

# Eleni Tzirita Zacharatou

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## Curriculum Vitae

### Education

- 2013 - 2019 **Ph.D. in Computer Science**, *École Polytechnique Fédérale de Lausanne (EPFL)*.  
Thesis Efficient Query Processing for Spatial and Temporal Data Exploration  
Advisor Prof. Anastasia Ailamaki
- 2007 - 2013 **Diploma in Electrical & Computer Engineering**, *National Technical University of Athens (NTUA)*.  
Thesis Automatic Music Transcription  
Advisor Prof. Petros Maragos  
GPA 9.06/10

### Professional Experience

- 05/2022-now **Assistant Professor**, *IT University*, Copenhagen, Denmark.
- 10/2019- **Postdoctoral Researcher**, *TU Berlin*, Germany.
- 04/2022
  - Member of the Database Systems and Information Management (DIMA) group
  - Supervisor: Prof. Volker Markl
- 09/2013- **Research Assistant**, *EPFL*, Switzerland.
- 08/2019
  - Member of the Data-Intensive Applications and Systems (DIAS) laboratory
  - Research on spatial and temporal data management for exploratory applications
- 07/2016- **Visiting Scholar**, *NYU*, USA.
- 10/2016
  - Member of the Visualization, Imaging and Data Analysis (VIDA) Research Center
  - Project: Real-Time Spatial Aggregation using GPU Rasterization
  - Supervisors: Prof. Juliana Freire and Dr. Harish Doraiswamy
- 01/2013- **Research Intern**, *EPFL*, Switzerland.
- 08/2013
  - Member of the Data-Intensive Applications and Systems (DIAS) laboratory
  - Project: Efficient Time Series Bitmap Indexing through Quadtree-based Compression
  - Supervisors: Prof. Anastasia Ailamaki and Dr. Thomas Heinis

### Awards and Honors

- 2022 Distinguished Reviewer Award, VLDB Conference.
- 2021 BIFOLD Junior Fellowship.
- 2018 Best Demonstration Award, ACM SIGMOD Conference.
- 2016 ExploreDB Workshop (co-located with SIGMOD/PODS) Travel Award.
- 2006 Distinction in the 1st (Thales) and 2nd (Euclid) round of the math competition for high school students by the Hellenic Mathematical Society.

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## Publications

### Conferences

- SIGSPATIAL 2022 C. -E. Muniz Cuza, N. Ho, **E. Tzirita Zacharatou**, T. Bach Pedersen, and B. Yang, Spatio-Temporal Graph Convolutional Network for Stochastic Traffic Speed Imputation, *30<sup>th</sup> International Conference on Advances in Geographic Information Systems, Seattle, Washington, USA, 2022.*
- SSDBM 2022 M. -P. Saputra, **E. Tzirita Zacharatou**, Serafeim Papadias, V. Markl: In-Place Updates in Tree-Encoded Bitmaps (Short Paper), *34<sup>th</sup> International Conference on Scientific and Statistical Database Management, Copenhagen, Denmark, 2022.*
- BiDS 2021 A. de Wall, B. Deiseroth, **E. Tzirita Zacharatou**, J.-A. Quiané-Ruiz, B. Demir, V. Markl, Agora-EO: A Unified Ecosystem for Earth Observation – A Vision For Boosting EO Data Literacy –, *European Conference on Big Data from Space, Virtual Event, 2021.*
- EDBT 2021 C. Winter, A. Kipf, C. Anneser, **E. Tzirita Zacharatou**, T. Neumann, A. Kemper, GeoBlocks: A Query-Cache Accelerated Data Structure for Spatial Aggregation over Polygons, *24<sup>th</sup> International Conference on Extending Database Technology, Virtual Event, 2021.*
- BTW 2021 Elena Beatriz Ouro Paz, **E. Tzirita Zacharatou**, V. Markl, Towards Resilient Data Management for the Internet of Moving Things, *19. Fachtagung für Datenbanksysteme für Business, Technologie und Web, Virtual Event, 2021.*
- CIDR 2021 **E. Tzirita Zacharatou**, A. Kipf, I. Sabek, V. Pandey, H. Doraiswamy, V. Markl, The Case for Distance-Bounded Spatial Approximations, *11<sup>th</sup> International Conference on Innovative Data Systems Research, Virtual Event, 2021.*
- EDBT 2020 A. Kipf, H. Lang, V. Pandey, R.A. Persa, C. Anneser, **E. Tzirita Zacharatou**, H. Doraiswamy, P. Boncz, T. Neumann, A. Kemper, Adaptive Main-Memory Indexing for High-Performance Point-Polygon Joins, *23<sup>rd</sup> International Conference on Extending Database Technology, Virtual Event, 2020.*
- SIGSPATIAL 2019 **E. Tzirita Zacharatou**, D. Sidlauskas, F. Tauheed, T. Heinis, and A. Ailamaki, Efficient Bundled Spatial Range Queries, *27<sup>th</sup> International Conference on Advances in Geographic Information Systems, Chicago, Illinois, USA, 2019.*
- VLDB 2018 **E. Tzirita Zacharatou**, H. Doraiswamy, A. Ailamaki, C. Silva and J. Freire, GPU Rasterization for Real-Time Spatial Aggregation over Arbitrary Polygons, *44<sup>th</sup> International Conference on Very Large Data Bases, Rio de Janeiro, Brazil, 2018.*
- ICDE 2018 D. Sidlauskas, S. Chester, **E. Tzirita Zacharatou** and A. Ailamaki, Improving Spatial Data Processing by Clipping Minimum Bounding Boxes, *34<sup>th</sup> International Conference on Data Engineering, Paris, France, 2018.*
- SSDBM 2015 **E. Tzirita Zacharatou**, F. Tauheed, T. Heinis and A. Ailamaki, RUBIK: Efficient Threshold Queries on Massive Time Series, *27<sup>th</sup> International Conference on Scientific and Statistical Database Management, San Diego, California, USA, 2015.*
- ECESCON 2013 **E. Tzirita Zacharatou** and P. Maragos, Signal Processing Methods for Automatic Transcription of Piano Music, *6<sup>th</sup> Annual Conference of Students of Electrical & Computer Engineering, Athens, Greece, 2013.*

