

# Dr. Georgios Bouloukakis

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**Research Interests:** Middleware | Edge Computing | Internet of Things | Distributed Systems.

**Head of the SATRAI Living Lab:** <https://satrai.telecom-sudparis.eu>

## Employment History

- 2020 – ..... 📌 **Associate Professor.** Télécom SudParis, IP Paris, France.
- 2021 – ..... 📌 **Visiting Researcher.** FORTH-ICS, Heraklion, Greece.
- 2019 – 2020 📌 **Adjunct Lecturer.** Donald Bren School, UC Irvine, USA.
- 2018 – 2020 📌 **Post-doctoral Researcher.** UC Irvine, DSM & ISG groups, USA.
- 2017 – 2018 📌 **Post-doctoral Researcher.** UC Irvine, DSM group, USA.  
– position funded by the INRIA@SiliconValley research program.
- 2013 – 2017 📌 **PhD Fellow.** INRIA Paris, MiMove team, France.
- 2012 – 2013 📌 **Software Engineer.** INRIA Paris-Rocquencourt, ARLES Team, France.
- 2010 – 2012 📌 **Research Assistant.** Institute of Computer Science (ICS), Foundation of Research and Technology – Hellas (FORTH), Heraklion, Greece.

## Education

- 2013 – 2017 📌 **Ph.D. in Computer Science, Université Pierre et Marie Curie, Paris, France.**  
*Thesis:* Enabling Emergent Mobile Systems in the IoT: Functional and QoS Interoperability at the Middleware-layer.  
*Advisers:* Valérie Issarny and Nikolaos Georgantas.  
*Jury Members:* Nalini Venkatasubramanian (UC Irvine), Fabio Costa (UFG), Dimitris Plexousakis (ICS-FORTH), Pierre Sens (UPMC), Gilles Privat (Orange).
- 2010 – 2012 📌 **M.Sc. Computer Science, University of Crete, Greece (First Class Honours, GPA: 8.88/10.0).**  
*Thesis:* myWebAccess: A platform for repairing, enhancing and re-distributing Web Services accessible to people with disability.  
*Adviser:* Constantine Stephanidis.
- 2005 – 2009 📌 **B.Sc. Informatics and Telecommunications, University of Peloponnese, Greece. (GPA: 7.98/10.0, 3rd among the graduating class)**  
*Adviser:* Nikolaos D. Tselikas.

## Awards & Achievements

- March 2022 📌 The 20th International Conference on Pervasive Computing and Communications (PerCom), **Best Paper Award.**
- Feb 2021 📌 ComDeX Proposal (101031729), Marie Skłodowska-Curie Actions **Seal of Excellence.**
- June 2018 📌 International Conference on Internet of Things (ICIOT), **Best Paper Award.**
- 2017-2018 📌 Recipient of the competitive **INRIA@SiliconValley Postdoc fellowship** (3 openings) to work as researcher in USA.
- 2013-2016 📌 Recipient of the **INRIA grant** and **CORDIS PhD fellowship** for doctoral studies affiliated to UPMC/Sorbonne.

## Awards & Achievements (continued)

2010-2012     Recipient of the **ICS-FORTH MSc fellowship** for master studies at the University of Crete.

## Grants

### Principal Investigator – EU Funding

#### *DI-Hydro: Digital maintenance for sustainable and flexible operation of hydro-power plant*

DI-Hydro is funded by the European Commission (HORIZON-CL5-2022-D3-03). It aims to develop intelligent algorithms that use data from static, dynamic (e.g. IoT devices) and alternative sources (e.g. satellites) in order to predict the operating behavior of individual plants and clusters of hydroelectric plants

Budget: 403,750.00, Total Budget: 4,498,761.00, Duration: 2023-2026

### Selected Research Projects Involved

#### *DARPA TIPPERS: Testbed for IoT-based Privacy-Preserving PERvasive Spaces*

TIPPERS is part of the Brandeis DARPA program which aims to protect the privacy of individuals in smart spaces. My main contributions include guiding 15 undergraduates for the abstraction of IoT device interactions towards a semantic vision of smart spaces.

