

Manoussos-Gavriil (Manos) Athanassoulis

Assistant Professor

Department of Computer Science, College of Arts and Sciences, Boston University
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RESEARCH INTERESTS

I am interested in **designing data systems**. My goal is to build systems that utilize efficiently the underlying **storage and processing hardware**, and match a wide range of application requirements like data analysis, transactional processing, scientific data exploration, and data science pipelines. I am particularly interested in the **data and metadata organization** in the **levels of the memory and storage hierarchy**, in the data structures that are (and can be) employed to **index, access, and update data**, and in the **query processing** paradigms that are needed for new system designs and workloads.

EDUCATION

- Ph.D. in Computer Science**, February 2014 **Ecole Polytechnique Fédérale de Lausanne**
 Thesis: “Solid-State Storage and Work Sharing for Efficient Scaleup Data Analytics”
 Advisor: Prof. Anastasia Ailamaki (natassa@epfl.ch)
- M.Sc. in Computer Systems Technology**, March 2008 **University of Athens, Greece**
 Thesis: “Thread scheduling technique for avoiding page thrashing”
 Supervisor: Prof. Stathes Hadjiefthymiades (shadj@di.uoa.gr)
- B.Sc. in Informatics & Telecommunications**, September 2005 **University of Athens, Greece**
 Thesis: “A Multi-Criteria Message Forwarding Architecture for Wireless Sensor Networks”
 Supervisor: Prof. Stathes Hadjiefthymiades (shadj@di.uoa.gr)

PROFESSIONAL EXPERIENCE

- | | | |
|-------------------|--|-----------------------|
| 01/2019 – now | Assistant Professor at Boston University | Boston, MA, USA |
| 07/2019 – now | Affiliate Faculty at Hariri Institute of Computing, Boston University | Boston, MA, USA |
| 06/2018 – 12/2018 | Adjunct Assistant Professor at Boston University | Boston, MA, USA |
| 09/2017 – 12/2018 | Research Associate at Harvard University | Cambridge, MA, USA |
| 01/2017 – 05/2017 | Visiting Lecturer at Tufts University | Medford, MA, USA |
| 09/2014 – 08/2017 | Postdoctoral Fellow at Harvard University | Cambridge, MA, USA |
| 10/2008 – 06/2014 | PhD Researcher at Ecole Polytechnique Fédérale de Lausanne | Lausanne, Switzerland |
| 07/2011 – 10/2011 | Research Intern at IBM Watson Research Labs | Hawthorne, NY, USA |
| 10/2004 – 08/2008 | Researcher at University of Athens | Athens, Greece |

HONORS & AWARDS

- | | |
|-----------|---|
| 2020 | Facebook Faculty Research Award |
| 2019 | NSF CRII Award |
| 2018 | “Best of VLDB 2017” selection with invitation to publish at VLDB Journal |
| 2018 | “Distinguished PC Member” at SIGMOD |
| 2017 | “Best of SIGMOD 2017” selection with invitation to publish at TODS Journal |
| 2017 | “Most Reproducible Paper Award” at SIGMOD |
| 2015-2016 | Harvard University Certificate of Distinction in Teaching (Fall 2015, Spring 2016, Fall 2016) |
| 2015-2016 | SNSF Early Postdoc Mobility Fellowship |
| 2014 | Harvard University Certificate of Teaching Excellence (Fall 2014) |
| 2013 | EPFL Outstanding Teaching Assistantship Award |
| 2011-2012 | IBM Ph.D. Fellowship |
| 2010 | “Best of VLDB 2010” selection with invitation to publish at VLDB Journal |

- 2007 Prize for having the best student record, M.Sc., University of Athens
- 2006-2007 Graduate Fellowship from Onassis Foundation
- 2006 “Ericsson Award of Excellence in Telecommunications” for B.Sc. Thesis
- 2005 Valedictorian B.Sc., University of Athens
- 2001-2005 Academic Excellence Award from State Fellowship Foundation of Greece (IKY)

