

Davide Domini | PhD Student

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ACADEMIC OVERVIEW

Profile	PhD Student at the University of Bologna
Position	PhD Student on public grant , University of Bologna, November 2023–November 2026. See Research Positions .
Research record	22 publications : 7 journal articles, 9 conference papers, 2 workshop papers, and 4 preprints. H-index 7 with 113 citations on Google Scholar; h-index 5 with 74 citations on Scopus (as of August 19, 2026). See Publications . Program Chair of AI4AS 2026. See Conference Service
Teaching	300+ tutoring hours ; 5 supervised theses ; See Teaching and Supervision .
Software	Designer of Phyelds and ScaRLib. See Research Software .
Mobility	Three-month visiting PhD period at Trinity College Dublin, hosted by Prof. Ivana Dusparic. See International Experience .

RESEARCH POSITIONS

2023–2026

Period	November 2023 — November 2026
Position	PhD Student
Institution	Alma Mater Studiorum — University of Bologna, Cesena
Supervisor	Prof. Mirko Viroli, Prof. Danilo Pianini and Prof. Matteo Ferrara
Description	Publicly funded PhD position on the topic of “Engineering Many-Agent Cooperative Learning in Collective Adaptive Systems”.

RESEARCH THEMES

My research lies at the intersection of *collective adaptive systems engineering* and *machine learning*, with a particular focus on engineering cooperative learning in large-scale distributed and many-agent systems. Rather than treating learning as an isolated algorithmic component, I investigate how learning, coordination, and deployment can be designed together so that autonomous devices can cooperate through local interactions, learn from distributed data, and adapt to heterogeneity, mobility, failures, and resource constraints. My work contributes to three main research areas:

- **Programming Frameworks and Experimental Infrastructures for Collective Learning**: In this research area, I develop programming abstractions, software frameworks, and experimental methodologies for engineering learning-enabled collective systems. I designed ScaRLib, a framework for cooperative many-agent deep reinforcement learning in Scala [16], subsequently extended into a hybrid toolchain connecting aggregate computing and multi-agent reinforcement learning [7]. To support reproducible and

scalable experimentation, I proposed a reusable simulation pipeline that separates learning algorithms, distributed execution, and simulation environments [15]. More recently, I contributed to Phydels, a Pythonic framework for aggregate computing designed to integrate field-based coordination with the broader Python machine-learning ecosystem [8]. These tools make it possible to express collective learning processes from a global perspective while retaining decentralized execution, and have been applied to federated learning, many-agent reinforcement learning, Internet-of-Things systems, and self-organizing robotic collectives.

- **Self-Organizing Federated Learning under Heterogeneous and Evolving Data:** This area constitutes a central part of my research and investigates how distributed devices can autonomously determine *with whom* they should learn, without relying on raw-data sharing, fixed federations, or permanent central coordinators. Starting from field-based coordination mechanisms for federated learning [13] and [1], I developed proximity-based self-federated learning approaches in which learning federations emerge from local interactions among spatially related devices [14]. I subsequently introduced decentralized proximity-aware clustering mechanisms that allow devices to form multiple specialized learning regions according to both network structure and data similarity [6]. This line of work was further developed through ProFed, a benchmark specifically designed to evaluate proximity-based federated learning under spatially structured heterogeneity [2]. More recent work extends these approaches by discovering collaboration opportunities from model novelty, combining clustered federated learning with continual learning to address mobility-induced temporal drift, and integrating neural-network sparsification into the self-organization process. Collectively, these contributions frame federated learning as an adaptive collective behavior in which both the learned models and the collaboration structure evolve over time.
- **Scalable Decentralized Reinforcement Learning:** Building on the principles of locality and collective coordination developed through macroprogramming, I investigate reinforcement-learning methodologies that remain effective as the number of interacting agents increases. In particular, I proposed neighbor-based decentralized training strategies in which agents learn through interactions with limited local neighborhoods rather than requiring complete system knowledge [12]. I also studied the use of graph neural networks to represent collective state and support policies that can operate across swarms of different sizes, evaluating how far learned coordination behaviors can scale beyond the configurations encountered during training [5]. Related work applies heterogeneous graph neural networks and deep reinforcement learning to collective task-offloading decisions across cloud–edge infrastructures [4]. This research investigates the trade-offs among centralized, independent, and neighborhood-based learning, with the broader objective of enabling policies that rely only on local observations while remaining robust to variable population sizes, changing interaction graphs, and large-scale deployment.

