Anna Lukina

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My primary research interests are in artificial intelligence, focusing on combination of formal methods and machine learning for reliable and explainable autonomous systems.

EMPLOYMENT

Since September 2021	**Tenured Assistant Professor in Computer Science** *Algorithmics Group: Design and analysis of planning and coordination algorithms for intelligent decision making in real world applications* *Delft University of Technology, The Netherlands*
March 2019 to August 2021	**Postdoctoral Researcher** *Henzinger Group: Design and Analysis of Concurrent and Embedded Systems* *Institute of Science and Technology (IST) Austria, Klosterneuburg, Austria* Designed new techniques for improving reliability of learned systems via combination of the state-of-the-art machine learning and formal methods.
June 2015 to February 2019	**Project Assistant** *Cyber-Physical Systems Group, Institute of Computer Engineering* *Technische Universität Wien, Vienna, Austria*
November 2013 to May 2015	**Leading Economist** *Finance Department, Management Information System* *Sberbank of Russia (Sber), Moscow* Modernized and maintained regular analytical reporting for top management.
July 2011 to October 2013	**Senior Officer** *Market Risk Unit, Unicredit Bank Russia, Moscow* Performed limit control, liquidity and interest rate risks stress testing.

EDUCATION

June 2015 to June 2019	**PhD in Computer Science** Supervisor: Prof. Radu Grosu **"mit Auszeichnung bestanden" (degree with distinction)** *Faculty of Informatics, Technische Universität Wien, Vienna, Austria* Thesis with Doctoral Program "Logical Methods in Computer Science": "Adaptive Optimization Framework for Verification and Control of Cyber-Physical Systems."
September 2009 to July 2011	**MA in Economics** *New Economic School, Moscow, Russia* Thesis "Clash of Cultures and Post-Merger Integration." Supervisor: Prof. Andrey Bremzen.
September 2004 to June 2009	**MSc in Applied Mathematics and Informatics** *Faculty of Computational Mathematics and Cybernetics* *Lomonosov Moscow State University, Russia* **GPA 4.87/5.0 (degree with distinction)** Department of Systems Analysis. Supervisor: Prof. Sergey N. Smirnov Thesis "Derivatives Portfolio Optimization with Respect to Active Orders."

AWARDS

August 2023	**NWO VENI Science Domain**
	Personal grant in science domain from the Dutch Research Council
	Explainable Monitoring (2024–2027)
November 2022	**DEWIS Award**
	Annual award from Delft Women in Science
	For increasing gender diversity, equity and inclusion at the EEMCS department of TU Delft, in particular, through spearheading the Future Female+ Faculty program.
April 2021	**Delft Technology Fellowship**
	Academic Career Track positions to outstanding female academic researchers in research themes in which the faculties of TU Delft want to be strengthened
	Additional funding for research development during tenure track.
January 2020	**Simons-Berkeley Research Fellowship**
	The Simons Institute for the Theory of Computing
	Funding to participate in Spring 2021 Program on "Theoretical Foundations of Computer Science."

ACADEMIC SERVICE

- PC Member: AAAI-24, VMCAI-24, TACAS-24, RV-23, iFM-23, AAAI-23, AAMAS-23, CONCUR-23, SPIN-23, RV-22, NSV-22, CAV-22, SAC-22, AAAI-22, VMCAI-22, AAAI-21, SAC-21, IJCAI-PRICAI-20, AAAI-20.
- Award committee member: VCLA International Student Award 2020, 2021.

SKILLS

| **Languages:** | Russian (Native), English (Fluent), German (C1), Italian (B1), Dutch (B1), French (A2) |
| **Programming:** | Python, Matlab, LaTex, VBA, SQL, C. GitHub |

SCIENCE COMMUNICATION

June 2021	**Zoom a Scientist: Introducing primary school students to robots and machine learning.** Volunteer from IST Austria.
December 2020	**"Picture a Scientist"** Moderating discussion on equity in science.
January 2019	**3D Projection Mapping "Steps of Logic", Vienna Ball of Sciences, Austria** Science communication through art installation.
October 2018	**Beginners' Trail 2018, TU Wien, Vienna, Austria** Represented Cyber-Physical Systems Team consulting first-year bachelor students on the ongoing research activities.
September 2019	**Cologne Summer School of Interdisciplinary Anthropology (CSIA) IV: "Beyond Humanism: Cyborgs – Animals – Data Swarms", University of Cologne, Germany.** Invited talk "Flocking-Inspired Algorithms."

