Matthias Springer
シュプリンガー　マティアス

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───── Profile

I am a doctoral student in mathematical and computing sciences, interested in programming language design, modularity, compilers and interpreters, GPU computing, deep learning and database query processing. My research goal is to provide easy-to-use high-level programming languages for high-performance computing.

───── Education

Oct. 2015
- Sept. 2019
(preliminary)

Tokyo Institute of Technology 【東京工業大学】, *Meguro-ku, Tokyo, Japan*,
Programming Research Group, Dept. of Mathematical and Computing Sciences
Ph.D. Candidate, Doctor of Science, Academic advisor: Prof. Hidehiko Masuhara.
- ○ *Research areas:* Compilers, Program Optimization, GPGPU, Modularity, Context-oriented Programming
- ○ *Relevant coursework:* Programming Language Design, Practical Parallel Computing

Sept. 2014
- Sept. 2015

Hasso Plattner Institute, University of Potsdam, *Potsdam, Brandenburg, Germany*,
Master of Science, IT Systems Engineering, overall grade: 1.0 (A+).
- ○ *Master's project:* Spur to go faster: Low-level Functionality in a High-level Language
- ○ *Master's thesis:* Nested Class Modularity in Squeak/Smalltalk (supervised by Prof. Dr. Robert Hirschfeld)
- ○ *Relevant coursework:* VMs and Execution Environments, Context-oriented Programming

Sept. 2013
- June 2014

University of California, San Diego, *La Jolla, CA, United States*,
Visiting student, Department of Computer Science and Engineering, GPA: 4.0.
- ○ Full tuition and living expenses covered by *UC Education Abroad Program* and *DAAD Scholarship*
- ○ *Relevant coursework:* Advanced Compilers (CSE 131/231), Programming Languages (CSE 130/230), Adv. Algorithms (CSE 190/202/203A), Parallel Computation (CSE 260), Database Analytics (CSE 190)

Aug. 2010
- July 2013

Hasso Plattner Institute, University of Potsdam, *Potsdam, Brandenburg, Germany*,
Bachlor of Science, IT Systems Engineering, overall grade: 1.0 (A+), rank 1-3/74.
- ○ *Bachelor's project:* Evolving Applications: Object-migration with Ruby and GemStone
- ○ *Bachelor's thesis:* Inter-language Collaboration in an Object-oriented Virtual Machine Project and thesis supervised by Prof. Dr. Robert Hirschfeld, Tim Felgentreff, Tobias Pape
- ○ *Relevant coursework:* Software Architecture, Software Engineering I, Advanced Modularity, Database Systems I/II, Internet and WWW Technologies, Designing Interactive Systems (HCI)

───── Work Experience

2017, 2018
2016, 2014
(4 × 3 months)

Google Inc., *United States*, Software Engineering Intern.
- ○ [Summer 2018, Mountain View, CA; Host: DeLesley Hutchins] Working in Machine Perception, TBD.
- ○ [Summer 2017, Mountain View, CA; Host: DeLesley Hutchins] Working in Machine Perception on LLGTM (Low-level Library for Gradients, Tensors, and Matrices), a deep learning C++ framework for dynamic computation graphs. Implemented Eigen/CUDA kernels and TensorFlow kernel adapters.
- ○ [Summer 2016, Seattle, WA; Host: Vijay Menon] Part of the Dart programming language team. Working on a Dart-to-Java compiler, focusing on performance optimizations and language interoperability.
- ○ [Summer 2014, Boulder, CO; Host: Craig Wright] Working on a business event process engine for an internal Google payments system, using Megastore, F1/Spanner, Java and Guice.

Nov. 2015
- June 2017

Tokyo Institute of Technology, *Meguro-ku, Tokyo-to, Japan*, Research/Teaching Assistant.
TA for exchange students and university courses: Information Literacy (Prof. Morozov, Ph.D.)

