YURI V. VASSILEVSKI

Professor, Corresponding Member of the Russian Academy of Sciences

Curriculum Vitae

BUSINESS ADDRESS:

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PERSONAL DATA:

Date and place of birth:	March 11, 1967, Moscow, Russia
Citizenship	Russia

EDUCATION:

Habilit. **Institute of Numerical Mathematics**, Russian Academy of Sciences, 2006, Physics and Mathematics, specialization in Applied Mathematics

Ph.D. **Institute of Numerical Mathematics**, Russian Academy of Sciences, 1993, Physics and Mathematics, specialization in Applied Mathematics

M.S. **Moscow Institute of Physics and Technology**, Russia, 1990, GPA 4.9/5.0 Applied Mathematics, specialization in Applied Mathematics and Physics

PROFESSIONAL EXPERIENCE:

11/2010–present:	Institute of Numerical Mathematics, Russian Academy of Sciences, Russia Deputy Director for Science
09/2007–present:	Moscow Institute of Physics and Technology, Moscow, Russia Professor, Head of Dept. of Computational Technologies and Modeling in Geophysics and Biomathematics
11/2007–present:	Moscow State University, Fac. of Comput. Mathematics and Cybernetics Professor
06/2017–present:	Sechenov University, Laboratory of mathematical modelling in medicine Head of Laboratory
07/2021–06/2024:	Sirius University, Department of mathematical modelling in biomedicine and geophysics Head of Department
06/2018–present:	Sechenov University, Department of mathematics, mechanics and mathematical modelling Head of Department

02/2001–10/2010:	Institute of Numerical Mathematics, Russian Academy of Sciences, Russia Staff member, Member of Scientific Board
01/2000–01/2001:	Texas Institute for Computational and Applied Mathematics, The University of Texas at Austin, USA. Visiting researcher
10/1993–12/1999:	Institute of Numerical Mathematics, Russian Academy of Sciences, Russia Staff member
10/1990–09/1993:	Institute of Numerical Mathematics, Russian Academy of Sciences, Russia Research Assistant / Graduate Student
09/1988–07/1990:	Moscow Institute of Physics and Technology, Moscow, Russia Research Assistant / Graduate Student

RESEARCH INTERESTS:

Theory of quasi-optimal meshes, mesh generation and adaptation, iterative methods, discretization methods for PDEs, Computational Fluid Dynamics, Computational Hemodynamics and Reservoir Simulation, Computational Mechanics.

EDITORIAL BOARDS:

- Editor-in-Chief, Russian Journal of Numerical Analysis and Mathematical Modelling (https://www.degruyterbrill.com/journal/key/rnam/html)
- Editor, International Journal for Numerical Methods in Biomedical Engineering (https:// onlinelibrary.wiley.com/journal/20407947)
- Editor, Cardiovascular Engineering and Technology (https://www.editorialmanager.com/cvet)
- Editor, Lobachevskii Journal of Mathematics (https://www.springer.com/journal/12202)
- Editor, Computational Mathematics and Mathematical Physics (https://www.springer.com/mathematics/computational+science+%26+engineering/journal/11470).
- Advances in Intelligent Systems and Computing, V.1028, Proceedings of the 12th International Symposium on Computer Science in Sport (M.Lames, A.Danilov, E.Timme, Yu.Vassilevski, Eds), Springer International Publishing 2020
- Advances in numerical mathematics. Proceedings of International Conference on the occasion of the 60th birthday of Y.A. Kuznetsov, September 16-17, 2005 (W. Fitzgibbon, R. Hoppe, J Periaux, O. Pironneau, Y. Vassilevski, Eds), Institute of Numerical Mathematics, Moscow, and Department of Mathematics, University of Houston, 2006.
- Mathematical Modelling of Natural Phenomena, Invited editor, V.6, No.7, 2011.
- Journal of Computational and Applied Mathematics, Invited editor for Special Issues, 2019, 2020, jointly with Y.Efendiev.
- Int.J.Numer.Meth.Biomed.Engineering, Invited editor for Special Issue "Numerical methods and mathematical models for biofluids and biotissues", jointly with Vitaly Volpert
- Mathematics, Invited editor for Special Issues "Mathematical in Modelling in Biomedicine II, III", jointly with Vitaly Volpert

- Mathematical Modelling of Natural Phenomena, Invited editor for Special Issue "Mathematical models in physiology", V.12, No.5, 2017, jointly with G. Bocharov, S. Simakov and V. Volpert.
- Lobachevskii J. Math., Invited editor for Special Issue on Computational and Applied Mathematics, 2023, jointly with Yu.A.Kuznetsov, A.V.Lapin, I.B.Petrov, V.V.Shaidurov, A.A.Shananin

INVITED RESEARCHER:

- Visiting professor in the Research Center for Mathematics and Economics, Tianjin University of Finance and Economics, China: 2015.
- Visiting professor in Beihang University, China: 2013.
- Visiting professor in T-7, Los Alamos National Laboratory, USA: 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014.
- Visiting professor in Center for Development of Scientific Parallel Computing, University of Lyon 1, FRANCE: 1997, 1998, 1999, 2001, 2004, 2005.
- Leading Researcher in Zentrum für Unweltsimulation, Universität Augsburg, GERMANY: 2003-2004.
- Visiting professor in Center for Subsurface Modelling, Texas Institute for Computational and Applied Mathematics, University of Texas at Austin, USA: 2000, 2002, 2003.
- Invited researcher in Department of Computer Science, University of Houston, USA: 2002.
- Visiting professor in Institut Francais du Petrol, FRANCE: 2001.
- Visiting professor in University of Rennes, FRANCE: 1999.

