

# Artem Pelenitsyn

## Curriculum Vitæ

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### Occupation

- 2023–present **Postdoc**, *Purdue University*, West Lafayette, USA, Advisor: Milind Kulkarni  
2018–2023 **Graduate Research Assistant**, *Northeastern University*, Boston, USA, Advisor: Jan Vitek  
Summer 2019 **Intern**, *Tweag I/O*, France (remotely; [final report](#))  
Fall 2017 **Researcher**, *Programming Research Lab*, Czech Technical University, Prague, Czechia  
Spring 2017 **Visiting Research Assistant**, *Programming Research Lab*, Northeastern U., Boston, USA  
2010–2017 **Teaching Assistant Professor**, *Southern Federal University*, Rostov-na-Donu, Russia  
2012–2013 **Software Engineer**, *Angstrom-SFEDU Labs (part-time)*, Rostov-na-Donu, Russia

### Education

- 2023 **Ph. D. in Computer Science**, *Northeastern University*, USA  
2009 **M. Sc. in Applied Mathematics and Computer Science**, *Southern Federal University*, Russia, [\[transcript\]](#)  
2007 **B. Sc. in Applied Mathematics and Computer Science**, *Southern Federal University*, Russia, [\[transcript\]](#)  
Ph. D. thesis *Type Stability in Julia: A Simple and Efficient Optimization Technique* (advisor: Jan Vitek)  
M. Sc. thesis *BMS-algorithm and its application to decoding* (advisor: Vladimir Deundyak)

### Research interests

Programming Languages and Compilers, Functional Programming, Types in Programming Languages

### List Of Publications

#### Peer-reviewed International

- PPoPP '25 RT-BarnesHut: Accelerating Barnes-Hut Using Ray-Tracing Hardware // (with Vani Nagarajan, Rohan Gangaraju, Kirshanthan Sundararajah, Milind Kulkarni) In: *ACM SIGPLAN Annual Symposium on Principles and Practice of Parallel Programming*. DOI: [10.1145/3710848.3710885](https://doi.org/10.1145/3710848.3710885)
- OOPSLA '24 SparseAuto: An Auto-scheduler for Sparse Tensor Computations using Recursive Loop Nest Restructuring // (with Adhitha Dias, Logan Anderson, Kirshanthan Sundararajah, Milind Kulkarni) In: *Proceedings of the ACM on Programming Languages*. DOI: [10.1145/3689730](https://doi.org/10.1145/3689730)
- ECOOP '24 Optimizing Layout of Recursive Datatypes with Marmoset: Or, Algorithms + Data Layouts = Efficient Programs // (with Vidush Singhal, Chaitanya Koparkar, Joseph Zullo, Michael Vollmer, Mike Rainey, Ryan Newton, Milind Kulkarni) In: *European Conference on Object-Oriented Programming*. DOI: [10.4230/LIPIcs.ECOOP.2024.38](https://doi.org/10.4230/LIPIcs.ECOOP.2024.38)
- ICS '24 Arkade: k-Nearest Neighbor Search With Non-Euclidean Distances using GPU Ray Tracing // **Best Paper Award** (with Durga Keerthi Mandarapu, Vani Nagarajan, Milind Kulkarni) In: *ACM International Conference on Supercomputing*. DOI: [10.1145/3650200.3656601](https://doi.org/10.1145/3650200.3656601)
- ISMM '24 Garbage Collection for Mostly Serialized Heaps // (with Chaitanya S. Koparkar, Vidush Singhal, Aditya Gupta, Mike Rainey, Michael Vollmer, Sam Tobin-Hochstadt, Milind Kulkarni, Ryan R. Newton) In: *ACM SIGPLAN International Symposium on Memory Management*. DOI: [10.1145/3652024.3665512](https://doi.org/10.1145/3652024.3665512)
- VMIL '23 Approximating Type Stability in the Julia JIT (Work in Progress) // In: *ACM SIGPLAN International Workshop on Virtual Machines and Intermediate Languages*. DOI: [10.1145/3623507.3623556](https://doi.org/10.1145/3623507.3623556)
- OOPSLA '21 Type stability in Julia: avoiding performance pathologies in JIT compilation // (with Julia Belyakova, Benjamin Chung, Ross Tate, Jan Vitek) In: *Proceedings of the ACM on Programming Languages*. DOI: [10.1145/3485527](https://doi.org/10.1145/3485527)
- OOPSLA '18 Julia subtyping: a rational reconstruction // (with Francesco Zappa Nardelli, Julia Belyakova, Benjamin Chung, Jeff Bezanson, Jan Vitek) In: *Proceedings of the ACM on Programming Languages*. DOI: [10.1145/3276483](https://doi.org/10.1145/3276483)
- TMPA '17 Functional Parser of Markdown Language Based on Monad Combining and Monoidal Source Stream Representation // (with Georgy Lukyanov) In: *International Conference on Tools and Methods for Program Analysis*. DOI: [10.1007/978-3-319-71734-0\\_8](https://doi.org/10.1007/978-3-319-71734-0_8)
- PCS Associated types and constraint propagation for generic programming in Scala // In: *Programming and Computer Software*. DOI: [10.1134/S0361768815040064](https://doi.org/10.1134/S0361768815040064)

