Jacopo **Massa**

A Ph.D. Student · Research Fellow

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1. Education & Experience

1.1. Education

Ph.D. student in Computer Science

PISA, ITALY

University of Pisa / CNR-ISTI

11/2021 – NOW

- **Thesis:** *"Declarative application and network management in the Cloud-Edge continuum"*
- **Advisors:** Antonio Brogi, Patrizio Dazzi, Stefano Forti
- **Abstract:** This thesis investigates declarative methodologies for managing applications and networks across the Cloud-Edge continuum, focusing on data-aware placement and intent-based networking. The work introduces models and prototypes that enable automated, context-sensitive distributed service deployment, based on data properties and infrastructure dynamics. It also proposes novel approaches for intent modelling, translation, and conflict resolution to support scalable orchestration of application and network configurations. The solutions are validated through simulation, emulation, and real-world case studies.

M.Sc. in Computer Science - "ICT Solutions Architect"

PISA, ITALY

University of Pisa

10/2019 – 10/2021

- **Thesis:** *"Data-aware application Placement And Routing in the Cloud-IoT"*
- **Advisors:** Antonio Brogi, Stefano Forti
- **Degree Mark:** 110/110 with honors
- **Date of Achievement:** 08/10/2021
- **Abstract:** This thesis proposes declarative modelling of Cloud-IoT infrastructures and multi-service applications that separately model computing and data services. Through formal logic reasoning, the methodology determines eligible service placements and data traffic routing over Cloud-IoT resources. The proposed methodology is prototyped in Prolog and assessed via simulation over a life-like use case.

B.Sc. in Computer Science

PISA, ITALY

University of Pisa

09/2016 – 10/2019

- **Thesis:** *"Voice and graphical user interface for a smart building application"*
- **Advisors:** Antonio Brogi, Stefano Forti
- **Degree Mark:** 106/110
- **Date of Achievement:** 04/10/2019
- **Abstract:** This thesis presents the design and implementation of a hybrid voice-graphical interface for smart building environments, enabling natural language interaction with IoT devices through Amazon Alexa and a touchscreen display. The system integrates multiple microservices within the GIÒ framework, allowing users to access contextual information, manage smart room goals, and control devices via voice commands or graphical input. The solution is prototyped using Python and the Alexa Skills Kit, and its usability is evaluated through real-user testing in a university setting.

1.2. Academic Positions

Research grant

PISA, ITALY

University of Pisa, NOUS Project

09/2024 – 09/2025

Holder of the research grant "*Ambienti per la programmazione strutturata parallela e distribuita di infrastrutture di calcolo all'Edge*" associated with the NOUS EU-funded project, under the Horizon Europe programme.

Scholarship holder

PISA, ITALY

University of Pisa & CNR-ISTI

11/2021 – NOW

Holder of the scholarship "*Efficient solutions and approaches for AI on Edge Computing platforms*", associated with participation in the Ph.D. programme in Computer Science, funded by CNR-ISTI "A. Faedo".

1.3. Other Educational Experiences

From Data to Social Innovation

BARATTI, ITALY

SoBigData 2025 (Ph.D. Summer School)

22/06/2025 – 28/06/2025

(40h) The 2025 edition focused on equipping participants with interdisciplinary skills in data science, machine learning, and AI, applied to social, political, and information dynamics. The program combined expert-led lectures and collaborative group projects, addressing topics such as disinformation, data governance, and ethical data practices.

Computational Complex and Social Systems: Spreading and Accessing Information

LIPARI, ITALY

University of Catania (Ph.D. Summer School)

16/07/2023 – 22/07/2023

(40h) The 2023 edition aimed to provide opportunities for gaining experience in modern data analysis, particularly in Big Data analytics. This encompassed subjects related to mining data in the Internet of Things. Distinguished guest lecturers and recognised authorities addressed these topics, focusing on algorithms, computational models, and practical results.

