

Pınar Tözün

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[Google Scholar](#) (850+ citations, h-index 15) / [DBLP](#) / [ORCID](#)

RESEARCH INTERESTS

Data-intensive systems on modern hardware, resource-aware and resource-constrained machine learning, characterization of data-intensive workloads

ACADEMIC BACKGROUND

PhD in Computer Science, 2009 – 2014 **École Polytechnique Fédérale de Lausanne, Switzerland**
Thesis: Transactions Chasing Scalability and Instruction Locality on Multicores
Advisor: Prof. Anastasia Ailamaki

BSc in Computer Engineering, 2005 – 2009 **Koç University, Istanbul, Turkey**
Department Rank: 1st

WORK EXPERIENCE

2/2018 – Present **IT University of Copenhagen** **Copenhagen, Denmark**
Associate professor in the Computer Science Department, group coordinator for [DASYA](#), and lead of the [RAD](#) team.

1/2015 – 1/2018 **IBM Almaden Research Center** **San Jose, CA, USA**
Research staff member at the Disruptive Information Management Architectures Group working on the Wildfire project that focuses on building a large-scale hybrid transactional/analytical processing system. Wildfire is commercialized by IBM as [IBM Db2 Event Store](#).

7/2009 – 11/2014 **École Polytechnique Fédérale de Lausanne** **Lausanne, Switzerland**
Doctoral assistant and Ph.D. candidate at the Data-Intensive Applications and Systems (DIAS) laboratory led by Prof. Anastasia Ailamaki working on exploiting modern hardware more effectively for data-intensive applications and systems.

5/2012 – 8/2012 **Oracle Labs** **Redwood Shores, CA, USA**
Summer Intern at Oracle Labs mentored by Brian Gold and Eric Sedlar working on memory characterization of traditional transaction processing systems.

6/2008 – 8/2008 **University of Twente** **Enschede, Netherlands**
Summer Intern at the Software Engineering Group led by Prof. Mehmet Akşit, mentored by Dr. Gürçan Güleşir and Prof. Lodewijk Bergmans working on evolvable behavior specifications during the development of complex software systems.

7/2007 – 8/2007 **Veripark** **Istanbul, Turkey**
Summer Intern developing applications and web interfaces using JSP and .NET.

HONORS & AWARDS

- Distinguished meta-reviewer: **SIGMOD** 2020
- Distinguished reviewer: **VLDB** 2019
- Best Gong-Show Talk, **HPTS** 2019
- Jim Gray Doctoral Dissertation Award – Honorable Mention, ACM **SIGMOD** 2016
- SAP Student Travel Grant, **EDBT/ICDT** 2013
- Best Demonstration Award, ACM **SIGMOD** 2011
- Google Eurosys Conference Grant and Travel Award for Women in CS, **Eurosys** 2010
- EPFL I&C School Fellowship Student, 2009-2010
- Vehbi Koç Honorary Award, for having SPA over 3.5, in Semester Fall 2005, Spring 2006, Fall 2006, Spring 2007, Fall 2007, Spring 2008
- Visiting Student, Massachusetts Institute of Technology, Spring 2006, in recognition of outstanding performance in Math 106 and Physics 101 classes in Koç University
- Full Scholarship from Vehbi Koç Foundation, founder of the Koç University, and Turkish Government during Bachelor's education for being among the top 200 students in the University Entrance Exam

