



Antonis Papaioannou

Postdoctoral Researcher

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SUMMARY

I am a postdoctoral researcher at the Institute of Computer Science (ICS) of Foundation for Research and Technology - Hellas (FORTH). My current projects span large scale distributed storage systems as well as stream processing systems. I enjoy studying and building real software systems!

I obtained my PhD in Computer Science from the Computer Science Department, University of Crete in 2021. During my PhD studies I worked on efficient adaptation mechanisms for improving performance during internal or external changes in distributed data stores under the supervision of professor Kostas Magoutis. The proposed mechanisms are implemented and applied in real and widely used data stores (Apache Cassandra, MongoDB, Redis) and popular storage engines (RocksDB, WiredTiger) as well as popular systems in the field of stream processing (Apache Flink, Apache Samza). During my PhD studies I was also a graduate research assistant at ICS-FORTH and before that I was a research associate at ICS-FORTH.

I am honored to have received the prestigious Hellenic Foundation for Research and Innovation (H.F.R.I.) scholarship for doctoral candidates (out of 2144 proposals submitted by doctoral candidates across all Greek universities in H.F.R.I.'s 1st Call) and the Maria Michail Manasaki Doctoral Fellowship (2019-2020).

EDUCATION

PHD IN COMPUTER SCIENCE

November 2021

COMPUTER SCIENCE DEPARTMENT, UNIVERSITY OF CRETE, GREECE

Area of Study: Parallel and Distributed Systems

Research topic: Efficient adaptation mechanisms for improving performance during internal or external changes in distributed data stores

Advisor: Prof. Kostas Magoutis

M.SC. IN COMPUTER SCIENCE

November 2013

COMPUTER SCIENCE DEPARTMENT, UNIVERSITY OF CRETE, GREECE

Areas of study:

- Major: Parallel and Distributed Systems

- Minor: Information Systems

GPA: 9.21/10.0

Thesis Topic: Design and Implementation of a System for Evaluating Distributed Application Deployments in Multicloud

Advisor: Prof. Evangelos Markatos

Co-Advisor: Prof. Kostas Magoutis

B.SC. IN COMPUTER SCIENCE

June 2010

COMPUTER SCIENCE DEPARTMENT, UNIVERSITY OF CRETE, GREECE

GPA: 7.21/10.0

Thesis Topic: Security Assessment on Information Systems Exposed to Web Attacks

Advisor: Dr. Manifavas Harry

EXPERIENCE

POSTDOCTORAL RESEARCHER

Dec. 2021 - Present

INFORMATION SYSTEMS LABORATORY (ISL), ICS - FORTH

Research Area: Adaptation techniques in large-scale distributed data stores and stream-processing systems

RESEARCH ASSISTANT

Jan. 2019 - Nov. 2021

INFORMATION SYSTEMS LABORATORY (ISL), ICS - FORTH

Research Area: Adaptation techniques in large-scale distributed data stores
Advisor: Prof. Kostas Magoutis

SYSTEMS AND NETWORK ADMINISTRATOR

Mar. 2018 - Dec. 2018

HELLENIC ARMY, RESEARCH AND INFORMATION CORPS

Duties:

- Systems administrator

Maintenance and support of the infrastructure that hosts critical applications of Hellenic Army.

Initial configuration and deployment of Dell PowerEdge VRTX servers.

- Network administrator

Redesign and deployment of the local area network topology supporting the HQ of a high formation military unit.

Bridge the local network with the private network of Hellenic Army. The network is used for highly classified information and enforces a strict security policy.

RESEARCH ASSISTANT

Nov. 2016 - Feb. 2018

INFORMATION SYSTEMS LABORATORY (ISL), ICS - FORTH

Research Area: Adaptation techniques in large-scale distributed data stores

Advisor: Prof. Kostas Magoutis

RESEARCH ASSOCIATE

Nov. 2013 - Nov. 2014

COMPUTER ARCHITECTURE AND VLSI SYSTEMS (CARV) LABORATORY, ICS - FORTH

Research Area: Cloud Computing, Distributed Storage Systems

RESEARCH ASSISTANT

Nov. 2012 - Oct. 2013

COMPUTER ARCHITECTURE AND VLSI SYSTEMS (CARV) LABORATORY, ICS - FORTH

Research Area: Evaluating Distributed Application Deployments in Multi-Clouds

Advisor: Prof. Kostas Magoutis

SOFTWARE DEVELOPER, DATABASE ADMINISTRATOR

April 2012 - Sept. 2012

HELP AT HOME, HERAKLION, CRETE, GREECE

Job description: Design and develop a data model for customer's data.

Design and develop an application to assign task to employees based on customer's requests.

RESEARCH ASSISTANT

Nov. 2011 - Oct. 2012

DISTRIBUTED COMPUTING SYSTEMS (DCS) LABORATORY, ICS - FORTH

Research Area: Impact of social media plugins on the web

Advisor: Prof. Evangelos Markatos

DATABASE ADMINISTRATOR

Nov. 2009 - April 2010

ANAPTIXI, HERAKLION, CRETE, GREECE

Job description: Design and develop a sustainable data model for customer's data.

