Eleni Tzirita Zacharatou Curriculum Vitae

Assistant Professor, IT University of Copenhagen Rued Langgaards Vej 7, 2300 Copenhagen, Denmark elza@itu.dk | ORCID <u>0000-0001-8873-5455</u> | heltzi.github.io

Education

Ph.D. in Computer Science

2013 - 2019

École Polytechnique Fédérale de Lausanne (EPFL), Switzerland

Thesis: Efficient Query Processing for Spatial and Temporal Data Exploration

Advisor: Prof. Anastasia Ailamaki

Diploma (M. Eng.) in Electrical & Computer Engineering National Technical University of Athens (NTUA), Greece 2007 - 2013

Thesis: Automatic Music Transcription

Advisor: Prof. Petros Maragos

Academic Experience

IT University of Copenhagen (ITU)

Copenhagen, Denmark

Mav 2022 - now

Assistant Professor, Computer Science Department

• Member of the Data-Intensive Systems and Applications (DASYA) group

• Research Focus: Spatial Big Data Analytics

Technical University of Berlin (TUB)

Berlin, Germany

Postdoctoral Researcher, Computer Science Department

Oct 2019 - Apr 2022

- Member of the Database Systems and Information Management (DIMA) group
- Junior Fellow at BIFOLD
- Supervisor: Prof. Volker Markl

New York University (NYU)

New York, USA

Visiting Researcher, Tandon School of Engineering

Jul 2016 - Oct 2016

- Member of the Visualization, Imaging and Data Analysis (VIDA) group
- Supervisors: Prof. Juliana Freire and Dr. Harish Doraiswamy

École Polytechnique Fédérale de Lausanne (EPFL)

Lausanne, Switzerland

Doctoral Assistant, Computer Science Department

Sep 2013 - Aug 2019

- Member of the Data-Intensive Applications and Systems (DIAS) group
- Research Focus: Spatial and temporal data management for exploratory applications
- Advisor: Prof. Anastasia Ailamaki

École Polytechnique Fédérale de Lausanne (EPFL)

Lausanne, Switzerland

Research Intern, Computer Science Department

Jan 2013 - Aug 2013

- rtesearch Intern, Computer Science Department
- Member of the Data-Intensive Applications and Systems (DIAS) group
- Supervisors: Prof. Anastasia Ailamaki and Prof. Thomas Heinis

Honors and Awards

• Distinguished Reviewer Award, VLDB Conference	2022
• Junior Fellowship, Berlin Institute for the Foundation of Learning and Data (BIFOLD)	2021
• Best Demonstration Award, ACM SIGMOD Conference	2018
• Travel Award, ExploreDB Workshop (in conjunction with ACM SIGMOD), USD 1K	2016
• Distinction in the Panhellenic Math Competition "Euclid", Hellenic Mathematical Society	2006

Publications Summary

Full papers at top-tier conferences (CORE A*/A ranking) and journals: 11

Other peer-reviewed conference papers: 3

Peer-reviewed workshop and demonstration papers: 9

Number of citations: 325 and h-index: 10 (as per Google Scholar in June 2024)