PUBLICATIONS

- T. Robroek, A. Duane, E. Yousefzadeh-Asl-Miandoab, P. Tözün. “Data Management and Visualization for Benchmarking Deep Learning Training Systems.” In Workshop on Data Management for End-to-End Machine Learning (**DEEM**) 2023.
- E. Yousefzadeh-Asl-Miandoab, T. Robroek, P. Tözün. “Profiling and Monitoring Deep Learning Training Tasks.” In Workshop on Machine Learning and Systems (**EuroMLSys**) 2023.
- P. D. Rosero-Montalvo, Z. István, P. Tözün, W. Hernandez. “Hybrid Anomaly Detection Model on Trusted IoT Devices.” **IEEE IoT Journal** 2023.
- L. Vogel, D. Ritter, D. Porobic, P. Tözün, T. Wang, A. Lerner. “Data Pipes: Declarative Control over Data Movement.” In Conference on Innovative Data Systems Research (**CIDR**), 2023.
- C. Binnig, A. Böhm, T. Rabl, P. Tözün. “Reviving the Workshop Series on Testing Database Systems – DBTest.” **Datenbank Spektrum** 2022.
- R. Borovica-Gajic, G. Graefe, A. Lee, C. Sauer, P. Tözün. “Database Indexing and Query Processing (Dagstuhl Seminar 22111).” **Dagstuhl Reports** 2022.
- R. Bayer, J. V. Tøttrup, P. Tözün. “TPCx-AI on NVIDIA Jetsons.” In TPC Technology Conference on Performance Evaluation & Benchmarking (**TPCTC**), 2022.
- S. Amer-Yahia, Y. Amsterdamer, S. Bhowmick, A. Bonifati, P. Bonnet, R. Borovica-Gajic, B. Catania, T. Cerquitelli, S. Chiusano, P. Chrysanthis, C. Curino, J. Darmont, A. El Abbadi, A. Floratou, J. Freire, A. Jindal, V. Kalogeraki, G. Koutrika, A. Kumar, S. Maiyya, A. Meliou, M. Mohanty, F. Naumann, N. S. Noack, F. Özcan, L. Peterfreund, W. Rahayu, W. C. Tan, Y. Tian, P. Tözün, G. Vargas-Solar, N. Yadwadkar, M. Zhang. “Diversity and Inclusion Activities in Database Conferences: A 2021 Report.” In **SIGMOD Record** June 2022 Issue.
- M. M. Andersen, P. Tözün. “Micro-architectural Analysis of a Learned Index.” In Proceedings of the International Workshop on Exploiting Artificial Intelligence Techniques for Data Management (**aiDM**), 2022.
- M. Rigger, P. Tözün. “DBTest'22: 9th International Workshop on Testing Database Systems.” In Proceedings of the ACM **SIGMOD** International Conference, 2022.
- P. Damme, M. Birkenbach, C. Bitsakos, M. Boehm, P. Bonnet, F. M. Ciorba, M. Dokter, P. Dowgiallo, A. Eleliemy, C. Faerber, G. Goumas, D. Habich, N. Hedam, M. Hofer, W. Huang, K. Innerebner, V. Karakostas, R. Kern, T. Kosar, A. Krause, D. Krems, A. Laber, W. Lehner, E. Mier, M. Paradies, B. Peischl, G. Poerwawinata, S. Psomadakis, T. Rabl, P. Ratuszniak, P. Silva, N. Skuppin, A. Starzacher, B. Steinwender, I. Tolovski, P. Tözün, W. Ulatowski, Y. Wang, I. Wrosz, A. Zamuda, C. Zhang, X. X. Zhu. “DAPHNE: An Open and Extensible System Infrastructure for Integrated Data Analysis Pipelines.” In Conference on Innovative Data Systems Research (**CIDR**), 2022.
- P. Bonnet, X. L. Dong, F. Naumann, P. Tözün. “VLDB 2021: Designing a Hybrid Conference.” In **SIGMOD Record** December 2021 Issue.