#### *NIST SCIFIRE: Prioritized IoT Data Exchange Middleware for Emergency Response*

SCIFIRE is a collaborative project with the *National Fire Protection Association* (NFPA) on *Smart Fire Fighting* technologies. My main contributions include the design of a middleware system for the prioritized delivery of mission-critical data from IoT devices to firefighters.

#### *H2020 CHOReVOLUTION: Large-scale, Dynamic and Secured Choreographies*

CHOReVOLUTION is part of the EU's Horizon 2020 program for the automated synthesis of dynamic and secured IoT choreographies. My main contributions include the mapping of functional and QoS protocol semantics employed by heterogeneous services and IoT devices.

#### *FP7 CHOReOS: Large Scale Choreographies for the Future Internet*

CHOReOS is part of the EU's FP7 program for the development of large-scale choreographies of services for the Future Internet. My main contributions include the design and implementation of an *Enterprise Service Bus* for integrating heterogeneous services.

## Research Achievements

### Publications: Journals, Book Chapters

A. Chio, D. Jiang, P Gupta, **G. Bouloukakis**, R. Yus, S. Mehrotra, N. Venkatasubramanian. (2023). Smartspec: a framework to generate customizable, semantics-based smart space datasets. *Pervasive and Mobile Computing*.

R. Yus, **G. Bouloukakis**, S. Mehrotra, N. Venkatasubramanian. (2022). The semiotic ecosystem: a semantic bridge between iot devices and smart spaces. *ACM Transactions on Internet Technology – TOIT*.

**G. Bouloukakis**, I. Moscholios, N. Georgantas, V. Issarny. (2021). Performance Analysis of Internet of Things Interactions via Simulation-Based Queueing Models. *Future Internet*, 13(4), 87.

**G. Bouloukakis**, K. Benson, L. Scalzotto, P. Bellavista, C. Grant, V. Issarny, S. Mehrotra, I. Moscholios, N. Venkatasubramanian. (2021). PrioDeX: a Data Exchange Middleware for Efficient Event Prioritization in SDN-based IoT systems. *ACM Transactions on Internet of Things – TIOT*.

**G. Bouloukakis**, N. Georgantas, A. Kattepur, V. Issarny. (2021). Timed protocol analysis of interconnected mobile iot devices. *Journal of Internet Services and Applications*.

D. Archer, M. August, **G. Bouloukakis**, C. Christopher, M. Diallo, D. Ghosh, C. Graves et al. (2020). Transitioning from Testbeds to Ships: An Experience Study in Deploying the TIPPERS IoT Platform to the US Navy. *Journal of Defense Modeling and Simulation*.

**G. Bouloukakis**, N. Georgantas, A. Kattepur, V. Issarny. (2020). Timed Protocol Analysis of Interconnected Mobile IoT Devices. *Journal of Internet Services and Applications (submitted)*.

**G. Bouloukakis**, N. Georgantas, P. Ntumba, V. Issarny. (2018). Automated Synthesis of Mediators for Middleware-layer Protocol Interoperability in the IoT. *Future Generation Computer Systems*.

**G. Bouloukakis**, I. Basdekis, C. Stephanidis. (2014). Supporting Accessible User Interfaces using Web Services. *Human-Computer Interfaces and Interactivity: Emergent Research and Applications*, vol. 8, IGI Global.

## **Publications: International Conferences**

**G. Bouloukakis**, C. Zeginis, N. Papadakis, K. Magoutis, G. Christodoulou, C. Kosyfaki, K. Lampropoulos, N. Mamoulis. (2023). Smartcitybus-a platform for smart transportation systems. In *Proceedings of the sixteenth acm international conference on web search and data mining*.

H. Hajj Hassan, **G. Bouloukakis**, A. Kattepur, D. Conan, D. Belaid. (2023a). Artifact: implementation of an adaptive flow management framework for iot spaces. In *18th Symposium on Software Engineering for Adaptive and Self-Managing Systems*.

