5 in National Corporate Governance Report. Issue 2, Moscow, 2009. P. 37–43. (in Russian)
ISBN: 978 5 903946 03 7
- Ruzhanskaya, L., Yakimova, E. (2015), "Changing Strategies for Russian Companies in the Conditions of Economic Crisis: The Experience of a Monographic Study", Mediterranean Journal of Social Sciences, vol 6, no. 3 53
DOI: 10.5901/mjss.2015.v6n3s3p365
- Ruzhanskaya, L. (2011) Critics on Shastitko A., "The New Institutional Economic Theory", Social Sciences, no. 1, vol. 0042, pp. 139–142.
<https://dlib.eastview.com/browse/doc/22303922>
- Ruzhanskaya, L. (2010), "Peculiarities of dividend policy of Russian companies and interests of investors", Issues of economics, no. 3, pp. 132–146. (in Russian)
DOI: 10.32609/0042 8736 2010 3 132 146
- Ruzhanskaya, L. (2010), "Disclosure by Russian companies: results of empirical Research", Russian Journal of Management, vol. 8, no. 3, pp. 35–56. (in Russian)
<https://rjm.spbu.ru/article/view/368>

**Research supervisor:**

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ECONOMICS, MATHEMATICAL AND INSTRUMENTAL METHODS OF ECONOMICS

Research goal:

Analysis of innovations and spatial effects on the performance of firms.

Aspects studied:

- Effects of innovations on performance of firms
- Effects of innovation policy adjustment
- Spatial effects on micro-level performance
- Spatial effects on innovation

Research highlights:

- Access to fresh micro-level data from the databases with limited access
- Opportunity to work with renowned researchers from other countries

Career opportunities:

- Researcher
- Policy making
- Data analysis

Supervisor's specific requirements:

- Master's degree in economics or mathematics
- English level B2 or higher
- Experience in using statistical software (R, Stata, Eviews, etc.)

Main publications:

- Mariev, O., Drapkin, I., and Chukavina, K. (2016), "Is Russia successful in attracting foreign direct investment? Evidence based on gravity model estimation", *Review of Economic Perspectives*, vol. 16, no. 3, pp. 245–267.
DOI: 10.1515/revecp-2016-0015
- Mariev, O. S., Drapkin, I. M., Chukavina, K. V. and Rachinger, H. (2016), "Determinants of FDI inflows: The case of Russian regions", *Economy of Region*, vol. 12, no. 4, pp. 1244–1252.
DOI: 10.17059/2016-4-24
- Davidson, N. B. and Mariev, O. S. (2015), "The impact of spatial concentration on enterprise performance", *Economy of Region*, vol. 4, pp. 95–105.
DOI: 10.17059/2015-4-8
- Mariev, O., Drapkin, I., and Chukavina, K. (2015), "Inflow and Outflow Potentials of Foreign Direct Investment in the Russian Economy: Numerical Estimation Based on the Gravity Approach", *Zhurnal Novaya Ekonomicheskaya Assotsiatsiya-Journal Of The New Economic Association*, vol. 4, no. 28, pp. 75–96.
<https://elibrary.ru/item.asp?id=25133121>

- Ignatyeva, Y. D. and Mariev, O. S. (2013), "Methodology attitude and instruments for structural and functional analysis of the regional development", *Economy of Region*, vol. 1, pp. 226–237. (in Russian)
DOI: 10.17059/2013-1-22
- Mariev, O. S. and Savin, I. V. (2010), "Factors of innovative activity in Russian regions: Modeling and empirical analysis", *Economy of Region*, vol. 3, pp. 235–244.
DOI: 10.17059/2010-3-31



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HUMAN CAPITAL RESEARCH

Research goal:

The research includes both theoretical and practical components in human capital study and its development in different spheres (such as family, education, and professional activity). Students obtain economic, sociological and political knowledge necessary for studying a broad spectrum of human capital and development determinants.

Aspects studied:

- Labour economics
- Sociology of labour
- Family research
- Demographical processes and their determinants
- Mixed methods
- Human capital development

Research highlights:

- Advanced study of modern issues of the development of human capital in demography and higher education
- The use of sociological and econometric methods

Career opportunities:

Graduates will be qualified for careers in Research Centers, Universities, businesses and public administrations in the area of the development of human capital.

Supervisor's specific requirements:

Basic knowledge in demography and data analysis (SPSS or others).

