Alëna Rodionova

School of Engineering and Applied Science, Electrical & Systems Engineering Department
University of Pennsylvania, Philadelphia, PA, USA 19104
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EDUCATION

Ph.D. in Electrical and Systems Engineering August 2017 – present
University of Pennsylvania, *Philadelphia, PA, USA*
Advisor: Prof. Rahul Mangharam
Co-advisor: Dr. Houssam Abbas

M.S. in Applied Mathematics and Informatics (with honors) September 2012 – June 2014
Siberian Federal University, *Russia*
Thesis: "Stability of Two-Layer Fluid Flows"
Advisor: Asst. Prof. Bekezhanova V. B.

B.S. in Mathematics (with honors) September 2008 – June 2012
Siberian Federal University, *Russia*
Thesis: "Solving Constrained Optimization Problems by using Genetic Algorithm"
Advisor: Asst. Prof. Panfilov I. A.

RESEARCH INTERESTS

Autonomous Systems, Cyber-Physical Systems, Control and Verification theory, Formally Constrained Machine Learning.

PROFESSIONAL EXPERIENCE

Research and Development Intern June 2018 – August 2018
General Motors, *Warren, MI*
GM Global Technical Center
ECS Process, Methods and Tools Group
Project: Correctness Preserving Optimization of Deep Neural Networks

Research Assistant February 2015 – November 2017
Vienna University of Technology, *Vienna, Austria*
Institute of Computer Engineering
Cyber-Physical Systems Group
Project: A Specification Language for Emergent Properties

Project Assistant June 2013 – February 2015
Russian Academy of Sciences, Siberian Branch, *Russia*
Institute of Computational Modeling
Projects: Convection Motions with Interfaces and Their Stability
The Study of Nonlinear Heat and Mass Transfer Regimes and Their Stability in Binary Mixtures

HONORS AND AWARDS

Fellowship Award from University of Pennsylvania May 2017
Awarded to PhD students in recognition of exceptional performance

Best Student Paper Award April 2016
19th ACM International Conference on Hybrid Systems: Computation and Control (HSCC 2016)
CPS Week 2016, *Austria*

Best Paper Presentation Award April 2014
10th All-Russian Scientific Students Conference "Youth and Science", *Russia*

Vladimir Potanin Foundation Scholarship Contest February 2011, 2012
Awarded to top Bachelor and Master students nation-wide, *Russia*

PATENTS

1. Correctness Preserving Optimization of Deep Neural Networks
   Prakash Mohan Peranandam, Ramesh Sethu and Alena Rodionova
   P047327-US-NP

PUBLICATIONS (JOURNALS)

1. H. Abbas, **A. Rodionova**, K. Mamouras, E. Bartocci, S. A. Smolka and R. Grosu
   "Quantitative Regular Expressions for Arrhythmia Detection Algorithms"
   IEEE/ACM Transactions on Computational Biology and Bioinformatics, ISSN 1545-5963, 2018.
2. H. Abbas, R. Alur, K. Mamouras, R. Mangharam and **A. Rodionova**
   "Real-time Decision Policies with Predictable Performance"
   Proceedings of the IEEE, ISSN 0018-9219, Vol. 106, Issue 9, pp. 1593–1615, 2018.
3. **A. Rodionova**, E. Rezanova
   "Stability of Two-Layer Fluid Flow"
   Journal of Applied Mechanics and Technical Physics, ISSN: 0021-8944, Vol. 57, No. 4, pp. 588–595, 2016.
4. V. Bekezhanova, **A. Rodionova**
   "Longwave Stability of Two-Layer Fluid Flow in the Inclined Plane"
   Fluid Dynamics, ISSN 0015-4628, Vol. 50, No. 6, pp. 723–736, 2015.

PUBLICATIONS (CONFERENCES AND WORKSHOPS)

5. H. Abbas, M. O'Kelly, **A. Rodionova** and R. Mangharam
   "Safe At Any Speed: A Simulation-Based Test Harness for Autonomous Vehicles"
   7th Workshop on Design, Modeling and Evaluation of Cyber Physical Systems (CyPhy17), Post-proceedings.
6. H. Abbas, **A. Rodionova**, E. Bartocci, S. A. Smolka and R. Grosu
   "Quantitative Regular Expressions for Arrhythmia Detection Algorithms"
   15th international conference on Computational Methods in Systems Biology, CMSB2017, Darmstadt, Germany, September 27-29, 2017, Proceedings.
7. **A. Rodionova**, M. O'Kelly, H. Abbas, V. Pacelli and R. Mangharam
   "An Autonomous Vehicle Control Stack"
   4th International Workshop on Applied Verification of Continuous and Hybrid Systems, ARCH17, Pittsburgh, PA, April 2017.

