YURI V. VASSILEVSKI

Professor, Corresponding Member of the Russian Academy of Sciences

CURRICULUM VITAE

BUSINESS ADDRESS:

Institute of Numerical Mathematics RAS
Gubkina str., 8
Moscow, 119333
Russia

Phone: (+7 495) 9848120-3913
Fax: (+7 495) 9898023
E-mail: yuri.vassilevski@gmail.com
WWW: http://dodo.inm.ras.ru/vassilevski/

HOME ADDRESS:

58-1 Zhukova prsp., Apt. 1
Moscow, 123154, Russia

Phone: (+7 499) 199 7781

PERSONAL DATA:

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

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 First Moscow State Medical University, Laboratory of mathematical modelling in biomedicine Head of Laboratory
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

RESEARCH INTERESTS:

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

EDITORIAL BOARDS:

- Managing Editor, Russian Journal of Numerical Analysis and Mathematical Modelling (impact factor: 0.6, http://www.degruyter.com/journals/rjnamm/).

- Editor, International Journal for Numerical Methods in Biomedical Engineering (impact factor: 2, http://onlinelibrary.wiley.com/journal/10.1002/%28ISSN%292040-7947).

- 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.

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 "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 – 2017 (5 researchers)

- PI in ExxonMobil-INM Project "Parallel iterative solution of linear systems on multi-core clusters" 2013 – 2017 (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. "Finite element adaptive methods and numerical methods for ill-posed problems" by N.Debit (Habilitation, University Lyon 1)

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

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

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

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

6. "A graph-based multigrid with applications" by A.Pennanen (University of Jyväskylä)

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

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

9. "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)

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

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

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

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

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

15. "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)

16. "Methods of iterating boudary conditions for the Stokes problem" by A.Kargin (Moscow State University)

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

18. "Efficient solvers for discretized elliptic vector-valued problems" by J.Martikainen (University of Jyväskylä)

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

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

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

22. 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: Phys-MatLit, 2016 (jointly with A.Danilov, K.Lipnikov, V.Chugunov)

JOURNAL ARTICLES:

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

2. A hybrid finite volume finite element method for bulksurface coupled problems. *J.Comp.Phys.* 2017, published online http://authors.elsevier.com/sd/article/S0021999117307374 (jointly with Chernyshenko A., Olshanskii M.)

3. 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.)

4. A finite volume scheme with improved well modeling in subsurface flow simulation. *Comp.Geosciences*, V.21, 2017, published online http://rdcu.be/uxFD (jointly with Kramarenko V., Nikitin K.)

5. 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.)

6. 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.)

7. Mathematical modelling of circulation in extracranial brachocephalic arteries at pre-operation stage in carotid endarterectomy Russian Journal of Cardiology. V.4, p.88-92, 2017 (In Russ.) (jointly with Burenchev D., Kopylov F., Bykova A., Gamilov T., Gognieva D., Simakov S.)

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

9. An adaptive numerical method for free surface flows passing rigidly mounted obstacles. *Computers & fluids*, V.148, p.56-68, 2017 (jointly with Nikitin K., Olshanskii M., Terekhov K., Yanbarisov R.)

10. LU factorizations and ILU preconditioning for stabilized discretizations of incompressible Navier-Stokes equations. *Numer. Linear Algebra Appl.*, DOI: 10.1002/nla2085, 2017 (jointly with Konshin I., Olshanskii M.)

11. Computational study of multivessel coronary disease: haemodynamic significance of stenoses in simulation. *Bulletin of Experimental Biology and Medicine*, 2016, V. 162, No.7, p.128-132, 2016 (jointly with Simakov S., Gamilov T., Kopylov Ph.)

12. Nonlinear finite volume method with discrete maximum principle for the two-phase flow model. *Lobachevskii Journal of Mathematics*, V.37, No.5, p.570-581, 2016 (jointly with Nikitin K., Novikov K.)

