

- Senior Software Developer at Waabi Innovation (US), Inc.
- Ph.D. with expertise in motion planning & control, temporal logics and formal methods.

## Education

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|------------|--|-----------------|
| 2017– 2022 | Ph.D. in Electrical and Systems Engineering,<br>University of Pennsylvania (UPenn), Philadelphia, PA | GPA: 3.89/4     |
| 2012-2014  | Master in Applied Mathematics and Informatics,<br>Siberian Federal University (SibFU), Russia        | Magna cum laude |
| 2008-2012  | Bachelor of Mathematics,<br>Siberian Federal University (SibFU), Russia                              | Magna cum laude |

## Work Experience

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|-------------------|---|
| 2023-present      | Waabi Innovation (US), Inc.<br>Senior Software Developer I <ul style="list-style-type: none"><li>○ Motion Planning team</li></ul>   |
| June–Sept<br>2019 | Intel Labs, Autonomous Driving Research, Hillsboro, OR<br>Graduate Technical Intern   |
| June–Sept<br>2018 | General Motors (GM), ECS Process, Methods and Tools Group, Warren, MI<br>Research and Development Intern                            |
| 2015-2017         | Vienna University of Technology (TU Wien), Institute of Computer Engineering, Austria<br>Researcher at Cyber-Physical Systems Group |

## Patents

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|----|---|
| P2 | Method and device for determining a configuration for an autonomous vehicle.<br>A. Rodionova, I. Alvarez.<br>Patent Application 16/726,276, US2020130709A1 (12/24/2019). <a href="#">[pdf]</a>  |
| P1 | Correctness preserving optimization of Deep Neural Networks.<br>P. M. Peranandam, R. Sethu, A. Rodionova.<br>Patent Application 16/227,195, US2020202214A1, (12/20/2018). <a href="#">[pdf]</a> |

## Honors and Awards

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|------------|--|
| 2022       | <b>Charles Hallac and Sarah Keil Wolf Award</b> for Best Doctoral Dissertation in ESE.   |
| 2022       | <b>Best Paper Finalist</b> at the 25th ACM International Conference on Hybrid Systems: Computation and Control (HSCC).                             |
| 2021       | <b>Best Student Paper Award</b> at the 60th IEEE Conference on Decision and Control (CDC).   |
| 2020       | <b>Best of Session Award</b> at the 39th IEEE/AIAA Digital Avionics Systems Conference (DASC).   |
| 2019       | Travel Grant by CRA-W Grad Cohort Workshop.  |
| 2018       | <b>MIT EECS Rising Star Award</b> , awarded annually to outstanding early-career women in electrical engineering and computer science (EECS), MIT. |
| 2017       | The Dean's Fellowship Award from University of Pennsylvania (UPenn), awarded to PhD students in recognition of exceptional performance.            |
| 2016       | <b>Best Student Paper Award</b> at the 19th ACM International Conference on Hybrid Systems: Computation and Control (HSCC).                        |
| 2015       | Career Grant by The Federal Ministry for Transport, Innovation and Technology (BMVIT), Austria.  |
| 2014       | <b>Best Presentation Award</b> at the 10th National Scientific Students Conference "Youth & Science".  |
| 2014       | Master's Degree with Distinction, SubFU Russia.  |
| 2012       | Bachelor's Degree with Distinction, SubFU Russia.  |
| 2011, 2012 | Scholarship by Vladimir Potanin Foundation, awarded annually to top Bachelor and Master students nation-wide, Russia.                              |

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## Teaching

- Fall 2020 Linear Systems Theory, ESE500 UPenn  
Teaching Assistant with George J. Pappas
- Spring 2020 Machine Learning, CIS520 UPenn  
Teaching Assistant with Shivani Agarwal
- Spring 2018 Model-Based Embedded Systems, ESE680 UPenn  
Guest Lecturer for “Parametric Timed Automata” and “Quantitative Semantics of TL”
- Sept 2012 - Mathematics, School of Physics and Mathematics, SibFU, Russia  
Feb 2015 High School Teacher

