

Jahresbericht 2019

Fachgebiet Software-Architekturen

Prof. Dr. Robert Hirschfeld



Hasso-Plattner-Institut
Digital-Engineering-Fakultät
Universität Potsdam

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<https://www.hpi.uni-potsdam.de/swa>

1. März 2020

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1 Personelle Zusammensetzung

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1 Personelle Zusammensetzung

Richard P. Gabriel, Ph.D.
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Tutoren und Studentische Hilfskräfte

Tom Beckmann
Leon Bein
Joana Bergsiek
Tom Braun
Jonas Chromik
Justus Eilers
Christian Flach
Tim Garrels
Eva Krebs
Pius Ladenburger
Stephan Lutz
Leon Matthes
Alexander Meissner
Martin Stamm
Christoph Thiede
Kira Weinlein
Tobias Zagorni

Schülerpraktikanten

Pauline Lincke

2 Lehrveranstaltungen

Wintersemester 2019/2020 (18 SWS)

Programming Experience (4 SWS, Projektseminar, Master)
Hirschfeld, Lincke, Niephaus, Rein

Reactive Programming (4 SWS, Projektseminar, Master)
Hirschfeld, Ramson, Taeumel

Software Architecture (4 SWS, Vorlesung, Bachelor)
Hirschfeld, Rein, Taeumel, Lincke, Ramson, Mattis, Niephaus, Pape, Henning

Graduate School Research Seminar (2 SWS, Forschungskolleg)
Polze, Hirschfeld

Software Development Tools for Polyglot Programming (2 SWS, Masterprojekt)
Hirschfeld, Niephaus, Felgentreff

Exploring Provenance Through Programming (2 SWS, Bachelorprojekt)
Hirschfeld, Lincke, Rein

Summer term 2019 (22 SWS)

Software Engineering 1 (4 SWS, Vorlesung, Bachelor)
Hirschfeld, Rein, Pape, Lincke, Taeumel, Henning, Ramson

Polyglot Programming (4 SWS, Projektseminar, Master)
Hirschfeld, Niephaus, Felgentreff

Software Design (4 SWS, Projektseminar, Master)
Hirschfeld, Rein, Lincke, Ramson

Virtual Execution Environments (4 SWS, Vorlesung, Master)
Hirschfeld, Niephaus, Pape, Henning, Felgentreff

2 Lehrveranstaltungen

Graduate School Research Seminar (2 SWS, Forschungskolleg)
Polze, Hirschfeld

Design and Implementation of a Live Programming Tool Set for Heterogeneous Simulations in Squeak/Smalltalk (2 SWS, Masterprojekt)
Hirschfeld, Rein, Ramson

Blocks to the Rescue (2 SWS, Bachelorprojekt)
Hirschfeld, Taeumel, Mattis, Ramson, Rein

Wintersemester 2018/2019 (16 SWS)

Introduction to Programming Technology 1 (4 SWS, Vorlesung, Bachelor)
Hirschfeld, Pape, Mattis, Henning, Niephaus, Taeumel, Ramson, Felgentreff

Reverse Engineering (4 SWS, Projektseminar, Master)
Hirschfeld, Lincke, Rein, Ramson, Taeumel, Matthis, Pape, Niephaus, Henning

Software Architecture (4 SWS, Vorlesung, Bachelor)
Hirschfeld, Rein, Taeumel, Lincke, Ramson, Mattis, Niephaus, Pape, Henning

Graduate School Research Seminar (2 SWS, Forschungskolleg)
Polze, Hirschfeld

Blocks to the Rescue (2 SWS, Bachelorprojekt)
Hirschfeld, Taeumel, Mattis, Ramson, Rein

3 Promotionsvorhaben

Abgeschlossene Promotionsvorhaben

Marcel Taeumel (Januar 2020)

Data-driven Tool Construction in Exploratory Programming Environments.

Laufende Promotionsvorhaben

Johannes Henning

Programming Language and Runtime Support for Database Analytics.

Toni Mattis

Supporting Program Comprehension Through Semantic Code Models.

Eliot Miranda

Register Allocation in the Context of Sista/Scorch.

Fabio Niephaus

Live Multi-language Development and Run-time Environments.

Tobias Pape

Efficient Compound Values in Virtual Machines.

Stefan Ramson

Active Expressions as a Basic Building Block for Reactive Programming Concepts.

Patrick Rein

Language Exploration and Development Environments.

Marcel Weiher (extern)

Linguistic Architectural Support for Interactive Software.

4 Abschlussarbeiten

Masterarbeiten

Friedrich Carl Schöne

Fast Packrat Parsing in a Live Programming Environment: Design and Implementation of Mechanisms to Optimize Left-recursion Handling in Parsing Expression Grammars

Betreuer: Robert Hirschfeld, Patrick Rein

Falco Dürsch

Learning from Failure: A History-based, Lightweight Test Prioritization Technique Connecting Software Changes to Test Failures

Betreuer: Robert Hirschfeld, Toni Mattis, Patrick Rein

Niklas Hoffmann

Auf dem Weg zu einer ausführbaren und umfassenden Checkliste für Benchmarks

Betreuer: Robert Hirschfeld, Patrick Rein

Daniel Stolpe

Graal-LSP: A Language Server Implementation with Polyglot Support for the GraalVM

Betreuer: Robert Hirschfeld, Tim Felgentreff, Fabio Niephaus

Bachelorarbeiten

Leon Bein

Visuelle Codierung nichtlinearen Programmflusses mithilfe des SandBlocks-Systems

Betreuer: Robert Hirschfeld, Marcel Taeumel, Toni Mattis, Stefan Ramson, Patrick Rein

Tom Braun

Konzepte zur Entwicklung einer visuellen Sprache zur Beschreibung und Anwendung von Softwareentwurfsmustern am Beispiel des Observers in Squeak/Smalltalk

Betreuer: Robert Hirschfeld, Marcel Taeumel, Toni Mattis, Stefan Ramson, Patrick Rein

Björn Daase

Erweiterung eines textorientierten Compilers für die Verarbeitung visueller Programmelemente

Betreuer: Robert Hirschfeld, Marcel Taeumel, Toni Mattis, Stefan Ramson, Patrick Rein

Elina Emsbach

Erweiterung einer textuellen Programmiersprache um visuelle Elemente: Vorstellung eines Konzepts heterogener Programmierung

Betreuer: Robert Hirschfeld, Marcel Taeumel, Toni Mattis, Stefan Ramson, Patrick Rein

Leon Matthes

Objekte Serialisieren und Austauschen: Heterogener, visueller Programmcode in Squeak/Smalltalk

Betreuer: Robert Hirschfeld, Marcel Taeumel, Toni Mattis, Stefan Ramson, Patrick Rein

Maximilian Stiede

SandBlocks: Integration grafischer, ausführbarer Objekte in die Live-Programmierungsumgebung Squeak/Smalltalk

Betreuer: Robert Hirschfeld, Marcel Taeumel, Toni Mattis, Stefan Ramson, Patrick Rein

5 Master- und Bachelorprojekte

Masterprojekt 2019/2020

Software Development Tools for Polyglot Programming.