13. Could revision of the embryology influence our Cesarean delivery technique: towards an optimized Cesarean delivery for universal use. *Am.J.Perinatol.Rep.*, V.6, 352-354, 2016 (jointly with Stark M., Mynbaev O., Vassilevski Yu., Rozenerg P.)

14. Transcranial ultrasound of cerebral vessels in silico: proof of concept. *Russian J. Numer. Anal. Math. Modelling*, V.31, No.5, p.317-328, 2016 (jointly with Beklemysheva K., Danilov A., Grigoriev G., Kazakov A., Kulberg N., Petrov I., Salamatova V., Vasyukov A.)

15. Methods of blood flow modelling. *Math. Model. Nat. Phenom.*, V.11, No.1, p.1-25, 2016 (jointly with Bessonov N., Sequeira A., Simakov S., Volpert V.)

16. Parallel software platform INMOST: a framework for numerical modeling. *Supercomputing Frontiers and Innovations*, V.2, No.4, p.55-66, 2015 (jointly with Danilov A., Terekhov K., Konshin I.)

17. A semi-Largangian method on dynamically adapted octree meshes *Russian J. Numer. Anal. Math. Modelling*, V.30, No.6, p.363-380, 2015 (jointly with Terekhov K., Nikitin K., Olshanskii M.)

18. Role of measurement of fractional flow reserve in coronary artery atherosclerosis. *Terapevticheskii archive*, V.87, No.9, pp.106-113, 2015 (jointly with Kopylov F., Bykova A., Simakov S.)

19. Methods of graph network reconstruction in personalized medicine. *Int.J.Numer.Meth.Biomed. Engng.*, e02754, 2015 (jointly with Danilov A., Ivanov Yu., Pryamonosov R.)

20. An unconditionally stable semi-implicit FSI finite element method. *Comput.Methods Appl.Mech. Engrg.*, V.297, pp.437-454, 2015 (jointly with Lozovskiy A., Olshanskii M., Salamatova V.)

21. ILU preconditioners for non-symmetric saddle point matrices with application to the incompressible Navier-Stokes equations. *SIAM J.Sci.Comp.*, V.37, No.5, pp.A2171-A2197, 2015 (jointly with Olshanskii M., Konshin I.)

22. Virtual blunt injury of human thorax: age-dependent response of vascular system. *Russian J. Numer. Anal. Math. Modelling*, V.30, No.5, 2015 (jointly with Beklemysheva K., Danilov A., Petrov I., Salamatova V., Vasyukov A.)

23. On the elastisity of blood vessels in one-dimensional problems of hemodynamics. *J.Computational Mathematics and Mathematical Physics*, V.55, No.9, pp.1567-1578, 2015 (jointly with Salamatova V., Simakov S.)

24. Patient-specific anatomical models in human physiology. *Russian J. Numer. Anal. Math. Modelling*, V.30, No.3, p.185-201, 2015 (jointly with Danilov A., Gamilov T., Pryamonosov R., Simakov S.)

25. A splitting method for numerical simulation of free surface flows of incompressible fluids with surface tension. *Comput.Methods Appl.Math.*, V.15, No.1, p.59-78, 2015, DOI:10.1515/cmam-2014-0025 (jointly with Nikitin K., Olshanskii M., Terekhov K.)

26. Patient specific haemodynamic modeling after occlusion treatment in leg. *Math. Model. Nat. Phenom.*, V.9, No.6, p.85-97, 2014 (jointly with Simakov S., Gamilov T., Ivanov Yu., Kopylov P.)

27. A monotone nonlinear finite volume method for diffusion equations and multiphase flows. *Comp. Geosciences*, V.18, No.3, p.311-324, 2014, DOI:10.1007/s10596-013-9387-6 (jointly with Nikitin K., Terekhov K.)

28. Development and use of software GeRa for safety assessment of nuclear wast repositories. *Problems of atomic science and technology. Mathematical modelling of physical processes*, No.4, p.44-54, 2014, in Russian (jointly with Kapyrin I., Utkin S.)

