Zsolt István

Contact Information

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Research Profile

My general research interests lie in the area of distributed systems and databases. More specifically, in an effort to overcome limitations that today's computers face, I explore ways these systems can benefit from different forms of specialization.

Education

Ph.D. candidate in Computer Science 2013 – 2017
Systems Group, ETH Zürich, Switzerland Defended: December 2017
Advisor: Prof. Gustavo Alonso

M.Sc., Computer Science (Distributed Systems) 2011 – 2013
ETH Zürich, Switzerland

B.Sc., Computer Science 2007 – 2011
UTCN Cluj-Napoca, Romania

Professional Experience

Microsoft Research, Redmond, WA June 2014 – August 2014
Research Intern
Supervisor: Ken Eguro
Topic: Adding support for B-tree indexes and a local cache to the FPGA in Cipherbase.

Xilinx Labs, Dublin, Ireland September 2012 – March 2013
Research Intern (Master Thesis)
Supervisor: Michaela Blott
Topic: Design of a hash table for an FPGA-based key-value store optimized for caching scenarios. Helped in overall prototype implementation.

INRIA, Sophia-Antipolis, France July 2011 – August 2011
Research Intern (OASIS Group)
Supervisors: Ludovic Henrio and Fabrice Huet
Topic: Annotation-based automatic parallelization of Active Objects in the ProActive Framework.

INRIA, Sophia-Antipolis, France June 2010 – August 2010
Research Intern (OASIS Group)
Supervisor: Denis Caromel
Topic: Parallel programming and scheduling for multicores in the ProActive Framework

MaxIQ Computer, Oradea, Romania 2008 – 2009
Junior Software Engineer
Role: Backend (Java EE) and frontend (HTML, Javascript) developer.

Scholarships and Awards

ETH Zürich Excellence Scholarship 2011-2013: Full scholarship for M.Sc. studies

"Grigore Moisil" National Programming Competition (3rd Place), Romania, 2007

Debate – South-East European Youth Leadership Institute (SEEYLI) 2005: Finalist in Romania; Attendee of summer school at Wake Forest University, NC

Conference Publications

Accelerating Pattern Matching Queries in Hybrid CPU-FPGA Architectures.
D. Sidler, Z. István, M. Ewaida, G. Alonso. *ACM SIGMOD/PODS Conference (SIGMOD'17), 2017.*

Low-Latency TCP/IP Stack for Data Center Applications.
D. Sidler, Z. István, G. Alonso. *26th Int'l Conference on Field Programmable Logic and Applications (FPL'16), 2016.*

Runtime Parameterizable Regular Expression Operators for Databases.
Z. István, D. Sidler, G. Alonso. *24th IEEE Int'l Symposium on Field-Programmable Custom Computing Machines (FCCM'16), 2016*

Consensus in a Box: Inexpensive Coordination in Hardware
Z. István, D. Sidler, G. Alonso, M. Vukolic. *13th USENIX Symposium on Networked Systems Design and Implementation (NSDI '16), 2016.*

Histograms as a Side Effect of Data Movement for Big Data.
Z. István, L. Woods, G. Alonso. *ACM SIGMOD/PODS Conference (SIGMOD'14), 2014.*

A Flexible Hash Table Design For 10Gbps Key-value Stores on FPGAs.
Z. István, G. Alonso, M. Blott, K. Vissers. *23rd Int'l Conference on Field Programmable Logic and Applications (FPL'13), 2013.*

Achieving 10Gbps Line-rate Key-value Stores with FPGAs.
M. Blott, K. Karras, L. Liu, K. Vissers, Z. István, J. Bar. *5th USENIX Workshop on Hot Topics in Cloud Computing (HotCloud'13), 2013.*

Multi-threaded Active Objects.
L. Henrio, F. Huet, Z. István. *15th Int'l Conference on Coordination models and Languages (COORDINATION), 2013.*

Adapting Active Objects to Multicore Architectures.
L. Henrio, F. Huet, Z. István, G. Sebestyen. *Int'l Symposium on Parallel and Distributed Computing (ISPDC 2011), 2011.*