Polyglot programming is the practice of writing code in multiple programming languages, which gives software engineers a much broader choice in terms of software libraries and frameworks they can use for building applications. In this project, we will explore the domain of polyglot programming with focus on the programming experience. In particular, we will design and build software development tools that support developers in writing polyglot applications. For this, we will use GraalVM and GraalSqueak. Students should be familiar with Smalltalk and at least one of the following programming languages: C, C++, Java, JavaScript, Python, R, Ruby (in alphabetical order).

Teilnehmer: Nico Scordialo, Bastian König, Jonas Hering, Jakob Edding, Kolya Opahle

Betreuer: Robert Hirschfeld, Fabio Niephaus, Tim Felgentreff

Masterprojekt 2019

Design and Implementation of a Live Programming Tool Set for Heterogeneous Simulations in Squeak/Smalltalk.

In this project, we will design and implement a tool set to enable a live programming workflow for working on simulations with heterogeneous objects in an educational setting. To support a large variety of object behaviors, the tool set will be based on the entity component system (ECS) architectural style. In the course of this project, we will review the problem domain of programming-based learning environments, such as Scratch, Etoys, Kedama, and StarLogo, and the design space of programming tools for heterogeneous simulations. Based on these insights, we will design, implement, and evaluate the tool set in the Squeak/Smalltalk live programming environment.

Teilnehmer: Tom Beckmann, Christian Flach, Eva Krebs

Betreuer: Robert Hirschfeld, Patrick Rein, Stefan Ramson, Marcel Taeumel

Bachelorprojekt 2019/2020

Exploring Provenance Through Programming: Incorporating Data Provenance Into Heterogeneous Data Visualizations in the Context of Africa's Voices Foundation.

In this project, students will explore how the provenance of data can be made explorable in visualizations for data of the Africa's Voices Foundation (AVF) to support decision making beyond pre-figured questions. Therefore, the students will build a platform that supports new and unforeseen visualizations of data to be built, as well as constructing several examples: explore means for exploring the provenance of parts of visualizations; implement a domain model for working with the AVF provenance data; design and implement means to support programming visualizations which allow the exploration of data provenance; design and implement means to use components developed from within Lively 4 independently; design and Implement example interactive visualizations based on data from AVF.

Partner: Luke Church (Africa's Voices Foundation, Cambridge, U.K.)

Teilnehmer: Wanda Baltzer, Theresa Hradilak, Lara Pfennigschmidt, Luc Prestin, Moritz Spranger, Simon Stadlinger, Leo Wendt

Betreuer: Robert Hirschfeld, Jens Lincke, Patrick Rein, Marcel Taeumel, Toni Mattis, Stefan Ramson

Bachelorprojekt 2018/2019

Blocks to the Rescue: Live Exploration of an Interactive Environment to Support Education, Construction, and Reflection in Program Design.

In this project, students will explore implementation strategies and application domains of block-based languages. Drawing from the design of the existing approaches such as Scratch and Snap!, they will extend the Squeak/Smalltalk live programming system to support the block-based paradigm as a flexible mechanism complementary to the Morphic graphics framework. The following goals form the starting point in this project and are likely to be refined and extended: design and implement a new block-based scripting system in Squeak/Smalltalk; explore means to construct sophisticated object state such as pre-scripted sprites; explore means to construct sophisticated object behavior such as custom blocks; refine the script execution model considering concurrency and reflection; explore trade-offs in visual programming to teach messaging and objects.

Partner: Jens Mönig (SAP Knowledge and Education, Walldorf)

Teilnehmer: Leon Bein, Tom Braun, Björn Daase, Elina Emsbach, Leon Matthes, Maximilian Stiede

Betreuer: Robert Hirschfeld, Marcel Taeumel, Toni Mattis, Stefan Ramson, Patrick Rein

6 Bearbeitete Forschungsthemen

Forschungsthemen

Software Modularity
Context-oriented Programming
Meta-level Architectures
Exploratory Programming
Live Programming
Babylonian Programming
Programming Languages
Polyglot Programming
Reactive Programming
Virtual Machines and Execution Environments
Code Repository Mining
Statistical Code Repository Analysis and Machine Learning

Anwendungsbereiche

Education
End-user Development
Programming Environments and Tool Support
Design Thinking for Programming Activities
Cloud Programming Environments
Personal Productivity Programming

Technologien

Squeak/Smalltalk
LivelyKernel, JavaScript
Vivide, VivideJS
GaalSqueak, GraalVM+Truffle
RSqueak, PyPy
Gramada, Ohm
Babelsberg Home

7 Veröffentlichungen

Zeitschriften und Konferenzen (begutachtet)

Fabio Niephaus, Tim Felgentreff, and Robert Hirschfeld. *GraalSqueak: Toward a Smalltalk-based Tooling Platform for Polyglot Programming*. In Proceedings of the International Conference on Managed Programming Languages and Runtimes (MPLR) 2019, co-located with the Conference on Object-oriented Programming, Systems, Languages, and Applications (OOPSLA), pages 14–26, Athens, Greece, October 21, 2019, ACM DL.

Marcel Weiher and Robert Hirschfeld. *Storage Combinators*. In Proceedings of the ACM Symposium for New Ideas, New Paradigms, and Reflections on Everything to do with Programming and Software (Onward!) 2019, co-located with the Conference on Object-oriented Programming, Systems, Languages, and Applications (OOPSLA), pages 111–127, Athens, Greece, October 23–25, 2019, ACM DL.

Daniel Stolpe, Tim Felgentreff, Christian Humer, Fabio Niephaus, and Robert Hirschfeld. *Language-independent Development Environment Support for Dynamic Runtimes*. In Proceedings of the Dynamic Languages Symposium (DLS) 2019, co-located with the Conference on Object-oriented Programming, Systems, Languages, and Applications (OOPSLA), pages 80–90, Athens, Greece, October 20, 2019, ACM DL.