29. An octree-based solver for the incompressible Navier-Stokes equations with enhanced stability and low dissipation. *Computers & fluids*, V.84, pp.231-246, 2013 (jointly with Olshanskii M., Terekhov K.)

30. Two-phase water flooding simulations on dynamic adaptive octree grids with two-point nonlinear fluxes. *Russian J. Numer. Anal. Math. Modelling*, V.28, No.3, pp.267-288, 2013 (jointly with Terekhov K.)

31. Sensitivity field distributions for segmental bioelectrical impedance analysis based on real human anatomy. *J. Phys.: Conf. Series*, V.434, 012001, 2013, DOI: 10.1088/1742-6596/434/1/012001 (jointly with Danilov A., Kramarenko V., Nikolaev D., Rudnev S., Salamatova V., Smirnov A.)

32. Anderson acceleration for nonlinear finite volume scheme for advection-diffusion problems. *SIAM J.Sci.Comp.*, V.35, No.2, pp.1120-1136, 2013 (jointly with Lipnikov K., Svyatskiy D.)

33. Minimal stencil finite volume scheme with the discrete maximum principle. *Russian J. Numer. Anal. Math. Modelling*, V.27, No.4, pp.369-385, 2012 (jointly with Lipnikov K., Svyatskiy D.)

34. Modelling of bioimpedance measurements: unstructured mesh application to real human anatomy. *Russian J. Numer. Anal. Math. Modelling*, V.27, No.5, pp.431-440, 2012 (jointly with Danilov A., Nikolaev D., Rudnev S., Salamatova V.)

35. On the L^q-saturation property for functions from $W^{2,p}(\Omega)$. *Applied Mathematics Letters*, V.25, pp.2123-2127, 2012 (jointly with Agouzal A.)

36. Finite element analysis of bioimpedance diagnostics. *J.Computational Mathematics and Mathematical Physics*, V.52, No.4, pp.733-745, 2012, in Russian (jointly with Danilov A., Nikolaev D., Rudnev S., Salamatova V., Smirnov A.)

37. CFD technology for 3D simulation of large-scale hydrodynamic events and disasters. *Russian J. Numer. Anal. Math. Modelling*, V.27, No.4, pp.399-412, 2012 (jointly with Nikitin K., Olshanskii M., Terekhov K.)

38. Mesh generation and computational modeling techniques for bioimpedance measurements: an example using the VHP data. *J.Phys.: Conf.Ser.*, V.407, 012004, 2012, DOI: 10.1088/1742-6596/407/1/012004 (jointly with Danilov A., Salamatova V.)

39. Monotonicity recovering and accuracy preserving optimization methods for postprocessing finite element solutions. *J.Comp.Phys.*, V.231, pp.3126-3142, 2012 (jointly with O.Burdakov, I.Kapyrin)

40. A numerical method for the simulation of free surface flows of viscoplastic fluid in 3D. *J. Comp.Math.*, V.29, No.6, pp.605-622, 2011 (jointly with Nikitin N., Olshanskii M., Terekhov K.)

41. Numerical issues of modelling blood flow in networks of vessels with pathologies. *Russian J. Numer. Anal. Math. Modelling*, V.26, No.6, pp.605-622, 2011 (jointly with Simakov S., Salamatova V., Ivanov Yu., Dobroserdova T.)

42. Simulation of interferon-mediated protective field in lymphoid organs with their spatial and functional organization taken into consideration. *Doklady Biological Sciences*, V.439, pp.194-196, 2011 (jointly with Bocharov G., Danilov A., Marchuk G., Chereshnev V., Ludewig B.)

43. Families of meshes minimizing P_1 interpolation error for functions with indefinite Hessian. *Russian J. Numer. Anal. Math. Modelling*, V.26, No.4, pp.337-352, 2011 (jointly with Agouzal A., Lipnikov K.)

