Anastasia Isychev

Curriculum Vitae

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Research Areas

My research spans over areas of formal methods and software engineering. Specifically, I am interested in static and dynamic program analysis, verification and optimization of numerical programs, and automated systematic testing.

Education

11/2017 - 10/2023	**Dr.rer.nat, Technical University of Munich (TUM)**, Germany *Thesis:* Improving Analysis and Optimization of Numerical Programs *Advisors:* Helmut Seidl, Eva Darulova *Reviewers:* Helmut Seidl, Eva Darulova, Zachary Tatlock
04/2015 - 07/2017	**Master of Science, University of Saarland**, Germany *Thesis:* Estimation of Relative Error Bounds for Floating-Point Arithmetic Expressions *Advisor:* Eva Darulova *Reviewers:* Eva Darulova, Bernd Finkbeiner *GPA: 1.5*
09/2008 - 07/2013	**Dipl.Engineer, St.Petersburg State Institute of Technology (Technical University)**, Russia *Major:* Automated Information Processing and Control Systems *GPA: 4.91 of 5.0*

Academic Positions

11/2023 - *present*	**Postdoctoral Researcher, TU Wien**, Vienna, Austria *Lab:* Rigorous Software Engineering, led by Maria Christakis
11/2017 - 10/2023	**Scientific Employee, TUM**, Munich, Germany *Lab:* Programming Languages, Compiler Construction and Specification Formalisms, led by Helmut Seidl
08/2018 - 10/2018	**Research Intern, Amazon Web Services**, New York City, USA *Lab:* Automated Reasoning Group, mentor Kasper Luckow
08/2017 - 10/2017	**Scientific Employee, fortiss GmbH**, Munich, Germany *Department:* Software Dependability, manager Holger Pfeifer

07/2016 - 07/2017   **Research Intern, Max-Planck Institute for Software Systems**,
from April 2017 Doctoral Student; Saarbrücken, Germany
Lab: Automated Verification & Approximation, led by Eva Darulova

Professional Experience

04/2013 - 04/2015   **Software Developer, T-Systems RUS**, St.Petersburg, Russia

Teaching and Mentoring Experience

Teaching at TU Wien

Software Engineering Seminar	summer 2024, 2025, winter 2024/25, 2025/26
Advanced Software Engineering *(guest lecture)*	winter 2025/26

Teaching at TUM

Lectures (teaching assistant)

Program Optimization	winter 2018/19, 2019/20, 2020/21, 2021/22, 2022/23
Virtual Machines	summer 2019, 2020, 2021, 2022, 2023
Functional Programming and Verification	winter 2017/18

Seminars

Program Synthesis (organizer)	summer 2018, 2019, 2020
The Tyranny of Types: Curse or Blessing?	summer 2022
Code Generation and Innovative Programming Models	winter 2019/20

Mentoring

SIGPLAN-M Longterm Mentoring Program	mentor for 1 PhD student, 2021 - *present*

Co-advised theses

Interactive Program Synthesis for Object-Oriented Programs, TUM, *Master Thesis* of A.Semin, 2022
Regime Inference for Finite-Precision Kernels, TUM, *Bachelor Thesis* of R.Rabe, 2020

Academic Service

Co-Organizer	FLoC 2026 Mentoring Workshop *(upcoming)*
Publicity Chair	International Symposium on Software Testing and Analysis (ISSTA) 2024

Program Committee Member	Object-Oriented Programming, Systems, Languages & Applications (OOP-SLA) 2026
	Computer-Aided Verification (CAV) 2025
	Programming Language Design and Implementation, Student Research Competition (PLDI SRC) 2024
	Static Analysis Symposium (SAS) 2024, 2023, 2020
	Automated Software Engineering, Tool Demo Track 2024
	Formal Aspects of Computing (FAoC Journal) 2021
Hiring Committee Member	TU Wien, Professorship for Programming Languages and Compilers 2024
	TU Wien, Professorship for Program Analysis and Verification 2025
Artifact Evaluation Committee Member	Programming Language Design and Implementation (PLDI) 2023
	International Symposium on Code Generation and Optimization (CGO) 2022
	Computer-Aided Verification (CAV) 2021
	Principles of Programming Languages (POPL) 2021
Student Volunteer	Federated Logic Conference (FLoC) 2022
	European Joint Conferences on Theory and Practice of Software (ETAPS) 2022
	Dagstuhl Seminar on Approximate Systems 2021
	Principles of Programming Languages (POPL) 2020
	Marktoberdorf Summer School 2019
Scientific Staff Representative	TUM, representing the lab of Programming Languages, Compiler Construction and Specification Formalisms, 2020 - 2023

Publications

Note: publications before 2023 use the old spelling of my name: Anastasiia Izycheva.