RESEARCH GRANTS

- 2021 “Near-Data Data Transformation for Edge Computing”, PI (Co-PI: Renato Mancuso), Cisco Research, \$50K
- 2021 “Programmable Logic In-the-Middle: The Case for Relational Memory”, Co-PI (PI: Renato Mancuso), BU RedHat Collaboratory, \$34K (renewal)
- 2020 “Achieving Deletion Guarantees in LSM Data Stores”, PI, Facebook Faculty Research Award, \$100K
- 2020 “Programmable Logic In-the-Middle: The Case for Relational Memory”, Co-PI (PI: Renato Mancuso), BU RedHat Collaboratory, \$68K
- 2019-2021 “Optimal Data Organization for Hybrid Transactional/Analytical Processing Data Systems”, PI, NSF CISE CRII Award, Grant No. IIS-1850202, \$175K
- 2015-2016 “The RUM Conjecture and the Big Data Access Wizard”, Swiss National Science Foundation (SNSF), Early Postdoc Mobility Fellowship, Grant No. P2ELP2_158936, 70K CHF

PUBLICATIONS

Journal and Journal-equivalent Conference Papers

1. K. Missimer, **M. Athanassoulis**, R. West, “Telomere: Real-Time NAND Flash Storage”, ACM Transactions on Embedded Computing Systems, (to appear), **2021**.
2. **M. Athanassoulis**, “Transparent Data Transformation”, ACM **SIGMOD Record**, Vol. 50(2), **2021**.
3. S. Sarkar, D. Staratzis, T. Papon, **M. Athanassoulis**, “Constructing and Analyzing the LSM Compaction Design Space”, In Proc. of Very Large Databases Endowment (**PVLDB**), Vol. 14(11), **2021**.
4. S. Sarkar, T. Papon, D. Staratzis, **M. Athanassoulis**, “Lethe: A Tunable Delete-Aware LSM Engine”, In Proc. of the ACM **SIGMOD Int’l Conference on Management of Data**, **2020**.
5. M. Olma, M. Karpathiotakis, I. Alagiannis, **M. Athanassoulis**, A. Ailamaki, “Adaptive Partitioning and Indexing for In-situ Query Processing”, The VLDB Journal (**VLDBJ**), Vol. 29(1), Special Issue, **2020**.
6. **M. Athanassoulis**, K. Bøgh, S. Idreos, “Optimal Column Layout for Hybrid Workloads”, In Proc. of Very Large Databases Endowment (**PVLDB**), Vol. 12(13), **2019**.
7. N. Dayan, **M. Athanassoulis**, S. Idreos, “Optimal Bloom Filters and Adaptive Merging for LSM-Trees”, ACM Transactions on Database Systems (**TODS**), Vol. 43(4), **2018**.
8. S. Idreos, K. Zoumpatianos, **M. Athanassoulis**, N. Dayan, B. Hentschel, M. Kester, D. Guo, L. Maas, W. Qin, A. Wasay, Y. Sun, “The Periodic Table of Data Structures”, **IEEE Data Engineering Bulletin**, Vol. 41(3), **2018**.
9. M. Olma, M. Karpathiotakis, I. Alagiannis, **M. Athanassoulis**, A. Ailamaki, “Slalom: Coasting Through Raw Data via Adaptive Partitioning and Indexing”, In Proc. of Very Large Databases Endowment (**PVLDB**), Vol. 10(10), **2017**. *Invited for publication at the Special Issue of VLDB Journal for VLDB 2017 Best Papers (one of top 5 papers).*
10. M. Kester, **M. Athanassoulis**, S. Idreos, “Access Path Selection in Main-Memory Optimized Data Systems: Should I Scan or Should I Probe?”, In Proc. of the ACM **SIGMOD Int’l Conference on Management of Data**, **2017**.
11. N. Dayan, **M. Athanassoulis**, S. Idreos, “Monkey: Optimal Navigable Key-Value Store”, In Proc. of the ACM **SIGMOD International Conference on Management of Data**, Chicago, **2017**. *Invited for publication at the Special Issue of TODS Journal for SIGMOD 2017 Best Papers (one of top 4 papers).*
12. **M. Athanassoulis**, Z. Yan, S. Idreos, “UpBit: Scalable In-Memory Updatable Bitmap Indexing”, In Proc. of the ACM **SIGMOD International Conference on Management of Data**, **2016**. *Awarded the ACM Computationally Replicable label & Won the Most Reproducible Paper award.*