PROJECTS:

- PI in Russian Science Foundation Project "New mathematical methods and technologies in geophysical and biomechanical problems" 2021 – 2024 (30 researchers)
- PI in Huawei Meshing Project, 2023 (5 researchers)
- PI in Russian Science Foundation Project "Multiscale modeling of blood flow system in personalized medical technologies of cardiology, vascular neurology, oncology" 2014 – 2018 (25 researchers)
- PI in Nuclear Safety Institute RAS and INM RAS Project "Development and verification of GeRa software modules for modeling of radionuclides geofiltration and geomigration" 2012 – 2024 (5 researchers)
- PI in ExxonMobil-INM Project "Parallel iterative solution of linear systems on multi-core clusters" 2013 – 2019 (9 researchers)
- PI in Federal Target Program Project "Supercomputer modeling of turbulent gasdynamic and hydrodynamic flows in industrial problems applications" 2013 (15 researchers)

- PI in Rosneft-INM Project "Difference schemes of higher order for multiphase multi-component flows" 2011 – 2012 (4 researchers)
- PI in Federal Target Program Project "Mathematical technologies of electroimpedance diagnostics and monitoring of cardiovascular and respiratory diseases" 2010 – 2012 (4 researchers, 2 students)
- PI in ExxonMobil-INM Project "New discretizations in simulators of three-phase flows" 2010 – 2015 (3 researchers)
- PI in Federal Target Program Project "Investigation of free surface dynamics of incompressible fluids" 2009 – 2011 (5 researchers, 2 students)
- PI in ExxonMobil Projects "Linear solvers for fluid flow problems in porous media", "Conservative monotone second order discretizations of convection-diffusion equations", 1999 – present (1 researcher, 2 students)
- PI in Inst. Fran. du Petrol Project "Iterative solution of linear systems in reservoir simulation", 2005 (3 researchers, 1 student)
- PI in French-Russian Liapounov Institute Project "Numerical simulations for nuclear waste disposal", 2001 – 2002 (3 researchers, 1 student)
- PI in French-Russian Liapounov Institute Project "Parallel solvers for CFD problems posed on nonmatching anisotropic grids", 1999 – 2000 (2 researchers)

HABILIT. AND PH.D. THESIS REVIEWS:

1. "Adaptive direct numerical simulation of multiscale multiphase inert and reactive flows" by E.Sharoborin (Skoltech)
2. "Mathematical modeling of hydrodynamic activation of platelets in blood flows" by D.Pushin (MIPT)
3. "Agent model for viral infection dynamics" by A.Vlad (MIPT)
4. "Methods for detection of oscillation sources for atrial fibrillation" by A.Zolotorev (MIPT)
5. "Computer simulation and regression methods for data analysis in biophysics of miocardium" by S.Khamzin (MIPT)
6. "Real-time simulation of fluid flows using neural networks" by E.Tumanov (MIPT)
7. "Rational approximations and synthesis of multibank electrical filters" by S.Lyamaev (MIPT)
8. "Adaptive wavelet collocation methods for multiscale numerical modeling of fluid dynamics problems" by O.Vasiliev (Keldysh IAP RAS)
9. "Discrete and asymptotic approximations of complex heat transfer in periodic systems of rods" by N.Krymov (MEI)
10. "Finite element adaptive methods and numerical methods for ill-posed problems" by N.Debit (Habilitation, University Lyon 1)

11. “Efficient parallel solution of filtration problems for viscous compressible multicomponent fluid” by K.Bogachev (Habilitation, Moscow State University)

12. “Computational algorithms for single phase and two-phase filtration problems on the basis of KABARE scheme” by A.Kanaev (Institute for Nuclear Safety RAS)

13. “Numerical modelling of wave processes in heterogeneous solid deformable media” by I.Kvasov (Moscow Institute of Physics and Technology)

14. “Discrete curvatures, quasi-isometric mappings and quasi-opitimal computational grids” by V.Garanzha (Habilitation, Computing Center RAS)

15. “A graph-based multigrid with applications” by A.Pennanen (University of Jyväskylä)

16. “Three-parametric iterative method for the solution of two classes of problems with nonlinear saddle point operators” by S.Milyutin (Moscow State University)

17. “Mathematical modeling of contaminant transport in fluids and porous media” by A.Sukhinov (Institute of mathematical modeling RAS, Moscow)