#### Drafts

- Fuzzy-Testing A Subtyping Relation // 2018 [\[PDF\]](#)
  - Handling Recursion in Generic Programming Using Closed Type Families (with A. Bolotina) // 2018 [\[PDF\]](#)
- Russian

- Buliding parsers with algebraic effects // Proceedings of the First Russian Conference on Programming Languages and Compilers (PLC'17), 2017, pp. 185–190. With G. Lukyanov.
- Pelenitsyn A. Generic and meta- programming approach to design of software implementation of decoder for a class of algebraic geometry codes // "Prikladnaya informatika" (Applied computer science), 2012, No 2(38), pp. 60–70. [\[PDF\]](#), [link to the draft in English](#).
- Pelenitsyn A. On exploiting one metaprogramming technique. Journal of the Ivanovo Mathematical Society, 2011, No. 1(8), pp.79–84. [\[PDF\]](#).
- Deundyak V., Pelenitsyn A. Operator-theoretic approach to Berlekamp–Massey Algorithm, // Izvestia vuzov (Universities' Bulletin), Sev.-Kav. Region (Caucasus Region), Estestvennie Nauki (Sciences), 2011, No. 3. Pp. 11–13. [\[PDF\]](#).
- Mayevskiy A., Pelenitsyn A. Software Implementation of Algebraic-Geometry Codec using Sakata algorithm, // Izvestia Yufu (Southern Federal University Bulletin), Technology Sciences, 2008, No. 8, pp. 196–198. [\[PDF\]](#).

## In Conference Transactions (Russian)

- Pelenitsyn A. On Implementation of n-Dimensional BMS-algorithm Using Generic Programming // Transactions of Scientific School of I.B. Simonenko, 2010, pp. 197–203. [\[PDF\]](#) [\(in Russian\)](#).
- Mayevskiy A., Pelenitsyn A. Methodic Supply and IT-infrastructure for Teaching Low-Level Programming // Transactions of Scientific-Methodic Conference "Modern Information Technologies in Education", 2010, pp. 210–212. [\[PDF\]](#) [\(in Russian\)](#).
- Mayevskiy A., Pelenitsyn A. On Software Implementation of Algebraic-Geometry Codec using Sakata algorithm, // Transactions of X International Conference on Information Security and Safety, 2008, pp. 55–57.
- Pelenitsyn A. On Implementation of Decoder for a Class of Algebraic-Geometry Codes on Projective Curves using Sakata algorithm, // Transactions of the Conference "Week of Science" in Southern Federal University, 2008, vol. 1, pp. 55–57. [\[PDF\]](#) [\(in Russian\)](#).
- Bragilevsky V., Mihalkovich S., Pelenitsyn A. Building Web-portal for Information and Education purposes on Computing Department // Transactions of Scientific-Methodic Conference "Modern Information Technologies in Education", 2008, pp. 48–49. [\[PDF\]](#) [\(in Russian\)](#).

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## Conference Talks: Research

### International

- 2023 **ACM SIGPLAN International Workshop on Virtual Machines and Intermediate Languages, 2023**, *"Approximating Type Stability in the Julia JIT (Work in Progress)"*  
[Video on SIGPLAN YouTube channel](#)
- 2021 **ACM SIGPLAN conference on Systems, Programming, Languages, and Applications: Software for Humanity, 2021**, *OOPSLA Research Papers Track Talk "Type Stability in Julia: Avoiding Performance Pathologies in JIT Compilation"*, Chicago, USA, 2021  
[Link to the conference page](#) (includes video)
- 2018 **ACM SIGPLAN Symposium on Scala, 2018**, *Student Talk "Julia Subtyping Lessons Scala Could Learn"*, St. Louis, USA, 2018 (co-located with ICFP)
- 2018 **2nd Workshop on Machine Learning Techniques for Programming Languages**, *Talk "Can We Learn Some PL Theory? How To Make Use of a Corpus of Subtype Checks"*, Amsterdam, The Netherlands, 2018 (co-located with ECOOP/ISSTA)