13. **M. Athanassoulis**, S. Idreos, “Design Tradeoffs of Data Access Methods”, (Tutorial) In Proc. of the ACM **SIGMOD** International Conference on Management of Data, San Francisco, **2016**.
14. **M. Athanassoulis**, S. Chen, P. Gibbons, A. Ailamaki, R. Stoica, “Online Updates on Data Warehouses via Judicious Use of Solid-State Storage”, ACM Transactions on Database Systems (**TODS**), Vol. 40(1), **2015**.
15. **M. Athanassoulis**, A. Ailamaki, “BF-Tree: Approximate Tree Indexing”, In Proc. of Very Large Databases Endowment (**PVLDB**), Vol. 7(14), **2014**.
16. I. Psaroudakis, **M. Athanassoulis**, A. Ailamaki, “Sharing Data and Work Across Concurrent Analytical Queries”, In Proc. of Very Large Databases Endowment (**PVLDB**), Vol. 6(9), **2013**.
17. R. Johnson, I. Pandis, R. Stoica, **M. Athanassoulis**, and A. Ailamaki. “Scalability of write-ahead logging on multicore and multisoocket hardware”, The VLDB Journal (**VLDBJ**), Vol. 21(2), **2012**.
18. **M. Athanassoulis**, S. Chen, A. Ailamaki, P. Gibbons, and R. Stoica, “MaSM: Efficient Online Updates in Data Warehouses”, In Proc. of the ACM **SIGMOD** Int’l Conf. on Management of Data, **2011**.
19. **M. Athanassoulis**, A. Ailamaki, S. Chen, P. Gibbons, and R. Stoica, “Flash in a DBMS: Where and How?”, **IEEE Data Engineering Bulletin**, Vol. 33(4), **2010**.
20. S. Chen, A. Ailamaki, **M. Athanassoulis**, P. Gibbons, R. Johnson, I. Pandis and R. Stoica, “TPC-E vs. TPC-C: Characterizing the New TPC-E Benchmark via an I/O Comparison Study”, ACM **SIGMOD Record**, Vol. 39(3), **2010**.
21. R. Johnson, I. Pandis, R. Stoica, **M. Athanassoulis**, and A. Ailamaki, “Aether: A Scalable Approach to Logging”, In Proc. of Very Large Databases Endowment (**PVLDB**), Vol. 3(1-2), **2010**. *Invited for publication at the Special Issue of VLDB Journal for VLDB 2010 Best Papers (one of top 5 papers)*.

Conference Vision Papers

22. **M. Athanassoulis**, M. S. Kester, L. M. Maas, R. Stoica, S. Idreos, A. Ailamaki, M. Callaghan, “Designing Access Methods: The RUM Conjecture”, In Proc. of the International Conference on Extending Database Technology (**EDBT**), **2016**.
23. A. Wasay, **M. Athanassoulis**, S. Idreos, “Queriosity: Automated Data Exploration”, In Proc. of the International Congress on **Big Data**, **2015**.