Pathways to Green ICT

PISA, ITALY

University of Pisa (Ph.D. course)

02/05/2022 – 01/06/2022

(16h) The course introduced students to the fundamentals of Green ICT, providing them with a toolbox to consider sustainability aspects in their research. The lectures introduced the concepts of sustainability and the types of environmental impact of the lifecycle of ICT systems, methodologies to assess and decrease the environmental impact of ICT systems, as well as use cases and open research challenges.

Programming Tools and Techniques in the Pervasive Parallelism Era

PISA, ITALY

University of Pisa (Ph.D. course)

02/05/2022 – 13/05/2022

(16h) The course covered techniques and tools suitable for efficient parallel/distributed applications targeting small-scale parallel systems and larger-scale parallel and distributed systems, possibly equipped with different accelerators. The course followed a methodological approach to provide a homogeneous overview of classical tools and techniques and new tools and techniques specifically developed for new, emerging architectures and applicative domains. Perspectives on reconfigurable coprocessors and domain-specific architectures have also been covered.

Mobile CrowdSensing and the Edge: An outlook to distributed architectures and privacy aspects

PISA, ITALY

University of Pisa (Ph.D. course)

14/12/2021 – 21/12/2021

(20h) The course provided an overview of the Mobile CrowdSensing (MCS) paradigm, focusing on edge-based architectures and security mechanisms. It included an introduction to MCS with real-world experiments, data analytics methodologies for MCS platform optimisation, and security/privacy mechanisms in MCS architecture.

2. Academic Activities

2.1. Scientific Publications

Bibliometric indicators

Last updated: *July 21, 2025*

Google Scholar	**Citations:** 53	**h-index:** 4	**i10-index:** 3
Scopus	**Citations:** 34	**h-index:** 4	**i10-index:** –

Conference Papers

[C1] E. Carlini, P. Dazzi, L. Ferrucci, **J. Massa**, and M. Mordacchini, "Marginal Cost of Computation as a Collaborative Strategy for Resource Management at the Edge", in *Economics of Grids, Clouds, Systems, and Services*, Springer Nature Switzerland, 2025, pp. 15–27.
DOI: 10.1007/978-3-031-81226-2_3,
Quality (GGS): N.A.

[C2] V. Besozzi, E. Carlini, M. Danelutto, P. Dazzi, M. Della Bartola, L. Ferrucci, **J. Massa**, and M. Mordacchini, "Decentralized Q-Learning for Workload Offloading in Urgent Edge Computing Scenarios", in *Complex, Intelligent and Software Intensive Systems*, Cham: Springer Nature Switzerland, Jul. 2025, pp. 231–239.
DOI: 10.1007/978-3-031-96096-3_22,
Quality (GGS): N.A.

[C3] **J. Massa**, "Towards a Comprehensive Approach to Resource and Conflict Management in Cloud-Edge Settings", in *Proceedings of the 33rd International Symposium on High-Performance Parallel and Distributed Computing*, ACM, 2024, pp. 397–400.
DOI: 10.1145/3625549.3658829,
Quality (GGS): A.

[C4] **J. Massa**, S. Forti, F. Paganelli, P. Dazzi, and A. Brogi, "A declarative reasoning approach to conflict management in Intent-Based Networking", in *2024 27th Conference on Innovation in Clouds, Internet and Networks*, 2024, pp. 228–233.
DOI: 10.1109/ICIN60470.2024.10494474,
Quality (GGS): N.A.

[C5] **J. Massa**, S. Forti, F. Paganelli, P. Dazzi, and A. Brogi, "Towards declarative intent processing and conflict resolution in IBN", in *Proceedings of the IEEE/ACM 16th International Conference on Utility and Cloud Computing*, ACM, 2024.
DOI: 10.1145/3603166.3632236,
Quality (GGS): N.A.