H. Hajj Hassan, **G. Bouloukakis**, A. Kattepur, D. Conan, D. Belaid. (2023b). Edict: simulation of edge interactions across iot-enhanced environments. In *19th International Conference on Distributed Computing in Smart Systems and the Internet of Things (DCOSS-IoT)*.

H. Hajj Hassan, **G. Bouloukakis**, A. Kattepur, D. Conan, D. Belaid. (2023c). Planiot: a framework for adaptive data flow management in iot-enhanced spaces. In *18th Symposium on Software Engineering for Adaptive and Self-Managing Systems*.

N. Papadakis, **G. Bouloukakis**, K. Magoutis. (2023a). ComDeX: a context-aware federated platform for IoT-enhanced communities. In *17th ACM International Conference on Distributed and Event-Based Systems (DEBS)*.

A. Chio, D. Jiang, P. Gupta, **G. Bouloukakis**, R. Yus, S. Mehrotra, N. Venkatasubramanian. (2022). Smartspec: customizable smart space datasets via event-driven simulations. In *The 20th international conference on pervasive computing and communications - PerCom, (Best Paper Award)*.

A. Elhabbash, Y. Elkhatib, **G. Bouloukakis**, M. Salama. (2022). A Middleware for Automatic Composition and Mediation in IoT Systems. In *IoT 2022 - The 12th International Conference on the Internet of Things*. Delft, Netherlands.

**G. Bouloukakis**, C. Zeginis, N. Papadakis, P. Zervakis, D. Plexousakis, K. Magoutis. (2022). Enabling IoT-enhanced Transportation Systems using the NGSI Protocol. In *IoT 2022 - 12th International Conference on the Internet of Things*. Delft, Netherlands.

T.C. Chang, **G. Bouloukakis**, C.Y. Hsieh, C.H. Hsu, N. Venkatasubramanian. (2021b). SmartParcels: cross-Layer IoT planning for smart communities. In *Iotdi 2021: 6th acm/ieee international conference on internet-of-things design and implementation* (pp. 1–13).

Y. Lin, D. Jiang, R. Yus, **G. Bouloukakis**, A. Chio, S. Mehrotra, N. Venkatasubramanian. (2021). LOCATER: Cleaning WiFi Connectivity Datasets for Semantic Localization. In *Very Large Data Bases (VLDB) Endowment*.