44. Reaction-diffusion modelling of interferon distribution in secondary lymphoid organs. *Mathematical Modelling of Natural Phenomena*, V.6, No.7, pp.13-26, 2011 (jointly with Bocharov G., Danilov A., Marchuk G., Chereshnev V., Ludewig B.)

45. On optimal convergence rate of finite element solutions of boundary value problems on adaptive anisotropic meshes. *Mathematics and Computers in Simulation*, V.81, No.10, pp.1949-1961, 2011 (jointly with Agouzal A., Lipnikov K.)

46. Vessel wall models for simulation of atherosclerotic vascular networks. *Mathematical Modelling of Natural Phenomena*, V.6, No.7, pp.82-99, 2011 (jointly with Simakov S., Salamatova V., Ivanov Yu., Dobroserdova T.)

47. Blood flow simulation in atherosclerotic vascular network using fiber-spring representation of deseased wall. *Mathematical Modelling of Natural Phenomena*, V.6, No.5, pp.333-349, 2011 (jointly with Simakov S., Salamatova V., Ivanov Yu., Dobroserdova T.)

48. A multi-model approach to intravenous filter optimization. *International Journal for Numerical Methods in Biomedical Engineering*, V.26, pp.915-925, 2010 (jointly with Simakov S., Kapranov S.)

49. Minimization of gradient errors of piecewise linear interpolation on simplicial meshes. *Comp.Meth. Appl.Mech.Engnr.*, V.199, pp.2195-2203, 2010 (jointly with Agouzal A.)

50. A monotone nonlinear finite volume method for advectiondiffusion equations on unstructured polyhedral meshes in 3D. *Russian J. Numer. Anal. Math. Modelling*, V.25, No.4, pp.335-358, 2010 (jointly with Nikitin K.)

51. Parallel solution of Mixed Finite Element/Spectral Element systems for convection-diffusion equations on non-matching grids. *J.Applied Numerical Mathematics*, V.60, No.11, pp.1131-1147, 2010 (jointly with Boursier I., Tromeur-Dervout D.)

52. A monotone finite volume method for advection-diffusion equations on unstructured polygonal meshes. *J.Comp.Phys.*, V.229, pp.4017-4032, 2010 (jointly with Lipnikov K., Svyatskiy D.)

53. Edge-based a posteriori error estimators for generating quasi-optimal simplicial meshes. *Math. Model. Nat. Phenom.*, V.5, No.7, pp.91-96, 2010 (jointly with Agouzal A., Lipnikov K.)

54. Hessian-free metric-based mesh adaptation via geometry of interpolation error. *J. Computational Mathematics and Mathematical Physics*, V.50, No.1, pp. 124-138, 2010 (jointly with Agouzal A., Lipnikov K.)

55. On discrete boundaries and solution accuracy in anisotropic adaptive meshing. *Engineering with Computers*, 26, pp.281-288, 2010 (jointly with Lipnikov K.)

56. Error estimates for a finite element solution of the diffusion equation based on composite norms. *J.Numer.Math.*, V.17, No.2, pp.77-95, 2009 (jointly with Agouzal A., Lipnikov K.)

57. A monotone nonlinear finite volume method for diffusion equations on conformal polyhedral meshes, *Russian J. Numer. Anal. Math. Modelling,* V.24, No.3, pp.207-227, 2009 (jointly with Danilov A.)

58. Interpolation-free monotone finite volume method for diffusion equations on polygonal meshes. *J.Comp.Phys.*, V.228, No.3, pp.703-716, 2009 (jointly with Lipnikov K., Svyatskiy D.)

59. Two splitting schemes for nonstationary convection-diffusion problems on tetrahedral meshes. *J. Computational Mathematics and Mathematical Physics*, V.48, No.8, pp. 1349-1366, 2008 (jointly with Kapyrin I.)