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## Demonstrations

- VLDB 2022 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, *48<sup>th</sup> International Conference on Very Large Data Bases, Sydney, Australia, 2022*.
- SIGMOD 2018 H. Doraiswamy, **E. Tzirita Zacharatou**, F. Miranda, M. Lage, A. Ailamaki, C. Silva and J. Freire, Interactive Visual Exploration of Spatio-Temporal Urban Data Sets using Urbane, *International Conference on Management of Data, Houston, Texas, USA, 2018*. **Best Demonstration Award**.

## Workshops

- DOLAP 2022 F. Henze, H. Gavriilidis, **E. Tzirita Zacharatou**, and V. Markl, Efficient Specialized Spreadsheet Parsing for Data Science, *International Workshop on Design, Optimization, Languages and Analytical Processing of Big Data, Virtual Event, 2022*.
- VLIoT 2021 X. Chatziliadis, **E. Tzirita Zacharatou**, S. Zeuch, and V. Markl, Monitoring of Stream Processing Engines Beyond the Cloud: an Overview, *International Workshop on Very Large Internet of Things, Copenhagen, Denmark, 2021*.
- VLIoT 2020 S. Zeuch, **E. Tzirita Zacharatou**, S. Zhang, X. Chatziliadis, A. Chaudhary, B. Del Monte, D. Giouroukis, P. M. Grulich, A. Ziehn, and V. Markl, NebulaStream: Complex Analytics Beyond the Cloud, *International Workshop on Very Large Internet of Things, Virtual Event, 2020*.
- ExploreDB 2016 M. Pavlovic, **E. Tzirita Zacharatou**, D. Sidlauskas, T. Heinis and A. Ailamaki, Space Odyssey - Efficient Exploration of Scientific Data, *3<sup>rd</sup> International Workshop on Exploratory Search in Databases and the Web, San Francisco, USA, 2016*.

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## Conference Presentations and Invited Talks

- 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, Online.
- 09/2021 **Agora-EO: A Unified Ecosystem for Earth Observation**, Monthly Research Meeting, Department of Geo-information Processing, University of Twente.
- 08/2021 **Spatio-temporal Data System Online Panel**, VLDB, Copenhagen, Denmark.
- 01/2021 **The Case for Distance-Bounded Spatial Approximations**, CIDR, Virtual Event.
- 11/2019 **Efficient Bundled Spatial Range Queries**, SIGSPATIAL, 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**, 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, Rio de Janeiro, Brazil.

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- 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, 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, San Diego, USA.