Main publications:

- Shubat, O. and Bagirova, A., (2018), "Econometric Modelling of Time Series Relationship Between Fertility and Income for the Russian Population: Methodological Issues", 32nd European Conference on Modelling and Simulation, May 22–25, 2018, Wilhelmshaven, Germany, pp. 20–26.
DOI: 10.7148/2018-0020
- Bagirova, A. and Shubat, O. (2018), "Resources for Fertility and Parenting in Russia", The 12th International Days of Statistics and Economics, September 6–8, 2018, Prague, Czech Republic, pp. 74–83.
ISBN: 978-80-87990-14-8
- Bagirova, A. (2017), "Human resources for parental labour as a new focus of the Russian demographic policy", The 11th International Days of Statistics and Economics, September 14–16, 2017, Prague, Czech Republic, pp. 39–48.
ISBN: 978-80-87990-12-4

- Bagirova, A. and Shubat, O. (2017), "Family and Parenting in the Light of the Students Views", *Sotsiologicheskie Issledovaniya*, Issue 7, pp. 126–131. (in Russian)
DOI: 10.7868/S0132162517070145
- Shubat, O., Bagirova, A. and Shmarova, I. (2017), "The Use Of Cluster Analysis To Assess The Demographic Potential Of Russian Regions", 31th European Conference on Modelling and Simulation, May 23–26, 2017, Budapest, Hungary, pp. 53–59.
DOI: 10.7148/2017-0053
- Bagirova, A. and Shubat, O. (2017), "Diversity of Human Capital Among Russian University Professors", 9th European Conference on Intellectual Capital ECIC2017, 6–7 April, 2017, Lisbon, Portugal, pp. 10–17.
ISBN: 978-191121831-9
- Bagirova, A., Shubat, O., Abdygapparova, S. and Karaeva, A. (2016), "Female University Students' Views on Parenthood as a Sociocultural Determinant of Birth Rates: Inter-Country Differences", The 10th International Days of Statistics and Economics, September 8–10, 2016, Prague, Czech Republic, pp. 72–81.
ISBN: 978-80-87990-10-0
- Bagirova, A., Shubat, O. and Scherbina, E. (2015), "How Human Capital of University Professors Impacts Students: A Russian Case Study", The 16th European Conference on Knowledge Management ECKM 2015, Udine, Italy, 3–4 September, 2015, pp. 78–85.
ISBN: 978-191081046-0
- Bagirova, A. and Shubat, O. (2014), "Parenthood image and its development in conception of parents work", *Sotsiologicheskie Issledovaniya*, Issue 4, pp. 103–110. (in Russian)
<https://elibrary.ru/item.asp?id=21583975>

**Research supervisor:**

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REGIONS AND CITIES: ADAPTATION AND DEVELOPMENT IN NEW ECONOMIC REALITY

Research goal:

Studying of modern economic, social and spatial issues of territorial development in the context of policy implementation and decision makings.

Aspects studied:

- Cities, digital transformation and public administration reforms; smart cities and smart governance
- Competitiveness of industrial regions and cities in modern conditions; company towns
- Capital cities: varieties and patterns of development
- Policies for shrinking cities
- Urban network development and reconfiguration

Research highlights:

- Focus on the interdisciplinary researching which allows the integration of social, spatial and economic approaches with the analysis of region and urban development.
- The programme is realized in collaboration with Institutions of Russian Academy of Science, foreign researchers and experts.

Career opportunities:

The program gives theoretical knowledge and practical experience which can be successfully applied in different spheres of regional and urban policy decision makings in authority bodies and private companies interested in the implementation of optimal spatial allocation of their business. Also, graduates of this program can work as lecturers and researchers in educational and research organizations.

Supervisor's specific requirements:

Strong analytical capacity.

Main publications:

- Turgel, I., Panzabekova, A. and Satpayeva, Z. (2018), "Comparative analysis of approaches to designing of regulatory impact assessment institute in Russia, Kazakhstan, and Kyrgyzstan", *The Bulletin The National Academy of Sciences of The Republic of Kazakhstan*, no. 4, pp. 153–160.
<http://www.bulletin-science.kz/images/pdf/v20184/153-160.pdf>
- Turgel, I. and Ulyanova, E. (2019), "Russia's Largest Regional Capitals. The Settlement System and the Economy of the Country Sergi" in: B. S. (Ed.). *Tech, Smart Cities, and Regional Development in Contemporary Russia*, Emerald Publishing Limited, Great Britain.
ISBN: 9781789738827

- Turgel, I., Bozhko, L. and Leskova, L. (2015), "State support for monotowns in Russia and Kazakhstan: experience and problems", *International Scientific Conference Environmental and Climate Technologies*, 14–16 October, Riga, Latvia, pp. 559–563.
DOI: 10.1016/j.egypro.2016.09.085.
- Turgel, I. and Veibert, S. (2016), "Institutional design of national systems of organization of the regulatory impact assessment (on the example of CIS countries)", *Public Administration*, vol. 3, pp. 90–93. (in Russian)
<https://elibrary.ru/item.asp?id=26366858>
- Turgel, I. (2015), "Russian Urban Settlement System: between Shrinkage and Growth", *North-East Asia International Forum, Harbin University of Commerce Proceedings*, pp. 20–26.