[C6] T. Di Riccio, **J. Massa**, S. Forti, and A. Brogi, "Sustainable placement of VNF chains in Intent-based Networking", in *Proceedings of the IEEE/ACM 16th International Conference on Utility and Cloud Computing*, ACM, Apr. 2024.
DOI: 10.1145/3603166.3632167,
Quality (GGS): N.A.

[C7] **J. Massa**, S. Forti, P. Dazzi, and A. Brogi, "Declarative and Linear Programming Approaches to Service Placement, Reconciled", in *2023 IEEE 16th International Conference on Cloud Computing (CLOUD)*, Sep. 2023, pp. 1–10.
DOI: 10.1109/CLOUD60044.2023.00033,
Quality (GGS): A-.

[C8] **J. Massa**, S. Forti, F. Paganelli, P. Dazzi, and A. Brogi, "Declarative Provisioning of Virtual Network Function Chains in Intent-based Networks", in *2023 IEEE 9th International Conference on Network Softwarization (NetSoft)*, Jul. 2023, pp. 522–527.
DOI: 10.1109/NetSoft57336.2023.10175449,
Quality (GGS): N.A.

[C9] **J. Massa**, S. Forti, and A. Brogi, "Data-Aware Service Placement in the Cloud-IoT Continuum", in *Service-Oriented Computing*, Springer International Publishing, Jun. 2022, pp. 139–158.
DOI: 10.1007/978-3-031-18304-1_8,
Quality (GGS): N.A.

Workshop Papers

[W1] J. Massa, S. Forti, F. Paganelli, P. Dazzi, A. Brogi, A. Clemm, and T. Eckert, "Towards Declarative Traffic Engineering for Guaranteed Latency-Based Forwarding", in *Euro-Par 2024: Parallel Processing Workshops*, Springer Nature Switzerland, 2025, pp. 231–242.
DOI: 10.1007/978-3-031-90203-1_20,
Quality (GGS): B.

[W2] P. Dazzi, L. Ferrucci, M. Danelutto, K. Tserpes, A. Makris, T. Theodoropoulos, **J. Massa**, E. Carlini, and M. Mordacchini, "Urgent Edge Computing", in *Proceedings of the 4th Workshop on Flexible Resource and Application Management on the Edge (FRAME)*, ACM, 2024, pp. 7–14.
DOI: 10.1145/3659994.3660315,
Quality (GGS): A.

[W3] **J. Massa**, "Data-Aware Application Placement and Management in the Cloud-IoT Continuum", in *Service-Oriented Computing – ICSOC 2022 Workshops*, Springer Nature Switzerland, 2023, pp. 301–307.
DOI: 10.1007/978-3-031-26507-5_24,
Quality (GGS): A-.

Theses

[T1] **J. Massa**, "Data-aware application placement and routing in the Cloud-IoT continuum", M.Sc. Thesis, Dept. of Computer Science, University of Pisa, Oct. 2021.
URL: `https://etd.adm.unipi.it/theses/available/etd-09072021-120248/`.

[T2] **J. Massa**, "Voice and graphical user interface for a smart building application", B.Sc. Thesis, Dept. of Computer Science, University of Pisa, Oct. 2019.

Micellaneous

[M1] **J. Massa**, V. De Caro, S. Forti, P. Dazzi, D. Bacciu, and A. Brogi, "ECLYPSE: a Python Framework for Simulation and Emulation of the Cloud-Edge Continuum", Jul. 2025. arXiv: `2501.17126 [cs.NI]`.

[M2] **J. Massa**, S. Forti, P. Dazzi, and A. Brogi, "Combining declarative and linear programming for application management in the cloud-edge continuum", Apr. 2025. arXiv: `2504.12032 [cs.DC]`.

[M3] **J. Massa**, S. Forti, F. Paganelli, P. Dazzi, A. Brogi, A. Clemm, and T. Eckert, "Declarative Traffic Engineering for Low-Latency and Reliable Networking", Mar. 2025. arXiv: `2503.21289 [cs.NI]`.

