

Sergey Lapin

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EDUCATION

Ph.D., Applied Mathematics (May 2005)

University of Houston

Dissertation advisors: Dr. R. Glowinski and Dr. S. Canic

Dissertation title: "Computational Methods in Biomechanics and Physics"

M.S., Applied Mathematics (August 2001)

University of Houston

M.S., Mathematics (June 1999)

Kazan State University, Russia

B.S. (*summa cum laude*), Mathematics (June 1996)

Kazan State University, Russia

PROFESSIONAL EXPERIENCE

Assistant Professor, Dept. of Mathematics, Washington State University (August 2007 – present)

Postdoctoral Fellow, Dept. of Mathematics, University of Houston (August 2005 – July 2007)

Research Assistant, Dept. of Mathematics, University of Houston (June 2003 – May 2005)

Research Assistant, AGL, Dept. of Geosciences, University of Houston (June 2002 – May 2003)

Instructor, Dept. of Mathematics, University of Houston (August 2000 – May 2002)

Teaching Assistant, Dept. of Mathematics, University of Houston (August 1999 – May 2000)

Research Assistant, Dept. of Computational Mathematics and Cybernetics, Kazan State University (August 1996 – June 1999)

RESEARCH INTERESTS

Numerical modeling of fluid flows, mathematical biology, modeling of wave propagation problems

TEACHING AREAS

Washington State University

<i>Course</i>	<i>Semester</i>	<i>Title</i>	<i># of students</i>	<i>Evaluation score</i>
MATH 545	Fall 2007	Numerical analysis of evolution equations	8	N/A
MATH 171	Spring 2008	Calculus I	138	4.35
MATH 448/548	Spring 2008	Numerical analysis	23	4.31
MATH 220	Summer 2008	Linear algebra	9	4.25
MATH 546	Fall 2008	Numerical analysis of elliptic equations	17	4.78
MATH 440/540	Spring 2009	Applied mathematics I	43	4.45
MATH 441/541	Spring 2009	Applied Mathematics II	20	3.88
MATH 273	Summer 2009	Calculus III	22	4.56
MATH 448/548	Fall 2009	Numerical analysis	33	4.7
MATH 273	Fall 2009	Calculus III	93	4.58
MATH 171	Spring 2010	Calculus I	210	4.57

<i>Course</i>	<i>Semester</i>	<i>Title</i>	<i># of students</i>	<i>Evaluation score</i>
MATH 220	Summer 2010	Linear Algebra	30	4.72
MATH 182	Fall 2010	Honors Calculus II	39	4.44
MATH 546	Fall 2010	Numerical analysis of elliptic equations	7	4.66
MATH 283	Spring 2011	Honors Calculus III	30	4.6
MATH 273	Summer 2011	Calculus III	30	4.63
MATH 182	Fall 2011	Honors Calculus II	32	4.76
MATH 283	Spring 2012	Honors Calculus III	28	4.78
MATH 202	Summer 2012	Business Calculus	39	4.8
MATH 182	Fall 2012	Honors Calculus II	33	N/A
MATH 546	Fall 2012	Numerical analysis of elliptic equations	14	N/A

Note: Evaluation score is an average over four questions scores. 5.0 is the maximum score and 1.0 is the minimum score.

Additionally, I gave guest lectures in MATH 398 class about life and work of Leonhard Euler in Spring 2008 and Spring 2009 semesters, and lectures about work of Nikolay Lobachevski in Spring 2010 and Spring 2011. I gave guest lectures in MATH 340 class on mathematical modeling of blood flow in 2008 and 2009.

University of Houston

Math 1310 – College Algebra
 Math 1330 – Elementary Functions
 Math 1431 – Calculus I
 Math 2311 – Introduction to Probability and Statistics

Kazan State University

Introduction to Computer Networks

PUBLICATIONS

Note: all publications are peer reviewed, except #25. The order of authors is alphabetical, except when the author's role is indicated

1. L.Wang, S. Lapin, J.Q. Wu, W.J. Elliot and F.R. Fiedler
 “Accuracy of Muskingum-Cunge method for constant-parameter diffusion-wave channel routing with lateral inflow”
 under review in *Journal of Hydrology, 2012*
Role: major contribution to derivation of mathematical model and numerical simulations
2. L. Wang, J.Q. Wu, W.J. Elliot, F.R. Fiedler and S. Lapin
 “Linear diffusion-wave channel routing using a discrete Hayami convolution method”
 under review in *Journal of Hydrology, 2012*
Role: contribution to numerical simulations
3. A. Khapalov and S. Lapin
 “On modeling for the dynamic granular matter formation process”
 under review in *SIAM Journal on Applied Mathematics, 2012*
4. E. Laitinen, A. Lapin and S. Lapin
 “Iterative solution methods for variational inequalities with nonlinear main operator and constraints to gradient

