Julia Belyakova

Curriculum Vitae

Mail	julbinb@gmail.com or belyakova.y@northeastern.edu
Homepage	http://julbinb.github.io
Professional	researchgate, github, linkedin

EDUCATION

PhD in Computer Science 2018–present

College of Computer and Information Science (Programming Research Laboratory)
Northeastern University, Boston, MA, USA
> Academic/Research advisor: Professor Jan Vitek

MS in Computer Science and Information Technologies 2012–2014

I. I. Vorovich Institute of Mathematics, Mechanics and Computer Science
Southern Federal University, Rostov-on-Don, Russia
> "The Concepts Model for the Imperative Programming Language"
> Academic/Research advisor: Assoc. prof. Stanislav Mikhalkovich
> [paper (in Russian)] [slides (in Russian)]

BS in Computer Science and Information Technologies 2008–2012

I. I. Vorovich Institute of Mathematics, Mechanics and Computer Science
Southern Federal University, Rostov-on-Don, Russia
> "Automatic Constraints Collection in the Modeling Programming Language with Generic
> Functions and Types Deduction"
> Academic/Research advisor: Assoc. prof. Stanislav Mikhalkovich
> [paper (in Russian)] [slides (in Russian)]

APPOINTMENTS

Research Scientist Sep 2017–Jul 2018

Programming Languages Laboratory, Faculty of Information Technology
Czech Technical University in Prague, Prague, Czech Republic

Research Scientist Jan–Jul 2017

Programming Research Laboratory, College of Computer and Information Science
Northeastern University, Boston, MA, USA

Teaching Assistant, Lecturer 2014–2016

I. I. Vorovich Institute of Mathematics, Mechanics and Computer Science
Southern Federal University, Rostov-on-Don, Russia
- Theory of Programming Languages (lectures, seminars, labs)
  [YouTube playlist of videos (in Russian)];
- Programming Basics (labs, seminars), Programming Languages (labs, seminars);
- Design Patterns (labs, seminars);
- Assembler Programming labs.

Part Time Programmer 2012–2013
Laboratory Angstrem-SFEDU, Rostov-on-Don, Russia

RESEARCH INTERESTS

Programming languages, type theory, generic programming, compiler construction, theorem provers, algorithms, design patterns, software engineering, programming by contracts, software testing.

SELECTED PROJECTS

Formalizing Subtyping in Julia 2017–present
Formal definition of subtyping in the Julia language, a dynamic language for scientific computing with multiple symmetric dispatch, user-defined parametric types, union types, and existential types. [project page]

**Concept Parameters: Language Support for Generic Programming
in Object-Oriented Languages** 2014–2017
Concepts (as C++0x concepts, Haskell type classes, or Java Genus constraints) encapsulate constraints on type parameters. Together with multiple models, concept parameters can provide OO languages with more expressive language mechanism of generic programming than the existing one based on F-bounded polymorphism. [project page]
[thesis proposal]
[Coq formalization for STLC at github (work-in-progress)]

Web Development Environment PascalABC.NET (WDE) 2009–2013
Web development environment for programming languages: PascalABC.NET, Python, C#.
[web-page] [e-source registration scan (in Russian)]

PUBLICATIONS

PEER-REVIEWED JOURNAL PUBLICATIONS

5. Francesco Zappa Nardelli, Julia Belyakova, Artem Pelenitsyn, Benjamin Chung, Jeff Bezanson, Jan Vitek. "Julia Subtyping: A Rational Reconstruction", *Proceedings of the ACM on Programming Languages. Volume 2 Issue OOPSLA*, ISSN 2475-1421, DOI 10.1145/3276483. ACM New York, 2018, p. 113:1–113:27. [preprint]

4. Julia Belyakova. "Language Support for Generic Programming in Object-Oriented Languages: Peculiarities, Drawbacks, Ways of Improvement", *Lecture Notes in Computer Science. Programming Languages: 20th Brazilian Symposium, SBLP 2016*, ISBN 978-3-319-45279-1 (Online), DOI 10.1007/978-3-319-45279-1_1, No 9889. Springer International Publishing, 2016, p. 1–15. [preprint]

3. Julia Belyakova. "Language Support for Generic Programming in Object-Oriented Languages: Design Challenges", *Proceedings of the Institute for System Programming*, ISSN 2220-6426 (Online), No 28(2). Moscow, Russia, 2016, p. 5–32.
[e-print in ACM format] [e-print]

2. Julia Belyakova, Stanislav Mikhalkovich. "Pitfalls of C# Generics and Their Solution Using Concepts", *Proceedings of the Institute for System Programming*, ISSN 2220-6426 (Online), No 27(3). Moscow, Russia, 2015, p. 29–45.

