

Alexey Solovyev

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Date and place of birth: February 14, 1985 in St. Petersburg, Russia.

Education:

- 2007–2012 *Ph.D. in Mathematics*
University of Pittsburgh, Pittsburgh, Pennsylvania.
Thesis: *Formal Computations and Methods*
<http://d-scholarship.pitt.edu/16721/>
Advisor: Prof. Thomas C. Hales
Cumulative GPA: 4.0/4.0
- 2002–2007 *B.S. in Mathematics*
Saint-Petersburg State University, St. Petersburg, Russia.
Advisor: Prof. Andrey Y. Garnaev
Cumulative GPA: 5.0/5.0

Research Experience:

- 2013–present **University of Utah**, School of Computing.
Postdoctoral Associate.
Errors and stability of floating-point computations.
Advisor: Prof. Ganesh Gopalakrishnan
- 2012–2013 **University of Pittsburgh**, Department of Mathematics.
Postdoctoral Associate.
The Flyspeck Project (a formal proof of the Kepler conjecture).
Advisor: Prof. Thomas C. Hales
- 2009–2012 **University of Pittsburgh**, Department of Mathematics.
Graduate Research Assistant.
Formal Computations and Methods. The Flyspeck Project.
Advisor: Prof. Thomas C. Hales
- May 2011–July 2011 **Microsoft Research–INRIA**, Saclay, France.
Summer Internship.
A formal proof of the Odd Order theorem.
Advisor: Dr. Georges Gonthier

- 2008–2012 **University of Pittsburgh**, Department of Mathematics and Center for Inflammation and Regenerative Modeling.
Graduate Research Assistant.
 Development of a new Agent-based Modeling framework for complex biological systems.
 Mathematical models of Traumatic Brain Injury.
 Advisors: Prof. Yoram Vodovotz, Prof. Qi Mi
- 2008–2011 **University of Pittsburgh**, Department of Mathematics.
Graduate Research Assistant.
 Combinatorial Designs: Construction and Existence.
 Advisor: Prof. Gregory M. Constantine
- 2004–2007 **Saint-Petersburg State University**, Russia, Department of Applied Mathematics and Control Processes.
Undergraduate Research Assistant.
 Investigation of N-player games of timing.
 An Investment Allocation Game.
 A Multi Stage Game of Employee Selection.
Thesis: “On an Ecology Monitoring Game.”
 Advisor: Prof. Andrey Y. Garnaev

Teaching Experience:

- Fall 2012 **University of Pittsburgh**, Department of Mathematics.
 Recitation instructor: MATH 413, Intro Theoretical Mathematics
- Summer 2009 **University of Pittsburgh**, Department of Mathematics.
 MATH 290, Ordinary Differential Equations

Scholarships and Awards:

- 2013** Thomas C. Hales Distinguished Research Award
- 2011** Andrew Mellon Predoctoral Fellowship
- 2010** IGI Global’s Fourth Annual Excellence in Research Journal Award
- 2009** The Teplitz-Culver award
- 2007** Award to the Best Graduate of Saint-Petersburg
- 2006** Scholarship of the President of Russian Federation
- 2002** Silver medal: honor award for excellent studies in a secondary school

Publications:

10. Chiang, W.; Gopalakrishnan, G.; Rakamarić, Z.; **Solovyev, A.** *Efficient Search for Inputs Causing High Floating-point Errors*, PPOPP, **2014**, to appear
9. Gonthier, G.; Asperti, A.; Avigad, J.; Bertot, Y.; Cohen, C.; Garillot, F.; Roux, S.; Mah-