Workshop, other Conference Papers, and Abstracts

24. T. Papon, **M. Athanassoulis**, “A Parametric I/O Model for Modern Storage Devices”, In Proc. of the Int’l Workshop on Data Management on New Hardware (**DaMoN**), **2021**.
25. Z. Zhu, J. Mun, A. Raman, **M. Athanassoulis**, “Reducing Bloom Filter CPU Overhead in LSM-Trees on Modern Storage Devices”, In Proc. of the Int’l Workshop on Data Management on New Hardware (**DaMoN**), **2021**.
26. T. Papon, **M. Athanassoulis**, “The Need for a New I/O Model”, In Proc. of the Annual Conference on Innovative Data Systems Research (**CIDR**), **2021** (abstract). *Honorable mention for best CIDR Gong Show talk*.
27. **M. Athanassoulis**, “Secure Data Systems and Performance: Friends or Foe?”, In Proc. of the 8th Biennial Conference on Innovative Data Systems Research (**CIDR**), **2017** (abstract).
28. S. Idreos, **M. Athanassoulis**, N. Dayan, D. Guo, M. S. Kester, L. Maas, K. Zoumpatianos, “Past and Future Steps for Adaptive Storage Data Systems: From Shallow to Deep Adaptivity”, (Keynote) In Proc. of the International Workshop on Enabling Real-Time Business Intelligence (**BIRTE**), **2016**.
29. S. Xi, O. Babarinsa, **M. Athanassoulis**, S. Idreos, “Beyond the Wall: Near-Data Processing for Databases”, In Proc. of the Int’l Workshop on Data Management on New Hardware (**DaMoN**), **2015**.
30. I. Alagiannis, **M. Athanassoulis**, and A. Ailamaki, “Scaling Up Analytical Queries with Column-Stores”, In Proc. of the International Workshop on Testing Database Systems, (**DBTest**), **2013**.
31. **M. Athanassoulis**, B. Bhattacharjee, M. Canim, K. Ross, “Querying Persistent Graphs using Solid State Storage”, 4th Annual Non-Volatile Memories Workshop (**NVMW**), **2013**.

32. **M. Athanassoulis**, “Solid-State Storage & DBMS”, In Proc. of the 6th Biennial Conference on Innovative Data Systems Research (**CIDR**), **2013** (abstract).
33. **M. Athanassoulis**, B. Bhattacharjee, M. Canim, K. Ross, “Path Processing Using Solid State Storage”, In Proc. of the 3rd International Workshop on Accelerating Data Management Systems Using Modern Processor and Storage Architectures (**ADMS**), **2012**.
34. R. Johnson, **M. Athanassoulis**, R. Stoica and A. Ailamaki, “A New Look at the Roles of Spinning and Blocking”, In Proc. of the Int’l Workshop on Data Management on New Hardware (**DaMoN**), **2009**.
35. R. Stoica, **M. Athanassoulis**, R. Johnson and A. Ailamaki, “Evaluating and Repairing Write Performance on Flash Devices”. In Proc. of the International Workshop on Data Management on New Hardware (**DaMoN**), **2009**.
36. **M. Athanassoulis**, I. Alagiannis and S. Hadjiefthymiades, “Energy Efficiency in Wireless Sensor Networks: A Utility-Based Architecture”, In Proc. of the 13th European Wireless (**EW**), **2007**.
37. **M. Athanassoulis**, I. Alagiannis and S. Hadjiefthymiades, “A Multi-Criteria Message Forwarding Architecture for Wireless Sensor Networks”, In Proc. of the 10th Pan-Hellenic Conference on Informatics (**PCI**), **2005**.

Demo Papers

38. I. Psaroudakis, **M. Athanassoulis**, M. Olma, A. Ailamaki, “Reactive and Proactive Sharing Across Concurrent Analytical Queries”, In Proc. of the ACM **SIGMOD** International Conference on Management of Data, **2014**.

PATENTS

- “Analytic Database with Optimal Navigable Key-value Store.” Filed on 1/2017 (US Patent Office).

MENTORING & STUDENT ADVISING

Postdocs

- Dr. Subhadeep Sarkar (since 01/2019)
- Dr. Ju Hyoung Mun (since 09/2019)

PhD Researchers

- Andy Huynh (since 05/2019), *IBM PhD Fellowship 2020-2022*
- Tarikul Islam Papon (since 09/2019), *Dean’s Fellow Fall 2019*
- Zichen Zhu (since 09/2019)
- Aneesh Raman (since 01/2021), *Dean’s Fellow Spring 2021*
- Dimitris Staratzis (09/2019-12/2020), *Eleni Gatzoyiannis Scholarship, Gerondelis Scholarship*