- G. Bouloukakis**, I. Moscholios, N. Georgantas. (2019). Probabilistic Event Dropping for Intermittently Connected Subscribers over Pub/Sub Systems. In *IEEE International Conference on Communications (ICC)*. Shanghai, China.
- R. Yus, **G. Bouloukakis**, S. Mehrotra, N. Venkatasubramanian. (2019). Abstracting Interactions with IoT Devices Towards a Semantic Vision of Smart Spaces. In *6th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation (Buildsys)*. New York, USA.
- V. Issarny, B. Billet, **G. Bouloukakis**, D. Florescu, C. Toma. (2019). LATTICE: A Framework for Optimizing IoT System Configurations at the Edge. In *The 39th IEEE International Conference on Distributed Computing Systems (ICDCS)*. Dallas, Texas, USA.
- G. Bouloukakis**, A. Kattepur, N. Georgantas, V. Issarny. (2018). Queueing Network Modeling Patterns for Reliable and Unreliable Publish/Subscribe Protocols. In *15th EAI International Conference on Mobile and Ubiquitous Systems: Computing, Networking and Services (MobiQuitous)*. New York, USA.
- G. Bouloukakis**, I. Moscholios, N. Georgantas, V. Issarny. (2018). Simulation-based Queueing Models for Performance Analysis of IoT Applications. In *11th International Symposium on Communication Systems, Networks, and Digital Signal Processing (CSNDSP)*. Budapest, Hungary.
- K. Benson, **G. Bouloukakis**, C. Grant, V. Issarny, S. Mehrotra, I. Moscholios, N. Venkatasubramanian. (2018). FireDeX: a Prioritized IoT Data Exchange Middleware for Emergency Response. In *ACM/IFIP/USENIX Middleware conference*. Rennes, France.
- R. Gomes, **G. Bouloukakis**, F. Costa, N. Georgantas, R. Da Rocha. (2018). QoS-Aware Resource Allocation for Mobile IoT Pub/Sub Systems. In *International Conference on Internet of Things (ICIOT)*. Seattle, WA, USA. (**Best Paper Award**).
- V. Issarny, **G. Bouloukakis**, N. Georgantas, F. Sailhan, G. Texier. (2018). When Service-oriented Computing Meets the IoT: A Use Case in the Context of Urban Mobile Crowdsensing. In *European Conference on Service-Oriented and Cloud Computing (ESOCC)*. Como, Italy.
- G. Bouloukakis**, I. Moscholios, N. Georgantas, V. Issarny. (2017). Performance Modeling of the Middleware overlay Infrastructure of Mobile Things. In *IEEE International Conference on Communications (ICC)*. Paris, France.
- G. Bouloukakis**, N. Georgantas, A. Kattepur, V. Issarny. (2017). Timeliness Evaluation of Intermittent Mobile Connectivity over Pub/Sub Systems. In *8th ACM/SPEC on International Conference on Performance Engineering (ICPE)*. L'Aquila, Italy.
- G. Bajaj, R. Agarwal, **G. Bouloukakis**, P. Singh, N. Georgantas, V. Issarny. (2016). Towards Building Real-Time, Convenient Route Recommendation System for Public Transit. In *International Smart Cities Conference (ISC2)*. Trento, Italy.
- V. Issarny, **G. Bouloukakis**, N. Georgantas, B. Billet. (2016). Revisiting Service-oriented Architecture for the IoT: a Middleware Perspective. In *International Conference on Service-Oriented Computing (ICSOC)*. Banff, Alberta, Canada.
- A. Kattepur, N. Georgantas, **G. Bouloukakis**, V. Issarny. (2015). Analysis of Timing Constraints in Heterogeneous Middleware Interactions. In *International Conference on Service-Oriented Computing (ICSOC)*. Goa, India.
- G. Bajaj, **G. Bouloukakis**, A. Pathak, P. Singh, N. Georgantas, V. Issarny. (2015). Toward Enabling Convenient Urban Transit through Mobile Crowdsensing. In *18th International Conference on Intelligent Transportation Systems (ITSC)*. Las Palmas, Gran Canaria, Spain.

**G. Bouloukakis**, N. Georgantas, R. Agarwal, A. Pathak, V. Issarny. (2015b). Leveraging CDR datasets for Context-Rich Performance Modeling of Large-Scale Mobile Pub/Sub Systems. In *11th International Conference on Wireless and Mobile Computing, Networking and Communications (WiMob)*. Abu Dhabi, UAE.

**G. Bouloukakis**, I. Basdekis, C. Stephanidis. (2013). myWebAccess: A platform for Repairing, Enhancing and Re-distributing Web Services Accessible to people with Disability. In *International Conference on Interfaces and Human Computer Interaction (IHCI)*. Prague, Czech Republic.

N. Georgantas, **G. Bouloukakis**, S. Beauche, V. Issarny. (2013). Service-oriented Distributed Applications in the Future Internet: The case for Interaction Paradigm Interoperability. In *European Conference on Service-Oriented and Cloud Computing (ESOCC)*. Malaga, Spain.

## **Publications: Workshops, Demos, Posters**

H. Hajj Hassan, **G. Bouloukakis**, D. Conan, A. Kattepur, M. Trabolsi, N. Papadakis, D. Belaid, K. Magoutis. (n.d.). *(demo) edict: a simulation tool for performance metrics datasets in iot environments*.

**G. Bouloukakis**, A. Kattepur. (2023). *Donna: a data model for enabling extensible and efficient metaverse applications*.

N. Papadakis, **G. Bouloukakis**, K. Magoutis. (2023b). *Demo: ComDeX unveiled demonstrating the future of IoT-Enhanced communities*.

