

CONTACT INFORMATION	Phone: +34 91-101-2202 Email: zsolt.istvan@imdea.org Website GoogleScholar
RESEARCH PROFILE	My research interests lie in the intersection of distributed systems, databases and specialized hardware. I explore and combine ideas from these areas in order to overcome the compute/data gap that modern data centers face.
EDUCATION	<div> Ph.D., Computer Science 2013 – 2018 Systems Group, ETH Zürich, Switzerland Advisor: Prof. Gustavo Alonso </div> <div> M.Sc., Computer Science (Distributed Systems) 2011 – 2013 ETH Zürich, Switzerland </div> <div> B.Sc., Computer Science 2007 – 2011 UTCN Cluj-Napoca, Romania </div>
PROFESSIONAL EXPERIENCE	<div> IMDEA Software Institute, Madrid, ES September 2018 – Present <i>Assistant Research Professor</i> Working in the area of distributed systems and hardware acceleration for data processing. </div> <div> IBM Research, Rüschlikon, CH May 2018 – July 2018 <i>Visiting Researcher</i> Topic: Exploring software and hardware acceleration opportunities for Blockchains. </div> <div> Microsoft Research, Redmond, WA June 2014 – August 2014 <i>Research Intern</i> Supervisor: Ken Eguro Topic: Adding support for B-tree indexes and a local cache to the FPGA in Cipherbase. </div> <div> Xilinx Labs, Dublin, Ireland September 2012 – March 2013 <i>Research Intern (Master Thesis)</i> 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. </div> <div> INRIA, Sophia-Antipolis, France July 2011 – August 2011 <i>Research Intern (OASIS Group)</i> Supervisors: Ludovic Henrio and Fabrice Huet Topic: Annotation-based automatic parallelization of Active Objects in ProActive. </div> <div> INRIA, Sophia-Antipolis, France June 2010 – August 2010 <i>Research Intern (OASIS Group)</i> Supervisor: Denis Caromel Topic: Parallel programming and scheduling for multicores in the ProActive Framework </div> <div> MaxIQ Computer, Oradea, Romania 2008 – 2009 <i>Junior Software Engineer</i> Role: Backend (Java EE) and frontend (HTML, Javascript) developer. </div>

FUNDING AND
PROJECTS

ACCORD: Accelerated Ordering Service for Distributed Ledgers.
Marie Curie Individual Fellowship 2018. Ref: EU Project 842956
Principal investigator: Z. István.
Mentor: M. Hermenegildo.

BOSCO: Fundamentos para el desarrollo, analisis y comprension de los blockchains y los contratos inteligentes.

Spanish National Research Grant, Ref.: PGC2018-102210-B-I00
Principal investigators: C. Sanchez, P. Ganty

Earlier:

BLOQUES-CM: Intelligent Contracts and Scalable Blockchains and Insurance through Verification and Analysis.

Community of Madrid Research Grant. Ref.: P2018/TCS-4339
Coordinator: J. Caballero; Members: UCM, UPM and IMDEA Software.

CONFERENCE
PUBLICATIONS

Specialize in Moderation – Building Application-aware Storage Services using FPGAs in the Datacenter.

L. Kuhring, E. Garcia, Z. István. *11th USENIX Workshop on Hot Topics in Storage and File Systems (HotStorage'19)*, 2019.

Design Patterns for Code Reuse in HLS Packet Processing Pipelines.

H. Eran, L. Zeno, Z. István, M. Silberstein. *27th IEEE Int'l Symposium on Field-Programmable Custom Computing Machines (FCCM'19)*, 2019.

A Flexible K-Means Operator for Hybrid Databases.

Z. He, D. Sidler, Z. István, G. Alonso. *International Conference on Field Programmable Logic and Applications (FPL)*, 2018.

Providing Multi-tenant Services with FPGAs: Case Study on a Key-Value Store. Z. István, G. Alonso, A. Singla. *International Conference on Field Programmable Logic and Applications (FPL)*, 2018.

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.

JOURNAL PUBLICATIONS

doppioDB 1.0: Machine Learning inside a Relational Engine. G. Alonso, Z. István, K. Kara, M. Owaida, D. Sidler. *IEEE Data Engineering Bulletin* June 2019.

The Glass Half Full: Using Programmable Hardware Accelerators in Analytics. Z. István. *IEEE Data Engineering Bulletin* March 2019.

Active Pages 20 Years Later: Active Storage for the Cloud.

Z. István, D. Sidler, G. Alonso. *IEEE Internet Computing* July/Aug 2018.

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.