Full list of publications: see https://heltzi.github.io/publications.html

Invited Talks, Panels, and Conference Presentations

- 08/2024: VLDB PhD Workshop Panel, Guangzhou, China (Invited Panelist)
- 07/2024: VLDB Summer School 2024, Cluj-Napoca, Romania (Invited Speaker)
- 07/2024: BIFOLD Lunch Talk, Berlin, Germany (Invited Speaker)
- 06/2024: Analysis of Geospatial Data Loading, DBTest Workshop@SIGMOD, Santiago, Chile
- 11/2023: Efficient Data Management for Modern Spatial Applications, HPI-TU Darmstadt Joint Database Systems Seminar, Online
- 09/2023: Efficient Data Management for Modern Spatial Applications, NERDS (ITU) Seminar, Denmark
- 09/2022: Efficient Data Management for Modern Spatial Applications and the Internet of Moving Things, DIREC Seminar, Aarhus, Denmark
- 05/2022: Spatial and Temporal Data Management Panel, ICDE Conference, Online
- 09/2021: Agora-EO: A Unified Ecosystem for Earth Observation, Monthly Research Meeting, Department of Geo-information Processing, University of Twente, Online
- 08/2021: Spatio-Temporal Data System Panel, VLDB Conference, Online
- 01/2021: The Case for Distance-Bounded Spatial Approximations, CIDR Conference, Online
- 11/2019: Efficient Bundled Spatial Range Queries, SIGSPATIAL Conference, Chicago, USA
- 08/2019: Efficient Query Processing for Spatial and Temporal Data Exploration, Public Defense, EPFL, Lausanne, Switzerland
- 07/2019: GPU Rasterization for Real-Time Spatial Aggregation over Arbitrary Polygons, Hellenic Data Management Symposium (HDMS), Athens, Greece
- 02/2019: Interactive and Exploratory Spatio-Temporal Data Analytics, DIMA Research Seminar, TU Berlin, Germany
- 08/2018: GPU Rasterization for Real-Time Spatial Aggregation over Arbitrary Polygons, VLDB Conference, Rio de Janeiro, Brazil
- 06/2018: Interactive Exploration of Urban Data with GPUs, Short Presentation, IC Research Day, EPFL, Lausanne, Switzerland
- 04/2018: Improving Spatial Data Processing by Clipping Minimum Bounding Boxes, ICDE Conference, Paris, France
- 06/2017: Real-Time Spatial Aggregation using GPU Rasterization, EcoCloud Annual Event, Lausanne, Switzerland
- 09/2016: Indexing the brain, Data Science Lunch Talk, NYU Center for Data Science, New York, USA
- 06/2015: RUBIK: Efficient Threshold Queries on Massive Time Series, SSDBM Conference, San Diego, USA

Advising (Current)

 Xenofon Chatziliadis, PhD, TUB, Primary advisor: Prof. Volker Markl Gereon Dusella, PhD, TUB, Primary advisor: Prof. Volker Markl Aske Wachs, MSc Research Project & Thesis, ITU Johan Kjersgård Flensmark, Benjamin Hammer Thygesen, Alexander Theodor Bild MSc Research Project & Thesis, ITU Barbara Puljak, MSc Research Project & Thesis, ITU 	Fall 2019 — now Fall 2023 — now Fall 2023 — now de Pedersen, Fall 2023 — now Fall 2023 — now
$\underline{\text{Advising (Alumni)}}$	
 Martin Kiefer, PhD, TUB, Primary advisor: Prof. Volker Markl Dagmara Kamila Przygocka, Kamila Garczynska, Barbara Puljak, MSc Research Pr Hanno Skowronek, MSc Thesis, TUB, Primary advisor: Prof. Begüm Demir Carl Bruun & Rasmus Garbarsch, BSc Thesis, ITU Gergo Gyori, BSc Thesis, ITU Gereon Dusella, MSc Thesis, TUB, Co-supervisor: H. Gavriilidis Peter Løffmann, Thomas Haugaard Mogensen, Zachery Kuntz, MSc Research Proj. Laert Nuhu, MSc Thesis, TUB, Co-supervisor: H. Gavriilidis Pablo Alberto Osinaga Arze, MSc Thesis, TUB Iva Mihajlovska, MSc Thesis, TUB Marcellus Prama Saputra, BSc Thesis, TUB Robin Papke, MSc Thesis, TUB Elena Beatriz Ouro Paz, MSc Thesis, TUB Carlos E. Muniz Cuza, MSc Thesis, TUB & Aalborg University, Co-supervisors: Professors Nguyen Thi Thao Ho, Torben Bach Pedersen, Bin Yang Vlad Mihaescu, MSc Research Project, EPFL Maria Ilina, Summer Intern, EPFL Parand Alizadeh, Summer Intern, EPFL Chenxi Sun, Summer Intern, EPFL 	Spring 2023
Guided Research	
 Thanasis Georgiadis, Approximating Polygons as Raster Interval Lists David Burell, Workload Prediction for IoT Data Management Systems Felix Henze, Efficient Specialized Spreadsheet Parsing Ahmet Kerem Aksoy, Satellite Image Search in AgoraEO Christian Winter, A Query-Cache Accelerated Data Structure for Spatial Aggregation over Polygons 	Spring 2023 Fall 2022 Spring 2022 Spring 2022 Fall 2021
Other Mentoring Activities	
• Mentor in the AI Grid network	2023 - now
PhD Thesis Committees	
 Keven Richly, PhD, HPI (Advisor: Hasso Plattner) Martin Kiefer, PhD, TU Berlin (Advisor: Volker Markl) Morten Tychsen Clausen, PhD Midway, ITU (Advisor: Philippe Bonnet) 	2024 2023 2023

