

Reto Achermann

PHD STUDENT · ETH ZÜRICH

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Personal Statement

Computer systems are getting increasingly complex and heterogeneous. Understanding their configuration and performance characteristics is hard. Writing system software to support new platforms is tedious and error prone. By the use of a formal model to capture the configuration of the system at hand we make provably correct assertions of the system, generate correct-by-construction configuration algorithms and provide smart resource allocation.

Education

PhD in Computer Science (expected 2019)

DEPARTMENT OF COMPUTER SCIENCE, ETH ZÜRICH

Advisor: Prof. Timothy Roscoe

Zurich, Switzerland

Nov. 2014 - PRESENT

MSc in Computer Science with Distinction

DEPARTMENT OF COMPUTER SCIENCE, ETH ZÜRICH

- Specialization: Distributed Systems
- Grade: 5.8 out of 6 (with distinction)
- Master's Thesis: *Message Passing and Bulk Transport on Heterogeneous Multiprocessors*

Zurich, Switzerland

Sept. 2013 - Oct. 2014

BSc in Computer Science

DEPT. OF COMPUTER SCIENCE ETH ZÜRICH

Bachelors's Thesis: *USB Subsystems for Barrelfish*

Zurich, Switzerland

Sept. 2009 - Sept. 2013

Employments

ETH Zurich

RESEARCH ASSISTANT

- Member of the core Barrelfish OS team
- Design and implementation of device drivers, networking, message passing, co-processors and ARMv8 support
- Formal modelling of hardware configurations
- Teaching of various undergraduate courses

Zurich, Switzerland

Nov. 2014 - PRESENT

Hewlett Packard Enterprise

SYSTEMS SOFTWARE RESEARCH (INTERNSHIP)

- Consensus for The Machine
- Mentor: Dejan Milojcic

Palo Alto, CA, United States of America

Sept. 2015 - Dec. 2015

Publications

Towards Correct-by-Construction Interrupt Routing on Real Hardware

LUKAS HUMBEL, **RETO ACHERMANN**, DAVID COCK, AND TIMOTHY ROSCOE

PLOS'17

October 2017

Separating Translation from Protection in Address Spaces with Dynamic Remapping

RETO ACHERMANN, CHRIS DALTON, PAOLO FARABOSCHI, MORITZ HOFFMANN, DEJAN MILOJICIC, GEOFFREY NDU, ALEXANDER RICHARDSON, TIMOTHY ROSCOE, ADRIAN L. SHAW AND ROBERT N. M. WATSON

HOTOS'XVI

Mai 2017

Formalizing Memory Accesses and Interrupts

RETO ACHERMANN, LUKAS HUMBEL, DAVID COCK AND TIMOTHY ROSCOE

MARS'17

April 2017

Machine-Aware Atomic Broadcast Trees for Multicores

STEFAN KAESTLE, **RETO ACHERMANN**, RONI HAECKI, MORITZ HOFFMANN, SABELA RAMOS AND TIMOTHY ROSCOE

OSDI'16

Nov 2016

SpaceJMP: Programming with Multiple Virtual Address Spaces

IZZAT EL HAJJ, ALEXANDER MERRITT, GERD ZELLWEGER, DEJAN MILOJICIC, **RETO ACHERMANN**, PAOLO FARABOSCHI, WEN-MEI HWU, TIMOTHY ROSCOE, AND KARSTEN SCHWAN

ASPLOS '16

April 2016

Shoal: Smart Allocation and Replication of Memory For Parallel Programs

STEFAN KAESTLE, **RETO ACHERMANN** TIMOTHY ROSCOE AND TIM HARRIS

HotOS XV

Jul 2015

Not Your Parents' Physical Address Space

SIMON GERBER, GERD ZELLWEGER, **RETO ACHERMANN**, KORNILIOS KOURTIS, TIMOTHY ROSCOE AND DEJAN MILOJICIC

HotOS XV

Mai 2015

Patents

Memory management with versioning of objects

IZZAT EL HAJJ, ALEXANDER MERRITT, GERD ZELLWEGER, DEJAN S. MILOJICIC AND **RETO ACHERMANN**

WO2017131789A1

January 2016

Professional Experience

Barrelfish Operating System

MEMBER OF THE CORE BARRELFISH TEAM

Barrelfish is a multikernel based research operating system developed at ETH Zurich. Project work consists of architectural support (Xeon Phi, ARMv8), device drivers (Xeon Phi co-processor, USB, DMA drivers), runtimes (bulk-transport subsystem, OpenMP, multiple-virtual address spaces, Shoal runtime)

www.barrelfish.org

Nov. 2014 - PRESENT

Formal Hardware Models

DECODING NET MODEL IN ISABELLE/HOL

A decoding net model to formally express the memory and interrupt configurations of heterogeneous computer systems. The model serves as a basis for correct-by-construction configuration algorithms and enables provably correct reasoning about the hardware at hand.

github.com/BarrelfishOS/

Nov. 2014 - PRESENT

Shoal

SMART ALLOCATION AND REPLICATION OF MEMORY

Automatic optimization of memory allocation for parallel programs (Graph processing in Green-Marl) based on access patterns. Project work consisted of the design and implementation of the memory abstractions, Barrelfish runtime support and support for DMA engines of the runtime.

github.com/libshoal

Nov. 2014 - Feb. 2015

Smelt

MACHINE-AWARE ATOMIC BROADCAST TREES FOR MULTICORES

Hardware optimized construction of broadcast and reduction trees for multicore systems. The project work consisted of design and implementation of the Smelt runtime library including message passing abstractions.

github.com/libsmelt

Jan. 2016 - May 2016

Teaching

- 2017 **252-0061-00L Systems Programming and Computer Architecture**, Prof. Timothy Roscoe
- 2016 **263-3800-00L Advanced Operating Systems**, Prof. Timothy Roscoe
- 2017 **252-0840-01L Introductory Programming in MATLAB**, Dr. Tomas Hruz
- 2016 **252-0061-00L Systems Programming and Computer Architecture**, Prof. Timothy Roscoe
- 2016 **263-3800-00L Advanced Operating Systems**, Prof. Timothy Roscoe
- 2016 **252-0840-01L Introductory Programming in MATLAB**, Dr. Tomas Hruz
- 2015 **252-0024-00L Parallel Programming**, Prof. Otmar Hilliges
- 2014 **252-0063-00L Data Modeling and Data Bases**, Prof. Donald Kossmann
- 2013 **252-0062-00L Operating Systems and Networks**, Prof. Donald Kossmann
- 2013 **252-0061-00L Systems Programming and Computer Architecture**, Prof. Timothy Roscoe

ETH Zurich

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Other Experience

Swiss Army

OFFICER IN CAPTAINS RANK

Switzerland

Nov. 2009 - PRESENT

Department of Sport (BASPO)

CERTIFIED TRAINER IN GYMNASTICS, "YOUTH AND SPORT" (J+S)

Sports Club "STV Buochs"

MEMBER OF EXECUTIVE BOARD

Switzerland

Mai 2007 - PRESENT

Switzerland

Mai 2007 - PRESENT