

SERGEY S. SIMAKOV

CURRICULUM VITAE

BUSINESS ADDRESS:

Moscow Institute of Physics and Technology
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PERSONAL DATA:

Date and place of birth:	March 17, 1980, Khabarovsk, Russia
Citizenship	Russia
Marital Status:	married

EDUCATION:

Ph.D. **Moscow Institute of Physics and Technology**, Russia, 2006,
Mathematical Modeling, Numerical Methods and Software (05.13.18),
Title: Numerical modeling of cardiovascular and respiratory systems
of a human including their interaction.

M.Sc. **Moscow Institute of Physics and Technology**, Russia, 2003, *magna cum laude*
Applied Mathematics and Physics

PROFESSIONAL EXPERIENCE:

09/2010–present: Moscow Institute of Physics and Technology, Moscow, Russia
Deputy Chief of the Department of Applied Mathematics

09/2008–present: Moscow Institute of Physics and Technology,
Department of Applied Mathematics,
Associate Professor

09/2003–09/2008: Moscow Institute of Physics and Technology, Moscow, Russia
Department of Applied Mathematics,
Assistant

RESEARCH INTERESTS:

Mathematical modeling, discretization methods for PDEs, cardiovascular and respiratory mechanics, global transport processes in human, environmental effects on human, endovascular surgery, laparoscopic surgery, graph layout algorithms.

PROJECTS:

- PI in Grant No MK-2719.2012.9 of Russian Federation President “High Performance Modeling Cardiovascular System of a Human Under Physical Load”, 2012 – 2013 (4 researchers)
- PI in Grant No P727 of Federal Program “Academic and pedagogical staff of innovative Russia”, “High Performance Computational Algorithms for Simulating Dynamical Processes in Respiratory and Cardiovascular Systems of Human Organism with Thier Interaction”, 2009 – 2011 (5 researchers)

PH.D. THESIS REVIEWS:

1. “Simulation of data transfer and search in decentralized distributed data bank using N-k - scheme of data storage” by V.Pavlov (Moscow Institute of Physics and Technology)

PEERS REVIEWS:

1. Reviewer in scientific journals:
 - Journal of Mathematical Modelling (*in Russian*, translated into english as Mathematical Models and Computer Simulations);
 - Russian Journal of Numerical Analysis and Mathematical Modeling;
 - International Journal of Injury Control and Safety Promotion.

JOURNAL ARTICLES:

1. Patient Specific Haemodynamic Modeling after Occlusion Treatment in Leg. *Mathematical Modelling of Natural Phenomena*, V.9, No.6, pp.85-97, 2014 (jointly with Gamilov T., Ivanov Yu., Kopylov Ph., Vassilevski Yu.)
2. Re. 'Abdominal hypertension and decompression: the effect on peritoneal metabolism in an experimental porcine study'. *European Journal of Vascular and Endovascular Surgery*, V.48, No.2, pp.229-230, 2014 (jointly with Mynbaev OA, Eliseeva MY, Tinelli A, Malvasi A, Massaro F, Stark M)
3. A surgical polypragmasy: Koninckx PR, Corona R, Timmerman D, Verguts J, Adamyan L. Peritoneal full-conditioning reduces postoperative adhesions and pain: a randomised controlled trial in deep endometriosis surgery. *J Ovarian Res.* 2013 Dec 11;6(1):90. *Journal of Ovarian Research*, V.7, No.29, doi: 10.1186/1757-2215-7, 2014 (jointly with Mynbaev OA, Biro P., Eliseeva MY, Tinelli A, Malvasi A, Kosmas IP, Babenko TI, Mazitova MI, Stark M)

4. Computational models for cardiovascular research. *Bulletin of Almazov's Federal Center for Heart, Blood and Endocrinology*, V.6, No.23, pp.5-13, 2013 (jointly with Gamilov T.M., Kholodov A.S.)
5. Computational study of blood flow in lower extremities under intense physical load. *Russian Journal of Numerical Analysis and Mathematical Modelling*, V.28, No.5, pp.485-504, 2013 (jointly with Gamilov T., Soe Y.N.)
6. Numerical issues of modelling blood flow in networks of vessels with pathologies. *Russian Journal of Numerical Analysis and Mathematical Modelling*, V.26, No.6, pp.605-622, 2011 (jointly with Vassilevski Yu., Salamatova V., Ivanov Yu., Dobroserdova T.)
7. Vessel wall models for simulation of atherosclerotic vascular networks. *Mathematical Modelling of Natural Phenomena*, V.6, No.7, pp.82-99, 2011 (jointly with Vassilevski Yu., Salamatova V., Ivanov Yu., Dobroserdova T.)
8. Blood flow simulation in atherosclerotic vascular network using fiber-spring representation of diseased wall. *Mathematical Modelling of Natural Phenomena*, V.6, No.5, pp.333-349, 2011 (jointly with Vassilevski Yu., Salamatova V., Ivanov Yu., Dobroserdova T.)
9. A multi-model approach to intravenous filter optimization. *International Journal for Numerical Methods in Biomedical Engineering*, V.26, pp.915-925, 2010 (jointly with Vassilevski Yu., Kapranov S.)
10. Computational Study of Oxygen Concentration in Human Blood under Low Frequency Disturbances. *Mathematical Models and Computer Simulations*, V.1(2), pp. 283-295, 2009 (jointly with Kholodov A.)
11. Hybrid approach to the global circulation modeling *Journal of Biomechanics*, V.39, Supplement 1. - p.S401, 2006 (jointly with Kholodov A.)