60. Free surface flow modelling on dynamically refined hexahedral meshes. *Russian J. Numer. Anal. Math. Modelling*, V.23, pp.469-485, 2008 (jointly with Nikitin K.)

61. Monotone finite volume schemes for diffusion equations on unstructured triangular and shape-regular polygonal meshes. *J.Comp.Phys.*, V.227, pp.492-512, 2007 (jointly with Lipnikov K., Shashkov M., Svyatskiy D.)

62. Pressure Schur complement preconditioners for the discrete Oseen problem. *SIAM J.Sci.Comp.*, V.29, No.6, pp.2686-2704, 2007 (jointly with Olshanskii M.)

63. Computational issues related to the iterative coupling of subsurface and channel flows. *Calcolo*, V.44, pp.1-20, 2007 (jointly with Hoppe R., Porta P.)

64. POD acceleration of fully implicit solver for unsteady nonlinear flows and its application on grid architecture. *Advances in Engineering Software*, V.38, pp.301-311, 2007 (jointly with Tromeur-Dervout D.)

65. Hessian recovery method for adaptive grid generation. *Voprosy atomnoj nauki i tehniki*, Ser. Mathematical modeling of physical processes., N3, pp.37-53, 2006 (jointly with Lipnikov K.)

66. Choice of initial guess in iterative solution of series of systems. *J.Comp.Phys.*, V.219, pp.210-227, 2006 (jointly with Tromeur-Dervout D.)

67. Parallel iterative multilevel solution of mixed finite element systems for scalar equations. *Concurrency and Computation: Practice and Experience*, V.18, No.5, pp. 501-518, 2006 (jointly with Chugunov V., Svyatski D., Tyrtyshnikov E.)

68. Parallel modeling of a blood flow through a cava-filter with a captured thrombus. *Mathematical Modelling*, V.17, No.11, pp.3-15, 2005 (jointly with Kapranov S.)

69. Hessian based anisotropic mesh adaptation in domains with discrete boundaries. *Russ.J.Numer. Anal.Math.Modelling*, V.20, No.4, pp.391-402, 2005 (jointly with Dyadechko V., Lipnikov K.)

70. An unified asymptotical analysis of interpolation errors for optimal meshes. *Doklady Mathematics*, V.72, No.3, pp.879-882, 2005 (jointly with Agouzal A.)

71. Error bounds for controllable adaptive algorithms based on a Hessian recovery. *J. Computational Mathematics and Mathematical Physics*, V.45, No.8, pp. 1374-1384, 2005 (jointly with Lipnikov K.)

72. On control of adaptation in parallel mesh generation. *Engineering with Computers*, V.20, No.3, pp.193-201, 2004 (jointly with Lipnikov K.)

73. A hybrid domain decomposition method based on aggregation. *Numer. Linear Algebra Appl.*, V.11, pp.327-341, 2004

74. Iterative solution methods for modeling multiphase flow in porous media fully implicitly. *SIAM J.Sci.Comp.*, V.25, No.3, pp.905-926, 2003 (jointly with Lacroix S., Wheeler M. and Wheeler J.)

75. Parallel adaptive solution of 3D boundary value problems by Hessian recovery. *Comp.Methods Appl.Mech.Engnr.*, V.192, No.11-12, pp.1495-1513, 2003 (jointly with Lipnikov K.)

76. Optimal Triangulations: Existence, Approximation and Double Differentiation of P_1 finite element functions. *J. Computational Mathematics and Mathematical Physics*, V.43, No.6, pp.827-835, 2003 (jointly with Lipnikov K.)

77. Parallel multilevel data structures for a non-conforming finite element problem on unstructured meshes. *Russ.J.Numer.Anal.Math.Modelling*, V.18, No.1, pp.1-11, 2003 (jointly with Chugunov V.)

78. On a discrete Hessian recovery for P_1 finite elements. *Journal of Numer.Math.*, V.10 No.1 pp.1-12, 2002 (jointly with Agouzal A.)

