

# Nadia Polikarpova

Chair of Software Engineering  
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## Research positions

- Research Assistant** Sept 2008–present  
Chair of Software Engineering, Department of Computer Science, ETH Zurich (Switzerland)
- Research Intern** May–Aug 2011  
Microsoft Research (Redmond, USA)  
Mentor: Michał Moskal
- Undergraduate Researcher** Oct 2005–Aug 2007  
Chair of Computer Technologies, Department of Information Technologies and Programming, SPbSU ITMO (Saint-Petersburg, Russia)

## Education

- PhD, Computer Science** Sept 2008–Jul 2014  
ETH Zurich (Switzerland)  
Thesis: *Specified and Verified Reusable Components*  
Advisor: Prof. Bertrand Meyer
- MSc, Applied Mathematics and Informatics** Sept 2006–May 2008  
SPbSU ITMO (Saint-Petersburg, Russia)  
Thesis: *Dynamic Assertion Inference in a Programming Language with Design by Contract Support (Eiffel Case Study)*  
Advisor: Prof. Anatoly Shalyto  
Co-advisor: Ilinca Ciupa (ETH Zurich)  
Grade: 5 / 5
- BEng, Applied Mathematics and Informatics** Sept 2002–May 2006  
SPbSU ITMO (Saint-Petersburg, Russia)  
Thesis: *Object-oriented approach to modeling and specification of entities with complex behavior*  
Advisor: Dr. Danil Shopyrin  
Grade: 5 / 5

## Research interests

My research interests lie in the area of *software correctness*. My expertise covers a range of topics in *formal methods* and *software engineering*; in particular, my research has contributed to auto-active verification, behavioral interface specifications, automated testing, dynamic invariant inference, and user interface for verification.

## Projects

I have been involved in the development of the following tools and libraries:

- AutoProof** co-developer, Eiffel  
 An auto-active program verifier for Eiffel  
<http://se.inf.ethz.ch/research/autoproof>
- EiffelBase2** main developer, Eiffel  
 A specified and verified data structure library for Eiffel  
<https://bitbucket.org/nadiapolikarpova/eiffelbase2>
- Boogaloo** main developer, Haskell  
 An interpreter and run-time assertion checker for Boogie  
<https://bitbucket.org/nadiapolikarpova/boogaloo>
- Dafny** contributor, C#  
 A Language and Program Verifier for Functional Correctness  
<http://research.microsoft.com/en-us/projects/dafny>
- CITADEL** main developer, Eiffel  
 An Eiffel front-end for the Daikon assertion detector  
<http://se.inf.ethz.ch/people/polikarpova/citadel>

## Publications<sup>1</sup>

### *International conferences and journals*

- P9. Polikarpova N., Tschannen J., Furia C., Meyer B., *Flexible Invariants Through Semantic Collaboration*, Proceedings of FM'14: 19th International Symposium on Formal Methods, (Singapore), May 2014
- P8. Polikarpova N., Furia C., West S., *To Run What No One Has Run Before* Proceedings of RV'13: Fourth International Conference on Runtime Verification, (Rennes, France), September 2013
- P7. Polikarpova N., Furia C., Pei Y., Wei Y., Meyer B., *What Good Are Strong Specifications?* Proceedings of ICSE'13: 35th International Conference on Software Engineering, (San Francisco, California, USA), May 2013
- P6. Leino K. R. M., Polikarpova N., *Verified calculations*, Proceedings of VSTTE'13: Verified Software: Theories, Tools and Experiments, (Atherton, California, USA), May 2013
- P5. Polikarpova N., Moskal M., *Verifying implementations of security protocols by refinement*, Proceedings of VSTTE'12: Verified Software: Theories, Tools and Experiments, (Philadelphia, Pennsylvania, USA), January 2012
- P4. Klebanov V. et al., *The 1st Verified Software Competition: Experience Report*, Proceedings of FM'11: 17th International Symposium on Formal Methods, (Limerick, Ireland), June 2011, **best paper award**
- P3. Polikarpova N., Furia C., Meyer B., *Specifying Reusable Components*, Proceedings of VSTTE'10: Verified Software: Theories, Tools and Experiments, (Edinburgh, Scotland), August 2010

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<sup>1</sup>Publications are available online at <http://se.inf.ethz.ch/people/polikarpova/>.

- P2. Polikarpova N., Tochilin V., Shalyto A., *Method of Reduced Tables for Generation of Automata with a Large Number of Input Variables Based on Genetic Programming*, Journal of Computer and Systems Sciences International, 49(2):265–283, February 2010
- P1. Polikarpova N., Ciupa I., Meyer B., *A comparative study of programmer-written and automatically inferred contracts*, Proceedings of ISSTA'09: International Conference on Software Testing and Analysis, (Chicago, Illinois, USA), July 2009

### National conferences

- N5. Polikarpova N., Tochilin V., Shalyto A., *A Library for Generating Control Automata by Means of Genetic Programming* (in Russian), Proceedings of the X International Conference on Soft Computing and Measurement, (Saint-Petersburg, Russia), June 2007
- N4. Polikarpova N., Tochilin V., Shalyto A., *Applying Genetic Programming to Implementation of Systems with Complex behavior* (in Russian), Proceedings of the IV International Theoretical and Practical Conference “Integrated Models and Soft Computing in Artificial Intelligence”, (Kolomna, Russia), May 2007
- N3. Polikarpova N., Tochilin V., *Applying Genetic Algorithms to Generating Logics in Computational Systems* (in Russian), Proceedings of the 4th Inter-University Young Researchers Conference, (Saint-Petersburg, Russia), April 2007
- N2. Polikarpova N., *Object-oriented approach to modeling and specification of entities with complex behavior*, Proceedings of SEC(R) 2006: Software Engineering Conference in Russia, (Moscow, Russia), November 2006
- N1. Polikarpova N., *Inheritance Relation for Types with Complex Behavior* (in Russian), Proceedings of the 3rd Inter-University Young Researchers Conference, (Saint-Petersburg, Russia), April 2006