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## Developed Software

### Safe and Robust Control

- S6 Time-robust control using Mixed-Integer Linear Programming (MILP). [\[code\]](#), [\[C14\]](#)
- S5 Robustness-guided testing: automatic safety constraints boundary estimation for decision-making in automated vehicles. [\[code\]](#), [\[C12\]](#)
- S4 FADS: Framework for Autonomous Drone Safety. [\[code\]](#), [\[J5\]](#)

### Machine Learning

- S3 Learning-to-Fly: learning-based collision avoidance for scalable urban air mobility. [\[J6\]](#), [\[C11\]](#)
- S2 Neprune: DNN pruning framework. [\[P1\]](#)
- S1 DNN classification algorithms for cardiac arrhythmias discrimination. [\[code\]](#)

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## Publications [\[ Google Scholar Citations: 225, h-index: 9, i10-index: 9 as of June 24, 2023 \]](#)

### Journals

- J8 A. Rodionova, L. Lindemann, M. Morari, G. J. Pappas. Combined Left and Right Temporal Robustness for Control under STL Specifications. IEEE Control Systems Letters (L-CSS), 2022. [\[pdf\]](#)
- J7 A. Rodionova, L. Lindemann, M. Morari, G. J. Pappas. Temporal Robustness of Temporal Logic Specifications: Analysis and Control Design. ACM Transactions on Embedded Computing Systems (TECS), 2022. [\[pdf\]](#)
- J6 A. Rodionova, Y. V. Pant, C. Kurtz, K. J. Jang, H. Abbas, R. Mangharam. Learning-'N'-Flying: A Learning-based, Decentralized Mission Aware UAS Collision Avoidance Scheme. ACM Transactions on Cyber-Physical Systems, 2021. [\[pdf\]](#)
- J5 Y. V. Pant, M. Z. Li, A. Rodionova, R. A. Quaye, H. Abbas, M. S. Ryerson, R. Mangharam. FADS: A Framework for Autonomous Drone Safety Using Temporal Logic-Based Trajectory Planning. Transportation Research Part C: Emerging Technologies, 2021. [\[pdf\]](#)
- J4 H. Abbas, A. Rodionova, K. Mamouras, E. Bartocci, S. A. Smolka, R. Grosu. Quantitative regular expressions for arrhythmia detection. IEEE/ACM transactions on computational biology and bioinformatics, 2018. [\[pdf\]](#)
- J3 H. Abbas, R. Alur, K. Mamouras, R. Mangharam, A. Rodionova. Real-time decision policies with predictable performance. Proceedings of the IEEE, 2018. [\[pdf\]](#)
- J2 A. Rodionova, E. Rezanova. Stability of two-layer fluid flow. Journal of Applied Mechanics and Technical Physics, 2016. [\[pdf\]](#)
- J1 V. Bekezhanova, A. Rodionova. Longwave stability of two-layer fluid flow in the inclined plane. Fluid Dynamics, 2015. [\[pdf\]](#)

### Conferences and Workshops

- C15 L. Lindemann\*, A. Rodionova\*, G. J. Pappas. Temporal Robustness of Stochastic Signals. The 25th ACM International Conference on Hybrid Systems: Computation and Control (HSCC), 2022. [\[pdf\]](#) – **Finalist for Best Paper Award**