SHORT PAPERS, POSTERS AND DEMOS

Something New Under The Sun: Thoughts on Optimizing the Performance of Blockchains. Z. István. *The 9th Workshop on Systems for Multi-core and Heterogeneous Architectures (SFMA) at EuroSys'19*.

StreamChain: Do Blockchains Need Blocks?

Z. István, A. Sorniotti, M. Vukolic. *2nd Workshop on Scalable and Resilient Infrastructures for Distributed Ledgers (SERIAL) at Middleware'18*.

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.

Enzian: a Research Computer for Datacenter and Rackscale Computing.

D. Cock, R. Achermann, M. Owaida, Z. Istvan, T. Grosser, Z. Wang, G. Alonso, T. Roscoe, D. Sidler, A. Turowski. *Poster at EuroSys'18*.

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*.

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*

SCHOLARSHIPS AND AWARDS	EuroSys Roger Needham PhD Award 2019 – Honorable Mention
	ETH Zürich Medal for Doctoral Dissertation 2018
	ETH Zürich Excellence Scholarship for Master’s Studies 2011-2013 “Grigore Moisil” National Programming Competition (3rd Place), Romania, 2007
TEACHING EXPERIENCE	Teaching at IMDEA Software Building Data Processing Systems with FPGAs (Seminar at UPM Madrid) Spring 2019 Performance Analysis and Modeling of Software Systems (Seminar at UPM) Fall 2018
	Student Supervision at IMDEA Software Internship: Eva Garcia (UAM, Madrid) Autumn 2018 Topic: Porting a benchmarking suite to Hyperledger Fabric
	Master Thesis: Lucas Kuhring (UPM, Madrid) Spring 2019 Topic: Optimizing the performance of Hyperledger Fabric
	Master Thesis: Srivatsan Lakshmi (UPM, Madrid) Spring 2019 Topic: Evaluation of distributed ledger platforms as a replacement for relational databases
	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) Spring 2018 Topic: A flexible K-Means operator for hybrid databases
	Bachelor Thesis: Mickey Vanska (co-advised with David Cock) Spring 2017 Topic: Program Trace Analysis on an FPGA
	Bachelor Thesis: Tim Taubner Spring 2015 Topic: Accelerating statistical methods using an FPGA
	Semester Project: Jakub Szymanek Spring 2014 Topic: Indexes and caching in IBEX
	Co-Chair for SERIAL’19 Workshop at Middleware’19, SFMA’19 Workshop at EuroSys’19. PC Member for ASPLOS 2020 (external), EDBT 2020, EuroSys’19 Doctoral Workshop.
COMMUNITY SERVICE	Reviewer for ACM Journal of Architecture and Code Optimization (TACO) (02.2019), IEEE Transactions on Knowledge and Data Engineering (TKDE) (09.2017), IEEE In- ternational Symposium on Circuits and Systems (ISCAS’18) (external), ACM Journal of Architecture and Code Optimization (TACO) (06.2017).
	Shadow PC Member for ASPLOS’18, EuroSys’18, EuroSys’17.
SELECTED INVITED TALKS	About past and future challenges of analytic database acceleration with FPGAs: <i>UCM, Madrid, Spain. May 2019.</i> <i>UPM, Madrid, Spain. June 2019.</i>
	About Multes and providing multi-tenant services with specialized hardware in the cloud: <i>UAM, Madrid, Spain. October 2018.</i> <i>UPB, Bucharest, Romania. September 2018.</i>

About Caribou, an intelligent distributed storage solution:
Technion, Haifa, Israel. November 2018
IMDEA Software Institute, Madrid, Spain. February 2018
KAUST, Thuwal, Saudi Arabia. October 2017
TU Dresden, Germany. July 2017
Swiss Joint Research Center Workshop, MSR, Cambridge, UK. February 2017

About inexpensive coordination (consensus) in hardware:
UTCN Cluj-Napoca, Romania. November 2018
IBM Research Rüschlikon, CH. October 2016
Xilinx Labs, San Jose, CA. March 2016
IBM Research Almaden, San Jose, CA. March 2016

About accelerating string matching queries with hybrid CPU-FPGA multicores:
UTCN Cluj-Napoca, Romania. April 2019 *Oracle Labs, Belmont, CA. March 2016*

About building specialized microservers:
University of Washington, Seattle, WA. June 2015
Microsoft Research, Redmond, WA. June 2015
Oracle Labs Zürich Kickoff Workshop, Zürich, CH. January 2015

LANGUAGES	Hungarian, Romanian, English – Proficient
	German, Spanish – Intermediate