Viktor Sanca

Menlo Park, CA viktor@viktorsanca.com viktorsanca.com viktor-sanca

Education

PhD, Computer Science	**EPFL**, EDIC Doctoral School, Data-Intensive Applications and Systems Laboratory (DIAS). Advisor: Prof. Anastasia Ailamaki. *Thesis:* **Efficient Approximate Analytics via Adaptive Context-Conscious Query Processing**. Link: infoscience.epfl.ch/.../b8ce973a-6b95-403c-be17-c84331c41b77	2018 – 2024
M.Sc Research Scholar	**EPFL**, DIAS Lab, Lausanne, Switzerland.	2017 – 2018
B.Sc. (Hons), Electrical and Computer Engineering	**University of Novi Sad**, Faculty of Technical Sciences, Serbia. Tracks: Computing and Control Engineering; Applied Computer Science and Informatics. GPA: 10.00/10.00.	2013 – 2017

Employment

Senior Member of Technical Staff, Oracle, Redwood Shores, CA, USA. Feb 2025 – present
Core DB, Vector Flow Analytics: Data and In-Memory Technologies. Vector indexing, quantization, inference, and generative AI infrastructure.

Doctoral Research Assistant, DIAS Lab, EPFL, Lausanne, Switzerland. 2018 – 2024
Researcher in data-intensive systems and vector analytics; systems development; grant and project writing; dissemination at conferences, industrial, and academic events; led, taught, and mentored TAs and junior students; work on Proteus (proteusdb.com).

Research Profile

Focus on systems, data management, and hybrid AI–relational analytics, approximate data processing and search, and performance on heterogeneous hardware. I build and evaluate systems, operators, and optimizers that combine traditional analytics and AI, and design workload and resource-aware, scalable execution tailored for modern hardware. My interdisciplinary view of operating systems, databases, and AI provides ample room for cross-stack optimizations, from high-level workload optimization to low-level execution, resource management, and hardware-conscious tuning.

Projects Lead

High-performance Relational Analytics, ANN Search, and Quantization
Fast and scalable vector quantization development, research, and deployment in an enterprise product.

Efficient, Reusable, and Workload-Conscious Approximate Analytics for Modern Systems
Workload-adaptive online summaries for high-bandwidth storage and many-core processors.

Hybrid Model–Relational Analytics: Context-Enhanced Operators and Holistic Optimization
Relational operators with ML-based vector embedding context; logical and physical optimizations.

Resource-Efficient Speculative Algorithms
Approximation with repair to relax strictly serial, data-parallel-only execution orders.

Relational and Vector Processing on Heterogeneous Compute and Memory
CPU and GPU capabilities with modern memory hierarchies for analytical workloads.

Research Interests

Analytical query processing; AI and ML for systems and data management; vector search and analytics; approximate analytics; data management systems and applications; model–relational operators and optimizers; systems for ML; parallel and distributed systems; GPUs and heterogeneous architectures; hardware–software co-design.

Awards

Distinguished Reviewer Award. ACM SIGMOD. 2026
IEEE ICDE Best Paper Runner-Up Award. For A-Scan, ICDE 2026. 2026
ACM SIGMOD Research Highlight Award. For LAQy, SIGMOD 2023. 2024
Distinguished Service Award. EDIC Doctoral School, EPFL. 2020 – 2023
Teaching Award. EDIC Doctoral School, EPFL. 2022
Best Student (2013/2014 cohort). Faculty of Technical Sciences, University of Novi Sad. 2017
Exceptional Award for Undergraduate Studies. University of Novi Sad. GPA 10.00/10.00.
Momcilo Momo Novkovic Charter. Recognition for outstanding curricular and extracurricular achievements, contribution to teaching, and promotion of the Faculty of Technical Sciences.

Service

Program Committee. ICDE; ICDE Industrial Track; SIGMOD; SIGMOD Demo Track. 2026
Program Committee. ADMS; VLDB Demo Track; SIGMOD ARI. 2025
Organizer and PC. NorCal DB Day: regional database community event bringing together industry and academia in Northern California. Website 2025
Program Committee. SIGMOD ARI. 2024