### Books

- B1. Polikarpova N., Shalyto A., *Automata-based Programming* (in Russian), Piter, 2009

### Teaching activities

Teaching assistant for *Java and C# in depth*, ETH Zürich, Spring 2014, Prof. Bertrand Meyer, Dr. Carlo A. Furia, Dr. Marco Piccioni

Teaching assistant and guest lecturer for *Introduction to Programming*, ETH Zürich, Fall 2008–2013, Prof. Bertrand Meyer

Guest lecturer for *Software Verification*, ETH Zürich, Fall 2009–2013, Prof. Bertrand Meyer, Dr. Carlo A. Furia, Dr. Sebastian Nanz

Guest lecturer for *Software Architecture*, ETH Zürich, Spring 2011, Prof. Bertrand Meyer, Dr. Carlo A. Furia, Dr. Martin Nordio

Teaching assistant for *Java and C# in depth*, ETH Zürich, Spring 2010, Prof. Bertrand Meyer, Dr. Carlo A. Furia

Guest lecturer for *Eiffel: Analysis, Design and Programming*, ETH Zürich, Fall 2009, Prof. Bertrand Meyer

Teaching assistant and guest lecturer for *Software Architecture*, ETH Zürich, Spring 2009, Prof. Bertrand Meyer

### *Supervised theses*

Tobias Kiefer *Model-based contracts for C#*, Bachelor Thesis, ETH Zürich, October 2012

Elena Mokhon *Model-based contracts for C# collections*, Master Thesis, ETH Zürich and Tver State University (Russia), April 2011

Flaviu Roman *Improving relevancy of dynamically-inferred contracts in Eiffel*, Master Thesis, ETH Zürich and Technical University of Cluj-Napoca, June 2009

### Talks

Flexible Invariants Through Semantic Collaboration FM'14, May 14 2014, Singapore

To Run What No One Has Run Before: Executing an Intermediate Verification Language RV'13, September 26 2013, Rennes, France

What Good Are Strong Specifications? ICSE'13, May 22 2013, San Francisco, California, USA

Verified calculations. VSTTE'13, May 18 2012, Atherton, California, USA

Verifying implementations of security protocols by refinement. VSTTE'12, January 28 2012, Philadelphia, Pennsylvania, USA

EiffelBase2: strong contracts for design and verification. Workshop "Eiffel at 25", November 24, 2010, Zürich, Switzerland.

Specifying Reusable Components. VSTTE'10, August 17 2010, Edinburgh, Scotland.

Specifying reusable components with model-based contracts. IFIP WG 2.3 meeting 50. March 5 2010, Lachen, Switzerland.

A comparative study of programmer-written and automatically inferred contracts. ISSTA'09, July 21 2009, Chicago, Illinois, USA.

Applying Genetic Programming to Implementation of Systems with Complex behavior. Integrated Models and Soft Computing in Artificial Intelligence, May 28 2007, Kolomna, Russia.

Applying Genetic Algorithms to Generating Logics in Computational Systems. 4th Inter-University Young Researchers Conference, April 12 2007, Saint-Petersburg, Russia.

Inheritance Relation for Types with Complex Behavior. 3rd Inter-University Young Researchers Conference, April 12 2006, Saint-Petersburg, Russia.

## Other events attended

VSCOMP'14 Verified Software Competition. June 14–15, 2014.

Dagstuhl seminar on Evaluating Software Verification Systems: Benchmarks and Competitions. Schloss Dagstuhl, Germany. April 22–25, 2014.

Workshop on Software Correctness and Reliability. Zurich, Switzerland. October 4–5, 2013.

LASER summer school on Innovative Languages for Software Engineering. Elba, Italy. September 2–8, 2012.

VSCOMP'12 Verified Software Competition (**bronze medal**). November 8–10, 2011.

COST Verification Competition. Turin, Italy. October 4, 2011.

LASER summer school on Tools for Practical Software Verification. Elba, Italy. September 4–10, 2011.

FOSE The Future of Software Engineering Symposium. Zürich, Switzerland. November 22–23, 2010.

LASER summer school on Empirical Software Engineering. Elba, Italy. September 5–11, 2010.

VSCOMP'10 Verified Software Competition. Edinburgh, Scotland. August, 2010

SICSA Summer School on Formal Reasoning & Representation of Complex Systems. Edinburgh, Scotland. August 14–15, 2010.

TOOLS-Europe 2009 47th International Conference on Objects, Models, Components, Patterns. Zürich, Switzerland. June 29 – July 3, 2009.

LASER summer school on Concurrency and Correctness. Elba, Italy. September 7–13, 2008.

## Professional Activities

**PC member, Tutorials Chair and Proceedings Chair**, 14th International Conference on Runtime Verification (RV 2014)

**PC member**, 11th International Workshop on Formal Engineering approaches to Software Components and Architectures (FESCA 2014)

**Deputy General Chair**, 9th Joint Meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE 2013)

**Publicity Chair**, LASER Summer School on Software Engineering (2011–2014)

**Publicity Chair**, 4th International Conference on Software Engineering Approaches For Offshore and Outsourced Development (SEAFOOD 2010)

## Awards

ACM SIGSOFT Recognition of Services Award in appreciation for the contribution as a Deputy General Chair of ESEC/FSE 2013.

## Personal data

**Date of birth:** 20 May 1985

**Place of birth:** Leningrad, USSR

**Nationality:** Russian

## Language proficiency

**Russian:** native

**English:** fluent

**German:** intermediate

**Italian:** fair