Teaching

Term	Institute	Course Name	Role
Fall 2023 – Fall 2024 & Fall 2022	ITU	Introduction to Database Systems	Course Manager & Responsible Lecturer
Fall 2021, Spring 2021	TUB	DBPRA: Datenbankprak- tikum (Practical course on databases)	Responsible Lecturer
Fall 2020	TUB	AIM-3: Scalable Data Analysis and Data Mining	Lecturer
Fall 2020, Spring 2020, Fall 2019	TUB	BDASEM: Big Data Analytics Seminar	Lecturer
Spring 2020	TUB	BDAPRO: Big Data Analytics Project	Project Mentor
Fall 2019	TUB	DBSEM: Foundations of Database Systems Seminar	Lecturer
Fall 2018/2019, Spring 2014	EPFL	Information, Computation, Communication	Teaching Assistant
Spring 2018, Spring 2017	EPFL	Database Systems	Teaching Assistant
Fall 2017/2018	EPFL	Programming I (in C)	Teaching Assistant
Spring 2016	EPFL	Probability and Statistics	Teaching Assistant
Fall 2015/2016	EPFL	Computer Architecture	Teaching Assistant
Spring 2015	EPFL	Introduction to Database Systems	Teaching Assistant
Fall 2014/2015	EPFL	Introduction to Object Oriented Programming (in Java)	Teaching Assistant

Service

Organization:

- Proceedings Co-chair, SIGMOD 2025
- Diversity and Inclusion Co-chair, EDBT 2026, EDBT 2025
- Proceedings Chair, DEBS 2022
- Co-chair, BOSS Workshop 2020 (in conjunction with VLDB)

Program Committee:

- ACM SIGMOD: 2025, 2024, 2023, 2022, 2021 (Industrial track)
- VLDB: 2025, 2023, 2022
- IEEE ICDE: 2024 (Demo track)
- EDBT: 2022
- VLDB PhD Workshop: 2023
- BTW: 2023 (Demo track)
- ACM SIGSPATIAL Workshop on Location-based Recommendations, Geosocial Networks and Geoadvertising (LocalRec): 2023

- PLDI Workshop on Distributions, Relational Algebra, Graphs, Semi-Rings, Tensors, and All That (DRAGSTERS): 2023
- IEEE Intl. Conf. on Cloud Engineering Workshop on Testing Distributed Internet of Things Systems (TDIS): 2022
- AI-ML Systems: 2021
- CIKM: 2018 (Short research papers track)

Journal Reviewer:

- VLDB Journal, 2021 2022
- Knowledge and Information Systems (KAIS) Journal, 2021 2022
- Big Data Research Journal, 2022

External Reviewer:

CIDR 2022, SIGMOD 2021, CIDR 2021, ICDE 2017

Panelist:

- Spatial and Temporal Data Management Panel, ICDE, May 2022
- Spatio-Temporal Data System Panel, VLDB, August 2021

Session Chair:

EDBT 2023, VLDB 2021, VLDB 2020

Assessment and Admission Committees:

- Program Admission Committee Member at ITU: Data Science Bachelor (Spring 2024), Software Design Master (Spring 2023)
- PhD Assessment Committee Member at ITU: Spring 2024, Spring 2023, Fall 2022
- Hiring Committee Member at TUB: Professorship of "W3 Big Data Engineering", 2021

Department Level:

- Co-organizer: CS Lectures Series, ITU, 2022 now
- Co-organizer: CS Department Annual Retreat, ITU, 2023