79. Decoupling preconditioners in the Implicit Parallel Accurate Reservoir Simulator (IPARS). *Numer. Linear Algebra Appl.*, V.8, No.8, pp.537-549, 2001 (jointly with Lacroix S. and Wheeler M.)

80. A parallel solver for unsteady incompressible 3D Navier-Stokes equations. *Parallel Computing*, V.27, No.4, pp.363-389, 2001 (jointly with Garbey M.)

81. Parallel Schwarz method for a convection-diffusion problem. *SIAM J.Sci.Comp.*, V.22, No.3, pp.891-916, 2000 (jointly with Garbey M., Kuznetsov Yu.)

82. Adaptive generation of quasi-optimal tetrahedral meshes. *East-West J. Numer. Math.*, V.7, No.4, pp.223-244, 1999 (jointly with Agouzal A., Lipnikov K.)

83. An adaptive algorithm for quasioptimal mesh generation. *Computational Mathematics and Mathematical Physics*, V.39, No.9, pp.1468–1486, 1999 (jointly with Lipnikov K.)

84. Analysis and parallel implementation of adaptive mortar element methods. *East-West J. Numer. Math.*, V.6, No.3, pp.223-248, 1998 (jointly with Hoppe R., Iliash Yu., Kuznetsov Yu., Wohlmuth B.)

85. Structuring preconditioners for unstructured meshes, *Russ.J.Numer.Anal.Math.Modelling*, V.11, No.2, pp.139-154, 1996 (jointly with Dyadechko V.G., and Iliash Yu.A.)

86. Domain decomposition methods and averaging operators for the case of multidomain splitting, *Russ.J.Numer.Anal.Math.Modelling,* V.10, No.2, pp.141-148, 1995

87. On application of global coarse space for two-level domain decomposition method in the case of a large number of subdomains, *Russ.J.Numer.Anal.Math.Modelling,* V.8, No.1, pp.59-82, 1993

OTHER PUBLICATIONS:

1. Personalized anatomical meshing of the human body with applications. In: *Modeling the Heart and the Circulatory System, Quarteroni A. (ed.)*, MS&A 14, Springer International Publishing Switzerland, pp.221–236, 2015 (jointly with Danilov A., Ivanov Yu., Simakov S., Gamilov T.)

2. A unified approach for computing tsunami, waves, floods, and landslides. In: *Numerical Mathematics and Advanced Applications, Abdulle A. et al (eds.)*, LNCSE, V.103, Springer, 2014 (jointly with Danilov A., Nikitin K., Olshanskii M., Terekhov K.)

3. The model of global blood circulation and applications. In: *6th European Conference of the International Federation for Medical and Biological Engineering, Lackovic I. and Vasic D. (eds.)*, IFMBE Proceedings 45, Springer International Publishing Switzerland, pp.403–406, 2015 (jointly with Danilov A. et al)

4. Nonlinear monotone FV schemes for radionuclide geomigration and multiphase flow models. In: *Finite Volumes for Complex Applications VII-Elliptic, Parabolic and Hyperbolic Problems*, Springer International Publishing, pp. 655–663, 2014 (jointly with Kapyrin I., Nikitin K., Terekhov K.)

5. A finite volume scheme with the discrete maximum principle for diffusion equations on polyhedral meshes. In: *Finite Volumes for Complex Applications VII-Methods and Theoretical Aspects*, Springer International Publishing, pp.197–205, 2014 (jointly with Chernyshenko A.)

6. Multiphase flows - nonlinear monotone FV scheme and dynamic grids . In: *ECMOR XIV-14th European conference on the mathematics of oil recovery.* EAGE 2014 (jointly with Nikitin K., Terekhov K.)

7. A monotone nonlinear finite volume method for advection-diffusion equations and multiphase flows. In: *ECMOR XIII-13th European conference on the mathematics of oil recovery.*, EAGE 2012 (jointly with Nikitin K.)