- U. Sirin, P. Tözün, D. Porobic, A. Yasin, A. Ailamaki. “Micro-architectural Analysis of In-memory OLTP: Revisited.” In the International Journal of Very Large Databases (**VLDBJ**), 2021.
- S. Baunsgaard, S. B. Wrede, P. Tözün. “Training for Speech Recognition on Coprocessors.” In International Workshop on Accelerating Analytics and Data Management Systems Using Modern Processor and Storage Architectures (**ADMS**), 2020.
- N. Hedam, J. Mollerup, P. Tözün. “Hash-Based Authentication Revisited in the Age of High Performance Computers.” In International Workshop on Accelerating Analytics and Data Management Systems Using Modern Processor and Storage Architectures (**ADMS**), 2020.
- I. L. Picoli, N. Hedam, P. Bonnet, P. Tözün. “Open-Channel SSD (What is it Good For).” In Conference on Innovative Data Systems Research (**CIDR**), 2020.
- R. Barber, C. Garcia-Arellano, R. Grosman, G. Lohman, C Mohan, R. Mueller, H. Pirahesh, V. Raman, R. Sidle, A. Storm, Y. Tian, P. Tözün, Y. Wu. “WiSer: A Highly Available HTAP DBMS for IoT Applications.” In IEEE International Conference on **Big Data**, 2019.
- I. L. Picoli, P. Bonnet, P. Tözün. “LSM Management on Computational Storage.” In Proceedings of the International Workshop on Data Management on New Hardware (**DaMoN**), 2019.
- P. Tözün, H. Kotthaus. “Scheduling Data-Intensive Tasks on Heterogeneous Many Cores.” In IEEE Data Engineering Bulletin (**DeBull**) Vol. 42(1), 2019.
- C. Luo, P. Tözün, Y. Tian, R. Barber, V. Raman, R. Sidle. “Umzi: Unified Multi-Zone Indexing for Large-Scale HTAP.” In Proceedings of the International Conference on Extending Database Technology (**EDBT**), 2019.
- I. L. Picoli, P. Tözün, A. Wasowski, P. Bonnet. “Programming Storage Controllers with OX.” In Non-Volatile Memories Workshop (**NVMW**), 2019.
- R. Barber, V. Raman, R. Sidle, Y. Tian, P. Tözün. “Wildfire: HTAP for Big Data.” In **Encyclopedia of Big Data Technologies**, 2019.
- P. Tözün. “Hardware-Assisted Transaction Processing: Many Core.” In **Encyclopedia of Big Data Technologies**, 2019.
- A. Ailamaki, E. Liarou, P. Tözün, D. Porobic, I. Psaroudakis. “Databases on Modern Hardware: How to Stop Underutilization and Love Multicores.” In Synthesis Lectures on Data Management Vol. 9(1), **Morgan & Claypool Publishers**, 2017. **Book**
- V. Rosenfeld, R. Mueller, P. Tözün, F. Özcan. “Processing Java UDFs in a C++ environment.” In Proceedings of the ACM Symposium on Cloud Computing (**SOCC**), 2017.
- F. Özcan, Y. Tian, P. Tözün. “Hybrid Transactional/Analytical Processing: A Survey.” In Proceedings of the ACM **SIGMOD** International Conference, 2017. **Tutorial**
- R. Barber, C. Garcia-Arellano, R. Grosman, R. Mueller, V. Raman, R. Sidle, M. Spilchen, A. Storm, Y. Tian, P. Tözün, D. Zilio, M. Huras, G. Lohman, C. Mohan, F. Özcan, H. Pirahesh. “Evolving Databases for New-Gen Big Data Applications.” In Conference on Innovative Data Systems Research (**CIDR**), 2017.
- D. Porobic, P. Tözün, R. Appuswamy, A. Ailamaki. “More Than A Network: Distributed OLTP on Clusters of Hardware Islands.” In Proceedings of the International Workshop on Data Management on New Hardware (**DaMoN**), 2016.
- R. Barber, M. Huras, G. Lohman, C. Mohan, R. Mueller, F. Özcan, H. Pirahesh, V. Raman, R. Sidle, O. Sidorkin, A. Storm, Y. Tian, P. Tözün. “Wildfire: Concurrent Blazing Data Ingest and Analytics.” In Proceedings of the ACM **SIGMOD** International Conference, 2016. **Demo**
- U. Sirin, P. Tözün, D. Porobic, A. Ailamaki. “Micro-architectural Analysis of In-memory OLTP.” In Proceedings of the ACM **SIGMOD** International Conference, 2016.
- D. Porobic, I. Pandis, M. Branco, P. Tözün, A. Ailamaki. “Characterization of the Impact of Hardware Islands on OLTP.” In the International Journal of Very Large Databases (**VLDBJ**), 2016.
- D. Cervini, D. Porobic, P. Tözün, A. Ailamaki. “Applying HTM to an OLTP System: No Free Lunch.” In Proceedings of the International Workshop on Data Management on New Hardware (**DaMoN**), 2015.
- A. Ailamaki, E. Liarou, P. Tözün, D. Porobic, I. Psaroudakis. “How to Stop Underutilization and Love Multicores.” In Proceedings of the International Conference on Data Engineering (**ICDE**), 2015. **Tutorial**
- P. Tözün, I. Atta, A. Ailamaki, A. Moshovos. “ADDICT: Advanced Instruction Chasing for Transactions.” In Proceedings of the Very Large Databases Endowment (**PVLDB**), Vol. 7(14), 2014.

