

CONTACT INFORMATION	Phone: +34 91-101-2202 Website: https://zistvan.github.io/	Email: zsolt.istvan@outlook.com 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	Ph.D., Computer Science 2013 – 2018 Systems Group, ETH Zürich, Switzerland 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	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. IBM Research , Rüschlikon, CH May 2018 – July 2018 <i>Visiting Researcher</i> Topic: Exploring software and hardware acceleration opportunities for Blockchains. 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. 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. 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. 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 MaxIQ Computer , Oradea, Romania 2008 – 2009 <i>Junior Software Engineer</i>	
AWARDS AND SCHOLARSHIPS	<ul style="list-style-type: none"> • Juan de la Cierva Formación 2018, Spanish Science Foundation (funding part of my salary with EUR 25.000 for 2 years, awarded in 2019) • ACM EuroSys Roger Needham PhD Award 2019 – Honorable Mention • ETH Zürich Medal for Doctoral Dissertations of 2018 (Awarded in 2019) • ETH Zürich Excellence Scholarship for Master's Studies 2011-2013 	

PROJECT
FUNDING

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.

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

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.

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.

	<p>Achieving 10Gbps Line-rate Key-value Stores with FPGAs. M. Blott, K. Karras, L. Liu, K. Vissers, Z. István, J. Bar. <i>5th USENIX Workshop on Hot Topics in Cloud Computing (HotCloud'13)</i>, 2013.</p> <p>Multi-threaded Active Objects. L. Henrio, F. Huet, Z. István. <i>15th Int'l Conference on Coordination models and Languages (COORDINATION)</i>, 2013.</p>
JOURNAL PUBLICATIONS	<p>doppioDB 1.0: Machine Learning inside a Relational Engine. G. Alonso, Z. István, K. Kara, M. Owaida, D. Sidler. <i>IEEE Data Engineering Bulletin June 2019</i>.</p> <p>The Glass Half Full: Using Programmable Hardware Accelerators in Analytics. Z. István. <i>IEEE Data Engineering Bulletin March 2019</i>.</p> <p>Active Pages 20 Years Later: Active Storage for the Cloud. Z. István, D. Sidler, G. Alonso. <i>IEEE Internet Computing July/Aug 2018</i>.</p> <p>A Hash Table for Line Rate Data Processing. Z. István, G. Alonso, M. Blott, K. Vissers. <i>ACM Transactions on Reconfigurable Technology and Systems (TRETS)</i>, 03/2015.</p>
BOOKS	<p>FPGA-Accelerated Analytics: From Single Nodes to Clusters Z. István, K. Kara, D. Sidler. <i>Now Publishers, 2020 (also as a journal: Foundations and Trends in Databases, Vol. 9, No. 2)</i></p>
SHORT PAPERS, POSITION PAPERS	<p>Let's Add Transactions to FPGA-based Key-Value Stores!. Z. István. <i>The 16th Workshop on Data Management on New Hardware (DAMON) at SIGMOD'20</i>.</p> <p>Acceleration Opportunities for BFT Consensus in Datacenter-like Environments. M. Bravo, Z. István, M.K. Sit. <i>The 10th Workshop on Systems for Post-Moore Architectures (SPMA) at EuroSys'20</i>.</p> <p>Something New Under The Sun: Thoughts on Optimizing the Performance of Blockchains. Z. István. <i>The 9th Workshop on Systems for Multi-core and Heterogeneous Architectures (SFMA) at EuroSys'19</i>.</p> <p>StreamChain: Do Blockchains Need Blocks? Z. István, A. Sorniotti, M. Vukolic. <i>2nd Workshop on Scalable and Resilient Infrastructures for Distributed Ledgers (SERIAL) at Middleware'18</i>.</p> <p>Adapting Active Objects to Multicore Architectures. L. Henrio, F. Huet, Z. István, G. Sebestyen. <i>Int'l Symposium on Parallel and Distributed Computing (ISPDC)</i>, 2011.</p>
POSTERS AND DEMOS	<p>I Can't Believe It's Not (Only) Software! Bionic Distributed Storage for Parquet Files. L. Kuhring, Z. István. <i>Demo for VLDB'19, FPL'19</i></p> <p>Enzian: a Research Computer for Datacenter and Rackscale Computing. D. Cock, R. Achermann, M. Owaida, Z. István, T. Grosser, Z. Wang, G. Alonso, T. Roscoe, D. Sidler, A. Turowski. <i>Poster at EuroSys'18</i>.</p> <p>Caribou: A Platform for Building Smart Storage Z. István, D. Sidler, G. Alonso. <i>Poster at EuroSys'17</i>.</p> <p>doppioDB: A Hardware Accelerated Database D. Sidler, M. Owaida, Z. István, K. Kara, G. Alonso. <i>Demo for SIGMOD'17 and FPL'17</i>.</p> <p>Specialized Microservers for the Data Center Z. István, D. Sidler, G. Alonso. <i>Demo for FPL'15. Poster at EuroSys'15</i>.</p> <p>Hybrid FPGA-accelerated SQL Query Processing L. Woods, Z. István, G. Alonso. <i>Demo for FPL'13</i>.</p>