Research supervisor:
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INSTITUTIONAL ECONOMICS

Research goal:

A fundamental and applied research on institutional modeling of economic systems at the company level and regional level. The objects of research are manufacturing firms, universities, scientific organizations, regional authorities, networks, public goods, digital society and others.

Aspects studied:

- The transaction design of economic institutions of science
- The institutions of governance of hybrid (network) organizations
- Simulation of the optimal set of public goods

Research highlights:

- Scientific investigations are carried out in collaboration with Prof.W. Strielkowski (Great Britain), Prof. J. Stoffers (Netherland), Prof. V. Draskovich (Montenegro), Prof. D. Vukovich (Serbia)
- The study is financially supported by the Russian Science Foundation and some international funds

Career opportunities:

Good relations with scientists in the European advanced universities are the main direction of development for postgraduate students under the supervision of Prof. E. Popov. Due to this fact the job proposal in the European universities may be the career opportunities for postgraduate students.

Supervisor's specific requirements:

- Sufficient skills in econometrics modeling
- Sufficient level in English language
- Sufficient knowledge of orthodox economics

Main publications:

- Draskovic, V., Popov, E. V., Peleckis, K. K. (2017), "Modeling of Institutional Changes in Transition Countries – the Gap between the Theory and Practice", Montenegrin Journal of Economics, vol. 13, no. 1, pp. 121–140.
DOI: 10.14254/1800–5845/2017.13–1.9
- Popov, E. V., Stoffers, J., Omonov, Z., Veretennikova, A. (2016), "Analysis of Civic Initiatives: Multiparameter Classification of Social Innovations", American Journal of Applied Sciences, vol. 13, no. 11, pp. 1136–1148.
DOI: 10.3844/ajassp.2016.1136.1148

- Popov, E. V. (2012), " Transactions & Institutions", Montenegrin Journal of Economics, vol. 8, no. 2, pp. 115–124.
http://repec.mnje.com/mje/2012/v08-n02/mje_2012_v08-n02-a16.pdf
- Popov, E. V. (2010), "Institutional Atlas", Atlantic Economic Journal, vol. 39, no. 4, pp. 445–446.
DOI: 10.1007/s11293-010-9249-8
- Popov, E. V. (2008), "Transaction Function", International Advances in Economic Research, vol. 14, no. 4, pp. 475–476.
DOI: 10.1007/s11294-008-9185-4



Research supervisor:
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ENVIRONMENTAL ECONOMICS AND MANAGEMENT

Research goal:

Theoretical and applied studies of economic evaluation problems of natural resources and development of instruments for increasing the socio-economic efficiency for their utilization. Improvement of environmental management methods.

Aspects studied:

- Analysis of the anthropogenic factors impact on the environment in order to justify the management decisions
- Development of economic methods for increasing the efficiency of the natural resources utilization
- Improvement of the economic mechanism of environmental management

Research highlights:

- The research is focused on a systemic approach to solution of the interdisciplinary environmental and natural resources problems of economic development
- The international vector of the research – network interaction within the problems of the research with the world's leading universities

Career opportunities:

The study provides a multidisciplinary pool of theoretical knowledge and practical experience, applicable by state and municipal government bodies, environmental infrastructure units, and industrial enterprises, including corporations of the oil, gas and nuclear industries, energy, innovative companies of the chemical and pharmaceutical cluster, among others.

Supervisor's specific requirements:

The engineering basic education is welcomed, especially in chemical technology.