- of solution”
accepted in *Lobachevskii Journal of Mathematics*, 2012
5. N. Chatterjee, S. Lapin and M. Flury
“Capillary forces between sediment particles and an air-water interface”
Environmental Science and Technology, vol.46, 2012, pp. 4411-4418
Role: contribution to derivation of mathematical model
 6. E. Laitinen, A. Lapin and S. Lapin
“Iterative solution methods for constrained saddle point problems with applications to free boundary and optimal control problems”
in *Proceedings of AfriCOMP 11*, 2011
 7. E. Laitinen, A. Lapin and S. Lapin
“On the iterative solution methods for finite-dimension inclusions with applications to optimal control problems”
Computational Methods in Applied Mathematics, vol.10(3), 2010, pp.283-301
 8. M. Asle Zaeem, S. Lapin and K. I. Matveev
“The effect of vibration on flow rate of non-Newtonian fluid”
in *Proceedings of 2009 SIAM Conference Mathematics for Industry*, 2010, pp.137-142
 9. L. Wang, J. Wu, S. Lapin, F. Fiedler and W. Elliot
“Implementation of channel-routing routines in the Water Erosion Prediction Project (WEPP) model ”
in *Proceedings of 2009 SIAM Conference Mathematics for Industry*, 2010, pp.120-128
Role: major contribution to numerical simulations
 10. G. Guidoboni, R. Glowinski, N. Cavallini, S. Canic and S. Lapin
“Kinematically coupled time-splitting scheme for fluid-structure interaction in blood flow.”
Applied Mathematics Letters, vol. 22 (5), 2009, pp.684-688
Role: major contribution to numerical simulations
 11. S. Lapin, A. Lapin, J. Periaux and P.M. Jacquart
“A Lagrange multiplier based domain decomposition method for the solution of a wave problem with discontinuous coefficients”
in *Partial Differential Equations: Modelling and Numerical Methods*, Springer-Verlag, 2008, pp.131-147
Role: major contribution to derivation of mathematical model and numerical simulations
 12. N. Barlas, K. Josic, S. Lapin and I. Timofeyev
“Non-uniform decay of predictability and return of skill in stochastic oscillatory models.”
Physica D:Nonlinear Phenomena, vol. 232 (2), 2007, pp.116-127
 13. S. Canic, Z. Krajcer and S. Lapin
“Design of optimal endoprosthesis using mathematical modeling”
Endovascular Today, May 2006 (Cover Story), pp. 48-50
 14. S. Canic and S. Lapin
“Numerical modeling of the design of bifurcated prostheses used in the treatment of Abdomial Aortic Aneurysm”
Scientific Notes of Kazan State University, Vol.148 (3), 2006, pp.1-15
 15. S. Canic, K. Ravi-Chandar, Z. Krajcer, D. Mirkovic and S. Lapin
“Mathematical model analysis of Wallstent® and AneuRx®: dynamic responses of bare-metal endoprosthesis compared with those of stent-graft”
Texas Heart Institute Journal, vol.32, 2005, pp. 502-506
Role: major contribution to derivation of mathematical model and numerical simulations
 16. R. Glowinski and S. Lapin
“Solution of a wave equation by a mixed finite element-fictitious domain method”
Computational Methods in Applied Mathematics, vol. 4, 2004, pp. 431-444
 17. A. Lapin and S. Lapin
“Identification of nonlinear coefficient in a transport equation”.
Lobachevskii Journal of Mathematics, vol.14, 2004, pp. 69-84
 18. K. Baamann, C. Bergeron, T. Burden, S. Kadiouglu, H. Huang, S. Lapin, B.McGee, J. Restrepo, A.Taylor, and R. Westbrook.