Media, Blogs, and Interviews

- 2023: An Interview with Eleni Tzirita Zacharatou, DIMA TUB webpage
- 2021: Advancing Big Data Analytics: Post-Doctoral Research, DataTalksClub podcast
- 2021: BIFOLD welcomes the first six junior fellows, BIFOLD webpage
- 2021: The Case for Distance-Bounded Spatial Approximations, The Agora Technology Blog, Medium
- 2018: Student-teacher Duo from EPFL Wins Best Demonstration Award at SIGMOD, Ecocloud News
- 2018: Tandon Team Takes Home Top Honors at Association for Computing Machinery Conference, Tandon School of Engineering News

References

Provided upon request.

Languages

Greek (Native), English (Fluent), French (Fluent), German (Intermediate)

Extracurricular

I have formally studied the piano, the violin, and music theory. I enjoy playing music alone or in groups.

- 2010: Piano Teaching Diploma (Ptychio), Grade Excellent, Athenaeum Conservatory
- 2005: Classical Harmony Diploma (Ptvchio), Heraklion Conservatory

Eleni Tzirita Zacharatou Publications

Assistant Professor, IT University of Copenhagen elza@itu.dk | ORCID <u>0000-0001-8873-5455</u> | heltzi.github.io

Metric	Value
Peer-reviewed publications	23
Citations	325
h-index	10
i10-index	10

Table 1: Summary of bibliometrics as per Google Scholar in June 2024.

It's important to note that the database research community is relatively small, leading to smaller indices for database researchers, as evidenced by conference indices.¹ The venue ranking according to the CORE Conference Portal² is included when available. My name is highlighted in **boldface** and the names of students under my (co-)mentorship are marked with an asterisk (*).

Peer-Reviewed Journal Publications

- [1] X. Chatziliadis*, E. **Tzirita Zacharatou**, A. Eracar, S. Zeuch, and V. Markl. "Efficient Placement of Decomposable Aggregation Functions for Stream Processing over Large Geo-Distributed Topologies". In: *Proceedings of the Very Large Databases Endowment (PVLDB)* 17(6) (2024), pp. 1501–1514. [Core A*].
- [2] H. Gavriilidis, F. Henze*, E. **Tzirita Zacharatou**, and V. Markl. "SheetReader: Efficient Specialized Spreadsheet Parsing". In: *Information Systems* 115 (2023), p. 102183. [Core A*].
- [3] M. Kiefer*, I. Poulakis, E. **Tzirita Zacharatou**, and V. Markl. "Optimistic Data Parallelism for FPGA-Accelerated Sketching". In: *Proceedings of the Very Large Databases Endowment (PVLDB)* 16(5) (2023), pp. 1113–1125. [Core A*].
- [4] E. **Tzirita Zacharatou**, H. Doraiswamy, A. Ailamaki, C. T. Silva, and J. Freire. "GPU Rasterization for Real-Time Spatial Aggregation over Arbitrary Polygons". In: *Proceedings of the Very Large Databases Endowment (PVLDB)* 11(3) (2017), pp. 352–365. [Core A*].

Peer-Reviewed Conference Publications

- [5] C. E. Muñiz-Cuza*, N. Ho, E. **Tzirita Zacharatou**, T. B. Pedersen, and B. Yang. "Spatio-temporal graph convolutional network for stochastic traffic speed imputation". In: *International Conference on Advances in Geographic Information Systems (SIGSPATIAL)*. ACM, 2022, 14:1–14:12. [Core A].
- [6] M. P. Saputra*, E. Tzirita Zacharatou, S. Papadias, and V. Markl. "In-Place Updates in Tree-Encoded Bitmaps". In: *International Conference on Scientific and Statistical Database Management* (SSDBM). ACM, 2022, 18:1–18:4. [Core2021 B].
- [7] E. Ouro Paz*, E. **Tzirita Zacharatou**, and V. Markl. "Towards Resilient Data Management for the Internet of Moving Things". In: *Datenbanksysteme für Business, Technologie und Web (BTW)*. Gesellschaft für Informatik e.V., 2021, pp. 279–301.