2.2. Scientific Conferences Organisation

Participation in the following international scientific conference committees:

Program Chair

- **AHPC³ 2025**, 2nd Workshop on Accelerated HPC in the Cloud edge Continuum @ IC2E 2025
- **AHPC³ 2024**, 1st Workshop on Accelerated HPC in the Cloud edge Continuum @ PDP 2025

Web Chair

- **HPDC 2024**, 33rd International Symposium on High-Performance Parallel and Distributed Computing

Program Committee member

- **IEEE SOSE 2025**, 19th IEEE International Conference on Service-Oriented System Engineering
- **ACR 2026**, 4th International Conference on Advances in Computing Research
- **MoCS 2025**, 15th Workshop on Management of Cloud and Smart City Systems
- **CSC 2025**, 11th International Conference on Connected Smart Cities
- **I3E 2025** 24th IFIP Conference e-Business, e-Services, and e-Society
- **ESOCC 2025**, 12th European Conference On Service-Oriented And Cloud Computing
- **ACR 2025**, 3rd International Conference on Advances in Computing Research
- **IEEE SOSE 2024**, 18th IEEE International Conference on Service-Oriented System Engineering
- **CSC 2024**, 10th International Conference on Connected Smart Cities
- **ESOCC 2023**, 10th European Conference On Service-Oriented And Cloud Computing
- **Microservices 2023**, 5th International Conference on Microservices
- **ACSOS 2023**, 4th International Conference on Autonomic Computing and Self-Organizing Systems

2.3. Reviewer Activities

Reviewing scientific contributions for the following international scientific conference series and journals:

Journal

- **IJNDC** – International Journal of Networked and Distributed Computing
- **TIOT** – ACM Transactions on Internet of Things
- **Computing**
- **Heliyon**
- **JSS** – Journal of Systems & Software

Conference

- **IEEE ISCC** – Symposium on Computers and Communications
- **PDP** – Euromicro International Conference on Parallel, Distributed, and Network-Based Processing
- **CCGRID** – International Symposium on Cluster, Cloud and Internet Computing
- **IEEE STI** – Conference on Science, Technology and Innovation Indicators
- **IEEE CLOUD** – International Conference On Cloud Computing
- **IEEE SOSE** – International Conference on Service-Oriented System Engineering
- **ESOCC** – European Conference on Service-Oriented and Cloud Computing
- **I3E** – IFIP Conference e-Business, e-Services, and e-Society
- **ACR** – International Conference on Advances in Computing Research

2.4. Research Groups

Parallel Programming Models Group

PISA, ITALY

Department of Computer Science, University of Pisa — 01/2024 – NOW

The group focuses on parallel and distributed computing, developing the FastFlow library with advanced parallel design patterns and tools optimized for multicore systems and GPUs. Their research covers parallel programming models, data stream processing, and energy-aware computing.

OSMWARE: hOlistic Sustainable Management of distributed softWARE systems

PISA, ITALY

Department of Computer Science, University of Pisa — 11/2022 – NOW

Research group comprising researchers from the namesake project.

High Performance Computing Laboratory

PISA, ITALY

Institute of Information Science and Technologies "Alessandro Faedo", CNR-ISTI — 01/2022 – NOW

The HPC Lab focuses on scalable algorithms and systems for computational and data-intensive problems, including cloud systems, big data analytics, and machine learning. They develop efficient solutions for managing large datasets in near real-time, optimizing for resource constraints and application-specific trade-offs.

Service-Oriented, Cloud and Fog Computing (SOCC) Research Group

PISA, ITALY

Department of Computer Science, University of Pisa — 05/2021 – NOW

Research group coordinated by Prof. Antonio Brogi.

GIÒ: A Fog Computing Testbed for Research & Education

PISA, ITALY

Department of Computer Science, University of Pisa — 06/2019 – NOW

Research group comprising researchers from the namesake project.