Responsible for database infrastructure, maintenance, tuning, data backup and replication.

RESEARCH PROJECTS

STREAMSTORE

2020 - present

<https://streamstore-project.eu>

Funded by the Hellenic Foundation for Research and Innovation (HFRI) (Grant ID: HFRI-FM17-1998)

The project aims to fully support highly elastic, scalable, and fault-tolerant stateful stream-processing systems, through the evolution of the elasticity, predictability, and availability of scalable data store technology beyond the state of the art.

EVOLVE

2019 - 2021

<https://www.evolve-h2020.eu>

Funded by the European Union (GA No. 825061)

The project aims to merge High-performance computing (HPC), Cloud and Big Data in a large-scale testbed applied in 7 domains, from mobility to agriculture to urban planning.

My work focuses on the design of microservices to support streaming analytics to support continuous data processing using state of the art frameworks, specially optimized to take advantage of HPC resources.

PAASAGE

2012 - 2016

<http://www.paasage.eu>

Funded by the European Union (GA No. 317715)

PaaSage is a development and deployment platform, with an accompanying methodology and language, with which developers of enterprise systems can access services of cloud platforms in a technology neutral approach that abstracts the technical details while guiding them to configure their applications for best performance. I designed and implemented a framework for evaluating distributed application deployments in multi-Cloud platforms. I was involved to the design of the Metadata Database containing historical data from past application executions. I was also responsible for the deployment and maintenance of the database backend of the social network developed within the project.

TEACHING EXPERIENCE

Teaching Assistant

Department of Computer Science, University of Crete

- CS-590.45 Modern Topics in Scalable Storage Systems Spring 2021, 2020
- CS-452 Introduction to the Science and Technology of Services Fall 2020
- CS-559 Infrastructure Technologies for Large-Scale Service-Oriented Systems Fall 2020, 2019, Spring 2015, 2013
- CS-335 Computer Networks Fall 2019
- CS-240 Data Structures Spring 2019, 2015 – 2017, Fall 2014 – 2017
- CS-345 Operating Systems Fall 2012
- CS-459 Internet Measurements Spring 2012
- CS-463 Information Retrieval Systems Fall 2011, Fall 2010
- CS-359 Web Programming Spring 2011

PEER-REVIEWED PUBLICATIONS

A. Papaioannou and K. Magoutis, Amoeba: Aligning Stream Processing Operators with Externally-Managed State, in the *14th IEEE/ACM International Conference on Utility and Cloud Computing*, Leicester, UK, December 2021

available for open access: <https://doi.org/10.1145/3468737.3494096>

A. Papaioannou, Chrysostomos Zeginis and K. Magoutis, The Case for Better Integrating Scalable Data Stores and Stream-Processing Systems, in the *IEEE Cluster Conference 2020*, Kobe, Japan, September 2020. (two page proceedings paper accompanying a poster)

<https://doi.org/10.1109/CLUSTER49012.2020.00057>

A. Papaioannou, Novel adaptation mechanisms for distributed data stores, in the *14th EuroSys Doctoral Workshop (EuroDW)*, 2020

A. Chronarakis, **A. Papaioannou** and K. Magoutis, On the impact of log compaction on incrementally checkpointing stateful stream-processing operators, in *Proceedings of the 38th International Symposium on Reliable Distributed Systems Workshops (SRDSW)*, Lyon, France, October 1, 2019

url: <https://doi.org/10.1109/SRDSW49218.2019.00008>

A. Papaioannou and K. Magoutis, Replica-group leadership change as a performance enhancing mechanism in NoSQL data stores, in *Proceedings of the 38th IEEE International Conference on Distributed Computing Systems (ICDCS 2018)*, Vienna, Austria, July 2 - 5, 2018

url: <https://doi.org/10.1109/ICDCS.2018.00147>

A. Papaioannou and K. Magoutis, Incremental elasticity for NoSQL data stores, in *Proceedings of the 36th IEEE International Symposium on Reliable Distributed Systems (SRDS 2017)*, Hong Kong, China, September 26-29, 2017

url: <https://doi.org/10.1109/SRDS.2017.26>

A. Papaioannou and K. Magoutis, Incremental elasticity for NoSQL data stores, in *Proceedings of the 37th IEEE International Conference on Distributed Computing Systems (ICDCS 2017)*, Atlanta, GA, USA, June 5-8, 2017, (two page paper accompanying a poster)

url: <https://doi.org/10.1109/ICDCS.2017.177>

F. Karniavoura, **A. Papaioannou** and K. Magoutis, C2C: An Automated Deployment Framework for Distributed Applications on Multi-Clouds, in *9th Symposium and Summer School on Service Oriented Computing*, 2015, Crete, Greece, June 2015; appears as IBM Technical Report RC25564, 2015

A. Papaioannou, D. Metallidis and K. Magoutis, Cross-layer Management of Distributed Applications on Multi-Clouds, in *2015 IEEE International Symposium on Integrated Network Management - IM'15*, Ottawa, Canada, May 2015, Ottawa, ON, 2015, pp. 552-558.