MSc Researchers

- Aneesh Raman (09/2019-12/2020), *BU CS MS Scholarship 2019 for high-achieving students*
- Guanting Chen (06/2019-06/2020)

Research Interns/Semester Projects

- Kaijie Chen (since 06/2021), MSc semester project
- Sean Brady (since 06/2021), MSc semester project
- Caterina Caravaggio (03/2020-08/2020), exchange student from Università di Bologna
- Zheng Hui (07/2020-08/2020), undergraduate summer intern
- Lina Qiu (09/2019-01/2020), PhD semester project
- Shirley Hu (09/2019-12/2019), BSc semester project
- Kenneth Bøgh (09/2015-06/2016), exchange PhD student at Harvard, now at Uber Inc.
- Zheng Yan (09/2014-06/2015), exchange undergraduate researcher at Harvard, now at Facebook Inc.

High School Research Interns

- Andrew Chung (07/2021-08/2021), RISE internship
- Siddhartha Mishra (07/2020-08/2021), RISE internship
- Rachel (Subin) Kim (06/2020-08/2020), Research internship

Kevin Xu (07/2019-08/2019), RISE internship

Naomi Johnson (07/2019-08/2019), RISE internship

Thesis Committee Member

Harshal Chaudhari (PhD Thesis Defense, 08/2021, Advisor: Evimaria Terzi)

Harshal Chaudhari (PhD Thesis Proposal, 05/2021, Advisor: Evimaria Terzi)

Katherine Zhao (PhD Thesis Defense, 08/2020, Advisor: Rich West)

Katherine Zhao (PhD Thesis Proposal, 06/2019, Advisor: Rich West)

Larissa Spinelli (PhD Thesis Defense, 06/2019, Chair, Advisor: Mark Crovella)

TEACHING EXPERIENCE

Boston University, Department of Computer Science

CAS CS 561: Data Systems Architectures Spring 2021

CAS CS 460: Introduction to Database Systems Fall 2019, Fall 2020, Fall 2021

CAS CS 591: Data Systems Architectures Spring 2019, Spring 2020

GRS CS 697: Graduate Initiation Seminar Spring 2020

Tufts University, Department of Computer Science

Comp115: Database Systems (Lecturer) Spring 2017

Harvard University, School of Engineering and Applied Sciences

CS165: Data Systems (Head TF) Fall 2015, Fall 2016

CS265: Big Data Systems (Head TF) Fall 2014, Spring 2016

Ecole Polytechnique Fédérale de Lausanne, School of Computer and Communication Sciences

Introduction to Database Systems (Head TF) Spring 2012, Spring 2013

Databases (Head TF) Spring 2010, Spring 2011

University of Athens, Department of Informatics and Telecommunications

Foundations of Databases (Head TF) Spring 2006, Spring 2007

Operating Systems (TA) Fall 2005, Fall 2006

Computer Architecture I (TA) Fall 2006

PROFESSIONAL SERVICE

Organization

Publicity Chair, VLDB 2022

Artifacts and Reproducibility Co-chair, ACM SIGMOD 2022

Sponsorship Chair, ACM SoCC 2021

Reproducibility Chair, ACM SIGMOD 2021

Publicity Co-chair, IEEE ICDE 2021

Area Chair

ICDE 2022

Committee Member

CIDR 2022

ACM SIGMOD, 2018, 2019, 2020, 2021

VLDB, 2020, 2021

EDBT, 2021

IEEE BigData, 2020, 2021

ACM DEBS, 2020

HardBD & Active Workshop, 2018, 2019, 2020, 2021

SEAdata Workshop, 2020, 2021

NEDBDay, 2020

HDMS Symposium, 2016, 2017, 2018, 2019

IEEE ICDE Demonstration Track, 2019

VLDB Demonstration Track, 2017 & 2019
EDBT Demonstration Track, 2019
ACM SIGMOD Student Research Competition, 2019
BigVis Workshop, 2018, 2019
ACM SIGMOD Reproducibility, 2015, 2016, 2017, 2018
XtremeCloud Workshop, 2018
AIMD Workshop, 2018
IEEE ICDE, 2018
SSDBM, 2018
IEEE ICDE PhD Workshop, 2017

