Dimitris Tsitsigkos

Software Engineer (PhD)

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Summary

Software Engineer with a PhD in Computer Science and 12 years in research institutes, focusing on data management, parallel computing, and practical experience with distributed systems. Strong in C++ for performance-critical algorithms, with additional project experience in Java and Python. Collaborative, detail-oriented, and passionate about building efficient, high-performance systems.

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

University of Ioannina (UoI) — Department of Computer Science & Engineering.

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

MSc, Computing Systems: Software and Hardware, Computer Science   Nov 2012 – Sep 2016

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

Thesis: Complex Event Processing (CEP) for Intrusion Detection

BSc, Computer Science   Sep 2006 – Jun 2012

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

Thesis: Clustering Wikipedia resources

Awards

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

Data management programming contest on cardinality estimation and related algorithms, organized by Athena Research Center with Huawei.

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.