18. “Parallel methods for the solution of linear systems with spd matrices on the basis of additive decomposition with overlapping” by I.Konshin (Computing Center RAS, Moscow)

19. “Mathematical model of growth of thrombus and applications in modeling of kedney chronical desease” by A.Ukrainets (Moscow Institute of Physics and Technology)

20. “Stable explicit difference methods and Chebyshev polynomials in hydrodynamics problems” by K.Ushakov (Institute of Numerical Mathematics RAS, Moscow)

21. “Methods of optimal control and conjugate equations for problems of geophysical hydrodynamics” by E.Botvinovskii (Institute of Numerical Mathematics RAS, Moscow)

22. “Finite-difference and finite element schemes for modelling weakly compressible barotropic gas flows” by K.Zhukov (Moscow State University)

23. “Scalable parallel algorithms of high accuracy for numerical simulation in gasdynamics and acoustics” by A.Gorobets (Institute of Mathematical Modelling RAS, Moscow)

24. “Accélération adaptative de décomposition de domaine hétérogène pour le couplage de problèmes avec interface libre sur maillage fixe” by A.Frullone (University of Lyon 1)

25. “Methods of iterating boudary conditions for the Stokes problem” by A.Kargin (Moscow State University)

26. “On application of the fictitious domain method for the solution of boundary value problems in multi-connected domains”, by M.Brusnikin (Moscow State University)

27. “Efficient solvers for discretized elliptic vector-valued problems” by J.Martikainen (University of Jyväskylä)

28. “ Décomposition de Domaine et Analyse Asymptotique appliquées en combustion” by R.Ait Mansour (University of Lyon 1)

29. “Iterative methods for elliptic equations based on Laplacian inversion on simple grids” by O.Ryabinin (Moscow State University)

30. “Iterative methods for boundary value problems with quasi-linear elliptic equations in complex domains” by K.Bogachev (Moscow State University)

31. Expert report on “Robust multigrid and preconditioned iterative methods” by M.Olshanski (Habilitation, Moscow State University)

PEERS REVIEWS:

Reviewer in scientific journals:

- J. Comp. Phys.,
- Comp.Methods Appl.Mech.Engnr.,
- SIAM J. Numer. Anal.,
- SIAM J. Sci. Comp.,
- Numerische Mathematik,
- Computational Geosciences,
- Numer. Linear Algebra Appl.,
- J. Computational Mathematics and Mathematical Physics,
- Russ. J. Numer. Anal. Math. Modelling,
- J. Computational and Applied Mathematics,
- Comptes Rendus Mathematics,
- J. Numerical Mathematics,
- Computational methods and programming,
- Concurrency and Computation: Practice and Experience,
- Central European Journal of Mathematics,
- Journal of Applied Numerical Mathematics,
- International Journal of Heat and Mass Transfer,
- Int. J. Numer. Meth. Biomed. Engng.,
- Journal of Computational Methods in Applied Mathematics,
- Multiscale Modelling and Simulation Journal,
- Mathematical Modelling and Numerical Analysis,
- Numerical Methods for Partial Differential Equations
- ZAMM.

BOOKS:

1. A brief introduction to multigrid and domain decomposition methods. MAX Press, Moscow, 2007, (jointly with M.Olshanskii).

2. Practicum on contemporary computational technologies and mathematical modeling. MAX Press, Moscow, 2009, (jointly with I.Kapyrin).

3. INMOST - Program platform and graphic environment for development of parallel numerical models on general meshes. Moscow university publishing, Moscow, 2013, (jointly with I.Konshin, G.Kopytov, K.Terekhov).

4. Automated technologies for generation of unstructured computational meshes. Moscow: PhysMatLit, 2016 (jointly with A.Danilov, K.Lipnikov, V.Chugunov)

5. Personalized computational hemodynamics: models, methods, and applications for vascular surgery and antitumor therapy. Academic Press, 2020, 280 p. (jointly with M.Olshanskii, S.Simakov, A.Kolobov, A.Danilov)

6. Parallel finite volume computation on general meshes. Springer International Publishing, 2020, 197 p. (jointly with K.Terekhov, K.Nikitin, I.Kapyrin)

JOURNAL ARTICLES:

1. A biomechanical model for concomitant functioning of neck and shoulder: a pilot study. *Sci Rep* 14, 31818 (2024) (jointly with Yurova, A., Gladkov, A., Kalinsky, E. et al.)

2. Solving coupled problems of blood flow and coagulation in moving domains, I: numerical models and simulations. *Lobachevskii Journal of Mathematics*, 2025, Vol. 46, No. 1, pp. 243-263 (jointly with I.Konshin, K.Terekhov)

3. Influence of pressure guidewire on coronary hemodynamics and fractional flow reserve.*Physics of Fluids* 37, 031920, 2025 (jointly with Xuanyu Li, Zhi Zhang, Sergey Simakov, Timur Gamilov,and Fuyou Liang)

4. Laser cavitation in a tube immersed in a confined volume filled with liquid. *Doklady Physics,* 2024 519, p.19-25 (jointly with V.M. Chudnovskii, M.A. Guzev, et al.)