- “In-situ thermal remediation of contaminated soil”
Canadian Applied Mathematics Quarterly, vol. 12, N. 1, 2004, pp. 25-37
19. R. Glowinski, A. Lapin and S. Lapin
“A penalty approach to the numerical simulation of the constrained wave motion”
Journal of Numerical Mathematics, Vol. 11, No. 4, 2003, pp. 289-300
20. R. Glowinski, S. Lapin, J. Periaux, P.M. Jacquart and H.Q. Chen
“Domain decomposition methods for wave propagation in heterogeneous media”
in *Numerical Mathematics and Advanced Applications: Proceedings of ENUMATH 2005*
Springer-Verlag, 2006, pp. 1203-1211
21. R. Glowinski and S. Lapin
“Iterative solution of linear variational problems in Hilbert spaces: some conjugate gradients success stories.”
in *Conjugate gradient algorithms and finite element methods*, Springer-Verlag, 2004, pp. 223-245
22. B. Ananthasayanam, E. Chan, P. Chen, J. Gibert, P. Gremaud, S. Lapin and A. Royal
“Effect of interstitial gas on powder flow”
CRSC Technical Report, North Carolina State University, Raleigh, March 2004, pp. 55-71
23. S. Kisin, S. Lapin and H.-W. Zhou
“Joint VSP and surface seismic tomography”
SEG Expanded Abstracts, 2003, pp. 2342-2344
24. R. Glowinski, A. Lapin and S. Lapin
“On the numerical simulation of the constrained wave motion: a penalty approach”
in *Proceedings of The Six International Conference on Mathematical and Numerical Aspects of Wave Propagation Held at Jyväskylä, Finland, 30 June - 4 July 2003*
25. S. Lapin, X. H. Nguyen, J. Oh, D. Vasiliu, P. Yin, N. Zhang and D. Misemer
“Optimal design for a varying environment”
IMA Preprint, July 2002, No.1866-5
26. S. Lapin
“The fictitious domain method for the mixed finite element approximation of the wave equation”
in *Proceedings of Russian-Finnish Workshop "Numerical Methods for Continuous Casting and Related Problems"*, Kazan, Russia, 2001, pp. 72-81
27. R. Dautov, A. Egorov and S. Lapin
“Numerical modeling of the problem of artificial freezing in filtrating soil” (In Russian)
in *Proceedings of the Conference "Function theory, its applications and related problems"*
Kazan, Russia, 1999, pp. 79-80

GRANTS

1. “Modeling Transport and Fate of Urban Stormwater Pollutants in the Vadose Zone under GSIs”. *Co-Principal Investigator*. Chicona Endowment Grant. \$6,000. January 2012 – January 2013
2. “Numerical Modeling of Wave Propagation in Heterogeneous Media”. *Principal Investigator*. WSU New Faculty Seed Grant. \$18,100. May 2009 – August 2010

CURRENT COLLABORATIVE PROJECTS

- Modeling Effect of Ocular Blood Flow on Development of Glaucoma (G. Guidoboni, Department of Mathematics, IUPUI; A. Harris, Department of Ophthalmology, Indiana University)
- Dynamics of oxygen-dependent mechanisms during collagen-cross linking in the corneal stroma (G. Guidoboni, Department of Mathematics, IUPUI; S.P. Srinivas, School of Optometry, Indiana University)
- Dynamic Granular Matter Formation Process (A. Khapalov, Department of Mathematics, WSU)
- Numerical Modeling for Channel Flow Routing (J. Wu, Department of Biological Systems Engineering, WSU)
- Colloid Transport in Soils and Sediments at the US Nuclear Hanford Reservation (M. Flury, Department of Crop and Soil Sciences, WSU)

GRADUATE STUDENTS SUPERVISED

1. Lois Kwon (MS, Spring 2009; joint with Elissa Schwartz)
– *currently Ph.D. student in Mathematics at IUPUI, Indianapolis, IN*
2. Andrew Stevens (MS, Summer 2009)
– *currently researcher at Pacific Northwest National Laboratory, Richland, WA*
3. Rochelle Dietz (MS, Fall 2011)
– *currently lecturer at Lewis-Clark State College, Lewiston, ID*
4. Lydia Miller (MS, expected May 2013)
5. Mindy Morgan (PhD, expected May 2015)

GRADUATE STUDENT COMMITTEE SERVICE

I-Ming Lee, MS committee, Department of Mathematics, 2008
Amit Sharma, MS committee, School of Materials and Mechanical Engineering, 2009
Marca Bruff, MS committee, Department of Mathematics, 2009
Greg Vogel, MS committee, Department of Mathematics, 2010
Corby Harwood, PhD committee, Department of Mathematics, 2011
Bonni Kealy, PhD committee, Department of Mathematics, 2011
Li Wang, PhD committee, Department of Biological Systems Engineering, 2012
Nirmalya Chatterjee, PhD committee, Department of Crop and Soil Science, expected 2013
Behrang Asgharian, PhD committee, School of Mechanical and Materials Engineering, expected 2013
Sharif Ibrahim, PhD committee student, Department of Mathematics, expected 2014
Jared Aurentz, PhD committee student, Department of Mathematics, expected 2015