[e-print in ACM format] [e-print]

1. Michail Abramyan, Julia Belyakova, Stanislav Mikhalkovich. "Using of Web Development Environment PascalABC.NET for a Distance Learning of Programming", *J. Distancionnoe I Virtualnoe Obuchenie [J. Distant and Virtual Learning]*, ISSN 1561-2449, No 57(3). Moscow, Russia, 2012, p. 14–24.   [e-print (in Russian)]

OTHER ISSUES

4. Stanislav Mikhalkovich, Julia Belyakova. "Concept Parameters as a Mechanism of Development of the Language Support for Generic Programming in C#", *J. Modern Information Technologies and IT in Education*, ISSN 2411-1473, No 11(2). Moscow, Russia, 2015, p. 205–213.   [e-print (in Russian)]

3. Julia Belyakova, Stanislav Mikhalkovich. "Support for Generic Programming in the Modern Object-Oriented Languages. Part 2. A Review of the Modern Solutions", *Transactions of Scientific School of I. B. Simonenko. Issue 2*, ISBN 978-5-9275-1607-0. Rostov-on-Don, Russia, 2015, p. 78–92.   [e-print (in Russian)]

2. Julia Belyakova, Stanislav Mikhalkovich. "Support for Generic Programming in the Modern Object-Oriented Languages. Part 1. An Analysis of the Problems", *Transactions of Scientific School of I. B. Simonenko. Issue 2*, ISBN 978-5-9275-1607-0. Rostov-on-Don, Russia, 2015, p. 63–77.   [e-print (in Russian)]

1. Stanislav Mikhalkovich, Julia Belyakova. "Web Development Environment PascalABC.NET and Its Usage in Education", *Transactions of Scientific School of I. B. Simonenko*. Rostov-on-Don, Russia, 2010, p. 172–178.   [e-print (in Russian)]

CONFERENCE PROCEEDINGS

11. Julia Belyakova. "Generic Approach to Certified Static Checking of Module-like Constructs", *Proceedings of the 19th Workshop on Formal Techniques for Java-like Programs, DOI 10.1145/3103111.3104045,* p. 5:1–5:2. Barcelona, Spain, Jun 2, 2017.

[pre-print]

10. Julia Belyakova. "Implementation of Certified Interpreter for an Extension of Simply Typed Lambda Calculus with Concept Parameters", *Proceedings of "A. L. Fuksman Conference on Programming Languages and Compilers 2017",* p. 53–58. Rostov-on-Don, Russia, Apr 3–5, 2017.   [e-print (in Russian)]

9. Julia Belyakova, Stanislav Mikhalkovich. "Requirements to Extending Support of Generic Programming in Existing Object-Oriented Languages", *Proceedings of Scientific conference "Modern Information Technologies: Tendencies and Perspectives of Evolution",* p. 65–68. Rostov-on-Don, Russia, 2016.   [e-print (in Russian)]

8. Julia Belyakova, Artem Pelenitsyn. "Storage and Publication System for Texts of Assignments in Educational Environment Moodle", *Proceedings of Scientific conference "Modern Information Technologies: Tendencies and Perspectives of Evolution",* p. 61–63. Rostov-on-Don, Russia, 2015.   [e-print (in Russian)]

7. Michail Abramyan, Julia Belyakova, Stanislav Mikhalkovich. "Multi-language web development environment PascalABC.NET and integration of electronic taskbook

Programming Taskbook in it", *Transactions of XIX All-Russian Scientific and Methodic Conference "Telematika'2012",* p. 288–289. Saint Petersburg, Russia, 2012.
[scan (in Russian)]

6. Julia Belyakova, Stanislav Mikhalkovich. "First report on the service of distance education in Web development environment PascalABC.NET", *Proceedings of Scientific conference "Modern Information Technologies in Education: Tendencies and Perspectives of Evolution",* p. 42–43. Rostov-on-Don, Russia, 2012.
[scan (in Russian)]

5. Julia Belyakova, Stanislav Mikhalkovich. "New functions of Web development environment PascalABC.NET: shared access to the files, graphic unit, increasing of stability", *Proceedings of Scientific and Methodic Conference "Modern Information Technologies in Education: Southern Federal District",* p. 48–49. Rostov-on-Don, Russia, 2011.
[scan (in Russian)]