2.5. Awards

11/2024 **Best Paper**, *GECON 2024*.
[C1] Marginal Cost of Computation as a Collaborative Strategy for Resource Management at the Edge.

2.6. Research Projects

NOUS: A catalyst for EuropeaN ClOUd Services

PISA, ITALY

Department of Computer Science, University of Pisa — 09/2024 – 09/2025

- **Project code:** HORIZON-CL4-2023-DATA-01-02
- **Role:** project member.
- **Description:** NOUS is a 36-month EU-funded project, which aims to develop the architecture of a European cloud service that allows computational and data storage resources to be used from edge devices as well as supercomputers, through the HPC network, and Quantum Computers.

OSMWARE: hOlistic Sustainable Management of distributed softWARE systems

PISA, ITALY

Department of Computer Science, University of Pisa — 11/2022 – NOW

- **Project code:** PRA_2022_64
- **Role:** project member.
- **Description:** the project's aim - coordinated by Prof. Antonio Brogi - is to study prototypes and technologies to enable holistic and sustainable management of next-generation distributed software applications, also considering the economic impact.

GIÒ: A Fog Computing Testbed for Research & Education

PISA, ITALY

Department of Computer Science, University of Pisa — 06/2019 – NOW

- **Role:** project member.
- **Description:** the project - coordinated by Prof. Antonio Brogi - aims at studying and experimenting with innovative methodologies and techniques for the realisation of ambient intelligence functions on a departmental Fog network and has already produced prototypes of functions for the monitoring and irrigation of plants and for the self-regulation of the natural illumination of an environment and of a graphic-conversational interface that includes an updated interactive map of the Department.

2.7. Research Products

ECLYPSE

ECLYPSE-ORG/ECLYPSE

Designer and Maintainer — 11/2024 – NOW

- **Related publications:** [M1]
- `ECLYPSE` (Edge-CLoud pYthon Platform for Simulated runtime Environments) is the first simulation library entirely written in Python for experimenting with deployment strategies in varying infrastructure conditions. It provides an interface for experimenting without and with an actual application implementation to be deployed.

dgLBF

DI-UNIPI-SOCC/DGLBF

Designer and Maintainer — 08/2024 – NOW

- **Related publications:** [W1, M3]
- `dgLBF` is a Prolog-based specification of the guaranteed Latency-Based Forwarding (gLBF) approach for path selection and delay configuration. The prototype determines paths and delays to meet data flow latency targets, offering a concise and extensible solution to the considered problem.

EdgeWise

DI-UNIPI-SOCC/EDGEWISE

Designer and Maintainer — 07/2023 – NOW

- **Related publications:** [M2, C7]
- `EdgeWise` is a Prolog open-source prototype for comparing and combining a declarative logic programming methodology with a Mixed Integer Linear Programming approach to determine eligible placements that minimise operational costs and reduce the number of used nodes to contain the amount of data transfers. Its enhanced version `EdgeWiseCR` improves the declarative stage with continuous reasoning, enabling the system to reuse existing placements and reduce unnecessary recomputation and service migrations.

DIPS

DI-UNIPI-SOCC/DIPS

Designer and Maintainer — 06/2023 – NOW

- **Related publications:** [C4, C6, C8]
- `DIPS` (Declarative Intent Provisioning System) is a Prolog tool that exploits a declarative methodology for modelling and processing VNF-based service provisioning intents in a high-level language. Its latest version also allows users to find static syntax conflicts among application operator and infrastructure provider intents.

DAPlacer

DI-UNIPI-SOCC/DAPLACER

Designer and Maintainer — 06/2022 – NOW

- **Related publications:** [C9]
- `DAPlacer` (Data-Aware Placer) is a Prolog tool for designing and proposing an eligible placement and a suitable routing strategy for a given service-oriented application within its data and requirements over a Cloud-IoT infrastructure.