Main publications:

- Magaril, E. (2016), "Improvement of the environmental and operational characteristics of vehicles through decreasing the motor fuel density", *Environmental Science and Pollution Research*, vol. 23, issue 7, pp. 6793–6802.
DOI: 10.1007/s11356-015-5920-6
- Magaril, E. & Magaril, R. (2016), "Fuel Quality: Challenges to the Sustainable Development of Automobile Transport and Approach to Solution", *E3S Web of Conferences*, vol. 6, 03001.
DOI: 10.1051/e3sconf/20160603001

- Genon, G., Magaril, E., Magaril, R., Abrzhnina, L., Panepinto, D., and Viggiano, F. (2016), "Sustainability in automotive transport: Russian and Italian experience concerning actual situation and intervention tools", *International Journal of Sustainable Development and Planning*, vol. 11, issue 4, pp. 603–615
DOI: 10.2495/SDP-V11-N4-603-615
- Magaril, E. R., Berezyuk, M. V., and Rukavishnikova, L. (2016), *IV Environmental Economics: Interdisciplinary approach: Textbook*. KDU, Moscow, 423 p. (in Russian). ISBN: 978 591304676 5
- Magaril, E. R. (2015), "Increasing the efficiency and environmental safety of vehicle operation through improvement of fuel quality", *International Journal of Sustainable Development and Planning*, vol. 10, no. 6, pp. 880–893.
DOI: 10.2495/SDP-V10-N6-880-893
- Abrzhina, L. L., and Magaril, E. R. (2015), "Assessment of environmental-economic effectiveness of multifunctional fuel additives", *WIT Transactions on Ecology and the Environment*, vol. 198, pp. 287–294.
DOI: 10.2495/AIR150241



Research supervisor:
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INTERNATIONAL BUSINESS, SUSTAINABILITY AND STRATEGIC CSR

Research goal:

Prospective students will be involved in the relatively new research sphere of creating a platform for sustainable development and strategic social responsibility impact-based models across global economy. The variety of the research themes is based on triangulation and links economic drivers with managerial decision-making process.

Aspects studied:

- International strategy of multinational companies and sustainable development
- International models of corporate social responsibility
- Strategic corporate and university responsibility
- Shared Value Creation: cross-cultural stakeholder management
- Impact based investment in international business
- Impacts of financial and nonfinancial factors on international strategies of corporations

Research highlights:

- Students will be involved in international teams working with global academic networks, partner Universities from EU and BRICS countries. That implies presenting research in the international academic venues as well
- The interdisciplinary approach requires complex study of research in economics, management, organization theory, science and technology studies, and social science
- Perspective students should be ready to participate extensively in research seminars, write research papers, apply for international grants and be actively involved in the research sector development

Career opportunities:

The program is tailored for two-tier careers: researchers in International Academic Networks as well as senior management level in strategic and analytical departments of global corporations. Also the results would be unique for impact based investors companies choosing the blue ocean strategies.

Supervisor's specific requirements:

- Qualitative and quantitative empirical skills (e. g. SPSS, SEM)
- Fluency in English (B2+)
- Students should be ready for short module teaching in English at the undergraduate level

Main publications:

- Belyaeva, Z., Thomas, M., Scagnelli, S. D., and Cisi, M. (2018), "Student Perceptions Of University Social Responsibility: Implications from an Empirical Study in France, Italy and Russia", *World Review of Entrepreneurship, Management and Sustainable Development*, vol. 14, no. 1/2.
DOI: 10.1504/WREMSD.2018.089094
- Riad Shams, S. M. and Belyaeva, Z. (2017), "Quality Assurance Driving Factors as Antecedents of Knowledge Management: a Stakeholder-Focussed Perspective in Higher Education", *Journal of Knowledge Economy*, vol. 1, pp. 1–14.
DOI: 10.1007/s13132-017-0472-2
- Krivorotov, V. V., Kalina, A. V., Belyaeva, Z. S., and Erypalov, S. Y. (2016), "Optimisation model for industrial complex competitiveness: A path to sustainable innovation process", *World Review of Entrepreneurship, Management and Sustainable Development*, vol. 12, no. 2–3, pp. 254–269.
DOI: 10.1504/WREMSD.2016.074969
- Belyaeva, Z. (2016), "Entrepreneurial Innovation and Stakeholder Relationship Management" in Kaufmann, H. R., Shams, R. M. (ed.) *Entrepreneurial Challenges in the 21st Century: Creating Stakeholder Value Co-Creation*, Palgrave M, London, United Kingdom, pp. 120–132.
DOI: 10.1057/9781137479761_8
- Belyaeva, Z. and Kazakov, A., (2015), "Integrated approach to social responsibility: a model of stakeholders interaction in Russia and China", *Systems Research and Behavioral Science*, vol. 32, issue 2, pp. 240–246.
DOI: 10.1002/sres.2265
- Belyaeva, Z. S. (2013), "Transformation Processes of the Corporate Development in Russia: Social Responsibility Issues", *Systemic Practice and Action Research*, vol. 26, no. 6, pp. 485–496.
DOI: 10.1007/s11213-013-9298-4