- I. Psaroudakis, T. Kissinger, D. Porobic, T. Ilsche, E. Liarou, P. Tözün, A. Ailamaki, W. Lehner. “Dynamic Fine-Grained Scheduling for Energy-Efficient Main-Memory Queries.” In Proceedings of the International Workshop on Data Management on New Hardware (**DaMoN**), 2014.
- A. Ailamaki, E. Liarou, P. Tözün, D. Porobic, I. Psaroudakis. “How to Stop Underutilization and Love Multicores.” In Proceedings of the ACM **SIGMOD** International Conference, 2014. **Tutorial**
- D. Porobic, E. Liarou, P. Tözün, A. Ailamaki. “ATraPos: Adaptive Transaction Processing on Hardware Islands.” In Proceedings of the International Conference on Data Engineering (**ICDE**), 2014.
- A. Ailamaki, R. Johnson, I. Pandis, P. Tözün. “Toward Scalable Transaction Processing – Evolution of Shore-MT.” In Proceedings of the Very Large Databases Endowment (**PVLDB**), 2013. **Tutorial**
- P. Tözün, B. Gold, A. Ailamaki. “OLTP in Wonderland -- Where do cache misses come from in major OLTP components?” In Proceedings of the International Workshop on Data Management on New Hardware (**DaMoN**), 2013.
- I. Atta, P. Tözün, X. Tong, A. Ailamaki, A. Moshovos. “STREX: Boosting Instruction Cache Reuse in OLTP Workloads through Stratified Transaction Execution.” In Proceedings of the International Symposium on Computer Architecture (**ISCA**), 2013.
- P. Tözün, I. Pandis, C. Kaynak, D. Jevdjic, A. Ailamaki. “From A to E: Analyzing TPC’s OLTP Benchmarks - The obsolete, the ubiquitous, the unexplored.” In Proceedings of the International Conference on Extending Database Technology (**EDBT**), 2013.
- P. Tözün, I. Pandis, R. Johnson, A. Ailamaki. “Scalable and Dynamically Balanced Shared-Everything OLTP with Physiological Partitioning.” In the International Journal of Very Large Databases (**VLDBJ**), 2013.
- I. Atta, P. Tözün, A. Ailamaki, A. Moshovos. “SLICC: Self-Assembly of Instruction Cache Collectives for OLTP Workloads.” In Proceedings of the IEEE/ACM International Symposium on Microarchitecture (**MICRO**), 2012.
- D. Porobic, I. Pandis, M. Branco, P. Tözün, A. Ailamaki. “OLTP on Hardware Islands.” In Proceedings of the Very Large Databases Endowment (**PVLDB**), Vol. 5(12), 2012.
- I. Atta, P. Tözün, A. Ailamaki, A. Moshovos. “Reducing OLTP Instruction Misses with Thread Migration.” In Proceedings of the International Workshop on Data Management on New Hardware (**DaMoN**), 2012.
- I. Pandis, P. Tözün, R. Johnson, A. Ailamaki. “PLP: Page Latch-free Shared-everything OLTP.” In Proceedings of the Very Large Databases Endowment (**PVLDB**), Vol. 4 (10), 2011.
- I. Pandis, P. Tözün, M. Branco, D. Karampinas, D. Porobic, R. Johnson, A. Ailamaki. “A Data-oriented Transaction Execution Engine and Supporting Tools.” In Proceedings of the ACM **SIGMOD** International Conference, 2011. **Best Demonstration Award**.
- H. Jula, P. Tözün, G. Candea. “Communix: A Collaborative Deadlock Immunity Framework.” In Proceedings of the International Conference on Dependable Systems and Networks (**DSN**), 2011.