https://scholar.google.de/citations?view_op=top_venues&hl=en&vq=eng_databasesinformationsystems

²www.core.edu.au/conference-portal

- [8] E. **Tzirita Zacharatou**, A. Kipf, I. Sabek, V. Pandey, H. Doraiswamy, and V. Markl. "The Case for Distance-Bounded Spatial Approximations". In: *Conference on Innovative Data Systems Research (CIDR)*. www.cidrdb.org, 2021. [Core A].
- [9] A. de Wall, B. Deiseroth, E. **Tzirita Zacharatou**, J.-A. Quiané-Ruiz, B. Demir, and V. Markl. "Agora-EO: A Unified Ecosystem for Earth Observation A Vision for Boosting EO Data Literacy". In: *Conference on Big Data from Space*. 2021, pp. 101–104.
- [10] C. Winter*, A. Kipf, C. Anneser, E. **Tzirita Zacharatou**, T. Neumann, and A. Kemper. "GeoBlocks: A Query-Cache Accelerated Data Structure for Spatial Aggregation over Polygons". In: *International Conference on Extending Database Technology (EDBT)*. OpenProceedings.org, 2021, pp. 169–180. [Core A].
- [11] A. Kipf, H. Lang, V. Pandey, R. A. Persa, C. Anneser, E. **Tzirita Zacharatou**, H. Doraiswamy, P. A. Boncz, T. Neumann, and A. Kemper. "Adaptive Main-Memory Indexing for High-Performance Point-Polygon Joins". In: *International Conference on Extending Database Technology (EDBT)*. OpenProceedings.org, 2020, pp. 347–358. [Core A].
- [12] E. **Tzirita Zacharatou**, D. Sidlauskas, F. Tauheed, T. Heinis, and A. Ailamaki. "Efficient Bundled Spatial Range Queries". In: *International Conference on Advances in Geographic Information Systems (SIGSPATIAL)*. ACM, 2019, pp. 139–148. [Core A].
- [13] D. Sidlauskas, S. Chester, E. **Tzirita Zacharatou**, and A. Ailamaki. "Improving Spatial Data Processing by Clipping Minimum Bounding Boxes". In: *International Conference on Data Engineering*, (ICDE). IEEE, 2018, pp. 425–436. [Core A*].
- [14] E. **Tzirita Zacharatou**, F. Tauheed, T. Heinis, and A. Ailamaki. "RUBIK: efficient threshold queries on massive time series". In: *International Conference on Scientific and Statistical Database Management (SSDBM)*. ACM, 2015, 18:1–18:12. [Core2014 A].

Peer-Reviewed Workshop and Demonstration Publications

- [15] G. Dusella*, H. Gavriilidis, L. Nuhu, V. Markl, and E. **Tzirita Zacharatou**. "Multi-Backend Zonal Statistics Execution with Raven". In: *International Conference on Management of Data (SIGMOD)*. ACM, 2024. Demo paper. [Core A*].
- [16] A. Wachs* and E. **Tzirita Zacharatou**. "Analysis of Geospatial Data Loading". In: *DBTest@SIGMOD*'24: Proceedings of the International Workshop of Testing Database Systems. To appear. 2024.
- [17] D. Burrell*, X. Chatziliadis*, E. **Tzirita Zacharatou**, S. Zeuch, and V. Markl. "Workload Prediction for IoT Data Management Systems". In: *Datenbanksysteme für Business, Technologie und Web (BTW)*. Gesellschaft für Informatik e.V., 2023, pp. 943–950. BTW 2023 DE4DS Workshop.
- [18] A. K. Aksoy*, P. Dushev, E. **Tzirita Zacharatou**, H. Hemsen, M. Charfuelan, J. A. Quiané-Ruiz, B. Demir, and V. Markl. "Satellite Image Search in AgoraEO". In: *Proceedings of the Very Large Databases Endowment (PVLDB)* 15(12) (2022), pp. 3646–3649. Demo paper. [Core A*].
- [19] F. Henze*, H. Gavriilidis, E. **Tzirita Zacharatou**, and V. Markl. "Efficient Specialized Spreadsheet Parsing for Data Science". In: *International Workshop on Design, Optimization, Languages and Analytical Processing of Big Data (DOLAP (co-located with EDBT))*. CEUR-WS.org, 2022, pp. 41–50. [Core B].
- [20] X. Chatziliadis*, E. **Tzirita Zacharatou**, S. Zeuch, and V. Markl. "Monitoring of Stream Processing Engines Beyond the Cloud: An Overview". In: *Open Journal of Internet Of Things (OJIOT)* 7(1) (2021), pp. 71–82. VLDB 2021 VLIoT Workshop.