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ELECTRICITY, INVESTMENTS, RISKS, FORECASTING, STRATEGY, INNOVATION, RENEWABLE ENERGY, FUEL-ENERGY COMPLEX, BIO-ENERGY, POWER GENERATION, SYSTEM ANALYSIS, ENERGY SECURITY, REGIONAL ECONOMY, BANKING SYSTEM

Research goal:

The goal of scientific activity is to study patterns of development of complex economic systems. Scientific supervisor is engaged in the development of industrial markets and is the author of theoretical-methodological foundations of competitive high-tech industries development in unstable conditions, due to the specific conditions of competition.

Aspects studied:

The supervisor is a member of the leading Russian scientific school in the field of management and energy production systems, has expertise, both in technical and economic matters and in Economics, investment, and Finance, among others. He has significant work on risk analysis, analysis of competitiveness, including energy facilities and new energy technologies.

Research highlights:

- The proposed approach to the risk ranking development of power generating companies according to their level of risk. This allowed to estimate objectively existing threats of the investment attractiveness of the power generating company and to define priority directions of increase of its competitiveness
- The results obtained were used in the development of programs to minimize the risk of development in energy systems. It is possible to increase the investment attractiveness of energy companies as well as the effectiveness of the implementation of investment projects

Career opportunities:

Risk management in energy sector.

Supervisor's specific requirements:

- Economic-mathematical modeling
- Energy technologies
- Investment analysis
- System analysis in the energy sector

Main publications:

- Domnikov, A., Chebotareva, G., and Khodorovsky, M. (2017), "Unbiased investment risk assessment for energy generating companies: rating approach", International journal of sustainable development and planning, vol.12, issue 7, pp. 1168–1177. DOI: 10.2495/SDP-V12-N7-1168-1177
- Domnikov, A. and Chebotareva, G. (2016), "Assessment of competitiveness of power generating companies through a risk-based approach: a case study of developing economies", International journal of energy production and management, vol. 1, issue 4, pp. 322–331. DOI: 10.2495/EQ-V1-N4-322-331
- Domnikov, A., Khomenko, P., and Khodorovsky, M. (2017), "Value-based approach to managing the risks of investing in oil and gas business", International journal of sustainable development and planning, vol. 12, issue 6, pp. 1085–1095. DOI: 10.2495/SDP-V12-N6-1085-1095
- Domnikov, A., Chebotareva, G., and Domnikova, L. (2016), "Economic and technological priorities of competitive development of Russian systems of energy cogeneration sources", International journal of design & nature and ecodynamics, vol. 11, issue 4, pp. 610–619. DOI: 10.2495/DNE-V11-N4-610-619
- Domnikov, A., Chebotareva, G., Khomenko, P., and Khodorovsky, M. (2017), "Riskoriented investment in management of oil and gas company value", International journal of sustainable development and planning, vol. 12, issue 5, pp. 946–955. DOI: 10.2495/SDP-V12-N5-946-955

**Research supervisor:**

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INSTITUTIONAL TRANSFORMATIONS, ECONOMIC SYSTEMS, PENSION SYSTEMS AND RISKS

Research goal:

- The research is devoted to the development of theoretical and practical foundations for the transformations of economic and social institutions and also the determination of the influence of risks on the economic systems
- On the basis of the developed models, the optimum parameters of economic systems are defined
- One of the main systems under consideration is the pension system
- The works developed within the frames of the research are based on the progressive works of economic scientists and are approbated on the broad statistical data
- The Research is an impact of institutional factors (religion, political stability, trust, and corruption) on the economy and markets using econometric modeling

Aspects studied:

- Institutional economics
- Impact of institutional factors (religion, political stability, trust, and corruption) on the economy and markets
- Risk management
- Pension systems

Research highlights:

- Studies are conducted with the University of Lisbon (Portugal), the Free University of Berlin (Germany), the University of Karlsruhe (Germany), the University of Regensburg (Germany), the University of Dresden (Germany), the Bulgarian Academy of Sciences, and the Serbian Academy of Sciences
- Cooperation within Russia: Lomonosov Moscow State University (Moscow, Russia), Higher School of Economics (Moscow, Russia), Tomsk Polytechnic University, Tomsk State University (Tomsk, Russia) and Saratov Aerospace University (Saratov, Russia)
- Students are actively involved in grant activities with University from US, Germany, Bulgaria, Serbia, Austria, and India. And also speak at conferences in Germany, Bulgaria, Czech Republic, Italy, and the USA

Career opportunities:

The results of the research can be used in government departments (the Ministry of Economy, the Ministry of Finance), international funds, association and organization (World Bank, ILO, OECD), and in the scientific career, including at foreign partner universities.