Publications and Conferences

Reminiscences on Influential Papers. Viktor Sanca. Invited contribution, LEO- DB2's LEarning Optimizer. *SIGMOD Record, June 2026 (Vol. 55, No. 2)*. PDF 2026
A-Scan: Efficient Scale-up Analytics via Throughput-Guided Data Movement. Hamish Nicholson, Aunn Raza, Viktor Sanca, Anastasia Ailamaki. *IEEE ICDE'26*.To Appear in Conference Proceedings
Data Movement–Aware GPU Sharing for Data-Intensive Systems. Yi Jiang, Hamish Nicholson, Viktor Sanca, Anastasia Ailamaki. *CIDR*. PDF
The Cambridge Report on Database Research. A. Ailamaki, S. Madden, D. Abadi, G. Alonso, S. Amer-Yahia, M. Balazinska, P. A. Bernstein, P. Boncz, M. Cafarella, S. Chaudhuri, S. Davidson, D. DeWitt, Y. Diao, X. L. Dong, M. Franklin, J. Freire, J. Gehrke, A. Halevy, J. M. Hellerstein, M. D. Hill, S. Idreos, Y. Ioannidis, C. Koch, D. Kossmann, T. Kraska, A. Kumar, G. Li, V. Markl, R. Miller, C. Mohan, T. Neumann, B. C. Ooi, F. Ozcan, A. Parameswaran, I. Pandis, J. M. Patel, A. Pavlo, D. Porobic, **V. Sanca**, M. Stonebraker, J. Stoyanovich, D. Suciu, W.-C. Tan, S. Venkataraman, M. Zaharia, S. B. Zdonik. arXiv:2504.11259. 2025
Reproducibility Report for ACM SIGMOD 2024 Paper: A Unified Approach for Resilience and Causal Responsibility with Integer Linear Programming (ILP) and LP Relaxations. Viktor Sanca, Yesdaulet Izenov, Amedeo Pachera, Wolfgang Gatterbauer. Preprint.
Efficient Data Access Paths for Mixed Vector–Relational Search. Viktor Sanca, Anastasia Ailamaki. *DaMoN*. DOI: 10.1145/3662010.3663448 2024
Optimizing Context–Enhanced Relational Joins. Viktor Sanca, Manos Chatzakis, Anastasia Ailamaki. *ICDE*. To appear. arXiv:2312.01476
Efficient and Reusable Lazy Sampling. Viktor Sanca, Periklis Chrysogelos, Anastasia Ailamaki. *SIGMOD Record*, 53(1). DOI: 10.1145/3665252.3665261
Efficient Model–Relational Data Management: Challenges and Opportunities. Viktor Sanca, Anastasia Ailamaki. Invited contribution for the Special Issue on Best and Innovation Papers. *IEEE TKDE*. DOI: 10.1109/TKDE.2024.3384276
Post-Moore's Law Fusion: High-Bandwidth Memory, Accelerators, and Native Half-Precision Processing for CPU-Local Analytics. Viktor Sanca, Anastasia Ailamaki. *ADMS @ VLDB*. PDF 2023
E-Scan: Consuming Contextual Data with Model Plugins. Viktor Sanca, Anastasia Ailamaki. *CDMS @ VLDB*. PDF
Improving K-means Clustering using Speculation. Stefan Igescu, Viktor Sanca, Eleni Zapridou, Anastasia Ailamaki. *AIDB @ VLDB*. PDF
Chaosity: Understanding Contemporary NUMA-architectures. Hamish Nicholson, Andreea Nica, Aunn Raza, Viktor Sanca, Anastasia Ailamaki. *TPC-TC @ VLDB*. Preprint

LAQy: Efficient and Reusable Query Approximations via Lazy Sampling. Viktor Sanca, Periklis Chrysogelos, Anastasia Ailamaki. *SIGMOD*. DOI: 10.1145/3589319

Analytical Engines With Context-Rich Processing: Towards Efficient Next-Generation Analytics. Viktor Sanca, Anastasia Ailamaki. *ICDE* Vision. arXiv:2212.07517. DOI: 10.1109/ICDE55515.2023.00298

Sampling-Based AQP in Modern Analytical Engines. Viktor Sanca, Anastasia Ailamaki. *DaMoN @ SIGMOD*. DOI: 10.1145/3533737.3535095 2022

Accelerating Complex Analytics Using Speculation. Panagiotis Sioulas, Viktor Sanca, Ioannis Mytilinis, Anastasia Ailamaki. *CIDR*. PDF 2021

Theses Supervised

Sequential Pattern Mining in Very Large Data Streams. Sebastien Ollquist, Master's Thesis – Swisscom. Co-supervisor at DIAS Lab. 2023

Distance-Based Anomaly Detection. Youssef Saied, Master's Thesis – done at Oracle Zurich. Co-supervisor at DIAS Lab. 2022 – 2023

In-Memory Graph Query Runtime Inside Relational Databases. Ciprian Baetu, Master's Thesis – Oracle Labs Zurich. Co-supervisor at DIAS Lab. 2019

University Teaching

Design of a new undergraduate course: Data Intensive Systems (CS-300). Professors: Anastasia Ailamaki and Sanidhya Kashyap. Spring semester. 2023
Assisted in evolving Introduction to Database Systems (CS-322), emphasizing practical work that synthesizes data management and operating systems.

Head Teaching Assistant: Introduction to Database Systems (CS-322). Professors: Anastasia Ailamaki and Christoph Koch. Spring semester. 2020 – 2023
Developed and improved materials, exams, and infrastructure for 270 students; mentored and managed 6 junior TAs; migrated course to support online and hybrid formats.

Initiated and co-designed: Machine Learning for Database Systems (CS-726). Professors: Anastasia Ailamaki and Christoph Koch. Fall semester. 2019 – 2020

Teaching Assistant: Information, Computation, Communication (CS-119d). Professor: Jean-Cedric Chappelier. Fall semester. 2019 – 2021

Teaching Assistant: Introduction to Database Systems (CS-322). Professors: Anastasia Ailamaki and Christoph Koch. Spring semester. 2019

Languages

English	Fluent, Professional	Certificate in Advanced English, Cambridge. Level C2.
Serbian	Native	
Hungarian	Conversational	
German	Beginner	
French	Intermediate	EPFL Centre des Langues, Level A2/B1.

Technical Skills

Programming: C++, C, LLVM, VHDL, CUDA, Assembly, R, Java, Scala, Python, SQL, PL/SQL, JavaScript
Software and Systems: PyTorch, vLLM, Matlab, Oracle DBMS, Intel VTune, familiar with Web and Cloud services
Platforms: Linux, Windows

Memberships

Association for Computing Machinery (ACM). **Institute of Electrical and Electronics Engineers (IEEE)**. **EPFL IC PhD Student Association Committee** (2020 to 2023).