UNDERGRADUATE STUDENTS SUPERVISED

Note: [†] – students supported by College of Sciences Minigrant, [‡] – students supported by UBM program, [‡] – student supported by NASA scholarship

1. Brain Stock[†] (Mathematical Biology, Harvey Mudd College), Summer 2008
2. Peter Klosterman[†] (Mathematics), Summer 2008
– *currently instructor at the Department of Mathematics, WSU, Pullman, WA*
3. Kelli Wuerth (Biology), Summer 2008
4. Svetlana Stadnik (Physics), Spring 2009
5. James Hensley (Mathematics), Summer 2009
– *currently software developer at Fast Enterprises LLC, Boise, ID, after finishing MS program in mathematics at Boise State University*
6. Melissa Johns[†] (Civil Engineering), Summer 2009 – Spring 2010
7. Kramer Wahlberg[†] (Bioengineering), Summer 2009 – Spring 2010
– *currently graduate student in School of Medicine, University of Washington, Seattle, WA*
8. Amelia Hancock^{*} (Mathematics), Spring 2009 – Fall 2010
– *currently analyst at The Tax Credit Company, Los Angeles, CA*
9. Daniel De Pinto[†] (Mathematics), Spring 2009 – Spring 2011
– *currently in IT support at Mercent Corporation, Seattle, WA*
10. Joseph Kristofzski (Mechanical Engineering), Spring 2010
11. Andrew Piazza (Mathematics; joint with Elissa Schwartz), Spring 2010 – Spring 2011
– *currently software developer at Google, Kirkland, WA*
12. Drea Rae Killingsworth^{*} (Geology; joint with Katherine Cooper), Spring 2010 – Spring 2011
– *currently graduate student at New Mexico Institute of Mining and Technology, Albuquerque, NM*
13. Abigail Moody[†] (MicroBiology; joint with Daniela Bermudez), Summer 2010 – Summer 2011
14. Gretchen Marx[†] (Zoology; joint with Daniela Bermudez), Summer 2010 – Summer 2011
15. Patrick Gavin[‡] (Electrical Engineering), Fall 2010 – present
16. William Bonner (Mathematics), Summer 2011 – present
17. Raeanne Marks (Mathematics), Spring 2012 – present
18. Mary Yovanoff (Mechanical Engineering, University of Idaho), Spring 2012 – present
19. Audri Sedgwick[†] (Biology, University of Idaho), Summer 2012
20. Mariah Eckwright[†] (Mathematics, University of Idaho), Summer 2012– present

SERVICE

- Undergraduate Math Club Advisor, 2008 – 2009, 2012
- PhD qualifying exam committee, Fall 2010, Fall 2012
- Undergraduate recruitment committee, 2009 – 2011
- Representing Department of Mathematics in WSU Fall preview events, 2009 – 2010
- Representing the Department of Mathematics to visit and present at high schools in the State of Washington, demonstrating how mathematics can be used to solve various engineering and science problems, in *ImagineU at WSU*, an undergraduate recruitment program
- Faculty mentor for NSF – sponsored UBM program, 2008 – present
- Mentor in WSU OISS International Scholar mentoring program, 2011– present
- Journal reviewer for
 - Applied Mathematics Modeling
 - Numerical Algorithms
 - Water Resources Research

AWARDS

- Faculty Advisor, Undergraduate Project *Numerical Modeling of Electromagnetic Wave Transport* (Patrick Gavin), *NASA Space Grant Undergraduate Scholarship*, 2011
- Mentor for Daniel De Pinto, 1st place College of Sciences Undergraduate Poster Competition, 2011
- Faculty Advisor, Undergraduate Project *Numerical Analysis of Advective Heat Transfer by Magma Bodies* (Drea Rae Killingsworth), *Undergraduate Student Research Minigrant*, 2010, College of Science, WSU
- Mentor for Amelia Hancock, 3rd place College of Sciences Undergraduate Poster Competition, 2010
- Faculty Advisor, Undergraduate Project *A One-dimensional numerical solution to Richards Equation* (Amelia Hancock), *Undergraduate Student Research Minigrant*, 2009, College of Science, WSU

