



Maël Madon

Researcher in Computer Science

About Me

Pluridisciplinary researcher with interest in studying the environmental impact of computing. I use both quantitative (simulation, data analysis) and qualitative (interview, thematic analysis) methods.

Contact

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Address

Heinrichstrasse 68/3
8010 Graz, Austria

Skills

Leadership, teamwork,
quick learner,
autonomous

Programming

C++, Python, Pandas,
PHP/HTML/CSS/SQL
Linux, Git, VSCode

Research impact

7 publications
h-index: 5 (G.Scholar)

Languages

French (native)
English (C2)
Swedish (B2)
Spanish (B2)
German (B1)

Interests

Green IT
Sustainability
Open Source
Reproducibility

Hobbies

Climbing, hiking,
caving, motorbiking
and choir singing

Education

2024, PhD in Computer Science

Université de Toulouse (Toulouse, FRANCE), IRIT laboratory

2021, M.Eng. in Computer Science

KTH Royal Institute of Technology (Stockholm, SWEDEN)

2021, École Polytechnique's diploma

École Polytechnique (Paris, FRANCE)

France's leading school of Science and Engineering

Research Experience

Apr21 - Jun24, PhD Thesis

Université de Toulouse (Toulouse, FRANCE), IRIT laboratory

Thesis title: “Digital Sufficiency in Data Centers: Studying the Impact of User Behaviors”

Supervisors: Georges Da Costa and Jean-Marc Pierson

Main outcomes:

- Development of the HPC user simulator Batmen (LGPLv3) in C++.
- In-depth study of how to correctly model user behavior when evaluating the performance of distributed systems [J1].
- Simulation and experimental characterization of the potential of digital sufficiency behaviors to decrease environmental impact [C4].
- Interdisciplinary social science study of digital sufficiency in the cloud [C3], during a research visit at the [Vrije Universiteit Amsterdam](#) (Prof. Patricia Lago) between October and December 2022.

Other collaborations:

- Active participation in the state-funded research project Datazero2 studying renewably-powered data centers.
- Qualitative study to identify “dark patterns” in cloud and edge [C5].
- Experimental validation of MPI malleability under realistic HPC conditions [U1].
- Coordination of a think tank of Labo1point5 to reflect upon Computer Science sustainably responsible research agendas.

Sep20 - Mar21, Master's Thesis

Ericsson (Stockholm, SWEDEN)

Developing a parameterized embodied emissions calculator for telecommunication base stations, based on Life Cycle Assessment results.

Supervisors: Daniel Pargman (KTH) and Pernilla Bergmark (Ericsson)

Apr - Jul19, Research Intern

Université de Toulouse (Toulouse, FRANCE), IRIT laboratory

Studying pre-cooling of a data center powered by renewable energies [C6]

Supervisor: Jean-Marc Pierson



Teaching and Supervision

Sep21 - Jun24, PhD student teaching assistant

Université de Toulouse (Toulouse, FRANCE)

Workload of 64h/year for three years

Conception and implementation of a 5-session lab (CC-BY-NC-SA) for the course **Resource Management for Embedded Systems**

Master courses taught: **Parallelism** (lab works in MPI), **Collaborative Development** (lab works in Git)

Undergraduate courses taught: **Algorithmic** (practical works in Python), **Programming in C** (practical work in C), **Networking and Systems** (practical work in C), **Basics of Computer Architecture and System** (exercises and practical works in shell)

Supervision

- Ambre Liabat, n7 Toulouse (Jun-Jul24): extension of a simulation campaign and creation of Batmen documentation.
- Jolyne Gatt, ENS Lyon (Feb-Jul23): energy-aware user behavior to deal with intermittent energy sources in data center [C1].
- Maliha Nawshin Rahman, VU Amsterdam (Feb-Jul23): digital sufficiency of cloud usage in flexible work [C2].

Collective responsibilities

2024, ICT4S'24 conference in Stockholm

Member of the organizing committee as Sponsorship Chair

Member of the program committee as reviewer

2021 - 2024, Ecological Transition Mission of IRIT lab

Member of the board (time spent: approx. 2h/week)

Funding and awards

2021 - 2024, AMX Doctoral Grant

Full three-year PhD funding from École Polytechnique

Extracurricular activities

Jul24 - Aug25, Gap Year

40-day alpine crossing on foot

Backpacking and volunteering in South America

2017 - now, Member of a choir

2017-19 Ensemble vocal de l'Ecole polytechnique (Paris)

2019-21 Kongl. Teknologkören (Stockholm)

2021-24 Co-funder of Södersken choir, member of Archipels (Toulouse)

2025-now Grazer Universitätschor (Graz)

2017 - now, caving

2017-19 President of the Ecole polytechnique caving club (Paris)

2021-25 Member of S3C (Toulouse)

2025-now Member of Höhlenbären (Graz)

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List of publications

Peer-reviewed journals

- [J1] Maël Madon, Georges Da Costa, and Jean-Marc Pierson. "Replay with Feedback: How Does the Performance of HPC System Impact User Submission Behavior?" In: *Future Generation Computer Systems* 155 (Jan. 2024), pp. 66–79. ISSN: 0167-739X. DOI: 10.1016/j.future.2024.01.024.

Peer-reviewed conferences and workshops

- [C1] Jolyne Gatt, Maël Madon, and Georges Da Costa. "Digital Sufficiency Behaviors to Deal with Intermittent Energy Sources in a Data Center". In: *ICT4S 2024: International Conference on ICT for Sustainability*. Stockholm, Sweden, June 2024. DOI: 10.1109/ICT4S64576.2024.00015.
- [C2] Maliha Nawshin Rahman, Maël Madon, and Patricia Lago. "Sufficient Use of the Cloud for Work: Practitioners' Perception and Potential for Energy Saving". In: *ICT4S 2024: International Conference on ICT for Sustainability*. Stockholm, Sweden, June 2024. DOI: 10.1109/ICT4S64576.2024.00038.
- [C3] Maël Madon and Patricia Lago. ""We Are Always on, Is That Really Necessary?" Exploring the Path to Digital Sufficiency in Flexible Work". In: *ICT4S 2023: International Conference on ICT for Sustainability*. Rennes, France: IEEE, June 2023, p. 11. DOI: 10.1109/ICT4S58814.2023.00012.
- [C4] Maël Madon, Georges Da Costa, and Jean-Marc Pierson. "Characterization of Different User Behaviors for Demand Response in Data Centers". In: *Euro-Par 2022: Parallel Processing*. Ed. by José Cano and Phil Trinder. Lecture Notes in Computer Science. Cham: Springer International Publishing, Aug. 2022, pp. 53–68. ISBN: 978-3-031-12597-3. DOI: 10.1007/978-3-031-12597-3_4.
- [C5] Klervie Toczé, Maël Madon, Muriel Garcia, and Patricia Lago. "The Dark Side of Cloud and Edge Computing: An Exploratory Study". In: *Computing within Limits*. LIMITS, June 2022. DOI: 10.21428/bf6fb269.9422c084.
- [C6] Maël Madon and Jean-Marc Pierson. "Integrating Pre-Cooling of Data Center Operated with Renewable Energies". In: *2020 IEEE Green Computing and Communications (GreenCom)*. Rhodos, 2020, p. 10. DOI: 10.1109/iThings-GreenCom-CPSCom-SmartData-Cybermatics50389.2020.00068.

Under review

- [U1] Sergio Iserte, Maël Madon, Georges Da Costa, Jean-Marc Pierson, and Antonio J. Pena. "MPI Malleability Validation under Replayed Real-World HPC Conditions". In: *Future Generation Computer Systems* (2025). Submitted.

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