April 2012
- March 2015

Hasso-Plattner-Institut für Softwaresystemtechnik GmbH, *Potsdam, Germany*, Teaching Assistant.
Lectures: Mathematics II (Dr. habil. Börner), Software Architecture (Prof. Dr. Hirschfeld), Software Engineering I (Prof. Dr. Hirschfeld)

Aug. 2012 - Oct. 2012	**Senacor Technologies AG**, *Munich, Germany*, Software Engineering Intern. Developed software components and tests for a service-oriented environment in the financial sector, using Java EE, the Spring Framework and Oracle database servers.
Aug. 2011 - Oct. 2011	**TNG Technology Consulting GmbH**, *Munich, Germany*, Software Engineering Intern. Developed plugins for Atlassian JIRA/Confluence (Subversion commit monitor) and Hudson/Jenkins (job status monitor). Set up an LDAP server for user authentification for SSH and Atlassian JIRA/Confluence.
July 2005	**Max Planck Computing & Data Facility (Rechenzentrum Garching)**, *Garching, Germany*, Intern.

Research Experience

Since Oct. 2014	**Programming Languages**, *Tokyo Institute of Technology / Hasso Plattner Institute*, Research with Prof. Hidehiko Masuhara and Prof. Robert Hirschfeld. ○ *High-Performance Computing:* Developing *Ikra-Cpp*, a C++/CUDA DSL for object-oriented programming in HPC with Structure-of-Arrays (SOA) data layout. ○ *GPGPU:* Developing *Ikra-Ruby*, a GPGPU library for Ruby focusing on Array-based operations. Working on low-level performance optimizations and high-level language abstractions for parallel operations. ○ *Virtual Machines:* Worked on the rpython-based *RSqueak VM*; implemented low-level primitives in a high-level language, including a transparent language-to-VM-to-language dispatch mechanism. Implemented call-target-specific method arguments for the Truffle-based JRuby implementation. ○ *Context-oriented Programming:* Worked on *ContextAmber*, a COP implementation for Amber Smalltalk. Implemented and evaluated concepts for partial method inlining and inlined layered method invalidation. ○ *Modularity in OOP:* Designed and implemented the Matriona module system for Squeak/Smalltalk, based on a hierarchical name lookup mechanism and supporting class nesting/parameterization.
March 2014 - Nov. 2014	**Relationship Queries**, *University of California, San Diego*, Database research with Prof. Yannis Papakonstantinou and Chunbin Lin. Evaluated algorithms and data structures for relationship queries in relational/graph database systems, and compared them with latest column store techniques. Implemented the first *GQ-Fast* DB prototype.
May 2011 - Apr. 2013	**Network Technologies**, *Hasso Plattner Institute, Internet Technologies and Systems Group*. ○ *SOA Security Lab:* A browser-based simulation system for modelling and executing web service scenarios. Worked on the Oryx Modelling Editor, developed a database backend with Grails and PostgreSQL, and integrated the system into an existing OpenNebula VM network. ○ *tele-lab:* A hands-on system for teaching and simulating network security scenarios on a cluster of virtual machines. Worked on the user interface using Grails, HTML and JavaScript.

Achievements and Prizes

April 2018 - March 2020	**Research Fellowship for Young Scientists (JSPS DC2)** 【日本学術振興会特別研究員DC２】. Fellowship from the Japan Society for the Promotion of Science, covering living expenses. Research expenses covered by KAKENHI (科研費) Grant-in-Aid for JSPS Fellows (18J14726).
Oct. 2015 - Mar. 2018	**Monbukagakusho (MEXT) Scholarship** 【文部科学省奨学金】. Japanese government scholarship for research students, covering tuition and living expenses.
Oct. 2014 - Sept. 2015	**Hasso Plattner Scholarship**. One-year scholarship awarded to the best Bachelor graduates of each year, covering living expenses.
March 2015	**Media Hack Day Berlin**, *Second Prize, Allryder API Prize, Fab Lab Berlin Prize*. Developed GREENtire, an iOS app which consolidates useful information from different sensors of the car and from partner APIs to evaluate the driving behavior.
Sept. 2013 - May 2014	**German Academic Exchange Service Scholarship (DAAD Jahresstipendium)**. Government scholarship from DAAD (Deutscher Akademischer Austausch Dienst) to study at a North American university for one academic year, covering tuition and living expenses.
2007 - 2010	**German Federal Competition in Computer Science**. Participated three years in a row. 30/around 1100 participants are invited to the final round. ○ [2009/2010] 1st prize in first two rounds, invited to final round (*University of Freiburg*) ○ [2008/2009] 2nd prize in first two rounds ○ [2007/2008] 1st prize in first two rounds, invited to final round (*Max Planck Institute for CS*)