- [21] S. Zeuch, E. **Tzirita Zacharatou**, S. Zhang, X. Chatziliadis, A. Chaudhary, B. D. Monte, D. Giouroukis, P. M. Grulich, A. Ziehn, and V. Markl. "NebulaStream: Complex Analytics Beyond the Cloud". In: *Open Journal of Internet Of Things (OJIOT)* 6(1) (2020), pp. 66–81. VLDB 2020 VLIoT Workshop.
- [22] H. Doraiswamy, E. **Tzirita Zacharatou**, F. Miranda, M. Lage, A. Ailamaki, C. T. Silva, and J. Freire. "Interactive Visual Exploration of Spatio-Temporal Urban Data Sets using Urbane". In: *International Conference on Management of Data (SIGMOD)*. ACM, 2018, pp. 1693–1696. Demo paper. [Core A*]

 Best Demonstration Award.
- [23] M. Pavlovic, E. **Tzirita Zacharatou**, D. Sidlauskas, T. Heinis, and A. Ailamaki. "Space odyssey: efficient exploration of scientific data". In: *International Workshop on Exploratory Search in Databases and the Web (ExploreDB (co-located with SIGMOD))*. ACM, 2016, pp. 12–18.

Articles and Technical Reports (Non-Peer-Reviewed)

- [24] Z. Bao, P. Bouros, R. Cheng, B. Choi, A. Dignös, W. Ding, Y. Fang, B. Han, J. Hu, A. Khan, W. Lin, X. Lin, C. Long, N. Mamoulis, J. Pei, M. Renz, S. Shekhar, J. Shi, E. **Tzirita Zacharatou**, S. Wang, X. Wang, X. Wang, R. C.-W. Wong, D. Yan, X. Yan, B. Yang, D. Yao, C. Zhang, P. Zhao, and R. Zhu. "A Summary of ICDE 2022 Research Session Panels". In: *Data Engineering Bulletin* 47 (2023). URL: http://sites.computer.org/debull/A23dec/p4.pdf.
- [25] T. Georgiadis*, E. **Tzirita Zacharatou**, and N. Mamoulis. "APRIL: Approximating Polygons as Raster Interval Lists". In: *CoRR* abs/2307.01716 (2023). DOI: 10.48550/arXiv.2307.01716. URL: https://doi.org/10.48550/arXiv.2307.01716. Under submission to VLDBJ.
- [26] V. Pandey, A. van Renen, E. Tzirita Zacharatou, A. Kipf, I. Sabek, J. Ding, V. Markl, and A. Kemper. "Enhancing In-Memory Spatial Indexing with Learned Search". In: CoRR abs/2309.06354 (2023). DOI: 10.48550/arXiv.2309.06354. URL: https://doi.org/10.48550/arXiv.2309.06354. Under submission to Frontiers in Big Data Journal.

PhD Thesis

[27] E. **Tzirita Zacharatou**. "Efficient Query Processing for Spatial and Temporal Data Exploration". PhD thesis. EPFL, 2019, p. 183.

Conference Proceedings

[28] Y. Zhou, P. K. Chrysanthis, V. Gulisano, and E. **Tzirita Zacharatou**, eds. 16th ACM International Conference on Distributed and Event-based Systems, DEBS 2022, Copenhagen, Denmark, June 27 - 30, 2022. ACM, 2022. ISBN: 978-1-4503-9308-9. DOI: 10.1145/3524860. URL: https://doi.org/10.1145/3524860. Proceedings chair.