Supervisor's specific requirements:

- Preference for students with econometric methods R, Stata, Statgraph, SPSS, and others
- Mathematical package; the MathCad

Main publications:

- Kazantseva, M. A., Nepp, A. N. (2016), "Mathematical Economics Methods in Assessing the Effects of Institutional Factors on Foreign Trade". Applications of mathematics in engineering and economics (AMEE`16). 42nd International Conference on Applications of Mathematics in Engineering and Economics, Sozopol, BULGARIA 1789: UNSP020015. DOI: 10.1063/1.4968436
- Nepp, A. N., Shilkov, A. A. General Principles of Institutional Risks Influence on Pension Systems Application of mathematics in engineering and economics (AMEE`16). 42nd International Conference on Applications of Mathematics in Engineering and Economics (AMEE) Sozopol, BULGARIA, 1789, 020003 DOI: 10.1063/1.4968424
- Kosarev, A. S., Nepp, A. N., Nikonov, O. I. Currency risk management: The experience of Russian companies (2012) IFAC Proceedings Volumes (IFAC-PapersOnline), pp. 241–245. DOI: 10.3182/20120913-4-IT-4027.00047
- Nepp, A. N., Lavysh, A. A., Kuprina, T. V., Nikonov, O. I. Optimization of the structure of portfolio1 (2012) IFAC Proceedings Volumes (IFAC-PapersOnline), pp. 246–250. DOI: 10.3182/20120913-4-IT-4027.00055



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LOGISTICS AND SUPPLY CHAIN MANAGEMENT

Research goal:

Students gain knowledge in the theoretical and practical areas of logistics and supply chain management. They acquire the conceptual skills and methodological tools necessary to design and conduct independent research in such spheres and successfully prepare the thesis.

Areas of specialization may be following:

- Supply chain management
- Distribution systems
- Transportation
- Warehousing and inventory management
- International logistics
- Cross-border trade

Aspects studied:

- Logistics
- Supply chain management

Research highlights:

- Close collaboration with world leading centers for logistics and supply chain management
- Opportunity to conduct research in leading local and international logistics companies

Career opportunities:

Graduates will be qualified for careers in Universities, companies in the area of logistics and supply chain management. For example, domestic and international trade and transportation companies, foreign trade companies, distributors, among others.

Supervisor's specific requirements:

- Knowledge on bachelor's level in economic theory, financial economics
- Knowledge on bachelor's level in management studies
- Basic knowledge in logistics and supply chain management

Main publications:

- Yashin, A. A., Ruzhanskaya, L. S., Soldatova, Yu. V. (2015), "Theory of Organization", Ural Federal University, Yekaterinburg, Russia, 200 p. (in Russian) ISBN: 978-5-7996-1564-2
- Yashin, A. A., Ryashko, M. L. (2014), "Principles of Logistic Systems Development and Evaluation", Ural Federal University, Yekaterinburg, Russia, 52 p. (in Russian) ISBN: 978-5-7996-1222-1



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CONSUMER MARKETS DEVELOPMENT

Research goal:

- Consumer markets research focuses on how consumers decide on what and how much to consume, how to integrate different pieces of information (both consciously and unconsciously) to make predictions and judgments about their environment and target stimuli to inform their consumption decisions
- Marketing strategy research focuses on the components of marketing capabilities and resources such as brands, consumer relationships, innovation, sales force management and their impact on brand, business unit, customer, firm, sales force and salesperson performance

Aspects studied:

- Marketing management
- Consumer behavior analysis
- Research Methods
- Systems analysis

Research highlights:

Consumer markets research is focused on economic and psychological aspects of a consumer's decision-making process and analysis of the data collected through laboratory studies and field experiments. Quantitative marketing research is based on theories of behavior from economics, data from observational, archival sources and field experiments, and analysis of the data using advanced statistical and econometric techniques.

Career opportunities:

The study is designed to develop superior scholars for careers in research and teaching at research and academic institutions throughout the world.

Supervisor's specific requirements:

Ability to apply quantitative and qualitative methods of analysis.