Journal Publications

Caribou: Intelligent Distributed Storage.
Z. István, D. Sidler, G. Alonso. *Proceedings of VLDB Endowment, Volume 10, No. 11 (VLDB'17), 2017.*

A Hash Table for Line Rate Data Processing.
Z. István, G. Alonso, M. Blott, K. Vissers. *ACM Transactions on Reconfigurable Technology and Systems (TRETS), March 2015.*

Ibex – An Intelligent Storage Engine with Support for Advanced SQL Off-loading.
L. Woods, Z. István, G. Alonso. *Proceedings of VLDB Endowment, Volume 7, No. 11 (VLDB'14), 2014.*

Patents

Systems and Methods for Providing Distributed Tree Traversal Using Hardware-Based Processing .
K. Eguro, Z. István, A. Arasu, R. Ramamurthy, K. Shriraghav.
US 20160147779 A1, Patent application filed 11/26/2014

Posters and Demos

Caribou: A Platform for Building Smart Storage
Z. István, D. Sidler, G. Alonso. *Poster at EuroSys'17.*

doppioDB: A Hardware Accelerated Database
D. Sidler, M. Ewaida, Z. István, K. Kara, G. Alonso. *Demo for SIGMOD'17 and FPL'17.*

Specialized Microservers for the Data Center
Z. István, D. Sidler, G. Alonso. *Demo for FPL'15. Poster at EuroSys'15.*

Hybrid FPGA-accelerated SQL Query Processing
L. Woods, Z. István, G. Alonso. *Demo for FPL'13.*

Teaching Experience

Teaching Assistant at **ETH Zürich**

Advanced Systems Lab	Fall 2013, Fall 2014, Fall 2015, Fall 2016, Fall 2017
Data Modeling and Databases	Spring 2016, Spring 2017
Programmieren und Problemlösen	Spring 2014, Spring 2015

Student Supervision at **ETH Zürich**

Semester Project: Zhenhao He (co-advised with David Sidler) — Autumn 2017
Title: Accelerating K-means Queries in Databases with FPGAs

Bachelor Thesis: Mickey Vanska (co-advised with David Cock) — Spring 2017
Title: Program Trace Analysis on an FPGA

Bachelor Thesis: Tim Taubner — Spring 2015
Title: Accelerating Statistical Methods using an FPGA

Semester Project: Jakub Szymanek — Spring 2014
Title: Indexes and Caching in IBEX

Community Service

Shadow PC member for ASPLOS'18, EuroSys'18, EuroSys'17.

Reviewer for IEEE Transactions on Knowledge and Data Engineering (TKDE) (09.2017), IEEE International Symposium on Circuits and Systems (ISCAS'18) (external), ACM Journal of Architecture and Code Optimization (TACO) (06.2017).

Invited Talks

Caribou – Intelligent Distributed Storage.
KAUST, Thuwal, Saudi Arabia. October 2017

Packing a Punch: Building Intelligent Distributed Storage with Hardware.
TU Dresden, Germany. July 2017

Caribou: Intelligent Storage for the Datacenter.
Swiss Joint Research Center Workshop, MSR, Cambridge, UK. February 2017

Consensus in a Box: Inexpensive Coordination in Hardware.
IBM Research Rüschlikon, CH. October 2016

Accelerating String Matching Queries with Hybrid CPU-FPGA Multicores.
Oracle Labs, Belmont, CA. March 2016

Consensus in a box – can we build distributed systems with FPGAs?
Xilinx Labs, San Jose, CA. March 2016
IBM Research Almaden, San Jose, CA. March 2016

Time to Specialize! A Microserver for Key-value Stores.
University of Washington, Seattle, WA. June 2015

Towards Better Energy Efficiency in Datacenters using FPGAs.
Microsoft Research, Redmond, WA. June 2015

Application-specific Micro-servers.
Oracle Labs Zürich Kickoff Workshop, Zürich, CH. January 2015

Languages

Hungarian, Romanian, English – Proficient
German – Intermediate