Marcel Weiher and Robert Hirschfeld. *Standard Object Out: Streaming Objects with Polymorphic Write Streams*. In Proceedings of the Dynamic Languages Symposium (DLS) 2019, co-located with the Conference on Object-oriented Programming, Systems, Languages, and Applications (OOPSLA), pages 104–116, Athens, Greece, October 20, 2019, ACM DL.

Corinna Jaschek, Tom Beckmann, Jaime A. Garcia, and William L. Raffe. *Mysterious Murder: MCTS-driven Murder Mystery Generation*. In Proceedings of the IEEE Conference on Games (GOG) 2019, 8 pages, London, UK, August 20–23, 2019, IEEE.

Richard P. Gabriel and Jenny Quillien. *A Search for Beauty / A Struggle with Complexity: Christopher Alexander*. Urban Science Journal, vol. 3, no. 2, 32 pages, 2019.

David Rauch, Patrick Rein, Stefan Ramson, Jens Lincke, and Robert Hirschfeld. *Babylonian-style Programming: Design and Implementation of an Integration of Live Examples Into General-purpose Source Code*. Journal on The Art, Science, and Engineering of Programming, vol. 3, no. 3, art. 9, 39 pages, 2019.

Workshops (begutachtet)

Toni Mattis, Patrick Rein, and Robert Hirschfeld. *Ambiguous, Informal, and Unsound: Metaprogramming for Naturalness*. In Proceedings of the Workshop on Metaprogramming Techniques and Reflection (META) 2019, co-located with the Conference on Object-oriented Programming, Systems, Languages, and Applications (OOPSLA), 10 pages, Athens, Greece, October 20, 2019, ACM DL.

Tom Beckmann, Christian Flach, Eva Krebs, Stefan Ramson, Patrick Rein, and Robert Hirschfeld. *An Exploratory Literature Study on Live-Tooling in the Game Industry*. In Proceedings of the Workshop on Live Programming Systems (LIVE) 2019, co-located with the Conference on Object-oriented Programming, Systems, Languages, and Applications (OOPSLA), 6 pages, Athens, Greece, October 20, 2019.

Johannes Henning, David Stangl, Fabio Niephaus, Bastian Kruck, and Robert Hirschfeld. *Hot Code Patching in CPython: Supporting Edit-and-Continue Debugging in CPython With Less Than 300 Lines of Code*. In Proceedings of the Workshop on Implementation, Compilation, Optimization of Object-Oriented Languages, Programs, and Systems (ICOOOLPS) 2019, co-located with the European Conference on Object-oriented Programming (ECOOP), 7 pages, London, UK, July 19, 2019, ACM DL.

Patrick Rein, Jens Lincke, Stefan Ramson, Toni Mattis, Fabio Niephaus, and Robert Hirschfeld. *Implementing Babylonian/S by Putting Examples Into Contexts: Tracing Instrumentation for Example-based Live Programming as a Use Case for Context-oriented Programming*. In Proceedings of the Workshop on Context-oriented Programming (COP) 2019, co-located with the European Conference on Object-oriented Programming (ECOOP), London, UK, July 15, 2019, ACM DL.

Tobias Pape, Tim Felgentreff, Fabio Niephaus, and Robert Hirschfeld. *Let Them Fail: Towards VM built-in Behavior That Falls Back to the Program*. In Proceedings of the Salon des Refusés (SDR) 2019 Workshop, companion volume to International Conference on the Art, Science, and Engineering of Programming (⟨Programming⟩), co-located with the International Conference on the Art, Science, and Engineering of Programming (⟨Programming⟩), 7 pages, Genova, Italy, April 1, 2019, ACM DL.

Fabio Niephaus, Tim Felgentreff, Tobias Pape, and Robert Hirschfeld. *Efficient Implementation of Smalltalk Activation Records in Language Implementation Frameworks*. In Proceedings of the Workshop on Modern Language Runtimes, Ecosystems, and VMs (MoreVMs) 2019, companion volume to International Conference on the Art, Science, and Engineering of Programming (⟨Programming⟩), co-located with the International Conference on the Art, Science, and Engineering of Programming (⟨Programming⟩), 3 pages, Genova, Italy, April 1, 2019, ACM DL.

Fabio Niephaus, Tim Felgentreff, and Robert Hirschfeld. *Towards Polyglot Adapters for the GraalVM*. In Proceedings of the Interconnecting Code Workshop (ICW) 2019,

companion volume to International Conference on the Art, Science, and Engineering of Programming (⟨Programming⟩), co-located with the International Conference on the Art, Science, and Engineering of Programming (⟨Programming⟩), 3 pages, Genova, Italy, April 1, 2019, ACM DL.

Fabio Niephaus, Eva Krebs, Christian Flach, Jens Lincke, and Robert Hirschfeld. *PolyJuS: A Squeak/Smalltalk-based Polyglot Notebook System for the GraalVM*. In Proceedings of the Programming Experience 2019 (PX/19) Workshop, companion volume to International Conference on the Art, Science, and Engineering of Programming (⟨Programming⟩), co-located with the International Conference on the Art, Science, and Engineering of Programming (⟨Programming⟩), 6 pages, Genova, Italy, April 1, 2019, ACM DL.

Toni Mattis, Falco Dürsch, and Robert Hirschfeld. *Faster Feedback Through Lexical Test Prioritization*. In Proceedings of the Programming Experience 2019 (PX/19) Workshop, companion volume to International Conference on the Art, Science, and Engineering of Programming (⟨Programming⟩), co-located with the International Conference on the Art, Science, and Engineering of Programming (⟨Programming⟩), 10 pages, Genova, Italy, April 1, 2019, ACM DL.

Student Research Competitions (begutachtet)

Patrick Rein. *Reading Logic as Code or as Natural Language Text*. ACM Student Research Competition (*First Place, Graduate Category*), In companion volume to International Conference on the Art, Science, and Engineering of Programming (⟨Programming⟩), 3 pages, Genova, Italy, April 1–4, 2019, ACM DL.

Buchkapitel

Patrick Rein, Marcel Taeumel, and Robert Hirschfeld. *Towards Empirical Evidence on the Comprehensibility of Natural Language Versus Programming Language*. In Christoph Meinel and Larry Leifer (eds.). *Design Thinking Research: Investigating Design Team Performance*. pages 111–131, Springer 2019.