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## Community Service

**Co-chair** BOSS Workshop 2020 (in conjunction with VLDB)

**Proceedings Chair** DEBS 2022

**Program Committee Member** SIGMOD 2024 (Research Track), VLDB 2023 (Research Track), SIGMOD 2023 (Research Track), VLDB 2023 PhD Workshop, BTW 2023 (Demo Track), VLDB 2022 (Research Track), SIGMOD 2022 (Research Track), EDBT 2022 (Research Track), TDIS 2022, AIMLSystems 2021, SIGMOD 2021 (Industrial Track), CIKM 2018 (Short Research Papers Track)

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

**External Reviewer** CIDR 2022, SIGMOD 2021 (Research Track), CIDR 2021, ICDE 2017 (Research Track)

**Session Chair** VLDB 2021 (Research Track), VLDB 2020 (Demo Track)

**Ph.D. Committee** Ph.D Thesis Reviewer of Martin Kiefer's Thesis, TU Berlin, 2023.

**Faculty Search Committee** Member of the faculty search committee for a full professorship position (W3) in "Big Data Engineering" at TU Berlin, 2021.

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## Mentorship

- Ongoing Xenofon Chatziliadis (PhD Candidate at TU Berlin)  
Primary Supervisor: Prof. Volker Markl. Co-supervision with Dr. Steffen Zeuch.
- Ongoing Martin Kiefer (PhD Candidate at TU Berlin)  
Primary Supervisor: Prof. Volker Markl.
- Ongoing Gereon Dusella (Master Thesis at TU Berlin)  
Thesis A Comparative Benchmark for Join Operations between Raster and Vector Data
- Spring 2022 Laert Nuhu (Master Thesis at TU Berlin)

- Thesis A Benchmark for Spatial Workloads: Combining Vector and Raster Data and Queries  
 Fall 2021 Pablo Alberto Osinaga Arze (Master Thesis at TU Berlin)
- Thesis Enabling Moving Range Queries in Stream Processing Systems  
 Spring 2021 Iva Mihajlovska (Master Thesis at TU Berlin)
- Thesis Tree-Based Bitmap Index Compression  
 Spring 2021 Marcellus Prama Saputra (Bachelor Thesis at TU Berlin)
- Thesis In-Place Updates in Tree-Encoded Bitmaps  
 Fall 2020 Robin Papke (Master Thesis at TU Berlin)
- Thesis Mobility-Aware Acquisition of Fog Resources for the Internet of Things  
 Spring 2020 Elena Beatriz Ouro Paz (Master Thesis at TU Berlin)
- Thesis Towards Resilient Data Management for the Internet of Moving Things  
 Spring 2020 Carlos E. Muniz Cuza (Master Thesis at TU Berlin)
- Thesis Stochastic Traffic Speed Estimation using Spatio-Temporal Graph Convolutional Neural Networks  
 Joint thesis with Aalborg University (Prof. Nguyen Thi Thao Ho, Prof. Torben Bach Pedersen, Prof. Bin Yang).
- Fall 2018 Vlad Mihaescu (2nd year Master's at EPFL)  
 Project Evaluating range queries on interval and range encoded time series data with RUBIK
- Summer 2018 Maria Ilina (Summer Intern at EPFL)  
 Project Efficient bitmap indexing via partitioning, reordering and compression
- Summer 2018 Parand Alizadeh (Summer Intern at EPFL)  
 Project Devising a density-driven packing strategy for efficient spatial data access
- Summer 2015 Chenxi Sun (Summer Intern at EPFL)  
 Project Benchmarking Spatial Queries in PostGIS

## Teaching Activities

Term	Institute	Course Name	Role
Fall 2022	ITU	Introduction to Database Systems	Course Manager & Instructor
Fall 2021/2022, Spring 2021	TUB	DBPRA: Datenbankpraktikum (Practical course on databases)	Primary Instructor
Fall 2020/2021	TUB	AIM-3: Advanced Information Management 3 – Scalable Data Science: Systems & Methods	Co-instructor
Fall 2020/2021, Spring 2020, Fall 2019/2020	TUB	BDASEM: Big Data Analytics Seminar	Teaching Assistant
Spring 2020	TUB	BDAPRO: Big Data Analytics Project	Project Mentor

Fall 2019/2020	TUB	DBSEM: Foundations of Database Systems Seminar	Teaching Assistant
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

## References

Provided upon request.

## Languages

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

## In The News

- 2021 *Advancing Big Data Analytics: Post-Doctoral Research*, DataTalksClub Podcast.
- 2018 *Student-teacher Duo from EPFL Wins Best Demonstration Award at SIGMOD 2018*, Ecocloud News.
- 2018 *Tandon Team Takes Home Top Honors at Association for Computing Machinery Conference*, Tandon School of Engineering News.

## Extracurricular

I enjoy playing music - alone or in groups.

I have formally studied the piano, the violin, and music theory.

- 2010 Piano Teaching Diploma (Ptychio), Grade Excellent, Athenaeum Conservatory
- 2005 Classical Harmony Diploma (Ptychio), Heraklion Conservatory
- 1996 - 2009 Studies in violin, Heraklion Conservatory & Athenaeum Conservatory