N. Papadakis, **G. Bouloukakis**, K. Magoutis. (2022). *Enabling Dynamic Smart Spaces using IoT-enhanced NGSI-LD Data Models*. Delft, Netherlands.

T.C. Chang, **G. Bouloukakis**, C.Y. Hsieh, C.H. Hsu, N. Venkatasubramanian. (2021a). *Demo Abstract: SmartParcels A What-If Analysis and Planning Tool for IoT-Enabled Smart Communities*.

A. Chio, **G. Bouloukakis**, C. Hsu, S. Mehrotra, N. Venkatasubramanian. (2019). Adaptive Mediation for Data Exchange in IoT Systems. (workshop) *ACM/IFIP/USENIX Middleware conference*. UC Davis, USA.

S. Almanee, **G. Bouloukakis**, D. Jiang, S. Ghayyur, D. Ghosh, P. Gupta, Y. Lin, S. Mehrotra, P. Pappachan, E.J. Shin, N. Venkatasubramanian, G. Wang, R. Yus. (2019). SemIoTic: Bridging the Semantic Gap in IoT Spaces. (demo) *6th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation (Buildsys)*. New York, USA.

L. Scalzotto, K. Benson, **G. Bouloukakis**, P. Bellavista, V. Issarny, S. Mehrotra, N. Venkatasubramanian. (2018). An Implementation Experience with SDN-enabled IoT Data Exchange Middleware. (poster) *ACM/IFIP/USENIX Middleware conference*. Rennes, France.

P. Ntumba, **G. Bouloukakis**, N. Georgantas. (2018). Interconnecting and Monitoring Heterogeneous Things in IoT Applications. (demo) *International Conference on Web Engineering (ICWE)*. Cáceres, Spain.

**G. Bouloukakis**, N. Georgantas, S. Dutta, V. Issarny. (2016). Integration of Heterogeneous Services and Things into Choreographies. (demo) *International Conference on Service Oriented Computing (ICSOC)*. Banff, Alberta, Canada.

**G. Bouloukakis**, N. Georgantas, R. Agarwal, A. Pathak, V. Issarny. (2015a). Towards Enabling Mobile Social Crowd-Sensing for Unstructured Transport Information Management. (poster) *D4D Challenge 2015 - (NetMob)*. Boston, MA, USA.

**G. Bouloukakis** and Nikolaos D. Tselikas. (2009). Wireless Ordering System. *3rd Pan-Hellenic Scientific Student Conference on Information Technologies (EUREKA)*. Corfu island, Greece.

**G. Bouloukakakis**, N. P. Diamantopoulos, D. Ouzounidis, A. C. Boucouvalas and N. D. Tselikas. (2009). The Lakouva Project. *3rd Pan-Hellenic Scientific Student Conference on Information Technologies (EUREKA)*. Corfu island, Greece.

## Research Talks

14. *Towards the Next Generation of IoT-enhanced Smart Communities*, SAMOVAR CNRS Laboratory, Télécom SudParis, France, 2021.
13. *Integrating Existing IoT systems: LA smart parking use case*, Los Angeles City Hall, Information Technology Agency (ITA), USA, 2020.
12. *Towards End-to-end Data Exchange in the IoT*, USC CPS Seminar, Los Angeles, USA, 2019.
11. *FireDeX: a Prioritized IoT Data Exchange Middleware for Emergency Response*, ACM Middleware, Rennes, France, 2018.
10. *QoS-Aware Resource Allocation for Mobile IoT Pub/Sub Systems*, ICIOT, Seattle, USA, 2018.
9. *Automated Synthesis of Software Artifacts for Middleware-layer Protocol Interoperability in the IoT*, DSM Research Seminars, UC Irvine, CA, USA, 2018.
8. *Enabling emergent mobile systems in the IoT: Functional and QoS interoperability at the middleware layer*, ACHOR Workshop, Goiania, Brazil, 2017.
7. *Scaling up for the IoT*, 7th Inria@SiliconValley workshop, UC Berkeley, CA, USA, 2017.
6. *Performance Modeling of the Middleware Overlay Infrastructure of Mobile Things*, ICC, Paris, France, 2017.
5. *Timeliness Evaluation of Intermittent Mobile Connectivity over Pub/Sub Systems*, ICPE, L'Aquila, Italy, 2017.
4. *Protocol Interconnection in the Urban Traffic Coordination use-case*, H2020 CHOReVOLUTION 1st Review, EU Commission, Brussels, Belgium, 2016.
3. *Leveraging CDR datasets for Context-Rich Performance Modeling of Large-Scale Mobile Pub/Sub Systems*, WiMob, Abu Dhabi, UAE, 2015.
2. *eXtensible Service Bus (XSB)*, FP7 CHOReOS Final Review, EU Commission, Brussels, Belgium, 2013.
1. *Service-oriented Distributed Applications in the Future Internet: The Case for Interaction Paradigm Interoperability*, IFIP Working Group on Service Oriented Systems, Amsterdam, The Netherlands, 2013.