url: <http://dx.doi.org/10.1109/INM.2015.7140336>

A. Papaioannou and K. Magoutis, An architecture for evaluating distributed application deployments in multi-clouds, in *Proceedings of the 2013 IEEE International Conference on Cloud Computing Technology and Science - Cloudcom '13*, Bristol, UK, December 2013, pp. 547-554.

url: <http://dx.doi.org/10.1109/CloudCom.2013.79>

G. Baryannis, P. Garefalakis, K. Kritikos, K. Magoutis, **A. Papaioannou**, D. Plexousakis, and C. Zeginis, Lifecycle management of service-based applications on multi-clouds: A research roadmap, in *Proceedings of 2013 International Workshop on Multi-cloud Applications and Federated Clouds (Multi-Cloud'13) ACM*, New York, NY, USA, 13-20,

url: <http://dx.doi.org/10.1145/2462326.2462331>

I. Kitsos, **A. Papaioannou**, N. Tsikoudis, and K. Magoutis, Adapting data-intensive workloads to generic allocation policies in cloud infrastructures, in *Network Operations and Management Symposium (NOMS)*, 2012, Maui, HI, 2012, pp. 25-33.

url: <http://dx.doi.org/10.1109/NOMS.2012.6211879>

JOURNAL PAPERS

Antonis Papaioannou and Kostas Magoutis, Addressing the read-performance impact of reconfigurations in replicated key-value stores, in the *IEEE Transactions on Parallel and Distributed System (TPDS)*, 2021

available for open access: <https://doi.org/10.1109/TPDS.2021.3135137>

Kostas Magoutis, Christos Papoulas, **Antonis Papaioannou**, Flora Karniavoura, Dimitrios-Georgios Akestoridis, Nikos Parotsidis, Maria Korozi, Asterios Leonidis, Stavroula Ntoa and Constantine Stephaniadis Design and implementation of a social networking platform for cloud deployment specialists, *SpringerOpen Journal of Internet Services and Applications*, 2015

url: <http://dx.doi.org/10.1186/s13174-015-0033-5>

POSTERS

A. Papaioannou and K. Magoutis, The Case for Better Integrating Scalable Data Stores and Stream-Processing Systems, to appear in the *IEEE Cluster Conference 2020*, Kobe, Japan, September 2020

A. Chronarakis, **A. Papaioannou** and K. Magoutis, On the impact of log compaction on incrementally checkpointing stateful stream-processing operators, in the *38th International Symposium on Reliable Distributed Systems (SRDS)*, Poster session, Lyon, France, October 1, 2019

A. Papaioannou and K. Magoutis, Incremental elasticity for NoSQL data stores, in the *37th IEEE International Conference on Distributed Computing Systems (ICDCS 2017)*, Atlanta, GA, USA, June 5-8, 2017

A. Papaioannou, D. Metallidis, and K. Magoutis. SmartM: Automated Lifecycle Management Frame-

work for Distributed Applications on Multi-Clouds. *Proc. of the Tenth International Summer School on Advanced Computer Architecture and Compilation for High-Performance and Embedded Systems (ACACES), Poster session, Fiuggi, Italy, July 2014*

HONORS AND AWARDS

- Maria Michail Manasaki Doctoral Fellowship (2019-2020)
- PhD scholarship, Hellenic Foundation for Research and Innovation (HFRI/ΕΛΙΔΕΚ)
Sep 2017 – Sep 2018
- Travel Grant for the 37th IEEE International Conference on Distributed Computing Systems (ICDCS 2017) at Atlanta, GA, USA, June 2017
- HiPEAC attendance grant for the Tenth International Summer School on Advanced Computer Architecture and Compilation for High-Performance and Embedded Systems (ACACES) at Fiuggi, Italy, July 2014
- Graduate student scholarship, FORTH (ISL Lab) Nov. 2016 to Aug. 2017
Mar. 2019 to Nov. 2021
- Graduate student scholarship, FORTH (CARV Lab) Nov. 2014 Oct. 2016
- Graduate student scholarship, FORTH (CARV Lab) Nov. 2012 to Oct. 2013
- Graduate student scholarship, FORTH (DCS Lab) Nov. 2011 to Oct. 2012

ACTIVITIES

- Shadow program committee member for the EuroSys 2020.
- Volunteer in the organization of EyroSys 2020
- Volunteer in the organization of the 14th EyroSysDoctoral Workshop (EuroDW), 2020
- Lead the organising committee of the Career Fair: Prepare for the Interview, 2021
- Volunteer in the organization of the 1st Graduate Student Conference in Computer Science, Computer Science Department, University of Crete, Greece, October 2019
- Subreviewer for 14th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid2014).
- Subreviewer for 19th International European Conference on Parallel and Distributed Computing (Euro-Par 2013).
- ACACES'14 - Tenth International Summer School on Advanced Computer Architecture and Compilation for High-Performance and Embedded Systems. Fiuggi, Italy, July 2014
- Chair of the Graduate Students Association, Computer Science Department, University of Crete, 2020-2021