CHAPTERS IN BOOKS:

1. Algorithmic basis for pathway visualization. In: *Pathway analysis for drug discovery: computational infrastructure and applications*, Wiley, chapter 4, pp.67-102, 2008 (jointly with Ispolatov I., Maslov S., Nikitin A.)
2. Numerical Analysis of Acoustical Impacts to Lung Functioning and Pulmonary Hemodynamics In: *Medicine in the Mirror of Informatics* O.Belotserkovskii (Ed.), A.Kholodov (Ed.), M.: Nauka, pp.124-144, 2008 (jointly with Kholodov A.)
3. Methods of Global Blood Flow Computations in Human Organism using Heterogenous Numerical Models. In: *Medicine in the Mirror of Informatics* O.Belotserkovskii (Ed.), A.Kholodov (Ed.), M.: Nauka, pp.145-170, 2008, (jointly with Kholodov A., Evdokimov A.)
4. Numerical simulation of peripheral circulation and substance transfer with 2D Models. *Mathematical Biology: Recent Trends*, Anshan, Chandra P. (eds.), pp.22-29, 2005 (jointly with Kholodov A., Evdokimov A.)

OTHER PUBLICATIONS:

1. The global CO₂ balance monitoring software during laparoscopic procedures, SLS Annual Meeting & ENDO EXPO, Washington/Reston, 2013 (jointly with Mynbaev OA)
2. CO₂-pneumoperitoneum pathophysiology: mechanisms of respiratory and cardiovascular disturbances, SLS Annual Meeting & ENDO EXPO, Washington/Reston, 2013 (jointly with Pismenskiy SV, Eliseeva MYu, Tinelli A, Kosmas IP, Medvedev MV, Shi Z, Mynbaev OA)
3. Computational multi-model framework for cardiovascular system simulation. In: *Proceedings of the V International Symposium on Modelling Physiological Flows*, p.58-59, 2013 (jointly with Vassilevski Yu., Salamatova V., Gamilov T., Dobroserdoa T., Ivanov Yu., Kramarenko V.)
4. Global blood flow and matter transport in regulated cardiovascular network. In: *Proceedings of the International Conference Instabilities and Control of Excitable Networks: From macro- to nano-systems*, p.243, 2012 (jointly with Gamilov T., Kholodov A., Yan Naing Soe)
5. Vessel wall modeling for 1D haemodynamics. In: *Proceedings of the 2nd international conference on computational and biomedical engineering*, pp. 395-398, 2011 (jointly with Vassilevski Yu., Salamatova V., Ivanov Yu., Dobroserdova T.)
6. A multi-model approach to intravenous filter optimization. In: *Proceedings of the 1st International Conference on Computational & Mathematical Biomedical Engineering*, pp.31-35, 2009 (jointly with Vassilevski Yu., Kapranov S.)
7. Heart valve dynamics in the model of global circulation In: *Proceedings of the III Asian Pacific Congress on Computational Mechanics* pp.286718.1-286718.7, 2007 (jointly with Kholodov A., Kholodov Y., Perfilov K., et. al.)
8. Global dynamical model of the cardiovascular system. In: *Proceedings of the III European Conference on Computational Mechanics*, Mota Soares C. (eds.), pp.1467.1-1467.15, 2006 (jointly with Kholodov A., Kholodov Y.)
9. Computational Study of the Vibrating Disturbances to the Lung Function. In: *Proceedings of the III European Conference on Computational Mechanics*, Mota Soares C. (eds.), pp.1464.1-1464.9, 2006 (jointly with Kholodov A., Kholodov Y.)
10. Computational models on graphs for nonlinear hyperbolic and parabolic systems of equations. In: *Proceedings of the III European Conference on Computational Mechanics*, Mota Soares C. (eds.), pp.2279.1-2279.19, 2006 (jointly with Kholodov A., Kholodov Y.)
11. 2D Computational model of blood circulation in organs coupled with the net model of large vessels. In: *Proceedings of the III European Conference on Computational Mechanics*, Rodrigues H. (eds.), pp.479-490, 2006 (jointly with Isaikin D., Kholodov A., Evdokimov A.)
12. Numerical simulations of cardiovascular diseases and global matter transport. In: *Proceedings of the International Conference Advanced Information and Telemedicine Technologies for Health*, Ablameiko S. (eds.), pp.188-192, 2005 (jointly with Kholodov A., Evdokimov A., Nadolskii N., et.al.)

INTERNATIONAL CONFERENCES

ESB04, SBC05, ICCB05, ECCM06, SBC06, ESB06, APCOM07, CMBE09, CMBE11, ICENET12, MPF13, SLS Annual Meeting & ENDO EXPO 13, Cardiac Growth and Regeneration 14, PhystechBio, ICENET14, ECMTB14, WCCM14.

MEMBERSHIP

New European Surgery Academy

AWARDS

The Best Young Teacher Award from Vladimir Potanin's Foundation, 2009.

SUPERVISION OF M.S. THESIS:

Gamilov T.(MIPT, 2012), Leyrich I.(MIPT, 2011), Samuilov D.(MIPT 2010), Belevich P.(MIPT 2009), Perfilov K.(MIPT 2008)

GRADUATE STUDENT SUPERVISION:

Gorodnova N., Turchenko E., Nazarov E.

TEACHING EXPERIENCE:

- 2008–present: Associate Professor, Department of Applied Mathematics, Moscow Institute of Physics and Technology. Course: Computational Mathematics, 136 hours per semester, seminars and labs
- 2007–2010: Assistant, Department of Applied Mechanics, Moscow Institute of Physics and Technology. Course: Numerical Methods for Continuum Mechanics, 34 hours per semester, lectures and seminars
- 2003–2008: Assistant, Department of Applied Mathematics, Moscow Institute of Physics and Technology. Course: Computational Mathematics, 68 hours per semester, seminars and labs

REFERENCES:

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