EVENT ORGANIZATION

July 2023	**3rd WOLVERINE** (Workshop on Open Problems in Learning and Verification of Neural Networks) during CAV 2023, Paris, France. Organizing team.
November 2022	**F+Cube Week 2022** at TU Delft, The Netherlands. Head organizer. The Future Female+ Faculty mentorship program connects junior self-identified female computer scientists all over the world with senior faculty at TU Delft.
August 2022	**2nd WOLVERINE** (Workshop on Open Problems in Learning and Verification of Neural Networks) during FLoC 2022, Haifa, Israel. Organizing team.
August 2022	**The 31th IJCAI-ECAI 2022**, Vienna, Austria. Local Diversity & Inclusion Chair.
October 2021	**WOLVERINE** (Workshop on Open Problems in Learning and Verification of Neural Networks) at ATVA 2021, Gold Coast, Australia, held virtually. Organizing team.
August 2021	**Borderless: Diversity of Academic and Industrial Careers across Continents at IJCAI 2021**, Montreal, Canada, held virtually. Organizer and moderator.

September 2018	**SEMANTiCS Conference 2018**, Vienna, Austria A member of the volunteering team.
October 2017	**31st International Symposium on Distributed Computing**, Vienna, Austria A member of the volunteering team.
September 2017	**Alpine Verification Meeting/RiSE Workshop 2017**, Budapest, Hungary Head of the organizing committee. Formal and probabilistic verification, games, synthesis, and decision procedures.
September 2016	**RiSE Workshop 2016**, Pöllauberg, Austria Head of the organizing committee. Formal and probabilistic verification, games, synthesis, and decision procedures.
April 2016	**CPSWeek 2016**, Vienna, Austria A member of the organizing committee.

RESEARCH VISITS

May 2022	**Univ.-Prof. Mag.art Manuela Naveau PhD, Interface Cultures at The University of Art and Design Linz, and Nicolas Naveau, FUTURELAB at Ars Electronica, Linz, Austria.** Designed an art installation on monitoring artificial intelligence.
April 2022	**Prof. Kim Larsen and Dr. Christian Schilling, research group on Distributed, Embedded and Intelligent Systems (DEIS), Department of Computer Science, Aalborg University, Denmark.** Kicked off collaboration on safe reinforcement learning.
January–May, 2021	**Simons-Berkeley Research Fellowship 2020** for Spring 2021 Program on "Theoretical Foundations of Computer Science" with the agenda of tackling the challenge of scalability of formal methods for modern technologies.
February–March, 2019; April, 2020	**Prof. James Bailey, School of Computing and Information Systems, University of Melbourne, Melbourne, Australia.** Explored combination of machine learning and combinatorial methods for safe controller design.
February–May, 2018	**Prof. Fuyuki Ishikawa and Prof. Ichiro Hasuo, ERATO MMSD, National Institute of Informatics, Tokyo, Japan.** Formalized and implemented an optimization-based control for coverage missions performed by a drone team.
September–December, 2017	**Prof. Joost-Pieter Katoen, MOVES Group, RWTH Aachen University, Aachen, Germany.** Explored statistical approaches to parameter synthesis for model repair.
May–July, 2017	**Prof. George Pappas, GRASP Lab, University of Pennsylvania, Philadelphia USA.** Formalized a new research problem on the decentralized control of the drone fleets with temporal objectives, followed by ongoing collaboration. **Dean Dr. Vijay Kumar, PERCH Lab, University of Pennsylvania, Philadelphia USA.** Performed field experiments with quadrotors and offered a test-case scenario for the web simulation environment developed in the lab.

TEACHING & SUPERVISION

Spring semester	**Formal Methods for Learned Systems** *TU Delft, The Netherlands* Master's seminar course
Spring semester	**Algorithms for NP-Hard Problems** *TU Delft, The Netherlands* Bachelor's elective course
2021–now	**2 PhD students, 8 Master's students, 1 Bachelor Honor's student.** *TU Delft, The Netherlands*
September–October, 2020	**Teacher in Introduction to Programming with Python** *Institute of Science and Technology (IST) Austria, Klosterneuburg, Austria* A hands-on introduction to programming with applications in science aimed at students and postdocs with no prior programming knowledge and with some non-Python programming knowledge who specifically want to learn Python.
February–April, 2020	**Teacher in Formal Methods for Learned Systems** *Institute of Science and Technology (IST) Austria, Klosterneuburg, Austria* Advanced course for students and postdocs in computer science who plan to specialize on the intersection of formal methods and machine learning and those who are interested in the state of the art in that field.