Main publications:

- Polbitsyn, S. N., Drokin, V. V., Zhuravlev, A. S., Chistyakov, Yu. F. (2012), "Multifunctional Model of Socio-economic Development of Rural Territories", Institute of Economics, Ural branch of RAS, Yekaterinburg, 160 p. (in Russian) ISBN 978-5-94646-396-6
- Polbitsyn, S. N., Abidullah, A. (2017), "Do general practices of management play role as drivers for employee job satisfaction in Pakistani entrepreneurial companies", Economy of Region, vol. 13, no. 1, pp. 196-203. DOI: 10.17059/2017-1-18

**Research supervisor:**

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KNOWLEDGE ECONOMICS

Research goal:

A fundamental and applied research of the dynamics of the knowledge-based economy, with an emphasis on the role of knowledge creation, diffusion, and application across the spectrum of organizations, industries, nations, and regions.

Aspects studied:

- The social, technological and economic aspects of knowledge and innovation, combining theory or concepts and practice or application
- The role of institutional environment for the economic and innovative development
- State development strategies and policies aimed at building a competitive knowledge-based economy
- The impact of informal institutions on competitiveness
- Competitiveness of companies and knowledge create strategies

Research highlights:

- Development a research agenda to inform policy making and management decisions
- Assessment of new directions in knowledge management and knowledge-based economy
- Learning how to put knowledge management to work to gain competitive advantages
- Benchmarking your current knowledge management practices against best practice organizations
- Sharing knowledge through debate and information exchange

Career opportunities:

Application of management skills in science, technology, and innovation to work undertaken during their subsequent careers with major companies, organizations and government bodies.

Main publications:

- Panikarova, S., Vlasov, M., Boyko, I. (2017) "Assessing Research Productivity in University Environment: Institutional Approach", *Journal of Information and Knowledge Management*, vol. 16, no. 2, 1750016. DOI: 10.1142/S0219649217500162
- Panikarova, S., Vlasov, M. (2016), "Knowledge Generation Strategies: Empirical Analysis of Industrial Enterprises", *Journal of Information and Knowledge Management*, vol. 15, no. 2, 1650018. DOI: 10.1142/S0219649216500180
- Panikarova, S., Vlasov, M. (2016), "Empirical Analysis of Knowledge-Generation Strategies in the Real Sector of the Economy", *Montenegrin Journal of Economics*, vol. 12, no. 1, pp. 75–84 DOI: 10.14254/1800-5845/2016.12-1.4

- Vlasov, M., Panikarova, S. (2015) "Knowledge creation in state-owned enterprises", *Mediterranean Journal of Social Sciences*, vol. 6, issue 4, pp. 475–480. DOI: 10.5901/mjss.2015.v6n4p475
- Panikarova, S.V., Vlasov, M.V. (2015), "Research on knowledge increment strategies at industrial enterprises", *Actual Problems of Economics*, vol. 174, issue 12, pp. 189–197. <http://www.scopus.com/inward/record.url?eid=2-s2.0-84959344081&partnerID=MN8TOARS>

**Research supervisor:**

Prof. Igor A. Mayburov,
Doctor of Science

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FINANCE, MONEY CIRCULATION AND CREDIT

Research goal:

Research and development of tax instruments for regulating socio-economic processes.

Aspects studied:

- Fiscal instruments for regulating the transport system
- Fiscal instruments for regulating the consumption of natural resources
- Fiscal instruments of environmental regulation

Research highlights:

- System of transport payments has been developed that regulates the ownership and use of vehicles
- System of fiscal payments has been developed that regulates the processes of extracting aquatic biological resources
- System of environmental payments has been developed that regulates the rational use of natural resources

Career opportunities:

- Building optimal systems of transport taxation in different countries
- Building optimal fiscal systems for the use of aquatic biological resources in different countries
- Building optimal systems of environmental taxation in different countries

Main publications:

- Mayburov, I. (2015), "The Concept of Tax Expenditures in Russia: The Evaluation Methodology of Effects", Proceedings of the 20th International Conference Theoretical and Practical Aspects of Public Finance, Prague, pp. 149–156. ISBN:978-80-245-2094-0
- Mayburov, I. and Leontyeva, Y. (2015), "Tax sources of funding the road network as a tool to increasing transport energy efficiency", WIT Transactions on Ecology and the Environment, vol. 212, pp. 151–160. ISSN: 1743–3541
- Mayburov, I. and Leontyeva Yu. (2016), "Forming the social optimum of passenger flows in urban agglomerations in Russia", International Conference on Sustainable Cities (ICSC2016), 19–20 May. E3S Web of Conferences, vol. 6. DOI: 10.1051/e3sconf/20160601008

**Research supervisor:**

Prof. Alexander A. Yashin,
Candidate of Science

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a.a.yashin@urfu.ru



SUSTAINABLE DEVELOPMENT

Research goal:

Such research is focused on investigation of economics, social and environmental aspects of local communities' sustainable development both in urban and rural areas. Another important aspect of this research is researching on intersectoral cooperation principles and activities according to local, national and international sustainable development agendas.