Technische Berichte

Tom Beckmann, Justus Hildebrand, Corinna Jaschek, Eva Krebs, Alexander Löser, Marcel Taeumel, Tobias Pape, Lasse Fister, and Robert Hirschfeld. *The Font Engineering Platform: Collaborative Font Creation in a Self-supporting Programming Environment*. HPI Technical Reports, vol. 128, 2019, Hasso Plattner Institute.

Sonstiges

Luke Church, Richard P. Gabriel, Hidehiko Masuhara, and Robert Hirschfeld. *PX/19 (Chairs' Welcome)*. In Proceedings of the Programming Experience 2019 (PX/19) Workshop, companion volume to International Conference on the Art, Science, and Engineering of Programming (⟨Programming⟩), co-located with the International Conference on the Art, Science, and Engineering of Programming (⟨Programming⟩), pages xiii–xv, Genova, Italy, April 1, 2019, ACM DL.

Luke Church, Richard P. Gabriel, Robert Hirschfeld, and Hidehiko Masuhara. *Self-supporting, Extensible Programming Languages and Environments for Exploratory, Live Software Development*. NII Shonan Meeting Report No. 2019-147, National Institute of Informatics, 2-1-2 Hitotsubashi, Chiyoda-Ku, Tokyo, Japan, February 25–28, 2019 (ISSN 2186-7437).

Fachgebiet Software-Architekturen. *Jahresbericht 2018*. Hasso-Plattner-Institut, Digital-Engineering-Fakultät, Universität Potsdam, 2019.

8 Vorträge auf Tagungen

Fabio Niephaus, Tim Felgentreff, and Robert Hirschfeld. *GraalSqueak: Toward a Smalltalk-based Tooling Platform for Polyglot Programming*. Conference on Managed Programming Languages and Runtimes (MPLR) 2019, Athens, Greece, October 21, 2019.

Marcel Weiher and Robert Hirschfeld. *Storage Combinators*. Symposium for New Ideas, New Paradigms, and Reflections on Everything to do with Programming and Software (Onward!) 2019, Athens, Greece, October 23–25, 2019.

Daniel Stolpe, **Tim Felgentreff**, Christian Humer, Fabio Niephaus, and Robert Hirschfeld. *Language-independent Development Environment Support for Dynamic Runtimes*. Dynamic Languages Symposium (DLS) 2019, Athens, Greece, October 20, 2019.

Marcel Weiher and Robert Hirschfeld. *Standard Object Out: Streaming Objects with Polymorphic Write Streams*. Dynamic Languages Symposium (DLS) 2019, Athens, Greece, October 20, 2019.

Toni Mattis, Patrick Rein, and Robert Hirschfeld. *Ambiguous, Informal, and Unsound: Metaprogramming for Naturalness*. Workshop on Metaprogramming Techniques and Reflection (META) 2019, Athens, Greece, October 20, 2019.

Tom Beckmann, Christian Flach, Eva Krebs, Stefan Ramson, **Patrick Rein**, and Robert Hirschfeld. *An Exploratory Literature Study on Live-Tooling in the Game Industry*. Workshop on Live Programming Systems (LIVE) 2019, Athens, Greece, October 20, 2019.

Fabio Niephaus. *Polyglot Notebooks with Squeak/Smalltalk on the GraalVM*. Conference of the European Smalltalk User Group (ESUG) 2019. Cologne, Germany, August 30, 2019.

Corinna Jaschek, **Tom Beckmann**, Jaime A. Garcia, and William L. Raffe. *Mysterious Murder: MCTS-driven Murder Mystery Generation*. IEEE Conference on Games (GOG) 2019, London, UK, August 20–23, 2019.

Johannes Henning, David Stangl, Fabio Niephaus, **Bastian Kruck**, and Robert Hirschfeld. *Hot Code Patching in CPython: Supporting Edit-and-Continue Debugging in CPython With Less Than 300 Lines of Code*. Workshop on Implementation, Compilation, Optimization of Object-Oriented Languages, Programs, and Systems (ICOOOLPS) 2019, London, UK, July 19, 2019.

Patrick Rein, Jens Lincke, Stefan Ramson, Toni Mattis, **Fabio Niephaus**, and Robert Hirschfeld. *Implementing Babylonian/S by Putting Examples Into Contexts: Tracing Instrumentation for Example-based Live Programming as a Use Case for Context-oriented Programming*. Workshop on Context-oriented Programming (COP) 2019, London, UK, July 15, 2019.

Tobias Pape, Tim Felgentreff, Fabio Niephaus, and Robert Hirschfeld. *Let Them Fail: Towards VM built-in Behavior That Falls Back to the Program*. Salon des Refusés (SDR) 2019 Workshop, Genova, Italy, April 1, 2019.

David Rauch, Patrick Rein, Stefan Ramson, **Jens Lincke**, and Robert Hirschfeld. *Babylonian-style Programming: Design and Implementation of an Integration of Live Examples Into General-purpose Source Code*. International Conference on the Art, Science, and Engineering of Programming (⟨Programming⟩), Genova, Italy, April 1, 2019.

Fabio Niephaus, Tim Felgentreff, Tobias Pape, and Robert Hirschfeld. *Efficient Implementation of Smalltalk Activation Records in Language Implementation Frameworks*. Workshop on Modern Language Runtimes, Ecosystems, and VMs (MoreVMs) 2019, Genova, Italy, April 1, 2019.

Fabio Niephaus, Tim Felgentreff, and Robert Hirschfeld. *Towards Polyglot Adapters for the GraalVM*. Interconnecting Code Workshop (ICW) 2019, Genova, Italy, April 1, 2019.

Fabio Niephaus, Eva Krebs, Christian Flach, Jens Lincke, and Robert Hirschfeld. *PolyJuS: A Squeak/Smalltalk-based Polyglot Notebook System for the GraalVM*. Programming Experience 2019 (PX/19) Workshop, Genova, Italy, April 1, 2019.

Toni Mattis, Falco Dürsch, and Robert Hirschfeld. *Faster Feedback Through Lexical Test Prioritization*. Programming Experience 2019 (PX/19) Workshop Genova, Italy, April 1, 2019.

Patrick Rein. *Reading Logic as Code or as Natural Language Text*. Conference on the Art, Science, and Engineering of Programming (⟨Programming⟩), Genova, Italy, April 1, 2019.