5. Biomechanical model of the patella in normal conditions and with rupture of the medial patellofemoral ligament. *Department of Traumatology and Orthopedics*, 2024, No 1. pp. 45-52 (jointly with E.B.Kalinskii et al.)

6. Patient-specific input data for predictive modelling of the Fontan procedure. *Math. Model. Nat. Phenom.*, 2024, Vol.19, 16 (jointly with T.Dobroserdova, L.Yurpolskaya, A.Svobodov)

7. Features of cavitation initiated on a laser heating element near a solid flat surface. *Tech. Phys. Lett.*, 2024, Vol.50, No.18, pp.3-6 (jointly with V.M. Chudnovskii, M.A. Guzev, et al.)

8. Strategies with algebraic multigrid method for coupled systems. *Lobachevskii Journal of Mathematics*, 2024, Vol. 45, No. 1, pp. 251-261 (jointly with I.Konshin, K.Terekhov)

9. Production well placement and history matching by hyperparametric optimization and machine learning. *Lobachevskii Journal of Mathematics*, 2024, Vol. 45, No. 1, pp. 166-176 (jointly with A. Donskoi, A. Medvedev, T. Shchudro, K. Terekhov)

10. Experience of using neural networks to assess age-related changes in some structures of the skull and cervical vertebrae based on scans (pilot project). *Sovremennye tehnologii v medicine* 2024; 16(2): 29-39 (jointly with olotenkova G.V., Valetov D.K., Poletaeva M.P.), in Russian

11. Patellar motion and dysfunction of its stabilizers in a biomechanical model of the knee joint. *Sechenov Medical Journal*, 2024; 15(1): 47-60 (jointly with Yurova A.S., Tyagunova A.I., Loginov F.B., et al.)

12. Automated personalization of biomechanical knee model. *International Journal of Computer Assisted Radiology and Surgery*, 2024, https://doi.org/10.1007/s11548-024-03075-5 (jointly with Yurova, A., Lychagin, A., Kalinsky, E. et al.)

13. Development of a testing machine for biaxial testing of soft tissue and biomaterials. *Russian J. Biomechanics*, 2023, V. 27, No 4, . 12-24 (jointly with A.Ovsepyan, V.Salamatova et al)

14. Extracting connectivity paths in digital core images using solution of partial minimum eigenvalue problem *Russ.J.Numer.Anal.Math.Modelling*, 38(6), 373-380, 2023 (jointly with S. Maliassov)

15. Dynamic adaptive moving mesh finite-volume method for the blood flow and coagulation modeling. *Int J Numer Meth Biomed Engng.* 2023; e3731 (jointly with K.Terekhov, I.Butakov, A.Danilov)

16. How material and geometrical nonlinearity influences diastolic function of an idealized aortic valve. *Continuum Mech. Thermodyn.* 2023, 35:1581-1594 (jointly with A.Liogky, V.Salamatova)

17. Application of compression optical coherence elastography for characterization of human pericardium: a pilot study *J. Biophotonics* 2022, e202200253 (jointly with V. Y. Zaitsev, A. A. Sovetsky et al.)

18. Personalization of mathematical models in cardiology: obstacles and perspectives. *Computer research and modeling*, V.14, No.4, 2022, 911-930 (jointly with S.Simakov et al.), in Russian.

19. A finite element scheme for the numerical solution of the Navier-Stokes/Biot coupled problem. *Russ.J.Numer.Anal.Math.Modelling, 37(3)*, 2022, 159-174 (jointly with A.Lozovskiy, M.Olshanskii)

20. Nonlinear Finite Volume Method for the Interface Advection-Compression Problem on Unstructured Adaptive Meshes. *Computational Mathematics and Mathematical Physics* 2022; 62(7): 1041-1058 (jointly with K.Terekhov)

21. Finite volume method for coupled subsurface flow problems, II: Poroelasticity. *Journal of Computational Physics*, Volume 462, 2022, 111225 (jointly with K.Terekhov)

22. Comparison of algorithms for estimating blood flow velocities in cerebral arteries based on the transport information of contrast agent: an in silico study. *Computers in Biology and Medicine*, 2021, 105040 (jointly with Q.Wu, S.Simakov, F.Liang)

23. On Ellipticity of Hyperelastic Models Restored by Experimental Data *Journal of Mathematical Sciences* (United States), 253 (5), 2021 p.720-729 (jointly with V.Salamatova)

24. Automatic detection of attachment sites for knee ligaments and tendons on CT images. *International Journal of Computer Assisted Radiology and Surgery*, 2021, https://doi.org/10.1007/s11548-021-02527-6 (jointly with A.Yurova, V.Salamatova, A.Lychagin)