Aspects studied:

- Managerial Economics
- Urban and Rural Economics and Management
- Research Techniques
- Supply Chain Management
- Corporate Social Responsibility
- Economics of Public Sector

Research highlights:

- Close collaboration with world leading centers for sustainable development
- Advanced study of modern issues of sustainable development or urban and rural sustainable development

Career opportunities:

Graduates will be qualified for careers in Research Centers, Universities, businesses and public administrations in the area of sustainable development and local agendas.

Supervisor's specific requirements:

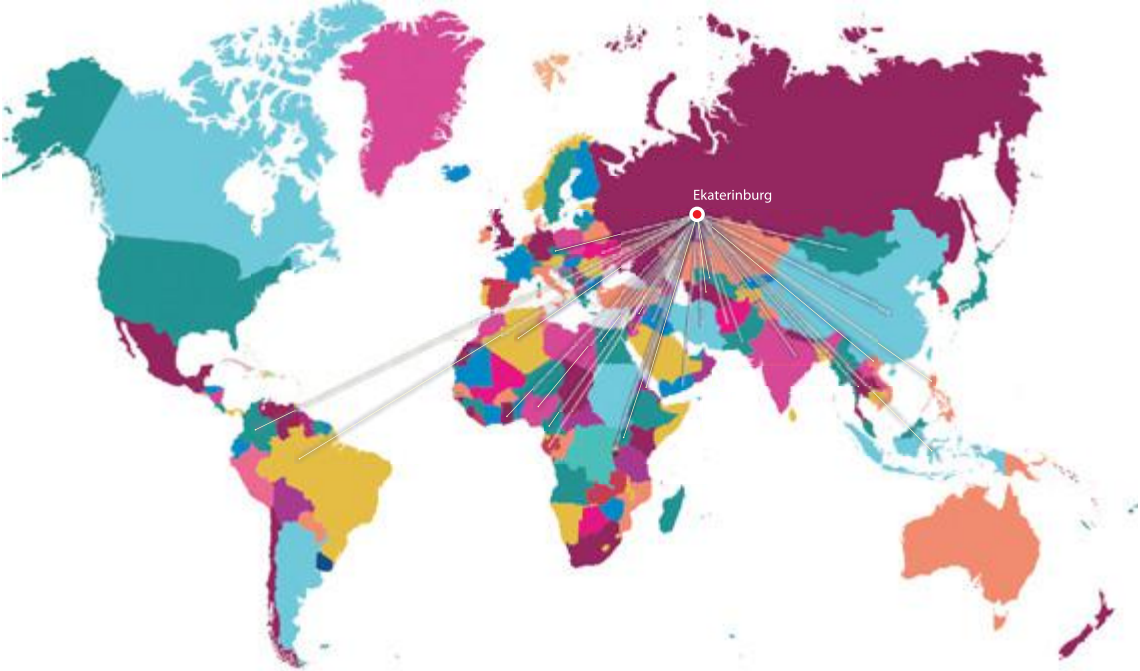
- Basic knowledge in theory of corporate social responsibility
- Knowledge on bachelor's level in economic theory and institutional economics
- Knowledge on bachelor's level in management studies

Main publications:

- Yashin, A. A., Ruzhanskaya, L. S., Soldatova, Yu. V. (2015), "Theory of Organization", Ural Federal University, Yekaterinburg, Russia, 200 p. (in Russian) ISBN: 978-5-7996-1564-2
- Yashin, A. A., Ryashko, M. L. (2014), "Principles of Logistic Systems Development and Evaluation", Ural Federal University, Yekaterinburg, Russia, 52 p. (in Russian) ISBN: 978-5-7996-1222-1



OUR CURRENT INTERNATIONAL PHD STUDENTS ENROLMENT MAP*



Algeria
Egypt
Gabon
Palestine
Jordan
Iran
Pakistan
Kyrgyzstan
China
Mongolia
Bangladesh
Afghanistan
Armenia

Ghana
Yemen
India
Indonesia
Iraq
Kazakhstan
Cameroon
Colombia
Serbia
Tajikistan
Uganda
Uzbekistan
Rwanda

Syria
Lebanon
Vietnam
Turkmenistan
Ukraine
Brazil
Nigeria
Philippines
The Czech Republic
Eritrea

*by 2020

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