

Eleni Tzirita Zacharatou

Curriculum Vitae

Assistant Professor, IT University of Copenhagen
Rued Langgaards Vej 7, 2300 Copenhagen, Denmark
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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 2007 – 2013
National Technical University of Athens (NTUA), Greece
Thesis: Automatic Music Transcription
Advisor: Prof. Petros Maragos

Academic Experience

IT University of Copenhagen (ITU) Copenhagen, Denmark
Assistant Professor, Computer Science Department May 2022 – now
• 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
• 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

Grants

DFF Inge Lehmann grant titled “Cybele: Transforming Earth Observation Data into Insights”
Sole PI, DKK 3.16 M, pending decision (expected in November 2023).

Publications Summary

Full papers at top-tier conferences and journals (CORE A* and CORE A ranking): 10

Other peer-reviewed conference papers: 3

Peer-reviewed workshop and demonstration papers: 7

Working papers: 3

Number of citations: 270 and h-index: 10 (as per Google Scholar in November 2023)

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

Invited Talks, Panels, and Conference Presentations

- 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, 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, 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, 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 Fall 2019 – now
- *Aske Wachs*, MSc Research Project, ITU Fall 2023
- *Dagmara Kamila Przygocka, Kamila Garczynska, Barbara Puljak*, MSc Research Project, ITU Fall 2023
- *Johan Kjersgård Flensmark, Benjamin Hammer Thygesen, Alexander Theodor Bilde Pedersen*, MSc Research Project, ITU Fall 2023

Advising (Alumni)

- *Martin Kiefer*, PhD, TUB, Primary advisor: Prof. Volker Markl Fall 2021 – Fall 2022
- *Hanno Skowronek*, MSc Thesis, TUB, Primary advisor: Prof. Begüm Demir Spring 2023
- *Carl Bruun & Rasmus Garbarsch*, BSc Thesis, ITU Spring 2023
- *Gergo Gyori*, BSc Thesis, ITU Spring 2023
- *Gereon Dusella*, MSc Thesis, TUB, Co-supervisor: H. Gavrilidis Spring 2023
- *Peter Løffmann, Thomas Haugaard Mogensen, Zachery Kuntz*, MSc Research Project, ITU Fall 2022
- *Laert Nuhu*, MSc Thesis, TUB, Co-supervisor: H. Gavrilidis Spring 2022
- *Pablo Alberto Osinaga Arze*, MSc Thesis, TUB Fall 2021
- *Iva Mihajlovska*, MSc Thesis, TUB Spring 2021
- *Marcellus Prama Saputra*, BSc Thesis, TUB Spring 2021
- *Robin Papke*, MSc Thesis, TUB Fall 2020
- *Elena Beatriz Ouro Paz*, MSc Thesis, TUB Spring 2020
- *Carlos E. Muniz Cuza*, MSc Thesis, TUB & Aalborg University, Co-supervisors: Professors Nguyen Thi Thao Ho, Torben Bach Pedersen, Bin Yang Spring 2020
- *Vlad Mihaescu*, MSc Research Project, EPFL Fall 2018
- *Maria Ilina*, Summer Intern, EPFL Summer 2018
- *Parand Alizadeh*, Summer Intern, EPFL Summer 2018
- *Chenxi Sun*, Summer Intern, EPFL Summer 2015

Guided Research

- *Thanasis Georgiadis*, Approximating Polygons as Raster Interval Lists Spring 2023
- *David Burell*, Workload Prediction for IoT Data Management Systems Fall 2022
- *Felix Henze*, Efficient Specialized Spreadsheet Parsing Spring 2022
- *Ahmet Kerem Aksoy*, Satellite Image Search in AgoraEO Spring 2022
- *Christian Winter*, A Query-Cache Accelerated Data Structure for Spatial Aggregation over Polygons Fall 2021

Other Mentoring Activities

- Mentor in the AI Grid network 2023 – now

PhD Thesis Committees

- Martin Kiefer, PhD, TU Berlin (Advisor: Volker Markl) 2023
- Keven Richly, PhD, HPI (Advisor: Hasso Plattner) 2023
- Morten Tychsén Clausen, PhD Midway, ITU (Advisor: Philippe Bonnet) 2023

Teaching

| Term | Institute | Course Name | Role |
|---|-----------|---|---------------------------------------|
| Fall 2022, Fall 2023 | ITU | Introduction to Database Systems | Course Manager & Responsible Lecturer |
| Spring 2021, Fall 2021 | TUB | DBPRA: Datenbankpraktikum (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:

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

Program Committee:

- ACM SIGMOD: 2024, 2023, 2022, 2021 (Industrial track)
- VLDB: 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 International Conference 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:

- Committee Member: Software Design Master's Program Admission, ITU, Spring 2023
- Committee Member: Two PhD Positions, ITU, Fall 2022 and Spring 2023
- Committee Member: Professorship of “W3 Big Data Engineering”, TU Berlin, 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 (Ptychio), Heraklion Conservatory

Eleni Tziritza Zacharatou

Publications

Assistant Professor, IT University of Copenhagen
elza@itu.dk | ORCID [0000-0001-8873-5455](https://orcid.org/0000-0001-8873-5455) | heltzi.github.io

| Metric | Value |
|----------------------------|-------|
| Peer-reviewed publications | 20 |
| Citations | 270 |
| h-index | 10 |
| i10-index | 10 |

Table 1: Summary of bibliometrics as per [Google Scholar](https://scholar.google.com/) in November 2023.

The venue ranking according to CORE (www.core.edu.au/conference-portal) 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] H. Gavriilidis, F. Henze*, E. **Tziritza Zacharatou**, and V. Markl. “SheetReader: Efficient Specialized Spreadsheet Parsing”. In: *Information Systems* 115 (2023), p. 102183. [Core A*].
- [2] M. Kiefer*, I. Poulakis, E. **Tziritza 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*].
- [3] E. **Tziritza 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

- [4] C. E. Muñoz-Cuza*, N. Ho, E. **Tziritza 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].
- [5] M. P. Saputra*, E. **Tziritza 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].
- [6] E. Ouro Paz*, E. **Tziritza 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.
- [7] E. **Tziritza 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].
- [8] A. de Wall, B. Deiseroth, E. **Tziritza 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.

- [9] 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].
- [10] 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].
- [11] 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].
- [12] 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*].
- [13] 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 Demo Publications

- [14] 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.
- [15] A. K. Aksoy*, P. Dushev, E. **Tzirita Zacharatou**, H. Hemsén, 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. VLDB 2022 Demo [Core A*].
- [16] F. Henze*, H. Gavrilidis, 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].
- [17] 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.
- [18] 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.
- [19] 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. SIGMOD 2018 Demo [Core A*].
Best Demonstration Award.
- [20] 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.

Working Papers

- [21] X. Chatziliadis*, E. **Tziritza Zacharatou**, A. Eracar, S. Zeuch, and V. Markl. “Efficient Placement of Decomposable Aggregation Functions for Stream Processing over Large Geo-Distributed Topologies”. Working paper. Under revision at PVLDB. 2023.
- [22] T. Georgiadis*, E. **Tziritza 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>. Submitted to EDBT.
- [23] V. Pandey, A. van Renen, E. **Tziritza 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>.

PhD Thesis

- [24] E. **Tziritza Zacharatou**. “Efficient Query Processing for Spatial and Temporal Data Exploration”. PhD thesis. EPFL, 2019, p. 183.

Conference Proceedings

- [25] Y. Zhou, P. K. Chrysanthis, V. Gulisano, and E. **Tziritza 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.