- boubi, A.; O'Connor, R.; Biha, S.; Pasca, I.; Rideau, L.; **Solovyev, A.**; Tassi, E.; They, L. *A Machine-Checked Proof of the Odd Order Theorem*, LNCS, ITP 2013, **2013**, 7998, 163–179. [link](#)
8. **Solovyev, A.**; Hales, T. *Formal Verification of Nonlinear Inequalities with Taylor Interval Approximations*, LNCS, NFM 2013, **2013**, 7871, 383–397. [link](#)
 7. **Solovyev, A.**; Mi, Q.; Tzen, Y.; Brienza, D.; Vodovotz, Y. *Hybrid Equation/Agent-Based Model of Ischemia-induced Hyperemia and Pressure Ulcer Formation Predicts Greater Propensity to Ulcerate in Subjects with Spinal Cord Injury*, PLoS Comput Biol, **2013**, 9(5): e1003070 [link](#)
 6. **Solovyev, A.**; Hales, T. *Efficient formal verification of bounds of linear programs*, LNCS, CICM 2011, **2011**, 6824, 123–132. [link](#)
 5. Mi, Q.; Constantine, G.; Ziraldo, C.; **Solovyev, A.**; Torres, A.; Namas, R.; Bentley, T.; Billiar, T.R.; Zamora, R.; Puyana, J.C.; Vodovotz, Y. *A dynamic view of trauma/hemorrhage-induced inflammation in mice: Principal drivers and networks*, PLoS ONE, **2011**, 6(5): e19424 [link](#)
 4. **Solovyev, A.**; Mikheev, M.; Zhou, L.; Dutta-Moscato, J.; Ziraldo, C.; An, G.; Vodovotz, Y.; Mi, Q. *SPARK: A Framework for Multi-Scale Agent-based Biomedical Modeling*, International Journal of Agent Technologies and Systems, **2010**, 2, 18–30. [link](#)
 3. Mikheev, M.; **Solovyev, A.**; Maltsev, A.; Bartels, J.; Chang, S.; Mi, Q.; Vodovotz, Y. *A parallel implementation of an agent-based modeling platform with application in modeling calcium releases in cardiomyocytes*, Journal of Critical Care, **2009**, 24, N 3, e21 [link](#)
 2. Garnaev, A.; **Solovyev, A.** *An Investment Allocation Game with a Cost*, Int. J. Math. Game Theory and Algebra, **2006**, 15, Issue 2, 221–229.
 1. Garnaev, A.; **Solovyev, A.** *On a Two Department Multi-Stage Game (in Russian)*, Vestnik St. Petersburg University, Seria 10, Applied Mathematics, **2005**, N 3-4, 3–12.

Presentations:

9. **Solovyev, A.**; Hales, T. *Formal Verification of Nonlinear Inequalities with Taylor Interval Approximations*, NFM, NASA Ames Research Center Moffett Field, CA, USA, 14–16 May, **2013**
8. **Solovyev, A.**; Hales, T. *Efficient formal verification of bounds of linear programs*, CICM, Bertinoro, Italy, 18–23 July, **2011**
7. **Solovyev, A.** *A Formal Proof of the Kepler Conjecture: the Flyspeck Project*, TypiCal seminar, École Polytechnique, France, 24 May, **2011**
6. **Solovyev, A.**; Mikheev, M.; Zhou, L.; Dutta-Moscato, J.; Ziraldo, C.; An, G.; Vodovotz, Y.; Mi, Q. *SPARK: A Framework for Multi-scale Agent-based Biomedical Modeling*, ADS Symposium 2010, Orlando, Florida, USA, 12–14 April, **2010**
5. Mi, Q.; Constantine, G.; **Solovyev, A.**; Susick, E.; Okonkwo, D.; Vodovotz, Y. *Patient-Specific Mathematical Models of Traumatic Brain Injury*, ICCAI 2009, Stanford University, Palo Alto, California, USA, 28–30 August, **2009**

4. Garnaev, A.; **Solovyev, A.** *On an Ecology Monitoring Game*, Control Processes and Stability, SPbSU, St. Petersburg, Russia, **2006**
3. Garnaev, A.; Galegov, A.; **Solovyev, A.** *An Investment Allocation Game*, The International Conference in Memory of V.I. Zubov “Stability and Control Processes”, SPbSU, St. Petersburg, Russia, *29 June–1 July*, **2005**
2. Garnaev, A.; **Solovyev, A.** *On A Two Department Multi-Stage Game*, The International Workshop “Optimal Stopping and Stochastic Control”, Petrozavodsk, Russia, *August 22-26*, **2005**
1. Garnaev, A.; **Solovyev, A.** *A Multi-Stage Game of Employee Selection*, Control Processes and Stability, SPbSU, St. Petersburg, Russia, **2005**

Software

SPARK	A cross-platform free software for multi-scale Agent-based modeling Authors: Alexey Solovyev, Qi Mi, Maxim Mikheev http://www.pitt.edu/~cirm/spark/
SPARK-PL	A programming language for rapid development of Agent-based models in SPARK Author: Alexey Solovyev http://code.google.com/p/spark-abm/
Flyspeck	A formal proof of the Kepler conjecture Author: Thomas Hales http://code.google.com/p/flyspeck/
SSReflect/HOL Light	An implementation of the SSReflect proof language in HOL Light Author: Alexey Solovyev http://code.google.com/p/flyspeck/downloads/list
Formal Verification of Nonlinear Inequalities	A tool for formal verification of multivariate nonlinear inequalities in HOL Light Author: Alexey Solovyev http://code.google.com/p/flyspeck/downloads/list
Guided Random Testing for Floating-point Error Estimation	A tool for detecting high floating-point errors Author: Wei-Fan Chiang https://sites.google.com/site/grt4fperror/