25. Two-scale haemodynamic modelling for patients with Fontan circulation. *Russ.J.Numer.Anal. Math.Modelling*, 36(5), 2021, 267-278 (jointly with T.Dobroserdova, S.Simakov, T.Gamilov, A.Svobodov, L.Yurpolskaya)

26. Numerical Modelling of Multicellular Spheroid Compression: Viscoelastic Fluid vs. Viscoelastic Solid. *Mathematics*, 9(18):2333, 2021 (jointly with R.Yanbarisov, Y.Efremov, N.Kosheleva, P.Timashev)

27. An implicit scheme for simulation of free surface non-Newtonian fluid flows on dynamically adapted grids. *Russ.J.Numer.Anal.Math.Modelling*, 36(3), 165-176, 2021 (jointly with R.Yanbarisov, K.Nikitin)

28. Application of Hyperelastic Nodal Force Method to Evaluation of Aortic Valve Cusps Coaptation: Thin Shell vs. Membrane Formulations. *Mathematics*. 2021; 9(12):1450 (jointly with A.Liogky, V.Salamatova)

29. Noninvasive Assessment of the Fractional Flow Reserve with the CT FFRc 1D Method: Final Results of a Pilot Study. *Global Heart*, V.16, No.1, 1. 2021 (jointly with D.Gognieva et al.)

30. Application of Hyperelastic Nodal Force Method to Evaluation of Aortic Valve Cusps Coaptation: Thin Shell vs. Membrane Formulations. *Mathematics*, 9(12):1450, 2021 (jointly with A.Liogky A, V.Salamatova)

31. A stable method for 4D CT-based CFD simulation in the right ventricle of a TGA patient. *Russian J. Numer. Anal. Math. Modelling*, V.35, No.5, p.315-324, 2020 (jointly with Danilov A., Lozovskiy A., Olshanskii M., Salamatova V., Chang S., Han Y., Lin C.)

32. Toward Universal Unified Cesarean Section Method in Africa *East African Scholars J Med Sci*, V.3, No.10, p.373-377, 2020 (jointly with Stark M., Mynbaev O., Belci D., Danilov A., Ogutu O.)

33. Analysis of impact of left ventricle assisted devices to systemic circulation. *Russian J. Numer. Anal. Math. Modelling*, V.35, No.5, p.295-314, 2020 (jointly with Simakov S., Timofeev A., Gamilov T., Kopylov P., Telyshev D.)

34. Analysis of operating modes for left ventricle assisted devices via integrated models of blood circulation. *Mathematics* 8: 1331, 2020 (jointy with Simakov S., Timofeev A., Gamilov T., Kopylov Ph., Telyshev D.)

35. A mathematical model to quantify the effects of platelet count, shear rate, and injury size on the initiation of blood coagulation under venous flow conditions. *PLoS ONE* 15(7): e0235392, 2020 (jointy with Bouchnita A., Terekhov K., Nony P., Volpert V.)

36. Numerical simulation of blood flow in aorta with dilation: a comparison between laminar and LES modeling methods. *Computer Modeling in Engineering & Sciences*, DOI:10.32604/cmes.2020.010719, 2020 (jointly with Xu L., Yang T., Yin L., Kong Y., Liang F.)

37. Non-invasive fractional flow reserve: a comparison of one-dimensional and three-dimensional mathematical modeling effectiveness. *Cardiovascular Therapy and Prevention.* V.19, No.2:2303. (In Russ.) (jointly with Gognieva D., Pershina E., Mitina Y., Gamilov T., Pryamonosov R., Gogiberidze N., Rozhkov A., Simakov S., Liang F., Sinitsyn V., Betelin V., Schekochikhin D., Syrkin A., Kopylov F.)

38. Comparison of instantaneous wave-free ratio (iFR) and fractional flow reserve (FFR) with respect to their sensitivities to cardiovascular factors: a computational model-based study. *Journal of Interventional Cardiology.* Article ID 4094121, 12 pages, 2020 (jointly with Ge X., Liu Y., Yin Z., Tu S., Fan Y., Simakov S., Liang F.)

39. Numerical modelling via INMOST software platform. *Mathematica Montisnigri*, V.47, p.75-86, 2020 (jointly with Konshin I., Terekhov K.).

40. Mathematical modelling of atherosclerosis. *Math. Model. Nat. Phenom.* 14, 603, 2019 (jointly with El Khatib N., Kafi O., Sequeira A., Simakov S., Volpert V.)

41. Automatic segmentation algorithms and personalized geometric modelling for a human knee. *Russian J. Numer. Anal. Math. Modelling*, V.34, No.6, p.361-367, 2019 (jointly with Salamatova V., Yurova A., Wang L.)

42. Numerical assessment of coaptation for auto-pericardium based aortic valve cusps. *Russian J. Numer. Anal. Math. Modelling*, V.34, No.5, p.277-287, 2019 (jointly with Salamatova V., Liogky A., Karavaikin P., Danilov A., Kopylov F., Kopytov G., Kosykhin O., Pryamonosov R., Shipilov A., Yurova A.)