13. **Interrogation Testing of CHC Solvers**, FSE'26. (accepted)
    David Kaindlstorfer, *Anastasia Isychev*, Valentin Wüstholz, Maria Christakis

12. **Cost of Soundness in Mixed-Precision Tuning**, OOPSLA'25. (*DOI*)
    Anastasia Isychev, Debasmita Lohar

11. **Using Action-Policy Testing in RL to Reduce the Number of Bugs**, SoCS'25. (*DOI*)
    Hasan Ferit Eniser, Songtuan Lin, Nicola Müller, *Anastasia Isychev*, Valentin Wüstholz, Isabel Valera, Jörg Hoffmann, Maria Christakis

10. **Lazy Testing of Machine-Learning Models**, IJCAI'25. (*DOI*)
    Anastasia Isychev, Valentin Wüstholz, Maria Christakis

9. **Fuzzing Processing Pipelines for Zero-Knowledge Circuits**, CCS'25. (*DOI*)
    Christoph Hochrainer, *Anastasia Isychev*, Valentin Wüstholz, Maria Christakis

8. **Interrogation Testing of Program Analyzers for Soundness and Precision Issues**, ASE'24. (*DOI*)
    David Kaindlstorfer, *Anastasia Isychev*, Valentin Wüstholz, Maria Christakis

7. **Constraint-Based Test Oracles for Program Analyzers** ASE'24. (*DOI*)
    Markus Fleischmann, David Kaindlstorfer, *Anastasia Isychev*, Valentin Wüstholz, Maria Christakis

6. **Scaling up Roundoff Analysis of Functional Data Structure Programs**, SAS'23. (*DOI*)
    Anastasia Isychev, Eva Darulova

5. **Regime Inference for Sound Floating-Point Optimizations**, EMSOFT'21. (*DOI*)
    Robert Rabe, *Anastasiia Izycheva*, Eva Darulova

4. **Counterexample- and Simulation-Guided Floating-Point Loop Invariant Synthesis**, SAS'20. (*DOI*)
    Anastasiia Izycheva, Eva Darulova, Helmut Seidl

3. **Synthesizing Efficient Low-Precision Kernels**, ATVA'19. (*DOI*)
    Anastasiia Izycheva, Eva Darulova, Helmut Seidl

2. **Daisy - Framework for Analysis and Optimization of Numerical Programs** (Tool Paper), TACAS'18. (*DOI*)
    Eva Darulova, *Anastasiia Izycheva*, Fariha Nasir, Fabian Ritter, Heiko Becker, Robert Bastian

1. **On Sound Relative Error Bounds for Floating-Point Arithmetic**, FMCAD'17. (*conference version*, *arXiv extended version*)
    Anastasiia Izycheva, Eva Darulova

Invited Presentations

2026	**Cost of Soundness in Mixed-Precision Tuning**, FPTalks, online (*upcoming*)	
2021	**Synthesizing Efficient Low-Precision Kernels**, FPTalks, online (recording available)	
2019	**Synthesizing Efficient Low-Precision Kernels**, Marktoberdorf Summer School (short talk and poster)	
2018	**Polynomial Approximations in Numerical Kernels**, Google Compiler and Programming Languages Summit 2018 (poster), Munich	
2018	**Daisy - a Framework for Sound Accuracy Analysis and Optimization of Numerical Programs**, Metalibm Workshop, Paris	

Open-Source Projects

LaZ Framework for lazy testing of machine-learning models

DS2L Scalable sound rounding error analysis for numerical programs with data structures

Pine Invariant generator for floating-point loops

Daisy A framework for analysis and optimization of numerical programs

Scholarships and Grants

2025	SIGPLAN PAC travel grant for attending OOPSLA
2020	Travel grant for attending VMCAI Winter School
2020	SIGPLAN PAC travel grant for attending POPL
2019	Travel grant, Verification Mentoring Workshop (could not attend due to visa issues)
2017	Doctoral student scholarship, Max-Planck Institute for Software Systems
2015 - 2017	Doctoral student scholarship, Graduate School of Computer Science, University of Saarland
2008 - 2013	Scholarship for outstanding academic performance, St.Petersburg State Institute of Technology

Programming Skills

Advanced:	Scala, Python, SQL
Intermediate:	C, Java

Language Proficiency

Advanced:	English, German
Beginner:	Spanish
Native:	Russian