Kaan **Kara**

Systems Engineer · Researcher/PhD Student

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Education

PhD Candidate in Computer Science — Zurich, Switzerland

Systems Group, ETH Zurich — *Dec. 2015 - Present*

- In my research I focus on making data processing faster and more efficient in terms of resource and power usage. To achieve this, I am designing specialized hardware performing inherently parallel and compute/data intensive tasks that a conventional CPU is not suitable for. I am prototyping my designs on shared memory heterogeneous architectures combining CPUs and FPGAs.
- Advisor: Gustavo Alonso

Master of Science in Electrical Engineering (1.0/1.0) — Karlsruhe, Germany

Karlsruhe Institute of Technology — *Sep. 2012 - Sep. 2015*

- Master Thesis: Design and Implementation of a Framework for Car-to-X Controllers under Real-Time and Safety Critical Constraints

Bachelor of Science in Electrical Engineering (1.1/1.0) — Karlsruhe, Germany

Karlsruhe Institute of Technology — *Sep. 2009 - Sep. 2012*

- Bachelor Thesis: Concept for a Modular Battery-Management-System enabling Charge Transfer between Li-Ion Battery Stacks for Electric Vehicles

Experience

Research Intern — Redmond, Washington

Microsoft — *Jul. 2018 - Sep. 2018 (3 months)*

- Worked on SQL Server performance improvements.

Graduate Technical Intern — Dublin, Ireland

Xilinx — *Jul. 2017 - Sep. 2017 (3 months)*

- Worked on low-precision deep neural networks on FPGAs, focusing on exploring efficient implementation of residual layers on FPGA-based architectures. Streamlined the transition of neural networks trained in Tensorflow to their Vivado HLS implementation.

Systems and Electronics Design Intern — Palo Alto, USA

Bosch North America — *Aug. 2014 - Apr. 2015 (8 months)*

- Developed a computer vision IP testing platform on an all-programmable Xilinx FPGA (Zynq) running embedded Linux, enabling rapid testing and prototyping of various image processing accelerators. Designed digital blocks of an image processing ASIC.

Software Developer Intern — Weissach, Germany

Porsche Engineering Services — *Mar. 2014 - Jun. 2015 (4 months)*

- Worked on a hardware-in-the-loop platform testing the operation between a smartphone app and a Porsche car. Developed various computer-vision based algorithms to provide valuable feedback during testing.

Trainee — Baden-Daetwill, Switzerland

ABB — *Oct. 2013 - Jan. 2014 (4 months)*

- Developed a self-calibration device for Rogowski coil current sensors, based on a patent-pending method increasing their measurement accuracy to well over current industry standard.

Honors & Awards

System Design Contest, 2nd Place by 55th Design Automation Conference — *2018*

- Placed 2nd in an international contest for designing an FPGA-based object detection system, delivering the highest frame processing rate. The contest had more than 100 teams participating from both academia and industry. Source: spooNN

DAAD Scholarship (funded by Bosch) by DAAD — *2009 - 2014*

- Awarded a full scholarship for Bachelor's and Master's studies in Germany for a duration of 5 years.

KIT Best Thesis Award by Karlsruhe Institute of Technology — *2012*

- Received the KIT Best Thesis Award 2012 in Electrical Engineering for the bachelor thesis.

Skills

Programming | OS	C/C++, VHDL, SystemVerilog, Python, C#, SQL	|	Linux, Mac OS X, Windows, FreeRTOS
Tools	Tensorflow, MATLAB, MonetDB, Xilinx Vivado/HLS, Altera Quartus, ModelSim, MS Office, Latex		
Languages	English, German, Turkish		

Publications

ColumnML: Column-Store Machine Learning with On-The-Fly Data Transformation *Dec. 2018*

Kaan Kara, Ken Eguro, Ce Zhang, Gustavo Alonso

Proceedings of the VLDB Endowment 12 (4) (PVLDB'19)

Accelerating Generalized Linear Models with MLWeaving: A One-Size-Fits-All System for Any-precision Learning *Mar. 2019*

Zeke Wang, **Kaan Kara**, Hantian Zhang, Gustavo Alonso, Onur Mutlu, and Ce Zhang

Proceedings of the VLDB Endowment 13 (PVLDB'19)

FPGA-accelerated Dense Linear Machine Learning: A Precision-Convergence Trade-off *Apr. 2017*

Kaan Kara, Dan Alistarh, Gustavo Alonso, Onur Mutlu, Ce Zhang

IEEE 25th Annual International Symposium on Field-Programmable Custom Computing Machines (FCCM'17)

FPGA-based Data Partitioning *May 2017*

Kaan Kara, Jana Giceva, Gustavo Alonso

Proceedings of the 2017 ACM International Conference on Management of Data (SIGMOD'17)

ZipML: Training Linear Models with End-to-End Low Precision, and a Little Bit of Deep Learning *Jul. 2017*

Hantian Zhang, Jerry Li, **Kaan Kara**, Dan Alistarh, Ji Liu, Ce Zhang

International Conference on Machine Learning (ICML'17)

Centaur: A framework for hybrid CPU-FPGA databases *Apr. 2017*

Muhsen Owaida, David Sidler, **Kaan Kara**, Gustavo Alonso

IEEE 25th Annual International Symposium on Field-Programmable Custom Computing Machines (FCCM'17)

(Demo) doppioDB: A Hardware Accelerated Database *May 2017*

David Sidler, Zsolt István, Muhsen Owaida, **Kaan Kara**, Gustavo Alonso

Proceedings of the 2017 ACM International Conference on Management of Data (SIGMOD'17)

(Short Paper) Fast and robust hashing for database operators *Sep. 2016*

Kaan Kara, Gustavo Alonso

26th International Conference on Field Programmable Logic and Applications (FPL'16)