October–February, 2020	**Co-supervised a PhD Student Rotation Project** *Institute of Science and Technology (IST) Austria, Klosterneuburg, Austria* Improving reliability of neural-network based systems via monitoring.
2016–2019	**Co-supervised two master projects and one bachelor thesis.** *TU Wien and IST Austria.*
2009–2012	**Teaching Assistant in Stochastic Analysis, Financial Mathematics** *Faculty of Computational Mathematics and Cybernetics* *Lomonosov Moscow State University, Russia*

MEDIA APPEARANCES

- TU Delta Magazine December 2022: „The digital revolution is here but we are not ready for it"
- DerStandard March 2019: "Warum so wenige Frauen Den Code knacken wollen" (German)
- Vienna Science Ball Magazine 2019: "Steps of Logic"
- KTH News December 2019: Building a new community of Future DigiLeaders at KTH and beyond.

SCIENTIFIC REFEREES

- Dr. Mathijs de Weerdt (m.m.deweerdt@tudelft.nl), Head of Algorithmics Group at TU Delft
- Prof. Thomas A. Henzinger (tah@ist.ac.at), postdoc supervisor, President of IST Austria
- Prof. Radu Grosu (radu.grosu@tuwien.ac.at), PhD supervisor at TU Wien

PUBLICATIONS[1]

[1] *Schilling C., *Lukina A., *Demirović E., Larsen K. G.: Safety verification of decision-tree policies in continuous time. In Proc. of NeurIPS 2023, spotlight.

[2] Kueffner K., *Lukina A., *Schilling C., Henzinger T.A.: Into the Unknown: Active Monitoring of Neural Networks (Extended Version). In STTT 2023, Special Issue RV 2021.

[3] *Demirović E., **Lukina A.**, Hebrard E., Chan J., Bailey J., Leckie C., Ramamohanarao K., Stuckey P. J.: MurTree: Optimal Decision Trees via Dynamic Programming and Search. In JMLR 2022.

[4] **Lukina, A.,** *Schilling, C., Henzinger T. A.: Into the Unknown: Active Monitoring of Neural Networks. To appear in Proc. of RV 2021.

[5] Henzinger, T. A., **Lukina, A.,** *Schilling, C.: Outside the Box: Abstraction-Based Monitoring of Neural Networks. In Proc. of ECAI 2020.

[6] Alizadeh Alamdari, P., *Avni G., Henzinger, T. A., **Lukina, A.**: Formal Methods with a Touch of Magic. In Proc. of FMCAD 2020.

[7] Legay A., **Lukina A.**, Traonouez L.M., Yang J., Smolka S. A., Grosu R. (2019) Statistical Model Checking. Chapter in the Lecture Notes in Computer Science (LNCS) book series, vol. 10'000.

[8] **Lukina, A.**: Adaptive Optimization Framework for Control of Multi-Agent Systems. (Short paper) In Proc. of AAAI 2019.

[9] **Lukina, A.**, Esterle, L., Hirsch, C., Bartocci, E., Yang, J., Tiwari, A., Smolka, S. A., and Grosu, R.: ARES: Adaptive Receding-Horizon Synthesis of Optimal Plans. In Proc. of TACAS 2017.

[10] Smolka, S. A., Tiwari, A., Esterle, L., **Lukina, A.**, *Yang, J., and Grosu, R.: Attacking the V: on the resiliency of adaptive-horizon MPC. In Proc. of ATVA 2017.

[11] **Lukina, A.**, Tiwari, A., Smolka, S. A., Grosu, R.: Distributed Adaptive-Neighborhood Control for Stochastic Reachability in Multi-Agent Systems. In Proc. of SAC 2019.

[12] *Schmittle, M., **Lukina, A.**, Vacek, L., Das, J., Buskirk, C. P., Rees, S., Sztipanovits, J., Grosu, R., Kumar, V.: OpenUAV: A UAV Testbed for the CPS and Robotics Community. In Proc. of CPSW 2018.

[13] **Lukina, A.**: Resilient Control and Safety for Multi-Agent Cyber-Physical Systems. (Short paper) In Proc. of IJCAI 2017*.

[14] **Lukina, A.**: V for Verification: Intelligent Algorithm of Checking Reliability of Smart Systems. (Short paper) In Proc. of AAAI 2017.

[15] Kalajdzic, K., Jegourel, C., **Lukina, A.**, Bartocci, E., Legay, A., Smolka, S. A., and Grosu, R.: Feedback Control for Statistical Model Checking of Cyber-Physical Systems. In LNCS Proc. of ISoLA 2016.

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[1] Corresponding authors are indicated with *