43. Model-based analysis of the sensitivities and diagnostic implications of FFR and CFR under various pathological conditions. *Int.J.Numer.Meth.Biomed.Engng.*, e3257, 2019 (jointly with Ge X., Liu Y., Tu S., Simakov S., Liang F.)

44. Noninvasive coronary CT angiographyderived fractional flow reserve (FFR): A benchmark study comparing the diagnostic performance of four different computational methodologies. *Int.J. Numer.Meth.Biomed.Engng.*, e3235, 2019 (jointly with Carson J., Pant S., Roobottom C. et al.)

45. Finite volume method for coupled subsurface flow problems, I: Darcy problem. *J. Comp. Phys.*, V.395, p.298-306, 2019 (jointly with Terekhov K.)

46. Noninvasive assessment of the fractional reserve of coronary blood flow with a one-dimensional mathematical model. Preliminary results of the pilot study. *Russian Journal of Cardiology*, V.24, No.3, p.60-68, 2019 (jointly with Gognieva D.G., Gamilov T.M., Pryamonosov R.A., Simakov S.S., Liang F. et al.)

47. Multiscale models of blood flow in the compliant aortic bifurcation. *Applied Mathematics Letters*, V.93C, p.98-104, 2019 (jointly with Dobroserdova T., Liang F., Panasenko G.)

48. Analysis and assessment of a monolithic FSI finite element method. *Computers and Fluids*, V.179, p.277-288, 2019 (jointly with Lozovskiy A., Olshanskii M.)

49. A quasi-Lagrangian finite element method for the NavierStokes equations in a time-dependent domain. *Comput. Methods Appl. Mech. Engrg.*, V.333, p.55-73, 2018 (jointly with Lozovskiy A., Olshanskii M.)

50. Numerical simulation of aberrated medical ultrasound signals. *Russian J. Numer. Anal. Math. Modelling*, V.33, No.5, p.277-288, 2018 (jointly with Beklemysheva K., Grigoriev G., Kulberg N., Petrov I., Vasyukov A.)

51. Two methods of surface tension treatment in free surface flow simulations. *Applied Mathematics Letters*, V.86, p.236-242, 2018 (jointly with Nikitin K., Terekhov K.)

52. A multiscale model of the coronary circulation applied to investigate transmural myocardial flow. *Int.J.Numer.Meth.Biomed.Engng.*, V.34, e3123, 2018 (jointly with Ge X., Yin Z., Fan Y., Liang F.)

53. A splitting method for free surface flows over partially submerged obstacles. *Russian J. Numer. Anal. Math. Modelling*, V.33, No.2, p.95-110, 2018 (jointly with Nikitin K., Olshanskii M., Terekhov K.)

54. Finite element models of hyperelastic materials based on a new strain measure. *Differential Equations*, V. 54, No.7, p.971-978, 2018 (jointly with Salamatova V., Wang L.)

55. Noninvasive assessment of fractional flow reserve with using mathematical modeling of coronary flow. *Kardiologiia*, V.58, No.12, p.85-92, 2018 (in Russ.) (jointly with Gognieva D., Syrkin A., Simakov S., Melerzanov A., Liang F., Lomonosova A., Bykova A., Eddin E., Kopylov F.)

56. A hybrid finite volume - finite element method for bulk-surface coupled problems. *J.Comp.Phys.*, V.352, p.516-533, 2018 (jointly with Chernyshenko A., Olshanskii M.)

57. Numerical modelling of medical ultrasound: phantom-based verification. *Russian J. Numer. Anal. Math. Modelling*, V.32, No.5, p.339-346, 2017 (jointly with Beklemysheva K., Grigoriev G., Kulberg N., Petrov I., Vasyukov A.)

58. On ellipticity of hyperelastic models, recovered by experimental data. *Contemporary mathematics. Fundamental directions*, V.63, No.3, p.504-515, 2017 (in Russ.). Translation to appear in *Journal of Mathematical Sciences* (jointly with Salamatova V.)

59. A finite element method for the Navier-Stokes equations in moving domain with application to hemodynamics of the left ventricle. *Russian J. Numer. Anal. Math. Modelling*, V.32, No.4, p.225-236, 2017 (jointly with Danilov A., Lozovskiy A., Olshanskii M.)

60. A finite volume scheme with improved well modeling in subsurface flow simulation. *Comp.Geosciences*, V.21, p.1023-1033, 2017 (jointly with Kramarenko V., Nikitin K.)

61. Concise formulas for strain analysis of soft biological tissues. *Differential Equations*, V.53, No.7, p.908-915, 2017 (jointly with Salamatova V., Lozovskii A.)

62. Simulation of heat convection in porous media accounting heat production in software GeRa. *Chebyshevkii sbornik*, V.18, No.3, p.234-253, 2017 (in Russ.) (jointly with Grigoryev F., Kapyrin I.)