2.8. Supervised Thesis

10/2023 Intent-based networking e piazzamento sostenibile di catene VNF
Tommaso Di Riccio (B.Sc. thesis)

2.9. Events

DAYstributed Homepage

Organiser and Presenter 29/05/2025

DAYstributed is a one-day event on distributed/decentralized systems and related research topics. During the day there will be a series of pitch talks, where each speaker has a few minutes to present and start a discussion on their research topics.

PhD Spotlight: From Study to Research Homepage

Organiser and Presenter 11/11/2024

The event consists of a poster session introducing M.Sc. students to the research carried out by Ph.D. students. These could become starting points for future dissertations or encourage them to continue their academic career with a Ph.D.

2.10. Teaching Experience

A.Y. 24/25	(*20h*) Laboratory 1, Teaching Assistant	B.Sc. course
A.Y. 23/24	(*20h*) Laboratory 1, Teaching Assistant	B.Sc. course
A.Y. 22/23	(*20h*) Advanced Software Engineering, Teaching Assistant	M.Sc. Course
A.Y. 21/22	(*20h*) Cloud & Green Computing, Teaching Assistant	M.Sc. Course
A.Y. 21/22	(*20h*) Laboratory 1, Teaching Assistant	B.Sc. course

3. Talks

3.1. Invited Seminars

08/04/2025 L'Informatica dopo la Laurea: industria, accademia e ricerca
"Incontra Informatica" educational guidance event

25/05/2024 RoboPython - Laboratori di Robotica Educativa
Festival della Robotica 2024

14/10/2023 Declarative Cloud-IoT continuum: Gestire applicazioni, dati e reti con la programmazione logica
"UniPi Orienta" educational guidance event

16/04/2021 Assistenti Personali e Smart Building Applications
"Incontra Informatica" educational guidance event

3.2. Conference Oral Presentations

26/09/2024 [C1] Marginal Cost of Computation as a Collaborative Strategy for Resource Management at the Edge
20th International Conference on the Economics of Grids Clouds, Systems, and Services

27/08/2024 [W1] Towards Declarative Traffic Engineering for Guaranteed Latency-Based Forwarding
2nd International Workshop on Scalable Compute Continuum

06/06/2024 [C3] Towards a Comprehensive Approach to Resource and Conflict Management in Cloud-Edge Settings
33rd International Symposium on High-Performance Parallel and Distributed Computing

06/12/2023 [C5] Towards declarative intent processing and conflict resolution in IBN
16th IEEE/ACM International Conference on Utility and Cloud Computing

06/12/2023 [C6] Sustainable placement of VNF chains in Intent-based Networking
16th IEEE/ACM International Conference on Utility and Cloud Computing

05/07/2023 [C7] Declarative and Linear Programming Approaches to Service Placement, Reconciled
16th IEEE International Conference On Cloud Computing (online)

19/06/2023 [C8] Declarative Provisioning of Virtual Network Function Chains in Intent-based Networks
3rd International Workshop on Intent-Based Networking

29/11/2022 [W3] Data-Aware Application Placement and Management in the Cloud-IoT Continuum
20th International Conference on Service-Oriented Computing

05/07/2022 [C9] Data-Aware Service Placement in the Cloud-IoT Continuum
16th Symposium and Summer School On Service-Oriented Computing

4. Skills

4.1. Language

Italian	**Mother tongue**
English	**C1**

4.2. Digital Skills

VCS	**Advanced** – *Git, GitHub, GitLab*
Containerization	**Advanced** – *Docker, docker-compose, Kubernetes*
Prog. Languages	**Advanced** – *Python, Prolog, LaTeX, Java, C, C++, Javascript*
Python Libraries	**Advanced** – *NetworkX, Ray Pandas, Keras, scikit-learn, Matplotlib, Seaborn, Plotly*

In compliance with the Italian legislative Decree no. 196 dated 30/06/2003, I hereby authorize the recipient to use and process my personal details contained in this document.