### Russian

- 2015 **Scientific Conference "Modern Information Technologies and IT-Education"**, *talk "C++17 Concepts in their relation to C++0x ones"*, Lomonosov Moscow State University, Faculty of Computational Mathematics and Cybernetics
- 2012 **Research and Praticce Conference: Free Open Source Software "FOSS Lviv 2012"**, *talk "Software Implementation of Decoder For a Class Of Error-Correcting Codes on Algebraic Curves: Designing on a Basis of Generic Metaprogramming Templates"*, Ivan Franko National University of Lviv, Lviv, Ukraine
- 2008 **Conference "Week of Science" in Southern Federal University**, *talk "On Implementation of Decoder for a Class of Algebraic-Geometry Codes on Projective Curves using Sakata algorithm"*, Rostov-na-Donu, Russia

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## Seminar Talks

- 2021 **Linear Haskell**, *Boston Computation Club*, Boston, USA (virtually, [Video](#))
- 2017 **Introduction to Dependent Types in Idris**, *PL Seminar Jr.*, Northeastern University, USA
- 2016 **Functional Visitors**, *Programming Languages and Compilers seminar*, Southern Federal University, Russia
- 2016 **Seminar on Galois Theory**, Southern Federal University, Russia
- 2011 **Minicourse on Galois Theory**, *Algebra seminar*, Southern Federal University, Russia
- 2011 **Talks "Foundations for programming Languages", "Automata and Formal Languages"**, *seminar for undergraduates "Introduction to Theoretical Computer Science"*, Southern Federal University, Russia
- 2009 **Talk "Higher-Order Computations and Model Checking"**, *Interchair seminar on Computer Science*, Southern Federal University, Russia
- 2009 **Talk "On multi-dimensional version of Berlekamp-Massey algorithm"**, *Seminar on Mathematical Methods in Information Safety and Security*, Southern Federal University, Russia
- 2009 **Talk "Inductive Data Types in Programming"**, *Seminar on Category Theory*, Southern Federal University, Russia
- 2008 **Talk "Spring Framework"**, *Rostov Java User Group*, Computing Center of Southern Federal University, Russia

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## Conference Talks: Education, Technology, Popular Science

### International

- 2014 **Joint International Program For Scientific and Technology Cooperation**, *talk "Computer Science Projects Developed inside (in connection with) Department of Mathematics, Mechanics and Computer Sciences / SFedU"*, Sao Paulo, Rio de Janeiro, Fortaleza, Brasil

## Russian

- 2015 **Scientific Conference “Modern Information Technologies in Education”**, talk “Store and publication assignment infrastructure for Moodle LMS”, Institute for Mathematics, Mechanics and Computer Science in honour of I. I. Vorovich, Rostov-na-Donu, Russia
- 2010 **Scientific-Methodic Conference “Modern Information Technologies in Education”**, talk “Methodic Supply and IT-infrastructure for Teaching Low-Level Programming”, Computing Center of Southern Federal University, Rostov-na-Donu, Russia
- 2008 **International Conference on Information Security and Safety**, talk “Building Web-portal for Information and Education purposes on Computing Department”, Taganrog, Russia

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## Teaching Experience

### Teaching Assistantship at [Northeastern University](#)

- CS4500: Software Development — 2020 (Spring).
- CS4410/6410: Compilers — 2019 (Fall).

### Teaching at [Southern Federal University](#) (in Russian, unless marked otherwise)

- Quantum Computations (lectures in English) — 2016 (Fall).
- Computer Architecture (lectures & labs) — 2013–2016 (Spring).
- Automata and Ciphers (lectures) — 2013–2016 (Fall).
- Programming Basics labs — 2008, 2010–2012, 2014–2016.
- Programming Languages labs — 2008, 2010, 2012–2015 (Fall).
- Functional Programming labs — 2011 (Spring).
- Automata and Languages — 2010 (Spring).
- Microprogramming/Assembler Programming labs — 2009 (Fall).
- Geometry and Algebra — 2009 (Fall).

### Supervising Students at Southern Federal University

- *Structuring Effectful Computations* — MSc G. Lukyanov, 2017, [\[PDF\]](#)
- *Generic Programming and Zippers* — A. Bolotina, 2017
- *Generation of algebraic data types descriptions based on JSON data via Template Haskell* — BSc O. Maroseev, 2016
- *Generation of type class instances based on instances of superclasses via GHC API* — BSc O. Filippskaya, 2016
- *Functional parser for Markdown using monad combination and monoidal representation of input* — BSc G. Lukianov, 2015
- *Deduction system for linear logic in Haskell* — BSc V. Pankov, 2015

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## Summer Schools and Workshops