Marcel Taeumel. *How to Guide the Discovery and Training of Exploratory Practices?* Shonan Meeting No.147 on Self-supporting, Extensible Programming Languages and Environments for Exploratory, Live Software Development. Shonan Village, Japan, February 26, 2019.

Stefan Ramson. *Active Expressions as a Basic Building Block for Reactive Programming Concepts* Shonan Meeting No.147 on Self-supporting, Extensible Programming Languages and Environments for Exploratory, Live Software Development. Shonan Village, Japan, February 26, 2019.

Patrick Rein. *Leveraging Examples for Live Programming Tools* Shonan Meeting No.147 on Self-supporting, Extensible Programming Languages and Environments for Exploratory, Live Software Development. Shonan Village, Japan, February 26, 2019.

Fabio Niephaus. *Polyglot Programming Experience* Shonan Meeting No.147 on Self-supporting, Extensible Programming Languages and Environments for Exploratory, Live Software Development. Shonan Village, Japan, February 26, 2019.

Jens Lincke. *Lively4: An Exploratory Web-Programming Environment* Shonan Meeting No.147 on Self-supporting, Extensible Programming Languages and Environments for Exploratory, Live Software Development. Shonan Village, Japan, February 26, 2019.

Toni Mattis. *Semantic Code Models for Better Modularity and Program Comprehension* Shonan Meeting No.147 on Self-supporting, Extensible Programming Languages and Environments for Exploratory, Live Software Development. Shonan Village, Japan, February 26, 2019.

9 Organisation von und Teilnahme an HPI-Workshops

HPI-SAP Graduate School Workshop

2019-12-09–11

New York City, New York, USA

HPI-University of Cape Town Graduate School Workshop

2019-11-04–06

Cape Town, South Africa

HPI-Stanford Design Thinking Research Workshop

2019-09-09–11

Potsdam, Germany

HPI-Nanjing University Graduate School Workshop

2019-09-03–04

Nanjing, China

Gemeinsamer Workshop der DFG Graduiertenkollegs

2019-06-16–19

Schloss Dagstuhl, Germany

14th Symposium on Future Trends in Service-oriented Computing 2019

2019-04-10–12

Hasso Plattner Institute, Potsdam, Germany

HPI-Stanford Design Thinking Research Workshop

2019-03-04–06

Stanford, California, USA

10 Vorträge von Gästen des Fachgebiets

Dr. Roly Perera (The Alan Turing Institute, UK)

2019-06-24-27

Change Provenance for Data Science.

Sebastián Krynski (University of Buenos Aires, Argentina)

2019-05-29

Orthogonal Synchronization for Software Services.

Mario Wolczko, Ph.D. (Oracle Labs, Redwood Shores, California, USA)

2019-05-14-17

Polyglot Programming.

Luke Church (University of Cambridge, UK)

2019-04-11

Using Socio-Technical Design to Improve the Service of Humanitarian Interventions
Symposium on Future Trends in Service-oriented Computing.

Mariana Mărășoiu (University of Cambridge, UK)

2019-04-10

Supporting the Work of Data Analytics and Visualisation (Keynote)

Doctoral Symposium, Future Trends in Service-oriented Computing.

Prof. Shriram Krishnamurthi, Ph.D. (Brown University)

2019-03-25

Desugaring as a Language Feature.

11 Partner

Africa's Voices Foundation
<https://www.africasvoices.org>

Bedarra Research Labs, Ottawa, Ontario, Canada
<http://www.bedarra.org>

DOCOMO Euro-Labs, Munich, Germany
<http://www.docomoeurolabs.de>

Dreamsongs, Redwood City, California, USA
<https://www.dreamsongs.com>

eXXcelent solutions, Ulm, Germany
<http://www.exxcelent.de>

GemTalk Systems, Beaverton, Oregon, USA
<http://www.gemtalksystems.com>

graphicore, Fürth, Germany
<http://www.graphicore.de>

HARC, Y Combinator Research, San Francisco, California, USA
<https://harc.ycr.org/member>

impara, Magdeburg, Germany
<http://www.impara.de>

Industrial Design Institute, Magdeburg, Germany
<http://www.gestaltung.hs-magdeburg.de>

Instantiations, Raleigh, North Carolina, USA
<https://www.instantiations.com>

Kyoto University, 京都大学, Kyoto, Japan
<http://www.kyoto-u.ac.jp>, <http://www.sato.kuis.kyoto-u.ac.jp>

Kyushu University, 九州大学, Fukuoka, Japan
<https://www.kyushu-u.ac.jp>

Oracle Labs Potsdam, Germany
<https://labs.oracle.com>

Oracle Labs Redwood Shores, CA, USA
<https://labs.oracle.com>

Oracle Labs Zurich, Switzerland
<https://labs.oracle.com>

SAP Innovation Center, Potsdam, Germany
<https://icn.sap.com>

SAP Knowledge and Education, Walldorf, Germany
<https://www.sap.com>

SAP Palo Alto Research Center, Palo Alto, California, USA
<https://www.sap.com>

SEC-i SmartEnergy Control Initiative, Ilmenau, Germany
<http://www.sec-i.org>

Stanford University, Center for Design Research, Palo Alto, California, USA
<http://www-cdr.stanford.edu>

Steinmayr Net Intelligence, Bergisch Gladbach, Germany
<http://www.steinmayr.de>

Sun Microsystems Laboratories, Menlo Park, California, USA
<http://research.sun.com>

Technische Universität Darmstadt, Darmstadt, Germany
<http://www.stg.tu-darmstadt.de>

Teleplace, Redwood City, California, USA
<http://www.teleplace.com>

The University of Tokyo, 東京大学, Tokyo, Japan
<http://www.u-tokyo.ac.jp>, <https://www.csg.ci.i.u-tokyo.ac.jp>

Tokai University, 東海大学, Tokyo, Japan
<https://www.u-tokai.ac.jp>

Tokyo Institute of Technology, 東京工業大学, Tokyo, Japan
<https://www.titech.ac.jp>, <https://prg.is.titech.ac.jp>

Travis CI, Berlin, Germany
<https://travis-ci.com>

University of Antwerp, Antwerp, Belgium
<http://www.win.ua.ac.be>

University of Bern, Bern, Switzerland
<https://www.iam.unibe.ch/~scg>

University of Koblenz-Landau, Koblenz, Germany
<http://softlang.wikidot.com>

Viewpoints Research Institute, Glendale, California, USA
<http://www.vpri.org>

Vrije Universiteit Brussel, Brussels, Belgium
<https://soft.vub.ac.be>

VMware R&D, GemStone Systems, Beaverton, Oregon, USA
<http://www.gemstone.com>

Windward Solutions, Los Altos, California, USA
<http://www.windwardsolutions.com>

12 Open-Source-Projekte

Eigene Projekte

Lively4

The self-supporting web-based development environment Lively4 transfers Lively Kernel's live programming experience to newest web technology. By integrating Smalltalk-like tool support with Web Components and cloud storages, Lively4 encourages an exploratory style of programming and wiki-inspired collaboration between students.