CONFERENCE PRESENTATIONS AND INVITED TALKS

- “Sustainable Use of Hardware for Deep Learning – A case for Collocation.” **Reykjavik University** 2022.
- “Micro-architectural Analysis of a Learned Index.” **aiDM** 2022.
- “Peaceful Co-habitation on GPUs for Deep Learning.” **Microsoft GSL Talk Series** 2022.
- “Sustainable Use of Hardware.” **ITU Climate IT Video Series** 2022.
- “Toward Hardware-Conscious Data Science.” **FGDB, WiDS Copenhagen, Frontiers of NLP Workshop** 2022.
- “Data-Intensive Systems in the Microsecond Era.” **University of Waterloo - Data Systems Seminars, TU Munich - Data Processing on Modern Hardware Lectures, Dutch Seminar on Data Systems Design** 2021.
- “PhD Symposium Panel” **ICDE** 2021
- “Dimensions of Hardware Parallelism and Exploiting Them for Data-Intensive Systems.” **Hasso-Plattner-Institut / University of Potsdam** 2019.
- “Data-Intensive Systems in the Microsecond Era.” **HPTS** 2019.

- “Training for Speech Recognition on Co-processors.” **HPTS 2019 Gong Show** (chosen as the **best gong show** talk by the audience).
- “LSM Management on Computational Storage.” **Facebook** (Menlo Park) 2019.
- “Data Management Systems in the Age of Dark Silicon.” **DaMoN** 2018.
- “Song of Hardware and Databases.” **HPTS** 2017.
- “Hybrid Transactional/Analytical Processing: A Survey.” **SIGMOD** 2017.
- “Transactions Chasing Scalability and Instruction Locality on Multicores.” **UC Santa Cruz** 2017.
- “Wildfire: Evolving Databases for New-Gen Big Data Applications.” **TU Munich** 2017.
- “Careers in Industry Panel.” **SIGMOD** 2016.
- “Breaking up with SQL.” **HPTS** 2015.
- “ADDICT: Advanced Instruction Chasing for Transactions.” **VLDB** 2015.
- “How to Stop Underutilization and Love Multicores.” **ICDE** 2015.
- “How to Stop Underutilization and Love Multicores.” **SIGMOD** 2014.
- “HPTS Next-Generation Panel.” **HPTS** 2013.
- “Toward Scalable Transaction Processing.” **VLDB** 2013.
- “OLTP in Wonderland.” **DaMoN** 2013.
- “Transactions Chasing Instruction Locality on Multicores.” **TU Dortmund** 2013.
- “From A to E: Analyzing TPC’s OLTP Benchmarks.” **EDBT** 2013.
- “A Case for Thread Migration.” **CIDR** 2013.
- “Transactions on Modern Hardware.” **Koç University** 2013.
- “Reducing OLTP Instruction Misses with Thread Migration.” **DaMoN** 2012.
- “Critical Sections through the Looking Glass.” **HPTS** 2011.
- “PLP: Page Latch-free Shared-everything OLTP.” **VLDB** 2011.

PATENTS

- US Patent #11182356: R. Barber, V. Raman, R. Sidle, Y. Tian., P. Tözün, C. Luo, A. Storm, R. Grosman, M. Spilchen. “Indexing for evolving large-scale datasets in multi-master hybrid transactional and analytical processing systems.” 2021.
- US Patent #11157307: R. Barber, C. Mohan, V. Raman, R. Sidle, P. Tözün. “Count and transaction identifier based transaction processing.” 2021.
- US Patent #11119678: R. Barber, C. Garcia-Arellano, R. Grosman, M. Huras, H. Pirahesh, V. Raman, R. Sidle, A. Storm, P. Tözün. “Transactional operations in multi-master distributed data management systems.” 2021.
- US Patent #11042522: Y. Tian, V. Raman, R. Barber, R. Sidle, P. Tözün, R. Mueller, R. Grosman, A. Storm, C. Garcia-Arellano, G. Lohman. “Resolving versions in an append-only large-scale data store in distributed data management systems.” 2021.
- US Patent #10831775: R. Barber, G. Lohman, V. Raman, R. Sidle, P. Tözün. “Efficient representation, access and modification of variable length objects.” 2020.
- US Patent #10769180: R. Barber, R. Mueller, V. Raman, R. Sidle, P. Tözün. “Efficient dataflow processing for objects.” 2020.
- US Patent #10747512: R. Barber, R. Mueller, V. Raman, R. Sidle, P. Tözün. “Partial object instantiation for object oriented applications.” 2020.
- US Patent #10452424: R. Barber, C. Mohan, V. Raman, R. Sidle, P. Tözün. “Unique transaction identifier based transaction processing.” 2019.