## Steering & TPC Member

- *Organizing*
  - Proceedings co-Chair of EuroSys 2024
  - Artifact Evaluator co-Chair of Middleware 2022 & 2023
  - Publicity co-Chair of IoTDI 2021
  - Web Chair of IEEE SMARTCOMP 2021
  - Publicity Chair of the Workshop on Adaptive and Reflexive Middleware (ARM) 2018
- *Conferences*
  - IEEE SMARTCOMP 2021, 2022 & 2023
  - IEEE MetaCom (Metaverse Computing track) 2023
  - ICIOT 2019, 2020, 2021, 2022 & 2023
  - Euro-Par PhD Symposium 2022 & 2023
  - FiCloud 2019, 2020, 2021 & 2023
  - ACM SAC (INTOP track) 2023
  - FATE workshop 2022

- SERENE workshop 2021 & 2022
- Adaptive and Reflexive Middleware (ARM) workshop 2018
- *Journals (external reviewer)*
  - ACM Transactions on Autonomous and Adaptive Systems
  - ACM Transactions on Internet of Things
  - ACM Transactions on Mobile Computing
  - IEEE Transactions on Services Computing
  - Information and Software Technology
  - Journal of Systems and Software
  - Pervasive and Mobile Computing
- *Workshops*
  - FATE 2022
  - SERENE 2021 & 2022
  - Adaptive and Reflexive Middleware (ARM) 2018
- *Grant Proposals reviewer*
  - CYRENE Open Call 2023
  - National Science Center - Poland 2018





## Research Prototypes

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|----------|---|
| SemIoTic |  A framework for facilitating the development of IoT applications in smart spaces using semantically enriched APIs.<br>More info: <a href="http://gbouloukakis.com/project/semiotic">http://gbouloukakis.com/project/semiotic</a>                              |
| PrioDex  |  A pub/sub-based middleware system for prioritized delivery of mission-critical data from IoT sources to relevant subscribers.<br>More info: <a href="http://gbouloukakis.com/project/priodex">http://gbouloukakis.com/project/priodex</a>                     |
| DeXMS    |  Data eXchange Mediator Synthesizer for enabling interoperability among IoT devices via code generation.<br>More info: <a href="http://gbouloukakis.com/project/dexms">http://gbouloukakis.com/project/dexms</a>   |
| IoTIS    |  An open-source simulator for modeling the performance of IoT applications using network of queues parameterized with constraints of IoT interactions.<br>More info: <a href="http://gbouloukakis.com/project/iotis">http://gbouloukakis.com/project/iotis</a> |
| XSB      |  eXtensible Service Bus framework supporting heterogeneous middleware interactions in service choreographies.<br>More info: <a href="http://gbouloukakis.com/project/xsb">http://gbouloukakis.com/project/xsb</a>  |

## Personal Background

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| <i>Nationality</i>   |  Greek  |
| <i>Date of Birth</i> |  1 November, 1986   |
| <i>Languages</i>     |  Greek (Fluent), English (Fluent), French (Intermediate).                     |
| <i>Interests</i>     |  Reading (popular science, history), Photography, Sports (Soccer, Basketball) |