Bibliometrics H-index 7 with 113 citations on Google Scholar; h-index 5 with 74 citations on Scopus (as of August 19, 2026).

SCHOLARSHIPS AND GRANTS

Research Grants

2025 **Gemma 3 Research Award (Google)** — USD 20,000. Credits supported research on field-based federated learning in collective adaptive systems [6, 2] and [8].

Doctoral Scholarship

- 2023–2026 **Computer Science and Engineering PhD Scholarship.** *Issuer:* University of Bologna, under the national framework of the Italian Ministry of University and Research (MUR). This full scholarship covered all three years of my PhD at Alma Mater Studiorum — University of Bologna and was awarded through the corresponding public competition based on qualifications and interview.

Mobility and Travel Grants

- 2025 **SpaceRaise 2025.** Competitive travel support provided by Gran Sasso Science Institute for participation in the SpaceRaise Summer School in L'Aquila, Italy.
- 2025 **ACM Grant — SAC 2025.** Competitive travel support provided by ACM for participation in the 40th ACM/SIGAPP Symposium on Applied Computing in Catania, Italy, where I presented *Neighbor-based decentralized training strategies for multi-agent reinforcement learning* [12].
- 2024 **IFIP Student Travel Grant — DisCoTec 2024.** Competitive travel support provided by the International Federation for Information Processing (IFIP) for participation in DisCoTec/COORDINATION 2024 in Groningen, the Netherlands, where I presented *Field-based coordination for federated learning* [13].
- 2023 **Mobility Grant — Marco Polo Programme.** *Issuer:* Department of Computer Science and Engineering (DISI), University of Bologna. This selective grant, awarded through a public call, supported my three-month visiting PhD period at Trinity College Dublin, Ireland, hosted by Prof. Ivana Dusparic.

PEER-REVIEWED PUBLICATIONS AND BIBLIOMETRICS

Bibliometrics

- **H-index:** 7 (Google Scholar), 5 (Scopus), as of August 19, 2026.
- **Number of citations:** 113 (Google Scholar), 74 (Scopus), as of August 19, 2026.
- **Number of publications:** 22 (7 journal articles, 9 conference papers, 2 workshop papers, 4 preprints).
- **Number of journal publications:** 7.
 - Number of  journal publications: 4.
 - Number of  journal publications: 2.
 - Number of  journal publications: 1.

Note: Quartiles are based on SCImago Journal & Country Rank (SJR), taking the journal's best quartile across all subject categories (Q1 being the highest). For each published article, I report the best quartile attained by the journal in either the calendar year preceding publication, used as a proxy for the review period, or the publication year. If the publication-year SJR data are not yet available, I use the latest available data; for accepted or in-press articles not yet published, I use the journal's latest available quartile. Quartiles were last checked on 19 August 2026.

Journal Articles

- [1] Davide Domini, Gianluca Aguzzi, Lukas Esterle, and Mirko Viroli. FBFL: A field-based coordination approach for data heterogeneity in federated learning. *Logical Methods in Computer Science*, 22, 2026. .
- [2] Davide Domini, Christian Otte Ingemann, Gianluca Aguzzi, Lukas Esterle, and Mirko Viroli. ProFed: a benchmark for proximity-based non-IID federated learning. *Journal of Open Research Software*, 14(1):13–13, 2026. .
- [3] Davide Domini, Leonardo Micelli, Samuele Burattini, and Sara Montagna. Digital twin ag-

gregates for adaptive mlops retraining policies in healthcare. *Future Generation Computer Systems*, 185, 2026. [Q1](#).