8. Families of meshes minimizing interpolation error. In: *Proceedings of the 20th International Meshing Roundtable*, W.R.Quadros (Ed.), Springer Berlin Heidelberg, pp.313-327, 2012 (jointly with Agouzal A., Lipnikov K.)

9. Application of nonlinear monotone finite volume schemes to advection-diffusion problems. In: *Finite Volumes for Complex Applications VI - Problems & Perspectives*, Vol.1, pp. 761–769, 2011 (jointly with Kapyrin I., Danilov A., Nikitin K.)

10. Benchmark 3D: A monotone nonlinear finite volume method for diffusion equations on polyhedral meshes. In: *Finite Volumes for Complex Applications VI - Problems & Perspectives*, Vol. 2, pp. 193–203, 2011 (jointly with Danilov A.)

11. Adaptive solution of PDEs on anisotropic triangular meshes. *AIP (American Institute of Physics) Conference Proceedings*, V.1281, pp. 1558–1561, 2010 (jointly with Agouzal A. and Lipnikov K.)

12. Unstructured 3D mesh generation and adaptation technologies in package Ani3D. In: *Numerical geometry, grid generation and scientific computing*, Moscow, Computing Center RAS, pp.27–24, 2010 (jointly with Danilov A., Lipnikov K.)

13. Preserving distance property of level set function and simulation of free surface flows on adaptive grids. In: *Numerical geometry, grid generation and scientific computing*, Moscow, Computing Center RAS, pp.25–32, 2010 (jointly with Nikitin K., Olshanskii M., Terekhov K.)

14. Edge-based a posteriori error estimators for generation of *d*-dimensional quasi-optimal meshes. In: *Proceedings of 3d Int.Conf. MAMERN, Pau,France* , B.Amaziane et al. (Eds.), Granada (Spain): University of Granada, V.1, pp.71–76, 2009 (jointly with Agouzal A. and Lipnikov K.).

15. Anisotropic mesh adaptation for solution of finite element probems using hierarchical edge-based error estimates. In: *Proceedings of 18th International Meshing Roundtable*, Salt Lake City, UT. B.Clark (Editor), Springer, pp.595–610, 2009 (jointly with Agouzal A. and Lipnikov K.)

16. Metric tensors for generation of optimal meshes. In: *Proceedings of Int. Conf. NUMGRID-2008*, Computing center RAS, Moscow, pp.264–271, 2008 (jointly with Agouzal A. and Lipnikov K.)

17. Metric based mesh adaptation in ALE simulation. In: *Proceedings of West-East High Speed Flow Field Conference*, 2007 (jointly with Lipnikov K.)

18. Generation of quasi-optimal meshes based on a posteriori error estimates. *Proceedings of 16th International Meshing Roundtable*, WA. M.Brewer, D.Marcum (Editors), Springer, pp.139-148, 2007 (jointly with Lipnikov K., Agouzal A.)

19. Monotone finite volume schemes for diffusion equations on unstructured triangular and shape-regular polygonal meshes. *Los Alamos Report LAUR-07-2886*, 2007 (jointly with D.Svyatsky, M.Shashkov, K.Lipnikov)

20. Applications of the discrete Hessian recovery methodology in adaptive mesh generation. In: *Proc. of Int.Conf. Advances in Numerical Mathematics, Moscow, September 16-17, 2005*, Moscow, Institute of Numerical Mathematics; Houston, Department of Mathematics, University of Houston; pp.167-182, 2006 (jointly with K.Lipnikov)

21. Metric-based control of mesh adaptation in arbitrary Lagrangian Eulerian simulations. *Los Alamos Report LAUR-06-4765*, 2006 (jointly with K.Lipnikov)

22. Analysis of Hessian recovery methods for generating adaptive meshes. *Proceedings of 15th International Meshing Roundtable*, P.Pebay (Editor), Springer, Berlin, Heidelberg, New York, pp.163-171, 2006 (jointly with Lipnikov K.)