<https://lively-kernel.org/lively4/lively4-core/start.html>

<https://github.com/LivelyKernel/lively4-core>

Vivide/VivideJS

A Squeak/Smalltalk-based programming environment and framework that supports low-effort construction of graphical tools by employing a data-driven perspective and a script-based programming model.

<https://github.com/hpi-swa/vivide>

<https://github.com/LivelyKernel/lively4-core/tree/gh-pages/src/client/vivide>

Squot and Squit

An object tracker for Squeak/Smalltalk allowing version control of arbitrary objects (Squot) with support for a Git backend (Squit) written Smalltalk.

<https://github.com/hpi-swa/Squot>

Ohm/S

A Squeak/Smalltalk implementation of the metaprogramming parser-generator framework Ohm.

<https://github.com/hpi-swa/Ohm-S>

Gramada

Gramada is an interactive development environment for programming languages defined in Ohm. It is based on Vivide and implemented in Squeak/Smalltalk.

<https://github.com/hpi-swa/Gramada>

GraalSqueak

An experimental virtual machine for Squeak/Smalltalk written in Truffle, the language implementation framework for GraalVM.

<https://github.com/hpi-swa/graalsqueak>

Home Desktop System

The Home System is a live, object-centric desktop system build on top of Squeak/Smalltalk. It is based upon the idea of representing data as living objects and allowing its users to adapt it to their needs without any restrictions.

<https://github.com/hpi-swa-lab/home-desktop-system/>

Animations

An extension for Squeak/Smalltalk that employs a simple programming model for adding animations to the Morphic framework.

<https://github.com/hpi-swa/animations>

Widgets

A set of graphical controls such as tree views, lists views, and buttons implemented in Squeak/Smalltalk using the Signals observer pattern.

<https://github.com/hpi-swa/widgets>

GlyphHub

Creating fonts is a complex task that requires expert knowledge in a variety of domains. GlyphHub is a platform that aims to enhance the means of communication by integrating complex font rendering and editing in a live environment, including an approach to generate code based on users' live edits.

<https://github.com/hpi-swa-lab/GlyphHub>

SandBlocks

An approach to combine both textual and visual elements in a shared programming system. Developers can rely on the familiar textual representation of source code but also leverage the programming experience with a visual language as needed.

<https://github.com/hpi-swa-lab/SandBlocks>

smalltalkCI

A framework for testing Smalltalk projects written in Squeak/Smalltalk, GemStone, and Pharo on Linux, macOS, and Windows. It provides support for Smalltalk on Travis CI and can be used with AppVeyor and other CI infrastructures.

<https://github.com/hpi-swa/smalltalkCI>

<https://docs.travis-ci.com/user/languages/smalltalk>

RSqueak/VM

A Squeak/Smalltalk virtual machine written in the language implementation framework RPython that allows for various research experiments such as performance optimizations and language compositions.

<https://github.com/hpi-swa/RSqueak>

Babelsberg

A formal design of Object-Constraint Programming with multiple implementations for object-constraint programming to integrate constraint declaration and continuous satisfaction with mutable object-oriented structures and behavior.

<https://github.com/babelsberg>

ContextJS

Context-oriented programming provides dedicated support for defining and composing variations to a basic program behavior. ContextJS implements context-oriented programming for JavaScript and introduces language abstractions to define a variety of scopes to dynamically adapt behavior variations at runtime.

<https://github.com/LivelyKernel/ContextJS>

<https://www.npmjs.com/package/contextjs>

SqueakJS

SqueakJS executes Squeak in a web page without a plugin. It is a fully capable virtual machine implemented in pure JavaScript running unmodified Squeak images. Squeak is a modern implementation of Smalltalk, the original dynamic object-oriented programming environment. It runs bit-identically on virtually any platform, and now in the web browser, too.

<https://github.com/bertfreudenberg/SqueakJS>

<https://squeak.js.org>

Lively Web

A browser-based runtime and development environment with live capabilities allowing to inspect and change applications and the system while it is running. Developers share applications and tools they created in Lively Web through an instance-based publication mechanism.

<https://lively-web.org/welcome.html>

<https://github.com/LivelyKernel/LivelyKernel>

Matriona

An experimental module system for Squeak/Smalltalk based on nested classes and inspired by Newspeak.

<https://github.com/hpi-swa/smalltalk-nested-classes>

SwaLint

An extendable code critics tool for Squeak/Smalltalk projects. Using object-oriented code metrics, SwaLint can give developers insight on the structure of their code and the architecture of their software. Codifying best-practices for Smalltalk programs, SwaLint is a hands-on tool to improve code quality.

<https://github.com/hpi-swa-teaching/SwaLint>

Community Code Project

A code review tool supporting ongoing collaborative discussions on code quality of a variety of meta objects such as packages, classes, protocols, and methods in the Squeak/Smalltalk environment.

<https://github.com/hpi-swa-lab/CommunityCodeReview>

Beiträge zu Projekten

Squeak/Smalltalk

An object-oriented, class-based, reflective, and self-sustaining programming system and a dialect of Smalltalk with support for live and exploratory programming.

<https://squeak.org>

OpenSmalltalk VM

The cross-platform virtual machine for Squeak, Pharo, Cuis, and Newspeak.

<https://github.com/OpenSmalltalk/opensmalltalk-vm>

SqueakSSL Plugin

A plugin for the OpenSmalltalkVM that provides an interface to the native SSL/TLS facilities with support for Windows, Unix, and MacOS.

<https://github.com/squeak-smalltalk/squeakssl>

SqueakCI

The base environment for running Squeak/Smalltalk continuous integration tests.

<https://github.com/squeak-smalltalk/squeak-ci>

Ohm

A library and language for building parsers, interpreters, compilers, and more.

<https://github.com/harc/ohm>

Graal

A dynamic compiler written in Java that integrates with the HotSpot JVM.

<https://github.com/oracle/graal>

Truffle

A framework for implementing languages and instruments that use Graal as a dynamic compiler.