4. Julia Belyakova. "Web development environment PascalABC.NET", *Proceedings of "Week of Science '2010",* p. 86–89. Rostov-on-Don, Russia, 2011. [scan (in Russian)]

3. Stanislav Mikhalkovich, Julia Belyakova. "Graphic library for Web development environment PascalABC.NET", *Proceedings of Selected Works of V International Scientific and Practical Conference "Modern Information Technologies and IT-Education",* p. 422–428. Moscow, Russia, 2010.
[scan (in Russian)]

2. Julia Belyakova, Stanislav Mikhalkovich. "Web development environment Pascal-ABC.NET", *Transactions of XIX All-Russian Scientific and Methodic Conference "Telematika '2010", Students and Postgraduate Scientific Works Competition "Telematika'2010: Telecommunications, Web-technologies, Supercomputing",* p. 288–289. Saint Petersburg, Russia, 2010.
[scan (in Russian)]

1. Julia Belyakova, Stanislav Mikhalkovich. "The First Report About Web Development Environment PascalABC.NET", *Proceedings of Scientific and Methodic Conference "Modern Information Technologies in Education: Southern Federal District",* p. 58–59. Rostov-on-Don, Russia, 2010.
[scan (in Russian)]

PROFESSIONAL SERVICE

- Co-Chair in Organizing Committee.
  ECOOP DS 2019: Doctoral Symposium at the European Conference on Programming languages 2019 (London, United Kingdom, Jul 2019).

- Program Committee Member.
  TyDe 2019: Workshop on Type-Driven Development, collocated with ICFP 2019 (Berlin, Germany, Aug 18–23, 2019).

- Artifact Evaluation Committee Member.
  ECOOP 2019: European Conference on Programming languages 2019 (London, United Kingdom, Jul 15–19, 2019).

- Co-Chair in Organizing Committee.
  ECOOP/ISSTA DS 2018: Doctoral Symposium at the European Conference on Object-Oriented Programming (Amsterdam, Netherlands, Jul 15, 2018).

- Program Committee Member.
  ECOOP DS 2017: Doctoral Symposium at the European Conference on Object-Oriented Programming (Barcelona, Spain, Jun 18, 2017).

- Organizing Committee Member, web-site co-master.
  PLC-2017: A.L. Fuksman Conference on Programming Languages and Compilers (Rostov-on-Don, Russia, Apr 3–5, 2017).

SELECTED TALKS

CONFERENCE TALKS

7. [Formal Techniques for Java-like Programs 2017](...) (Barcelona, Spain), [ECOOP Series](...), Jun 20, 2017. *"Generic Approach to Certified Static Checking of Module-like Constructs"* [pre-print] [slides]

6. [A. L. Fuksman Conference on Programming Languages and Compilers 2017](...) (Rostov-on-Don, Russia), Session 1-3, Apr 4, 2017. *"Implementation of Certified Interpreter for an Extension of Simply Typed Lambda Calculus with Concept Parameters"* [e-print (in Russian)] [slides (in Russian)]

5. [XX Brazilian Symposium on Programming Languages 2016](...) (Maringa, Brazil), Session 5, Sep 23, 2016. *"Language Support for Generic Programming in Object-Oriented Languages: Peculiarities, Drawbacks, Ways of Improvement"* [preprint] [slides]

4. [ECOOP 2016 Doctoral Symposium](...) (Rome, Italy), Session 2, Jul 17, 2016. *"Concept Parameters as a New Mechanism of Generic Programming for C# Language"* [proposal] [slides]

3. [META 2016](...): Fifth International Valentin Turchin Workshop on Metacomputation (Pereslavl-Zalessky, Russia), Session 3, Jun 28, 2016. *"Language Support for Generic Programming in Object-Oriented Languages: Design Challenges"* [e-print] [slides]

2. SITO: Modern Information Technologies: Tendencies and Perspectives of Evolution 2016 (Rostov-on-Don, Russia), Innovative Research in Information technologies Section, Apr 21, 2016. *"Requirements to Extending Support of Generic Programming in Existing Object-Oriented Languages"* [slides (in Russian)]

1. SYRCoSE: Spring/Summer Young Researchers Colloquium on Software Engineering 2015 (Samara, Russia), Programming Technologies Section, May 28, 2015. *"Pitfalls of C# Generics and Their Solution Using Concepts"* [e-print in ACM format] [slides]

