

Mathias Vorreiter Pedersen



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Work experience

Senior Software Engineer, *GitHub*

2019 –

Static C/C++ program analysis using CodeQL. I am the lead developer of most of the C/C++ analysis libraries, and I have also implemented many of the analyses that runs on the GitHub Code Scanning platform for finding security vulnerabilities. I also work on CodeQL support for the Swift programming language.

Android Developer, *TV 2*

2015

Developed a “trojan horse”-style app used by the publicly-owned Danish television channel TV 2 for a series of programmes about the dangers of giving third-party apps too many privileges.

iOS Developer, *Apprestitute*

2012 – 2015

Lead developer of the iOS team.

Education

Research visit, *Harvard University, Boston, Massachusetts*

2018

Six month research visit at Gordon McKay Professor Stephen Chong's group at Harvard John A. Paulson School of Engineering and Applied Sciences (SEAS).

University, *Aarhus University, Aarhus*

2015 – 2019

Ph.D. in Computer Science

Thesis: *Enforcement of Timing-Sensitive Security Policies in Runtime Systems*

My thesis was about provably eliminating side-channel attacks mounted by modern programming language features (such as garbage collection and thread scheduling) by developing new programming languages and program analyses that provide static guarantees about their execution time.

University, *Aarhus University, Aarhus*

2014 – 2017

Master of Computer Science

University, *Aarhus University, Aarhus*

2011 – 2014

Bachelor of Computer Science

Gymnasium, *Vejle Tekniske Gymnasium, Vejle*

2008 – 2011

Programming projects

Here's a highlight of some interesting programming projects I've done. The projects are sorted by the number of stars on GitHub (in descending order).

Counter-Strike 1.6, in *JavaScript*

An implementation of Counter-Strike 1.6 in JavaScript. It parses the original game files and renders the game using WebGL.

Windows API-hooking framework, in C++

A framework for hooking low-level Windows API functions (i.e., hooking `NtQueryDirectoryFile` in `explorer.exe`).

LR(1) parsing using template metaprogramming, in C++

An LR(1) parser generator implemented using only template metaprogramming in C++.

Alpha, in Standard ML

A compiler for a programming language of my own design. It is a garbage collected, object-oriented language with first-class functions.

Volunteer work

Student volunteer, GOTO conference, Aarhus **2012-2014**

Technical volunteer, Roskilde festival **2012**

Sprinted across the festival area and fixed ATMs when they, inevitably, broke down during the festival.

Academic activities

Conferences

European Symposium on Security and Privacy (EuroS&P), Stockholm, Sweden **2019**

Computer Security Foundations Symposium, Hoboken, NJ **2019**

Symposium on Principles of Programming Languages (POPL), Lisbon, Portugal **2019**

38th IEEE Symposium on Security and Privacy (S&P), San Jose, CA **2017**

Symposium on Principles of Programming Languages (POPL), Paris, France **2017**

Received a scholarship through the Programming Languages Mentoring Workshop (PLMW).

Workshops

Principles of Secure Compilation (PriSC), Lisbon, Portugal **2019**

Google PhD Student Summit on Compiler & Programming Technology, Munich, Germany **2015-2018**

Nordic Workshop on Programming Theory (NWPT), Aalborg, Denmark **2016**

Summer schools

DeepSpec Summer School on Verified Systems (DSSS), Princeton, New Jersey **2018**

Oregon Programming Languages Summer School (OPLSS), Eugene, Oregon **2017**

Midlands Graduate School in the Foundations of Computing Science (MGS), Birmingham, England **2016**

Awards

Student of the Year Award, Aarhus University **2016**
Jointly awarded *Student of the Year* with fellow students Thor Bagge and Mikkel Brun Jakobsen for the positive influence on the learning environment and the dissemination of extra curricular knowledge.

Grants

Stibo Foundation's IT travel grants for PhD students, *Stibo Systems*, 60.000 DKK **2018**

I have received the Stibo foundation's IT travel grant for "Excellent Danish PhD students in computer science and IT."

Graduate School of Science and Technology, Aarhus University, 20.000 DKK **2018**

I am a receipt of the GSST grant for "Financial support for stays abroad for PhD students enrolled at Graduate School of Science and Technology/GSST."

Teaching

Occasional lecturer, *Compilers*, Aarhus **2018-2019**

Teaching assistant, *Compilers*, Aarhus **2014-2017**

Teaching assistant, *Programming Languages*, Aarhus **2015**

Organizer and lecturer, *Spare-Time Teaching*, Aarhus **2013 – 2017**

I taught undergrad students in several topics related to the foundations of programming language semantics. Topics include the lambda calculus, dependent type theory and programming paradigms.

Publications



ICYMI: improved C++ vulnerability coverage and CodeQL support for Lombok

<https://github.blog/2023-10-19-icymi-improved-c-vulnerability-coverage-and-codeql-support-for-lombok/>



Static Enforcement of Security in Runtime Systems

In Proceedings of the 32nd IEEE Computer Security Foundations Symposium.



Programming with Flow-Limited Authorization: Coarser is Better

In Proceedings of the 4th IEEE Symposium on European Security and Privacy.



From trash to treasure: timing-sensitive garbage collection

In Proceedings of the 38th IEEE Symposium on Security and Privacy.