63. Towards a unified evidence-based cesarean section in the african continent the introduction of the all-african surgical database *Clin. Obstet. Gynecol. Reprod.Med.*, V.3, No.3, p.1-4, 2017 (jointly with Danilov A., Yurova A., Stark M., Mynbaev O.)

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65. Asymptomatic atherosclerosis of brachiocephalic arteries: modern approaches to diagnosis and treatment. *Terapevticheskii archive*, V.89, No.4, p.95-100, 2017 (In Russ.) (jointly with Kopylov F., Bykova A., Schekochikhin D., Elmanaa H., Dzyundzya A., Simakov S.)

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46. A Mosaic Preconditioner for a Dual Schur Complement. In: *Numerical Mathematics and Advanced Applications*, Proceedings of ENUMATH 2001, Springer-Verlag Italia, Milano, pp.867-880, 2003 (jointly with Tyrtyshnikov E.)

47. A parallel interface preconditioner for the mortar element method in case of jumping coefficients. In: *Domain Decomposition Methods in Sciences and Engineering*, 231-240, DDM.org, 2001.

48. An interface preconditioner for the mortar element method. In: *Numerical Mathematics and Advanced Applications*, Proceedings of ENUMATH 1999, World Scientific Publishing Co., Singapore, pp.753-761, 2000 (jointly with Kuznetsov Yu.)

49. Parallel Schwarz method for convection-diffusion constituent of the Navier-Stokes solver. In: *Proceedings of 10th Parallel CFD-98 Conf.*, North-Holland publisher, pp. 191-198, 1998 (jointly with Garbey M., Kuznetsov Yu.)

50. Solution of boundary value problems on nonmatching meshes. In: *Works of Lobachevski's Math.Center*, V.2, pp.94–121, 1999

51. On Parallel Solution of Singularly Perturbed Convection-Diffusion Problems. In: *Proceedings of the 3d ECCOMAS Conference on Numerical Methods in Engineering,* V.2, pp.245–250, John Wiley & Sons, 1998 (jointly with Garbey M., Kuznetsov Yu.)

52. Adaptive finite element methods for domain decomposition on nonmatching grids. In: *Parallel Solution of PDEs*, IMA Volume in Mathematics and its Applications, V.120, pp.57–86, Springer, Berlin-Heidelberg-New York, 1999 (jointly with Engelmann B.,Hoppe R., Iliash Yu., Kuznetsov Yu., Wohlmuth B.)

53. Adaptive macro-hybrid finite element methods. In: *Proc. 2nd European Conference on numerical Methods (ENUMATH)*, Heidelberg, Sept. 29 - Oct. 3, 1997, World Scientific, Singapore, 1998 (jointly with Engelmann B.,Hoppe R., Iliash Yu., Kuznetsov Yu., Wohlmuth B.)

54. Parallel preconditioning on nonmatching unstructured grids. In: *Proceedings of 4th Fr.-Rus.-It.-Uzb. Symposium on num.anal. and applications*, Marseilles, 1997 (jointly with Dyadechko V., Iliash Yu., Tkhir A.)

55. On application of strengthened AMG for partially unstructured meshes to unsteady fully potential flow problem with moving boundaries. In: *Experimentation, Modelling and Computation in Flow, Turbulence and Combustion*, V.2, John Wiley&Sons, pp.71-86, 1997 (jointly with Kuznetsov Yu.A., and Iliash Yu.A.)

56. Efficient parallel solving the potential flow problems on nonmatching grids. In: *Numerical Methods in Engineering. Proceedings of the Second ECCOMAS Conference on Numerical Methods in Engineering.* John Wiley & Sons, pp.469–475, 1996 (jointly with Iliash Yu., Kuznetsov Yu.)

PRESENTATIONS:

1. Invited lectures in Universities of:

   CHINA – Beihang (2012,2013), Tianjin (2015), Shenzhen (2018)

   FRANCE – Paris 6 (2001), Paris 13 (1998), Lyon 1 (1998,2005),

   USA – Austin (2001), Houston (2002,2012,2014,2015)

   GERMANY – Heidelberg (1995), Munich (1997), Augsburg (2001,2002,2003,2012),

   FINLAND – Jyvaskyla (1998,1999),

   NETHERLANDS – Neimegen (1995)

2. Invited course of lectures (12 hours) in the Research Center for Mathematics and Economics, Tianjin University of Finance and Economics (2015)

3. Invited lectures in Scientific Centers: ICM SEC CAS (2015), INRIA (1998,2001), Institut Francais du Petrol (2001,2008), Los Alamos National Laboratory (2006,2007,2008,2011,2012,2013,2014)

4. Invited lectures in Industry: Moscow Schlumberger (2009), ExxonMobil Upstream Research C. (1999,2000,2006,2009,2010,2016,2017)

5. Invited course of lectures (12 hours) at Rome-Moscow school on Matrix Methods and Applied Linear Algebra (2011)

6. International Conferences: SIAM GeoSci.01, SIAM GeoSci.03, SIAM GeoSci.05, SIAM GeoSci.07, SIAM GeoSci.09, SIAM GeoSci.11, SIAM GeoSci.13, ParCFD03, ParCFD04, ParCFD08, DDM99, DDM11, ENUMATH95, ENUMATH99, ENUMATH01, ENUMATH13, ENUMATH15, ECCOMAS96, ECCOMAS98, ECCOMAS08, ECCOMAS14, CMBE15, CMBE17, CMBE19.