- 2018 **Programming Languages Mentoring Workshop @ ICFP**, St. Louis, USA, September 23rd 2018
- 2017 **Oregon Programming Languages Summer School**, *Univeristy of Oregon*, Eugene, USA, June 26th to July 8th 2017
- 2015 **Summer School on Generic and Effectful Programming**, *Department of Computer Science, Univeristy of Oxford*, St Anne’s College, Oxford, 6th to 10th July 2015
- 2011 **Summer School “Algebra and Geometry”**, *Laboratory of Algebraic Geometry in the National Research University Higher School of Economics, Teachers’ Training University of Yaroslavl’*, Yaroslavl’, Russia
- 2010 **Microsoft Algorithms and Data Structures Summer School**, *Microsoft Research in Silicon Valey*, Saint-Petersburg, Russia
- 2010 **Winter School on Applied Mathematics and Computer Science**, *National Research University Higher School of Economics*, Moscow province, Russia
- 2009 **Marktoberdorf Summer School “Logics and Languages for Reliability and Security”**, Marktoberdorf, Germany

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## Service

### Conference Organization

- **Program Committees**: PLDI ’25, SBLP ’25
- **Organizing Committees**: [ML4PL ’18](#), [PLC ’17](#)
- **Artifact Evaluation Committee**: [ICFP ’22](#)
- **Web Co-Chair**: [ETAPS ’19](#)
- **Student Volunteer**: ECOOP ’18, SPLASH ’18, ICFP ’20, ’21

### Book Translations (English to Russian)

- Dowek, Gilles, Levy, Jean-Jacques. Introduction to the Theory of Programming Languages. / Springer. 2011. Russian translation together with V. Bragilevsky. Published by DMK Press in 2013. [Link to web page](#), [link to Google Books preview](#).
- Bird, Richard. Pearls of Functional Algorithm Design. / Cambridge University Press. 2010. Russian translation together with V. Bragilevsky. Published by DMK Press in 2013. [Link to web page](#), [link to Google Books preview](#).

## Open Source Software Contributions

<a href="#">Cabal</a>	Contributor, maintainer, release manager for the Haskell build system Cabal ( <a href="#">10+ commits</a> )
<a href="#">GHC</a>	Contributor to the Glasgow Haskell Compiler ( <a href="#">10+ commits</a> )
<a href="#">BNFC-meta</a>	Maintainer of the Haskell BNFC-meta package for embedding BNF grammars into source via Template Haskell
<a href="#">Monads.jl</a>	Maintainer for Julia Mondas.jl package implementing monadic do-notation for the Julia programming language

## Pet Projects

<a href="#">covid-19-in-russia</a>	Updating the Wikipedia table showing dynamics of COVID-19 in Russia by region / Julia, 2020
<a href="#">tiger-test</a>	The v2 of check-test (see below) developed at NEU / Haskell, 2019
<a href="#">subtype-fuzzer</a>	A fuzzer to test a tricky subtype relation as found in the Julia programming language / Haskell, 2018
<a href="#">chek-test</a>	Remove groove from checking students' submissions / Haskell, 2016
<a href="#">cpp-mv-poly</a>	C++-implementation of multivariate polynomials and the BMS-algorithm massively using C++ templates
<a href="#">mmcs-entrance</a>	Generation of entrance diagrams (in PNG) in MMCS/SFedU from official data (XLS) / Java, 2010
<a href="#">lj-comments-notifier</a>	Notifications about new comments in some livejournal.com-based blog / Haskell, 2011
<a href="#">Project Euler</a>	Link to the participant record / Haskell (mostly), C++
<a href="#">Me @ GitHub</a>	ulysses4ever

## Computer skills

Programming languages	Proficient: Haskell, Julia; Experienced: C++, Java, C, Pascal; Familiar: Scala, C#
Markup, Scripting	<b>LaTeX</b> , HTML, CSS, JavaScript, PHP, bash, Regular expressions
Environment	Git, Make, Nix, Emacs, Wiki/Markdown
Operating systems	<b>GNU/Linux family</b> , Windows family

## Awards, Scholarships, etc.

- 2012 **Participation in all-russian final of international student olympiad "IT-planet"**, competition: "Oracle Java Olympic"
- 2012 **Diploma for taking second place in regional stage of international student olympiad "IT-planet"**, competition: "Oracle Java Olympic"
- 2012 **Participation in the final stage of VI Open Programming Contest of Southern Federal University**, individual event
- 2011 **Scholarship from foundation "Education and Science on the South of Russia"**
- 2011 **Rector's commendation for participating in international accreditation of university teaching programmes**, *Southern Federal University*
- 2008 **Diploma for the best talk**, *student session during annual "Week of Science", Southern Federal University*

## Personal Info

Gender	Male
Pronouns	He/His/him
Marital status	Married to <a href="#">Julia Belyakova</a>
Current place of living	Lafayette, IN, USA
Citizenship, Homeland	Russia
Name spelling	To reflect the reality, my first name transliteration should be, in fact, something like Artyom. Also, there is no 'ch' sound after the 'r' sound — just 't'.
Languages	Russian: Native; English: Advanced