PATENTS	Systems and Methods for Providing Distributed Tree Traversal Using Hardware-Based Processing. K. Eguro, Z. István, A. Arasu, R. Ramamurthy, K. Shriraghav. <i>US 20160147779 A1, Patent application filed 11/26/2014</i>	
TEACHING	Teaching at UPM Madrid Building Data Processing Systems with FPGAs Spring 2019 Performance Analysis and Modeling of Software Systems Fall 2018, Fall 2019	
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	
SUPERVISION	Member of PhD committee Mario Daniel Ruiz Noguera (UAM, Madrid) Defended: January 2020 Title: On the Exploration of FPGAs and High-Level Synthesis Capabilities on Multi-Gigabit-per-Second Networks	
EXPERIENCE	Student Supervision at IMDEA Software BSc Intern: Paula Benedec (UTCN, Romania) Summer 2020 Topic: Benchmarking permissioned blockchains PhD Intern: Andrei Tosa (UTCN, Romania) Summer 2020 Topic: Towards differential privacy on FPGAs PhD Intern: Mustapha Bouhali (ENP Oran, Algeria) Spring 2020 Topic: Evaluating Rowhammer risks on modern FPGA boards Bachelor Thesis: Samuel Garcia (UPM, Madrid) Spring 2020 Topic: In-network data processing with FPGAs PhD Intern: Man-Kit Sit (Imperial College, London) Fall 2019 - Spring 2020 Topic: Acceleration of Blockchains using specialized hardware BSc Intern: Lukas Stasytis (KTU, Lithuania) Summer 2019 - Fall 2019 Topic: Acceleration of matrix-multiply operations using HLS BSc Intern: Claudiu Mihali (UTCN, Romania) Summer 2019 Topic: Near-data processing in an FPGA-based KVS 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 blockchains as a replacement for relational databases BSc Intern: Eva Garcia (UAM, Madrid) Fall 2018 Topic: Porting a benchmarking suite to Hyperledger Fabric 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	

COMMUNITY
SERVICE

Conference/Workshop Organization:

Workshop co-chair for EuroSys'21

Sustainability chair for VLDB'21

Workshop Co-organizer: SFMA'19, SPMA'20 (EuroSys) , SERIAL'19 and '20 (Middleware)

Hackathon Co-organizer: [chainReaction 2020](#)

PC Member:

Database conferences: SIGMOD'21, EDBT'21, EDBT'20

Systems conferences: SRDS'20, HotCloud'20, ASPLOS'20 (light)

FPGA conferences: FCCM'20

Others: EuroSys Doctoral Workshop 2020 and 2019.

Invited Reviewer:

Journals: IEEE TC-CS (04.2020), ACM TACO (02.2019, 06.2017), IEEE TKDE (01.2019, 09.2017)

SELECTED INVITED
TALKS

About re-imagined architectures and how looking across layers increases efficiency in data-intensive systems:

ITU Copenhagen, Denmark. May 2020 (virtual)

About StreamChain and how to design a Blockchain with sub-millisecond commit times:

ETH Zurich, Switzerland, November 2019

About past and future challenges of analytic database acceleration with FPGAs:

SAP Walldorf, Germany. November 2019

UCM, Madrid, Spain. May 2019

UPM, Madrid, Spain. June 2019

About Multes and providing multi-tenant services with specialized hardware in the cloud:

UAM, Madrid, Spain. October 2018

UPB, Bucharest, Romania. September 2018

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 and December 2019

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:

TU Munich, Germany. June 2020 (virtual)

UTCN Cluj-Napoca, Romania. April 2019 and December 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