- C14 A. Rodionova, L. Lindemann, M. Morari, G. J. Pappas. Time-Robust Control for STL Specifications. IEEE Conference on Decision and Control (CDC), 2021. [\[pdf\]](#) – **Best Student Paper Award**
- C13 K. Jang, Y. V. Pant, A. Rodionova, R. Mangharam. Learning-to-Fly RL: Reinforcement Learning-based Collision Avoidance for Scalable Urban Air Mobility. The 39th IEEE/AIAA Digital Avionics Systems Conference (DASC), 2020. [\[pdf\]](#) – **Best of Session Award**
- C12 A. Rodionova, I. Alvarez, M. S. Elli, F. Oboril, J. Quast, R. Mangharam. How safe is safe enough? Automatic safety constraints boundary estimation for decision-making in automated vehicles. IEEE Intelligent Vehicles Symposium, 2020. [\[pdf\]](#)
- C11 A. Rodionova\*, Y. V. Pant\*, K. J. Jang, H. Abbas, R. Quaye, R. Mangharam. Learning-to-Fly: learning-based collision avoidance for scalable urban air mobility. IEEE International Conference on Intelligent Transportation Systems, 2020. [\[pdf\]](#)
- C10 H. Abbas, K. Mamouras, A. Rodionova, R. Alur, J. Liang, S. Dixit, R. Mangharam. A novel programming language to reduce energy consumption by arrhythmia monitoring algorithms in implantable cardioverter-defibrillators. The 39th Heart Rhythm Scientific Sessions, 2018. [\[pdf\]](#)
- C9 A. Rodionova, M. E. O’Kelly, H. Abbas, V. Pacelli, R. Mangharam. An Autonomous Vehicle Control Stack. The 4th International Workshop on Applied Verification of Continuous and Hybrid Systems (ARCH), 2017. [\[pdf\]](#)
- C8 H. Abbas, M. E. O’Kelly, A. Rodionova, R. Mangharam. Safe at any speed: A simulation-based test harness for autonomous vehicles. International Workshop on Design, Modeling, and Evaluation of Cyber Physical Systems (CyPhy), 2017. [\[pdf\]](#)
- C7 H. Abbas, A. Rodionova, E. Bartocci, S. A. Smolka. Quantitative regular expressions for arrhythmia detection algorithms. International Conference on Computational Methods in Systems Biology, 2017. [\[pdf\]](#)
- C6 A. Rodionova, E. Bartocci, D. Nickovic, R. Grosu. Temporal logic as filtering. The 19th International Conference on Hybrid Systems: Computation and Control, 2016. [\[pdf\]](#) – **Best Student Paper Award**
- C5 A. Rodionova, V. Bekezhanova. Longwave stability of two-layer fluid flow in the inclined plane. The 15th National Young Scientists Conference on Mathematical Modeling and Information Technologies, 2014. [\[pdf\]](#)
- C4 A. Rodionova, V. Bekezhanova. Stability of two-layer fluid flow with evaporation effect and long-wave perturbations. The 10th National Scientific Conference of Students and Young Scientists: Youth & Science, 2014. [\[pdf\]](#) – **Best Presentation Award**
- C3 A. Rodionova, V. Bekezhanova. Microscale static two-layer fluid flow in the inclined plane. 9th National Scientific Conference of Students and Young Scientists: Youth & Science, 2013. [\[pdf\]](#)
- C2 A. Rodionova, I. Panfilov. Static and dynamic penalty functions for constrained optimization in genetic algorithms. 8th National Scientific Conference of Students and Young Scientists: Youth & Science, 2012. [\[pdf\]](#)
- C1 S. Senashov, A. Rodionova, I. Shefer. New contact transformations. 14th International Scientific Conference Reshetnev Readings, 2010. [\[pdf\]](#)

### Book Chapters

- B1 A. Rodionova, E. Bartocci, D. Nickovic, R. Grosu. Temporal logic as filtering. Dependable Software Systems Engineering, NATO Science for Peace and Security Series - D: Information and Communication Security, 2017. [\[pdf\]](#)

### Magazine Articles

- M1 H. Abbas, M. E. O’Kelly, A. Rodionova, R. Mangharam. A driver’s license test for driverless vehicles. Mechanical Engineering Magazine (ASME), 2017. [\[pdf\]](#)