CONTRIBUTIONS TO SCIENTIFIC COMMUNITY:

- organizer of conference series "Mathematical models and numerical methods in biomathematics", Moscow, (16 conferences 2010 – present time)
- co-organizer of a minisymposium on anisotropic meshes, SIAM Conf. on Math. and Comp.Issues in Geosciences, Avignon, June, 2005
- co-organizer of an Int.Workshop "Advances in Numerical Mathematics", Moscow, September, 2005
- co-organizer of a minisymposium on conservative monotone schemes, SIAM Conf. on Math. and Comp.Issues in Geosciences, Leipzig, June, 2009
- co-organizer of a minisymposium on monotone discretization methods for subsurface flows, SIAM Conf. on Math. and Comp.Issues in Geosciences, Long Beach, March, 2011
- co-organizer of a minisymposium "Numerical methods for fluid flows with free boundaries and interfaces", European Conference on Numerical Mathematics and Advanced Applications, Lausanne, August, 2013
- co-organizer of an Int.Workshop "Mathematical modeling of natural disasters and technical hazards", Sion, August, 2013
- co-organizer of the 3d Russian-Chinese Workshop on Numerical Mathematics and Scientific Computing, Moscow, September, 2013
- co-organizer of the British-Russian Workshop under the British Council Researcher Links scheme "Mathematical and Computational Modelling in Cardiovascular Problems", Moscow, April, 2014
- co-organizer of a minisymposium "Numerical methods in blood flow simulation", European Conference on Numerical Mathematics and Advanced Applications, Ankara, September, 2015
- co-organizer of a minisymposium "Individualized Models of Biological Fluid Flows", 4th International Conference on Computational & Mathematical Biomedical Engineering, Paris, June, 2015
- co-organizer of a minisymposium "Reduced Order Modelling of the Cardio-Vascular System", 4th International Conference on Computational & Mathematical Biomedical Engineering, Paris, June, 2015
- member of organizing committee of the 4th Russian-Chinese Workshop on Numerical Mathematics and Scientific Computing, Tianjin, October, 2015
- co-organizer of the British-Russian Workshop under the British Council Researcher Links scheme "Mathematical modelling in physiology: biomedical applications", Moscow, March, 2016

- co-organizer of the 17th International Symposium on Mathematical and Computational Biology, Moscow, November, 2017
- co-organizer of the 12th International Symposium on on Computer Science in Sport, Moscow, July, 2019
- co-organizer of the Week of Applied Mathematics and Mathematical Modelling, Vladivostok, October, 2019.

SUPERVISION OF PH.D. THESIS:

- I.Kapyrin, "3D simulation of transport processes in porous media with complex structure", Institute of Numerical Mathematics, 2007.
- A.Danilov, "Unstructured mesh generation technology and monotone discretization of the diffusion equation", Institute of Numerical Mathematics, 2010.
- K.Nikitin, "Finite volume method for convection-diffusion equation and two-phase models", Institute of Numerical Mathematics, 2010.
- K.Terekhov, "Application of octree meshes to problems of filtration and hydrodynamics", Institute of Numerical Mathematics, 2013.
- A.Chernyshenko, "Generation of adaptive polyhedral meshes and numerical solution of elliptic 2nd order equations in 3D domains and on surfaces", Institute of Numerical Mathematics, 2013.
- V.Kramarenko, "Solution of the diffusion equation in media with contrast inclusions and with distributed sourxe singularities", Marchuk Institute of Numerical Mathematics, 2019.

SUPERVISION OF M.S. THESIS:

A.Prokopenko (2006, MSU), A.Danilov (2007, MSU), I.Mironec (2007, MSU), E.Bulygin (2007, MIPT), T.Dobroserdova (2010, MSU), Yu.Ivanov (2010, MSU), A.Chernyshenko (2010, MSU), V.Sikorski (2010, MSU), V.Kramarenko (2013, MIPT).

TEACHING EXPERIENCE:

2006–present:	Professor, Department of Computational Mathematics and Cybernetics, Moscow State University. Course: Finite element methods, 40 hours per semester, seminars and labs
2006–present:	Professor, Moscow Institute of Physics and Technology. Course: Finite element methods, 40 hours per semester
2006–2013:	Professor, Department of Computational Mathematics and Cybernetics, Moscow State University, Moscow Institute of Physics and Technology. Course: Multigrid methods and domain decomposition methods, 40 hours per semester
2002–2005:	Professor Assistant, Department of Mechanics and Mathematics, Moscow State University. Course: Numerical methods, 80 hours per semester, seminars and labs

REFERENCES:

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