- [4] Nicolas Farabegoli, Davide Domini, Gianluca Aguzzi, and Mirko Viroli. Heterogeneous GNN for collective-task offloading in cloud-edge via deep Q-learning. *Future Generation Computer Systems*, page 108539, 2026. [Q1](#).
- [5] Gianluca Aguzzi, Davide Domini, Filippo Venturini, and Mirko Viroli. Scaling swarm coordination with gnns—how far can we go? *AI*, page 282, 2025. [Q1](#).
- [6] Davide Domini, Nicolas Farabegoli, Gianluca Aguzzi, Mirko Viroli, and Lukas Esterle. Decentralized proximity-aware clustering for collective self-federated learning. *Internet of Things*, page 101841, 2025. [Q1](#).
- [7] Davide Domini, Filippo Cavallari, Gianluca Aguzzi, and Mirko Viroli. ScaRLib: Towards a hybrid toolchain for aggregate computing and many-agent reinforcement learning. *Science of Computer Programming*, 238:103176, 2024. [Q2](#).

Conference Papers

- [8] Gianluca Aguzzi, Davide Domini, Nicolas Farabegoli, and Mirko Viroli. Phyelds: A Pythonic framework for aggregate computing. In *International Conference on Coordination Models and Languages*, pages 174–191. Springer, Cham, 2026. [C](#).
- [9] Manuel Andruccioli, Angela Cortecchia, Davide Domini, Nicolas Farabegoli, Giovanni Delnevo, Danilo Pianini, Riccardo Venanzi, and Mirko Viroli. Harmonikt: a unifying middleware for heterogeneous robot fleets. In *2026 IEEE 23rd Consumer Communications & Networking Conference (CCNC)*, pages 1–6. IEEE, 2026. [B](#).
- [10] Gianluca Aguzzi, Lorenzo Bacchini, Martina Baiardi, Roberto Casadei, Angela Cortecchia, Davide Domini, Nicolas Farabegoli, Danilo Pianini, and Mirko Viroli. A demonstrator for self-organizing robot teams. In *International Conference on Coordination Models and Languages*, pages 230–244. Springer Nature Switzerland Cham, 2025. [C](#).
- [11] Davide Domini, Laura Erhan, Gianluca Aguzzi, Lucia Cavallaro, Amirhossein Douzandeh Zenoozi, Antonio Liotta, and Mirko Viroli. Sparse self-federated learning for energy efficient cooperative intelligence in Society 5.0. In *2025 International Joint Conference on Neural Networks (IJCNN)*, pages 1–8. IEEE, 2025. [B](#).
- [12] Nicolò Malucelli, Davide Domini, Gianluca Aguzzi, and Mirko Viroli. Neighbor-based decentralized training strategies for multi-agent reinforcement learning. In *Proceedings of the 40th ACM/SIGAPP Symposium on Applied Computing*, pages 1250–1257, 2025. *International*.
- [13] Davide Domini, Gianluca Aguzzi, Lukas Esterle, and Mirko Viroli. Field-based coordination for federated learning. In *International Conference on Coordination Models and Languages*, pages 56–74. Springer Nature Switzerland Cham, 2024. [C](#).
- [14] Davide Domini, Gianluca Aguzzi, Nicolas Farabegoli, Mirko Viroli, and Lukas Esterle. Proximity-based self-federated learning. In *2024 IEEE International Conference on Autonomous Computing and Self-Organizing Systems (ACSOS)*, pages 139–144. IEEE, 2024. *International*.
- [15] Davide Domini, Gianluca Aguzzi, Danilo Pianini, and Mirko Viroli. A reusable simulation pipeline for many-agent reinforcement learning. In *2024 28th International Symposium on Distributed Simulation and Real Time Applications (DS-RT)*, pages 83–90. IEEE, 2024. [C](#).

- [16] Davide Domini, Filippo Cavallari, Gianluca Aguzzi, and Mirko Viroli. ScaRLib: a framework for cooperative many-agent deep reinforcement learning in Scala. In *International Conference on Coordination Languages and Models*, pages 52–70. Springer Nature Switzerland Cham, 2023. .

Workshop Papers

- [17] Davide Domini. Towards self-adaptive cooperative learning in collective systems. In *IEEE International Conference on Autonomic Computing and Self-Organizing Systems, ACSOS 2024 - Companion, Aarhus, Denmark, September 16-20, 2024*, pages 158–160. IEEE, 2024.
- [18] Davide Domini, Nicolas Farabegoli, Gianluca Aguzzi, and Mirko Viroli. Towards intelligent pulverized systems: a modern approach for edge-cloud services. In *WOA*, pages 233–251, 2024.