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## Invited Talks

- 04/2022 U. Waterloo Invited Lecture – Temporal Robustness of Temporal Logic Specifications: Analysis and Control. Waterloo, Canada. Virtual.
- 01/2022 UPenn PGM Research Seminar – Time Robustness of Temporal Logic Specifications: Analysis and Control. Philadelphia, PA.
- 04/2021 UPenn PGM Research Seminar – Robust Planning for STL Specifications. Philadelphia, PA.
- 09/2020 Grace Hopper Celebration – Verifying Safety Laws for Automated Vehicles. Orlando, FL. Virtual.
- 09/2020 UPenn PGM Research Seminar – Learning-to-Fly: Learning-based Collision Avoidance for Scalable Urban Mobility. Philadelphia, PA.

- 11/2019 Intel Autonomous Driving Community Of Practice 2019: RSS Workshop – Robustness-Guided Testing of RSS Rules. Intel Labs, Hillsboro, OR.
- 10/2019 Intel Science and Technology Center (WAS-ISTC) Monthly Seminar – Test harness for guided search of unsafe driving instances. Virtual.
- 10/2019 PRECISE Industry Day – Verifying Robot Safety Laws for Autonomous Vehicles. University of Pennsylvania (UPenn), Philadelphia, PA.
- 10/2018 EECS Rising Stars – Foundations of Safe Autonomy: On-Board Verification and Formally-Constrained Machine Learning. Massachusetts Institute of Technology (MIT), Cambridge, MA.
- 04/2018 CyberCardia (NSF Frontiers) PI Meeting – Quantitative Regular Expressions for Arrhythmia Detection Algorithms. Georgia Institute of Technology (Georgia Tech), Atlanta, GA.
- 04/2016 CyberCardia (NSF Frontiers) PI Meeting – Cardiac Arrhythmias Analysis: VT/SVT Discrimination Algorithm. Stony Brook University (SBU), Stony Brook, NY.
- 12/2015 ARVI Meeting – Temporal Logic as Filtering. Estonian Academy of Science, Tallinn, Estonia.
- 09/2015 CyberCardia (NSF Frontiers) PI Meeting – On Temporal Logic and Signal Processing. NSF Stafford Place, Arlington, VA.

## Professional Services

Reviewer Journal Reviewer

Automatica: A journal of the international federation of automatic control (IFAC), 2022  
 Chaos: An Interdisciplinary Journal of Nonlinear Science, 2018  
 Journal of Formal Methods in System Design (FMSD), 2017  
 Journal on Software Tools for Technology Transfer (STTT), 2017

Conference Reviewer

Conference on Decision and Control (CDC), 2022  
 Conference on Cyber-Physical Systems (ICCPS), 2022, 2020, 2018  
 Intelligent Vehicles Symposium (IV), 2022, 2021  
 Workshop on Autonomous Systems Design (ASD), 2020  
 Conference on Embedded Software (EMSOFT), 2019, 2018  
 Symposium on Model Checking of Software (SPIN), 2017  
 Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), 2016  
 Conference on Runtime Verification (RV), 2016  
 Symposium on Automated Technology for Verification and Analysis (ATVA), 2016  
 Workshop on Hybrid Systems Biology, (HSB), 2016  
 Conference on Formal Modeling and Analysis of Timed Systems (FORMATS), 2015  
 Conference on Computational Methods in Systems Biology (CMSB), 2015

Conference Organization ACM Conference on Hybrid Systems: Computation and Control (HSCC), 2016.

## Technical Skills

Programming Python, MATLAB, C++  
 Optimization Gurobi, S-TaLiRo CPLEX, CVX, CVXPY, YALMIP, CasADi, Simulink  
 Miscellaneous CARLA Simulator, RSS, UPPAAL  
 ML TensorFlow, Keras, DeepXplore

## Language Skills

English Proficient  
 Russian Native  
 German Basic