23. Aitken-Schwarz methods with non matching finite elements and spectral elements grids for the parallel simulation of an underground waste disposal site modelized by upscaling. In: *Proceedings of Int.Conf. ParCFD 2004* , G.Winter et al. (Editors), Elsevier Science, pp.69-76, 2005 (jointly with Boursier I., Tromeur-Dervout D.)

24. On discrete boundaries and solution accuracy in anisotropic adaptive meshing. *Proceedings of 14th International Meshing Roundtable*, B.Hanks (Editor), Springer, Berlin, Heidelberg, New York, pp.313-324, 2005 (jointly with Lipnikov K.)

25. Error estimates for Hessian-based mesh adaptation algorithms with control of adaptivity. In: *Proceedings of 13th International Meshing Roundtable*, September 19-22, 2004, Williamsburg, Virginia, pp.345-351 (jointly with Lipnikov K.)

26. On a parallel algorithm for controlled Hessian-based mesh adaptation. In: *Proceedings of 3d Conf. Appl.Geometry, Mesh Generation and High Performance Computing*, Moscow, June 28 –July 1, 2004, Comp.Center RAS, V.1, pp.155-166 (jointly with Lipnikov K.)

27. Adaptive grid refinement for computation of the homogenized elasticity tensor. In: *Proceedings of 4th Intern. Conf. on Large-Scale Sci. Comput. LSSC-03*, Sozopol, Bulgaria, June 4-8, 2003. *Lect.Notes Comput.Sci.*, V.2907, pp.371-378, Springer, 2004 (jointly with Hoppe R.H.W. and Petrova S.)

28. An algorithm for generation of a conformal quasi-hierarchical triangulation subject to a set of constraints.// In: *Proceedings of 3d Conf. Appl.Geometry, Mesh Generation and High Performance Computing*, Moscow, June 28 –July 1, 2004, Comp.Center RAS, V.2, pp.28-39 (jointly with Chugunov V.)

29. Numerical simulation of unsteady 3D flows on anisotropic grids. In: *Transactions of French-Russian Liapounov Institute for Applied Mathematics and Computer Science*, V.4, Moscow, pp.107-124, 2003 (jointly with Achdou Y., Jaffré J., Svyatski D.)

30. Parallel adaptive solution of the Stokes and Oseen problems on unstructured 3D meshes. In: *Proceedings of Int.Conf. ParCFD 2003* , Elsevier, pp.153-162, 2004 (jointly with Lipnikov K.)

31. A Parallel CG Solver Based on Domain Decomposition and Non-Smooth Aggregation. In: *Conjugate Gradient Algorithms and Finite Element Methods, (Proceedings of Int.Conf. 50 years of CG)*, Springer-Verlag, Berlin Heidelberg, pp.93-102, 2004.

32. Blood Flow Simulation in Grid Environment. In: *Proceedings of Parallel CFD-2002 Conf.* (jointly with Resch M., Garbey M., Kuster U. and Sander B.)

33. 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.)

34. 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.

35. 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.)

36. 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.)

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

38. 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.)

39. 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.)

40. 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.)

41. 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.)

42. 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.)

43. 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),

   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.

CONTRIBUTIONS TO SCIENTIFIC COMMUNITY:

- 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

- organizer of conference series "Mathematical models and numerical methods in biomathematics", Moscow, (June 2010, January 2011, October 2011, October 2012, October 2013, October 2014, October 2015)

- 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

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.

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:

Eugene E. Tyrtyshnikov, Institute of Numerical Mathematics, Gubkina, 8, Moscow, 119333, RUSSIA, phone: (+7 495) 984 8120. E-mail: EUGENE.TYRTYSHNIKOV@GMAIL.COM

Yuri A. Kuznetsov, Department of Mathematics, University of Houston, Texas 77204-3476, USA, phone: (+1 713) 743 3493. E-mail: KUZ@MATH.UH.EDU