<https://github.com/oracle/graal/tree/master/truffle>

Travis Build

A library used on Travis CI workers to generate build scripts. The library can be extended to provide community-supported languages such as Dart, R, and Smalltalk.

<https://github.com/travis-ci/travis-build>

PyPy

An alternative implementation of the Python programming language. It includes RPython, a translation and support framework for producing implementations of dynamic languages, emphasizing a clean separation between language specification and implementation aspects.

<http://pypy.org>

Topaz

A high-performance implementation of the Ruby programming language written in RPython.

<https://github.com/topazproject/topaz>

13 Drittmittelprojekte

HPI-Stanford Design Thinking Research Program, 12th Call (2019–2020)

Software Design in an Exploratory Culture: Toward a Pattern Language to Discover, Learn, and Communicate Exploratory Programming Practices.

Understanding unfolds only gradually. Because of that, software developers strive for simple and malleable design models and code elements to be able to react to insights and changes swiftly and concisely. While Design Thinking and agile development provide guidance mainly for user-centered and collaborative activities, processes and supporting technologies suitable for exploring complex problem domains and solution spaces have been neglected. With programming as theory building at the core of software system development, we want to apply the idea of pattern languages to capture and preserve original and modern exploratory programming practices. Based on the concise representation of each individual pattern, such a pattern language for exploratory programming can support developers discover, learn, and communicate best practices to arrive at and maintain a high-quality code base. We argue that software development will greatly benefit from such a synergy of insights from the Design Thinking and Design Patterns communities to provide means to explore interesting problem domains and propose meaningful software solutions more creatively and effectively.

Oracle Labs (2019)

Advancing the Polyglot Programming Experience.

A key part of the GraalVM ecosystem is its support for polyglot applications. Being able to use more than one language for building applications gives developers a much broader choice of tools and reusable software artifacts. However, the technology enabling this new style of programming requires the evaluation and creation of potentially novel APIs, tools, and architectural concepts to allow programmers to use it effectively. In this project, we work on a coherent programming experience for polyglot programming. We evaluate and advance polyglot programming with GraalVM in a series of tasks and exercises. We build polyglot applications and prototypes that showcase the capabilities of GraalVM for different use cases. Based on the lessons learned, we will work on tools, concepts, and APIs for an improved programming experience in a polyglot environment.

HPI-Stanford Design Thinking Research Program, 11th Call (2018–2019)

Can Design Thinking Improve Programming? III—Exploring Means to Grow a Shared Vocabulary Between Programmers and Domain Experts.

Software design projects are carried out by teams of experts from multiple professions, which need to establish a shared vocabulary to foster collaboration and focused discussions. Tacit knowledge impedes direct knowledge exchange and thus involves social interactions supported by design tools such as interviews, drawings, and tangible prototypes. Similarly, in software engineering, there are agile practices to cope with changing insights due to only slowly revealing, domain-specific details. Eventually, the executable code artifacts carry that vocabulary and describe the software. Thus, collaboration close to such artifacts can support knowledge exchange. In this project, we investigate the strategies non-programming experts apply when understanding source code. We derive techniques to represent readable, domain-specific expressions carried by general-purpose programming languages to reduce translation efforts and support collaboration. We enrich the text form with visual, yet executable, annotations to amplify the use of tangible artifacts. In addition to improving timeliness and quality, we expect domain experts to carry on adjusting domain-specific rules in the software product without the programmers' assistance.

14 Mitarbeit in Programmkomitees

ACM SIGPLAN Symposium on New Ideas in Programming and Reflections on Software (Onward!) 2019

2019-10-23–24 Co-located with SPLASH 2019, Athens, Greece

<https://2019.splashcon.org/track/splash-2019-Onward-papers/>

<https://2019.splashcon.org/track/splash-2019-Onward-Essays/>

Dynamic Languages Symposium (DLS) 2019

2019-10-22

Co-located with SPLASH 2019, Athens, Greece

<https://conf.researchr.org/home/dls-2019/>

Workshop on Meta-programming (META) 2019

2019-10-20–22

Co-located with SPLASH 2019, Athens, Greece

<https://2019.splashcon.org/home/meta-2019/>

Workshop on Live Programming (LIVE) 2019

2019-10-20–22

Co-located with SPLASH 2019, Athens, Greece

<https://2019.splashcon.org/home/live-2019/>

Workshop on Implementation, Compilation, Optimization of Object-Oriented Languages, Programs, and Systems (ICOOOLPS) 2019

2019-07-19

Co-located with ECOOP 2019, Hammersmith, London, UK

<https://2019.ecoop.org/home/ICOOOLPS-2019/>

Workshop on Context-oriented Programming (COP) 2019

2019-07-15

Co-located with ECOOP 2019, Hammersmith, London, UK

<https://2019.ecoop.org/home/COP-2019/>

International Workshop on Digital Enterprise Engineering and Architecture (IDEA) 2019

2019-06-26–28

Co-located with BIS 2019, Sevilla, Spain

<http://bis.ue.poznan.pl/bis2019/idea/>

International Conference on Enabling Technologies: Infrastructure for Collaborative Enterprises (WETICE) 2019

2019-06-12–14

Track on Validation of Safety critical Collaboration systems

Capri, Italy

Evaluation of Novel Approaches to Software Engineering (ENASE) 2019

2019-04-04–05

Heraklion, Crete, Greece

<http://www.enase.org/?y=2019>

Conference on the Art, Science, and Engineering of Programming (⟨Programming⟩) 2019

2019-04-01–04

Genova, Italy

<http://2019.programming-conference.org/>

Workshop on Modern Language Runtimes, Ecosystems, and VMs (MoreVMs) 2019

2019-04-02

Co-located with ⟨Programming⟩ 2019

Genova, Italy

<https://2019.programming-conference.org/track/MoreVMs-2019/>

Programming Experience Workshop (PX/19) 2019

2019-04-01

Co-located with ⟨Programming⟩ 2019

Genova, Italy

<https://2019.programming-conference.org/track/px-2019-papers/>

15 Begutachtungen und Gremientätigkeit

Begutachtungen

Tobias Pape

ACM Student Research Competition Grand Finals

Robert Hirschfeld

Aalto University, Finland

Association Internationale pour les Technologies Objets (AITO)

Deutsche Forschungsgesellschaft (DFG)

Deutscher Akademischer Austauschdienst (DAAD)