CONFERENCES, PRESENTATIONS & RESEARCH VISITS

- WSU Puyallup Research Station Seminar, May 11, 2012
Talk: Mathematical Modeling in Biological and Environmental Sciences
- WSU Academic Showcase 2012
Poster: Modeling of the Dynamic Granular Matter Formation Process
- SIAM Conference on Parallel Processing for Scientific Computing, Savannah, GA, February 15 – 17, 2012
Talk: Parallel Computational Model of HIV Infection
- Co-organizer of 23rd Pacific Northwest Numerical Analysis Seminar, Washington State University, Pullman, WA, October 2, 2010
Talk: The Effect of Vibration on Flow Rate of Non-Newtonian Fluid
- SIAM Conference on Life Sciences, *Minisymposium Organizer: Mathematical Modeling in Biological and Environmental Sciences*, Pittsburgh, PA, July 12 – 15, 2010
Talk: Modeling Immune Dynamics of Equine Infectious Anemia Virus
- WSU Academic Showcase 2010
Poster: The Effect of Vibration on a Mean Flow Rate of Non-Newtonian Fluid
Poster: Simulating HIV Infection Using Matlab, C and Python
Poster: An epidemic model of H1N1 in Pullman in fall 2009
- SIAM Conference on Mathematics for Industry, San Francisco, CA, October 9 – 10, 2009
Talk: The Effect of Vibration on Flow Rate of Non-Newtonian Fluid
- WSEAS International Conference on Computational and Information Science, Houston, TX, April 30 – May 2, 2009
Talk: The Effect of Vibration on Flow Rate of Non-Newtonian Fluid
- MAA Pacific Northwest Section Conference, *Minisymposium Organizer: Mathematical Modeling in Biological and Environmental Sciences*, Ellensburg, WA, April 3 – 4, 2009
Talk: Mathematical Model of Strain Competition in Retroviruses
- WSU Academic Showcase 2009
Poster: Modeling Immune Dynamics of Equine Infectious Anemia Virus

- University of Idaho, Department of Mathematics Colloquium, March 27, 2008
Talk: Domain Decomposition Method for Wave Propagation in Heterogeneous Media
- University of Houston Downtown Colloquium, April 4, 2007
Talk: Lagrange Multiplier Based Domain Decomposition Method for Wave Propagation in Heterogeneous Media
- University of Tennessee at Chattanooga Colloquium, March 8, 2007
Talk: Lagrange Multiplier Based Domain Decomposition Method for Wave Propagation in Heterogeneous Media
- SIAM Conference on Computational Science and Engineering, Minisymposium Organizer: Computational Methods for Heterogeneous Systems, Costa Mesa, CA, February 19 – 23, 2007
Talk: Domain Decomposition Method for Wave Propagation in Heterogeneous Media
- Joint AMS-SMM International Meeting, Houston, May 13 – 15, 2004
- Workshop on Nonlinear Wave Equations, Fields Institute, University of Toronto, Toronto, March 15 – 19, 2004
- SIAM Gators Student Conference, University of Florida, Gainesville, March 3 – 4, 2004
Poster: Optimal Design of Endovascular Prostheses used in Non-surgical Treatment of Aortic Abdominal Aneurysm
- HSEMB Annual Meeting, Houston, February 12 – 13, 2004
- RedRaider Minisymposium "Mathematical and Computational Modeling of Biological Systems", Texas Tech University, Lubbock, November 5 – 8, 2003
- IPAM Inverse Problems Workshop, UCLA, Los-Angeles, September 15 – 18, 2003
- Industrial Mathematical and Statistical Modeling Workshop for Graduate Students, North Carolina State University, Raleigh, July 21 – 29, 2003
- PIMS Industrial Problem Solving Workshop, Univ. of Calgary, Calgary, May 2003
- IMA Graduate Industrial Mathematical Modeling Camp, Banff Research Station, Banff, May 2003
- IMA Workshop for Mathematical Modeling in Industry, IMA, Minneapolis, June 2002
- LACSI Symposium, Santa Fe, New Mexico, October 15 – 18, 2001
- 12-th International Summer School, Juvaskyla, Finland, August 2001

PROFESSIONAL AFFILIATIONS

- Society for Industrial and Applied Mathematics (SIAM)
- The Association of Research in Vision and Ophthalmology (ARVO)
- American Mathematical Society (AMS)

SKILLS

- Scientific computing
 - Programming languages: C/C++, Fortran, Java
 - Packages: Matlab, Maple, Mathematica, R, Latex, FreeFem++
 - Platforms: Unix/Linux, Windows
- Languages: fluent English/Russian, basic French/German/Spanish