SEMINAR TALKS

7. [Olsen Hall, UMass Lowell](...) (Lowell, MA, USA), [New England Programming Languages and Systems Symposium Series](...), Jun 2, 2017. *"Generic Coq Library for Certified Static Checking of Module-like Language Constructs"* [slides]

6. [College of Computer and Information Science, Northeastern University](...) (Boston, MA, USA), [Programming Language Seminar](...), Feb 3, 2017. *"Comparative Study of Generic Programming Features in Object-Oriented Languages"* [slides]

5. [JetBrains Research](...) (Saint Petersburg, Russia), [Seminar of Programming Languages and Tools Lab](...), Oct 24, 2016. *"Generic Programming Approaches and Tools in Object-Oriented Languages: Peculiarities, Drawbacks, Alternatives"* [slides (in Russian)]

4. Oregon Programming Languages Summer School [(OPLSS) 2015](#) (University of Oregon, Eugene, Oregon, USA), Participant Talks, 23.06.2015. *"Pitfalls of C# Generics: How Can We Do Better?"* [slides]

3. Institute for System Programming of the Russian Academy of Sciences (Moscow, Russia), System Programming Department seminar, 21.01.2015. *"Motivation and design of Concepts with subtype constraints for C# language"* [slides (in Russian)]

2. I. I. Vorovich Institute of Mathematics, Mechanics and Computer Science (Rostov-on-Don, Russia), Foundations of Programming Languages seminar, 01.04.2013. *"Praconcepts: long path from birth to new birth, part I"* [slides (in Russian)]

1. I. I. Vorovich Institute of Mathematics, Mechanics and Computer Science (Rostov-on-Don, Russia), Foundations of Programming Languages seminar, 22.04.2013. *"Praconcepts: long path from birth to new birth, part II"* [slides (in Russian)]

SUMMER SCHOOLS AND OTHER TRAININGS

ECOOP 2016 Summer School [(ESS 2016)](#), co-located with the 30th European Conference on Object-Oriented Programming   2016
Rome, Italy

Programming Languages Mentoring Workshop [(PLMW) 2016](#), co-located with 43rd Symposium on Principles of Programming Languages   2016
St. Petersburg, Florida, USA

Oregon Programming Languages Summer School 2015 [“Types, Logic, Semantics, and Verification”](#)   2015
University of Oregon, Eugene, Oregon, USA

Summer School Marktoberdorf 2014 [“Dependable Software Systems Engineering”](#)   2014
Marktoberdorf, Germany [Certification of Participation]

PERSONAL AWARDS

Letter of Gratitude for the Talk   2014
Southern Federal University   [Letter scan (in Russian)]
    Student Session during Annual "Week of Science". Title: "Extended Constraints on .NET Generics Type Parameters" [slides (in Russian)]

Diploma for Study and Research Achievements   2011
Southern Federal University   [Diploma scan (in Russian)]

Participation in the Final Stage of All-Russian Student Researches Competition “Telematics ‘2010: Telecommunications, Web-Technologies and Supercomputing”   2010
University of Information Technologies, Mechanics and Optics
Saint Petersburg, Russia   [Certificate scan (in Russian)]

Project "Web Development Environment PascalABC.NET"

Diploma of the American Charitable Foundation "Information Technology" for the Participation in "Telematics '2010" Student Competition 2010

[Diploma scan (in Russian)]

Diploma for the participation in the Final Stage of All-Russian Student Researches Competition "Telematics '2010: Telecommunications, Web-Technologies and Supercomputing"

Diploma for the Best Talk 2010

Southern Federal University [Diploma scan (in Russian)]

Student Session during Annual "Week of Science". Title: "Web Environment for Programming PascalABC.NET" [slides (in Russian)]

SCHOLARSHIPS

Academic Mobility Stimulation Scholarship 2015
Southern Federal University, Rostov-on-Don, Russia

Increased State Academic Scholarship Feb 2014–June 2014
Southern Federal University, Rostov-on-Don, Russia

President's Scholarship Sep 2011–June 2012
Southern Federal University, Rostov-on-Don, Russia [Annex to the Order (in Russian)]

Governor's Scholarship Feb 2011–June 2011
Southern Federal University, Rostov-on-Don, Russia

LANGUAGES

Russian	Native speaker
English	Advanced (CAE Certificate, Grade C [190/210], 2015)

COMPUTER SKILLS

Languages and Scripts	C#, C, C++, Java, Haskell, SML, Pascal, Scala, Coq bash, LaTeX JavaScript, Python, ASP.NET, HTML, CSS
Operating Systems	GNU/Linux family, Windows family