Deutsch-Amerikanische Fulbright- Kommission

Eidgenössische Technische Hochschule Zürich (ETH Zürich), Switzerland

Studienstiftung des deutschen Volkes

Vrije Universiteit Brussel, Belgium

Gutachten zu Bachelorarbeiten, Masterarbeiten und Dissertationen

Gutachten für Berufungsverfahren

Gremientätigkeit

Tobias Pape

Managing Editor, AOSA Programming Journal

Patrick Rein

Secretary, AOSA

Treasurer, AOSA

Marcel Taeumel

Member, Squeak Oversight Board

1. Vorsitzender, Squeak Deutschland e.V.

Jens Lincke

Organizing Committee Member, Workshop on Context-oriented Programming (COP)

Mitglied, Berufungskommission Design Thinking and Innovation Research

Mitglied, Berufungskommission Digital Energy – Infrastructure

Mitglied, Berufungskommission Digital Energy – Ubiquity

Fabio Niephaus

Organizing Committee Member, <Programming> 2019

Richard P. Gabriel

Steering Committee Member, ACM SIGPLAN Onward!

Steering Committee Member, AOSA

Advisory Board Member, AOSA Programming Journal

Organizing Committee Member, NII Shonan Meeting No. 147

Organizing Committee Member, Programming Experience Workshop (PX)

Robert Hirschfeld

Steering Committee Past-Chair, ACM SIGPLAN Onward!

Steering Committee Past-Chair, AOSA

Steering Committee Member, ACM SIGPLAN Dynamic Languages Symposium (DLS)

Advisory Board Member, AOSA Programming Journal

Managing Editor, AOSA Programming Journal

Organizing Committee Member, NII Shonan Meeting No. 147

Organizing Committee Member, Workshop on Context-oriented Programming (COP)

Organizing Committee Member, Programming Experience Workshop (PX)

Mitglied, Fakultätsrat der Digital-Engineering-Fakultät

Mitglied, Promotionsausschuss der Digital-Engineering-Fakultät

Mitglied, Entwicklungs- und Planungskommission der Universität Potsdam

Koordinator, HPI-Forschungskolleg

Vorsitzender, Berufungskommission Digital Energy – Infrastructure

Vorsitzender, Berufungskommission Digital Energy – Ubiquity

Vorsitzender, Berufungskommission Design Thinking and Innovation Research

Stellv. Vorsitzender, Berufungskommission Artificial Intelligence – Machine Learning

Stellv. Vorsitzender, Berufungskommission Artificial Intelligence – Intelligent Systems

Stellv. Vorsitzender, Berufungskommission Internet – Technology

Stellv. Vorsitzender, Berufungskommission Internet – Security

16 Tagungsorganisation

Jahresversammlung des Squeak Deutschland e.V.

2019-11-09

Hasso-Plattner-Institut, Potsdam

https://squeak.de/news/2019/08/20/squeak_treffen/

ACM SIGPLAN Symposium on New Ideas in Programming and Reflections on Software (Onward!) 2019

2019-10-23–25

Co-located with SPLASH 2019, Athens, Greece

<https://2019.splashcon.org/track/splash-2019-Onward-papers/>

ACM SIGPLAN Dynamic Languages Symposium (DLS) 2019

2019-10-22

Co-located with SPLASH 2019, Athens, Greece

<https://conf.researchr.org/home/dls-2019/>

Workshop on Context-oriented Programming (COP) 2019

2019-07-15

Co-located with ECOOP 2019, Hammersmith, London, UK

<https://2019.ecoop.org/home/COP-2019/>

Programming Experience Workshop (PX/19) 2019

2019-04-01

Co-located with <Programming> 2019, Genova, Italy

<http://programming-experience.org/px19/>

<https://2019.programming-conference.org/track/px-2019-papers/>

NII Shonan Meeting No. 147 on Exploratory and Live Software Development (ELSD)

2019-02-25–28

Shonan Village, Japan

<http://shonan.nii.ac.jp/seminar/147/>

17 Herausgeberschaft

Zeitschriften

Journal on The Art, Science, and Engineering of Programming

Tobias Pape und Robert Hirschfeld

<https://programming-journal.org/2019>

Tagungsbände

Proceedings of the *Workshop on Context-oriented Programming (COP) 2019*, co-located with the European Conference on Object-oriented Programming (ECOOP), London, UK, July 15, 2019, ACM DL.

Proceedings of the *Programming Experience 2019 (PX/19) Workshop*, co-located with the International Conference on the Art, Science, and Engineering of Programming (‘Programming’), Genova, Italy, April 1, 2019, ACM DL.

Web-Portale

Fachgebiet Software-Architekturen

<https://www.hpi.de/swa>

Programmiersprachen, -werkzeuge und -umgebungen

<https://squeak.org>

<https://squeak.de>

<https://squeak-ev.de>

<https://lively-kernel.org>

Zeitschriften

<https://programming-journal.org>

Konferenzen

<https://programming-conference.org>

<https://modularity.info>

<http://programming-experience.org>

<https://dynamic-languages-symposium.org>

<https://onward-conference.org>

Forschungsverbände

<https://aosa-inc.org>

Software-Repositories

<https://github.com/orgs/hpi-swa>

<https://github.com/orgs/hpi-swa-lab>

<https://github.com/orgs/hpi-swa-teaching>

<https://www.hpi.uni-potsdam.de/hirschfeld/squeaksource>

18 Mitgliedschaften

Robert Hirschfeld
ACM, AOSA, Squeak Deutschland e.V.

Jens Lincke
Squeak Deutschland e.V.

Toni Mattis
ACM

Fabio Niephaus
ACM, Squeak Deutschland e.V.

Tobias Pape
AOSA, Squeak Deutschland e.V.

Patrick Rein
ACM, AOSA, Squeak Deutschland e.V.

Marcel Taeumel
Squeak Deutschland e.V.

19 Auszeichnungen

Fabio Niephaus

ESUG Innovation Technology Award 2019

(Title of Submission: GraalSqueak–A Squeak/Smalltalk Implementation for the GraalVM).

Marcel Taeumel, Stephanie Platz, Bastian Steinert, Robert Hirschfeld, and Hidehiko Masuhara

Japan Society for Software Science and Technology (JSSST) 2019 Best Paper Award 2017

(Paper Title: Unravel Programming Sessions with THRESHER).

Patrick Rein

First Place, 2019 <Programming> ACM Student Research Competition

(Title of Submission: Reading Logic as Code or as Natural Language Text).