2008/2009	**German Federal Competition in Mathematics**, 3$^{\text{rd}}$ prize in first round.
2010/2011	**informatiCup 2011**, *organized by the Gesellschaft für Informatik, Bonn, Germany*.
	Participated in first round and in final round (6/38 teams invited). Wrote optimization algorithms for placing ATMs on a map, using Simulated Annealing, Tabu Search and greedy algorithms.
(various)	**Academic Honors**, Graduation with distinction (Bachelor's, Master's), 2x Provost's Honors at UCSD, Third Place at CGO 2018 ACM Student Research Competition (graduate category).
(various)	**Travel Grants**, ECOOP Summer School 2016, SIGPLAN-PLMW (POPL 2017), SIGPLAN-PAC (PLDI 2017), Google MUC Compiler and PL Summit 2017, ACM SRC at CGO 2018.

Other Projects

Sept. 2014 - July 2015	**ME310 Global Team-based Product Innovation & Engineering**, *Collaboration between Hasso Plattner Institute and Stanford University, including several exchange visits*. Working on a design challenge by Audi USA with Stanford mechanical engineering students. Prototyping concepts for communication between pedestrians, passengers and autonomous cars, using design thinking.
June 2013 - Sept. 2013	**Athens for Amber Smalltalk**, *Google Summer of Code 2013 Project*, *European Smalltalk User Group (ESUG), Mentors: Nicolas Petton, Igor Stasenko*. Implemented the Athens vector graphics library in Amber Smalltalk, a Smalltalk system running in the web browser, using HTML5 Canvas. Developed a Morphic-like framework for building GUIs with Athens.
Dec. 2012 - June 2013	**MagLev Database Explorer**, *Part of Bachelor's project at HPI, Software Architecture Group*. Developed an IDE running in a web browser for exploring Ruby/Smalltalk objects persisted in a GemStone/S 64 image, writing Ruby/Smalltalk code and debugging Rails/Sinatra applications interactively.

Academic Service

Program Committee, Workshops: CROW 2016, COP 2017, COP 2018.

External Reviewer, Workshops: APLAS 2016, ARRAY 2017, LASSY 2017.

Student Volunteer, Conferences: ECOOP (2015, 2016, 2017), PLDI (2016, 2017, 2018).

Skills

Programming	Android (A), C (C), C++ (B), C# .NET (A), CUDA (B), Dart (B), Haskell (A), Java EE (A), Java SE (C), LLVM (A), NumPy (A), Prolog (A), Python (B), Ruby (MRI, MagLev) (B), OCaml (A), Smalltalk (Amber, GemStone, Pharo, Seaside, Squeak) (C), SQL (B), Visual Basic (VB 6, VBA) (A).
Software Engineering	Design Patterns (B), Extreme Programming (A), BDD (A), Git (B), Jenkins (A), Scrum (A), Subversion (A), TDD (A), UML (B).
Server OS	Debian/Linux Server (A), Windows Server (A).
Web	CSS (A), Grails (B), Groovy (A), HTML (A), JavaScript (A), jQuery (A), Ruby on Rails (A).
Certifications*	Database Administration Fundamentals (MTA 98-364) Windows Server Administration Fundamentals (MTA 98-365) Windows Applications Development with Microsoft .NET Framework 4 (MCTS 72-511) .

A: level 1/basic, B: level 2/experienced, C: level 3/expert

* Digital verification: `http://goo.gl/tUV71`, Transcript ID: 963416 and 963421, Access Code: 62478569

Personal Information

Languages	German (native speaker), English (CEFR C2, TOEFL iBT score 118/120), Japanese (少し話せます).
Memberships	ACM, ACM-SIGPLAN, Gesellschaft für Informatik e.V. (GI), Bundeswettbewerb Informatik Alumni und Freunde e.V. and Tokyo Tech International Student Association (TISA).
Hobbies	Running, weightlifting, Dance Dance Revolution, playing trumpet and flugelhorn.

Date: May 14, 2018