8. **A. Rodionova**, E. Bartocci, D. Nickovic and R. Grosu
"Temporal Logic as Filtering"
19th ACM International Conference on Hybrid Systems: Computation and Control, HSCC 2016, Vienna, Austria, April 12-14, 2016, Proceedings. **Best Student Paper Award**.

9. **A. Rodionova**, V. Bekezhanova,
"Stability of Two-Layer Fluid Flow with Long-Wave Perturbations"
15th All-Russian Young Scientists Conference on Mathematical Modelling and Information Technologies, Russia, October 2014, Proceedings.

10. **A. Rodionova**, V. Bekezhanova,
"Stability of Two-Layer Fluid Flow with Evaporation Effect and Long-Wave Perturbations"
10th All-Russian Scientific Students Conference "Youth and Science", Russia, April 2014, Proceedings. **Best Paper Presentation Award**.

11. V. Bekezhanova, **A. Rodionova**
"Microscale Static Two-Layer Fluid Flow in the Inclined Plane"
9th All-Russian Scientific Students Conference "Youth and Science", Russia, April 2013, Proceedings.

12. I. Panfilov, **A. Rodionova**
"Static and Dynamic Penalty Functions for Constrained Optimization in Genetic Algorithms"
8th All-Russian Scientific Students Conference "Youth and Science", Russia, April 2012, Proceedings.

13. S. Senashov, **A. Rodionova**, I. Shefer
"New Contact Transformations"
14th International Scientific Conference "Reshetnev's Readings", Russia, November 2010, Proceedings.

PUBLICATIONS (BOOK CHAPTERS)

14. **A. Rodionova**, E. Bartocci, D. Nickovic and R. Grosu
"Temporal Logic as Filtering"
NATO Science for Peace and Security Series - Information and Communication Security, Dependable Software Systems Engineering, Vol. 50, pp. 164-185, 2017.

PUBLICATIONS (MAGAZINE ARTICLES)

15. H. Abbas, M. O'Kelly, **A. Rodionova** and R. Mangharam
"A Driver's License Test for Driverless Vehicles"
ASME Dynamic Systems and Control Magazine, December 2017.

SELECTED TALKS AND PRESENTATIONS

EECS Rising Stars Workshop, Poster presentation October 2018
Foundations of Safe Autonomy: On-Board Verification and Formally-Constrained Machine Learning
Massachusetts Institute of Technology, Cambridge, MA

CyberCardia (NSF Frontiers) PI Meeting April 2018
Quantitative Regular Expressions for Arrhythmia Detection Algorithms
Georgia Institute of Technology, Atlanta, GA

CyberCardia (NSF Frontiers) PI Meeting April 2016
Cardiac Arrhythmias Analysis: VT/SVT Discrimination Algorithm
Stony Brook University, Stony Brook, NY

ARVI Meeting December 2015
Temporal Logic as Filtering
Estonian Academy of Science, Tallinn, Estonia

CyberCardia (NSF Frontiers) PI Meeting September 2015
On Temporal Logic and Signal Processing
NSF Stafford Place, Arlington, VA

Institute of Computational Modeling, Research Seminar September 2014
Stability of Two-Layer Fluid Flow with Evaporation Effect
Krasnoyarsk, Russia

Kyrgyz State Technical University, Invited talk April 2014
Enumerative Combinatorics
Bishkek, Kyrgyzstan

TEACHING EXPERIENCE

Teacher of Mathematics September 2013 – July 2014
Krasnoyarsk Educational Institution Lyceum 6, *Russia*

Teacher in Extracurricular Activities February 2013 – May 2013
Krasnoyarsk Preschool 3, *Russia*

Teaching Assistant August 2010, 2011
Krasnoyarsk Summer School
Siberian Federal University, *Russia*

PROFESSIONAL SERVICE

Journal Reviewer

- Chaos: An Interdisciplinary Journal of Nonlinear Science, 2018
- International Journal of Formal Methods in System Design (FMSD), 2017
- International Journal on Software Tools for Technology Transfer (STTT), 2017

Conference Reviewer

- International Conference on Embedded Software (EMSOFT), 2018
- International Conference on Cyber-Physical Systems (ICCPS), 2018
- International SPIN Symposium on Model Checking of Software (SPIN), 2017
- International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), 2016
- International Conference on Runtime Verification (RV), 2016
- International Symposium on Automated Technology for Verification and Analysis (ATVA), 2016
- International Workshop on Hybrid Systems Biology, (HSB), 2016
- International Conference on Formal Modeling and Analysis of Timed Systems (FORMATS), 2015
- International Conference on Computational Methods in Systems Biology (CMSB), 2015

LANGUAGES SKILLS

English: proficient
Russian: native
German: basic