Editorial Roles

Associate Editor at ACM SIGMOD Record

Journal Reviewer

ACM SIGMOD Record
ACM Computing Surveys (CSUR)
The VLDB Journal (VLDBJ)
ACM Transactions on Database Systems (TODS)
IEEE Transactions on Knowledge and Data Engineering (TKDE)
Distributed and Parallel Databases (DAPD)
ACM Transactions on Storage (TOS)
IEEE Transactions on Computers (TC)
IEEE Transactions on Cloud Computing (TCC)
Computers and Security (COSE)
Journal of Internet Services and Applications (JISA)
The Computer Journal, Information Systems (IS)
IEEE Transactions on Big Data (TBD)

Technical Paper Reviewer (2008-2015)

ACM Transactions on Database Systems (TODS), The VLDB Journal (VLDBJ), ACM SIGMOD, VLDB, IEEE ICDE, CIDR, ASPLOS, EDBT, FAST, HardBD, CloudDP, DAMON

Society Member

2010-now ACM & ACM Special Interest Group on Management of Data (SIGMOD)
2005-now IEEE & IEEE Computer Society
2015-now IEEE Technical Committee on Data Engineering

UNIVERSITY SERVICE

Member of the BU CS Graduate Admissions Committee, 2022
Member of the BU CS Graduate Fellows Committee, 2021
Member of the BU CS Graduate Awards & Fellowships Committee, 2021
Member of the BU CS Graduate Admissions Committee, 2021
Member of the BU CS Graduate Awards & Fellowships Committee, 2020
Member of the BU CS Graduate Research & Teaching Excellence Award Committee, 2020
Member of the BU CS Teaching Excellence Award Committee (ad hoc), 2019
Member of the BU CS Graduate Admissions Committee, 2019

SELECTED RECENT TALKS AND LECTURES

2021

“Deletes in Modern Data Stores”, Harvard University
“Robust Data Systems”, Research Talk at Hariri Institute
“The Need for a New I/O Model”, Research Talk at CIDR

2020

“Deletes in Modern Data Stores”, BU MET
Invited Panelist on “Query Processing meets Modern Hardware” at VLDB 2020
“Optimal Column Layout for Hybrid Workloads”, Research Talk at VLDB 2020
“Delete: The Forgotten Operator”, EPFL
“Deletes in Modern Data Stores”, Facebook
“Lethe: A Tunable Delete-Aware LSM Engine”, Alibaba Cloud

2019

“Towards Robust Data Systems”, Worcester Polytechnic Institute
“Towards Robust Data Systems”, NetApp
“Robust Data Systems”, TU Berlin, Germany
“Data Science Foundations: The Data Systems Perspective”, Panel on Invisible Foundations at BU Data Science Day 2019

2018

“Building Tunable Optimal Access Methods”, University of Athens, Greece
“Data Systems for Hybrid Analytics”, University of Pittsburgh
“Data Systems for Hybrid Analytics”, Tufts University
“Data Systems for Hybrid Analytics”, Boston University
“Tuning, Optimizing, and Selecting the right way to access data”, Northwestern University
“Tuning, Optimizing, and Selecting the right way to access data”, Institute of Science & Technology, Austria
“Data Systems for Hybrid Analytics”, University of Warwick, UK
“Tuning, Optimizing, and Selecting the right way to access data”, Paris Descartes University, France
“Tuning, Optimizing, and Selecting the right way to access data”, École Polytechnique, France
“Tuning, Optimizing, and Selecting the right way to access data”, École Normale Supérieure, France

2017

“UpBit: Scalable In-Memory Updatable Bitmap Indexing”, North East DB Day at MIT

2016

“Designing Access Methods: The RUM Conjecture”, Vision Track at EDBT 2016
“Design Tradeoffs of Data Access Methods”, Tutorial at ACM SIGMOD 2016

Last update: September 2021.