Dimitris Tsitsigkos

Software Engineer (PhD)

dtsitsigkos | dtsitsigkos.github.io | DBLP | Google Scholar | dtsitsigkos
tsitsigkosdim@gmail.com | +30 6942951698

Summary

Software Engineer with a background in data management and parallel computing. Experienced in the design and implementation of in-memory indexing techniques that accelerate query performance for single and multi-dimensional data. Focuses on developing scalable data systems and performance-critical algorithms in C++, Java, and Python, leveraging parallelism and memory-efficient designs to solve complex data challenges.

Technical Skills

Languages:	C, C++, Java, Python
Data Management:	MySQL, PostgreSQL, PostGIS, HBase
Parallel & Systems Programming:	OpenMP, SIMD, MPI
Distributed Data Frameworks:	Hadoop, Spark, Dask
Web & Frameworks:	Spring, RESTful Web Services, JavaScript, JSP, JSF
Operating Systems:	Ubuntu, Microsoft Windows, macOS

Work Experience

Archimedes Research on AI, Data Science and Algorithms, Greece Feb 2025 - present

Research Engineer (Data Science and Engineering team)

- Developed performance-critical indexing components for multi-dimensional and vector data, focusing on low-latency query execution.
- Implemented and optimized in-memory data structures using C++, leveraging multi-core parallelism (OpenMP) and SIMD to improve query throughput.
- Worked on hardware-aware optimizations and memory-efficient designs to scale query processing on modern multi-core systems.
- Technologies: **C++, openMP, SIMD**.

Dept. of Computer Science & Engineering, Univ. of Ioannina, Greece Jan 2024 – Dec 2024

Software Engineer (PhD Research)

- Implemented novel parallel and non-parallel index structures in C++ for spatial queries, including spatial join, range queries, and k-NN.
- Designed memory-efficient algorithms and data partitioning strategies to scale query processing on multi-core architectures.
- Contributed to the design and development of a prototype distributed spatial data management system using MPI and OpenMP, focusing on scalability and performance.
- Technologies: **C++, OpenMP, MPI**.

Information Management Systems Institute, Athens, Greece Dec 2012 – Dec 2023

Software Engineer

Participated in several Greek and European funding projects, including:

- MORE: Management of Real-time Energy data.
  (Oct 2020 – Dec 2023)
  - Developed a parallel continuous evaluation module in Java for sliding-window aggregations to process real-time sensor data at the edge, enabling faster response times for energy analytics workloads.
  - Implemented parallel and distributed data processing pipelines in Python using Dask to improve the efficiency and scalability of large-scale time-series analytics.
  - Technologies: **Java, Python, Dask**.
- Amnesia: A platform for anonymizing relational, multi-dimensional, and hierarchical data.
  (Aug 2015 – Sep 2020)
  - Led the end-to-end design and development of a open-source data anonymization platform, providing high-performance privacy guarantees for complex datasets.
  - Developed the core anonymization engine in Java, implementing efficient algorithms to process large-scale data transformations with minimal information loss.
  - Designed and implemented RESTful APIs using Spring, and integrated the platform into the OpenAIRE ecosystem, supporting a global community of researchers and data providers.
  - Owned the full software development lifecycle, including requirements analysis, system design, implementation, and deployment.

- Technologies: **Java, Spring, RESTful Web Services, JavaScript**.

- MoDisSENSE: A Distributed Spatio-Temporal and Textual Processing Platform for Social.
(Dec 2012 - Jul 2015)
  - Developed distributed data processing algorithms in Java using Hadoop and HBase to analyze large-scale location data, including point-of-interest discovery and trajectory reconstruction from GPS traces.
  - Built backend services and RESTful APIs in Java, backed by PostgreSQL, to support spatial data processing and recommendation functionality.
  - Technologies: **Java, RESTful Web Services MapReduce, Hadoop, HBase, PostgreSQL**.

Institute of CS, Johannes Gutenberg University Mainz, Germany May 2022 – Jul 2022

Visiting Researcher (PhD Collaboration)

- Implemented and optimized spatial join algorithms in C++, focusing on performance and memory efficiency.
- Technologies: **C++ and OpenMP**.

Hellenic Army Information Technology Support Center, Greece Apr 2017 – Nov 2018

Software Engineer

- Maintained and extended backend Java applications, implementing new features and resolving production issues for internal information systems.
- Worked with Oracle Database to support application data storage and retrieval.
- Optimized database queries and backend logic to improve the performance of internal information systems.
- Technologies: **Java, Oracle Database, JSF**.

Education

PhD, Computer Science Jul 2019 – Dec 2024

Department of Computer Science & Engineering, University of Ioannina (UoI)

Thesis: In-memory Indexing for Parallel Processing of Single and Multi-Dimensional Queries

M.Sc., Computing Systems: Software and Hardware, Computer Science Nov 2012 – Sep 2016

Department of Informatics and Telecommunications, National and Kapodistrian University of Athens (NKUA)

Thesis: Complex Event Processing (CEP) for Intrusion Detection

B.Sc., Computer Science Sep 2006 – Jun 2012

Department of Informatics and Telecommunications, National and Kapodistrian University of Athens (NKUA)

Thesis: Clustering Wikipedia resources

Awards

3rd place Future of Database Programming Contest, Athens Mar 2025

Selected Publications

Dimitrios Tsitsigkos, Achilleas Michalopoulos, Nikos Mamoulis, and Manolis Terrovitis (2026). "B^S-tree: A gapped data-parallel B-tree". In: *IEEE International Conference on Data Engineering, (ICDE)*.

Dimitrios Tsitsigkos, Panagiotis Bouros, Konstantinos Lampropoulos, Nikos Mamoulis, and Manolis Terrovitis (2024). "Two-Layer Space-Oriented Partitioning for Non-Point Data". In: *IEEE Transactions on Knowledge and Data Engineering (TKDE)*.

Panagiotis Bouros, Nikos Mamoulis, Dimitrios Tsitsigkos, and Manolis Terrovitis (2021). "In-Memory Interval Joins". In: *VLDB J.*

Other

Languages Greek (native), English (Advanced)
Volunteer European Data Forum 2014, EDBT/ICDT 2023 Joint Conference, 6th ACM Europe Summer School on Data Science 2025, HDMS 2025.