Jacopo **Massa**

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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:** *"Data-aware application Placement And Management in the Cloud-IoT continuum"*
- **Advisors:** Antonio Brogi, Patrizio Dazzi, Stefano Forti

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

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

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

Computational Complex and Social Systems
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

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", 2024, *To appear in: "20th International Conference, GECON 2024 Proceedings"*,
Quality (GGS): N.A.

[C2]   **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.

[C3]   **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.

[C4]   **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.

[C5]   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.

[C6]   **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-.

[C7]   **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]   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*, ser. FRAME '24, ACM, 2024, pp. 7–14.
DOI: 10.1145/3659994.3660315,
Quality (GGS): A.

[W2]   **J. Massa**, S. Forti, F. Paganelli, P. Dazzi, and A. Brogi, "Towards declarative traffic engineering for guaranteed latency-based forwarding", 2024, *To appear in: "Euro-Par 2024: Parallel Processing Workshops"*,
Quality (GGS): B.

[W3]   **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.

[W4]   **J. Massa**, "Data-Aware Application Placement and Management in the Cloud-IoT Continuum", in *Service-Oriented Computing – ICSOC 2022 Workshops*, Springer Nature Switzerland, Mar. 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**, S. Forti, P. Dazzi, and A. Brogi, "Data-Aware Declarative Application Management in the Cloud-IoT Continuum", *ERCIM News*, no. 133, Jun. 2023.
URL: `https://ercim-news.ercim.eu/en133/special/data-aware-declarative-application-management-in-the-cloud-iot-continuum`.

2.2. Scientific Conferences Organisation

Participation in the following international scientific conference committees:

Chair

- **AHPC³ 2024**, 1st Workshop on Accelerated HPC in the Cloud edge Continuum

Program committee member

- **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

Web Chair

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

2.3. REVIEWER ACTIVITIES

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

Journal

- **TIOT** – ACM Transactions on Internet of Things
- **Computing**
- **Heliyon**
- **JSS** – Journal of Systems & Software

Conference

- **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

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. RESEARCH PROJECTS

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.

2.6. RESEARCH PRODUCTS

dgLBF
di-unipi-socc/dglbf
DESIGNER AND MAINTAINER *08/20204 – now*

`dgLBF` is a Prolog-based specification of 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 extendable solution to the considered problem.

FEDCLYPSE
eclypse-org/fedclypse
DESIGNER AND MAINTAINER *04/2024 – now*

Previously FedRay, **FEDCLYPSE** is a Python library for researching and developing Federated Learning processes on simulated, dynamic infrastructures. Based on **ECLYPSE** and Ray, it allows easy prototyping, seamless scalability, and process parallelisation.

ECLYPSE
eclypse-org/eclypse
DESIGNER AND MAINTAINER *11/2023 – now*

`ECLYPSE` (Edge-CLoud telemetrY 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.

EdgeWise
di-unipi-socc/edgewise
DESIGNER AND MAINTAINER *07/2023 – now*

`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.

DIPS
di-unipi-socc/dips
DESIGNER AND MAINTAINER *06/2023 – now*

`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. In its latest version, it 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*

`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.

2.7. SUPERVISED THESIS

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

2.8. 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

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 [W2] Towards declarative traffic engineering for guaranteed latency-based forwarding
2nd International Workshop on Scalable Compute Continuum

06/06/2024 [C2] 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 [C4] Towards declarative intent processing and conflict resolution in IBN
16th IEEE/ACM International Conference on Utility and Cloud Computing

06/12/2023 [C5] Sustainable placement of VNF chains in Intent-based Networking
16th IEEE/ACM International Conference on Utility and Cloud Computing

05/07/2023 [C6] Declarative and Linear Programming Approaches to Service Placement, Reconciled
16th IEEE International Conference On Cloud Computing (online)

19/06/2023 [W3] Declarative Provisioning of Virtual Network Function Chains in Intent-based Networks
3rd International Workshop on Intent-Based Networking

29/11/2022 [W4] Data-Aware Application Placement and Management in the Cloud-IoT Continuum
20th International Conference on Service-Oriented Computing

05/07/2022 [C7] 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*
Programming Languages	**Advanced** – *Python, Prolog, LaTeX, Java, C, C++, Javascript*
Python Libraries	**Advanced** – *NetworkX, Pandas, Keras, scikit-learn, Matplotlib, Seaborn, Plotly, Ray*

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