PROFESSIONAL ACTIVITIES

- Organization committee:** CIDR 2024-2025 (D&I chair)
 Dagstuhl Seminar 2024 on Resource-Efficient Machine Learning (organizer)
 ACM SIGMOD 2023-2024 (workshop chair)
 ICDE 2024 (D&I chair)
 ACM SIGMOD 2022 (D&I chair)
 DBTest Workshop 2020-2022 (workshop co-chair, co-located with ACM SIGMOD)
 Dagstuhl Seminars 2022 on Database Indexing and Query Processing (organizer)
 ACM SoCC (marketing chair)
 VLDB 2021 (general chair)
 ACM SIGMOD Jim Gray Doctoral Dissertation Award 2019-2020 (chair)
 BOSS Workshop 2019 (workshop co-chair, co-located with VLDB)
 SIGMOD Programming Contest 2019 (chair)
 WiDS Copenhagen 2019 (local chair)
 SIGMOD/PODS Video Series
- Associate Editor / Meta-Reviewer:** SIGMOD Record Reminiscences on Influential Papers Column (September 2021 – present), Survey Column (August 2017 – December 2020)
 ACM SIGMOD 2020-2021
 VLDB 2024
 EDBT 2024, 2021
- Program committees:** VLDB 2022 (Research), 2019 (Industry), 2017-2019 (Research), 2016 (Demo), 2015 (Demo & Best Demo Award Committee)
 SIGMOD 2024, 2019 (Student Research Competition), 2018 (Research & Jim Gray Doctoral Dissertation Award), 2017 (Research & Student Research Competition), 2016 (Demo), 2015 (Demo)
 EDBT 2021 (Demo), 2017 (Industry)
 CIDR 2024, 2020-2021, 2017
 DaMoN 2023, 2018-2020
 ADMS 2020, 2015-2016
 SPMA 2020
 ISCA 2019
 ICDE 2017 (Demo), 2016 (Research & Demo Tracks)
 ACM SoCC 2023, 2017
 womENCourage 2016-2017
 IMDM 2014-2016
 CIKM 2014-2015
 TinyToCS 2013
- Reviewer:** Datenbank-Spektrum (2022), The VLDB Journal (2018-2021, 2013), TODS (2020), TKDE (2018-2020), Morgan & Claypool Publishers (2019), Information Systems (2019), JISA (2016), TC (2015); SIGMOD (External Reviewer in 2014)

TEACHING**IT University of Copenhagen:**

- Course manager & instructor in Computer Science MSc course *Computer Systems Performance* (Spring 2019-2023)
- Course manager & instructor in Computer Science MSc course *Advanced Data Systems* (Fall 2019-2022)
- Course manager & instructor in Computer Science PhD course *Deep Learning: A Computational Efficiency Perspective* (Spring 2022)
- Course manager in Data Science BSc course *Large-Scale Data Analysis* (Spring 2019)
- Course manager & instructor in Data Science BSc course *Data Management* (Fall 2018)
- Co-instructor in Data Science BSc course *First Year Project* (Spring 2018)

École Polytechnique Fédérale de Lausanne:

- Teaching assistant in undergraduate course *Programming II* (Spring 2014)
- Teaching assistant in undergraduate course *Introduction to Database Systems* (Spring 2013)
- Teaching assistant in undergraduate course *Introduction to Programming* (Fall 2011, Fall 2010)
- Teaching assistant in graduate course *Advanced Databases* (Spring 2011)

Koç University:

- Teaching assistant in undergraduate course *Introduction to Programming* (Spring 2008)
- Teaching assistant in undergraduate course *Structure and Interpretation of Computer Programs* (Spring 2007)

Voluntary Teaching:

- Organizer and one of the instructors of the mathematics course of the Koç University Volunteers project, where the sixth grade students from nearby elementary schools are brought to the university and attend weekly courses held by the university students. (Spring & Fall 2006, 2007)
- One of the organizers of the weekly film interpretation and discussion sessions with female prisoners in Bakırköy Women's Penitentiary in Istanbul, Turkey. (Spring 2008)

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