Preprints

- [19] Angela Cortecchia, Davide Domini, Giovanni Ciatto, Roberto Casadei, Danilo Pianini, and Mirko Viroli. Flexible distributed particle filtering for the internet of things via aggregate computing. In *ArXiv preprint*, 2026.
- [20] Davide Domini, Gianluca Aguzzi, Ivana Dusparic, Danilo Pianini, and Mirko Viroli. Discovering collaboration from novelty: Random network distillation for clustered federated learning. In *ArXiv preprint*, 2026.
- [21] Davide Domini, Gianluca Aguzzi, Lorenzo Pellegrini, Mirko Viroli, and Lukas Esterle. C2fl: Clustered continual federated learning under spatial and temporal drift. In *ArXiv preprint*, 2026.
- [22] Davide Domini, Gianluca Aguzzi, Amirhossein Douzandeh Zenoozi, Laura Erhan, Lucia Cavallaro, Antonio Liotta, and Mirko Viroli. Sparseful: Self-organizing sparse federated learning over spatially non-iid data. In *ArXiv preprint*, 2026.

RESEARCH SOFTWARE

2025 – present	Phyelds, Designer Python framework for aggregate computing. [8] https://github.com/phyelds/phyelds
2023 – present	ScaRLib, Designer Framework for cooperative many-agent deep reinforcement learning in Scala [7]. https://github.com/ScaRLib-group/ScaRLib

Teaching and Supervision

TEACHING

Courses

Summary	121 documented course hours through 2026, across degree courses at the University of Bologna and partners.
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2026

Course	Software Engineering
Role	Teaching Tutor
Hours	40
Audience	Master's Degree Programme in Digital Transformation Management (English), University of Bologna
Course	Fundamentals of Computer Science
Role	Teaching Tutor
Hours	20
Audience	Bachelor's Degree Programmes in Biomedical Engineering and Electronics Engineering, University of Bologna
Course	Relational Database Systems
Role	Teacher
Hours	30
Audience	FITSTIC ITS Academy
Course	Generative Artificial Intelligence
Role	Teacher
Hours	31
Audience	Formart

2025

Course	Software Engineering
Role	Teaching Tutor
Hours	40
Audience	Master's Degree Programme in Digital Transformation Management (English), University of Bologna
Course	Fundamentals of Computer Science
Role	Teaching Tutor
Hours	20
Audience	Bachelor's Degree Programmes in Biomedical Engineering and Electronics Engineering, University of Bologna
Course	Relational Database Systems
Role	Teacher
Hours	30
Audience	FITSTIC ITS Academy
Course	Generative Artificial Intelligence
Role	Teacher
Hours	15
Audience	Formart

2024

Course	Software Engineering
Role	Teaching Tutor

Hours 40
Audience Master's Degree Programme in Digital Transformation Management (English), University of Bologna
Course Relational Database Systems
Role Teacher
Hours 30
Audience FITSTIC ITS Academy

2023

Course Software Engineering
Role Teaching Tutor
Hours 40
Audience Master's Degree Programme in Digital Transformation Management (English), University of Bologna
Course Big Data, Data Mining and Data Analytics Workshop Classes
Role Teaching Tutor
Hours 32
Audience Bachelor's Degree Programme in Computer Science and Engineering, University of Bologna
Course Machine Learning Systems for Data Science
Role Teaching Tutor
Hours 20
Audience Bachelor's Degree Programme in Statistical Science, University of Bologna
Course Relational Database Systems
Role Teacher
Hours 30
Audience FITSTIC ITS Academy

2022

Course Machine Learning Systems for Data Science
Role Teaching Tutor
Hours 10
Audience Bachelor's Degree Programme in Statistical Science, University of Bologna
Course Digital Design Principles and Computer Architecture
Role Teaching Tutor
Hours 50
Audience Bachelor's Degree Programmes in Biomedical Engineering and Electronics Engineering, University of Bologna
Course Fundamentals of Computer Science
Role Teaching Tutor
Hours 10
Audience Bachelor's Degree Programme in Statistical Science, University of Bologna

Thesis (Co-) Supervision

Summary	5 supervised theses: 4 Master's and 1 Bachelor's. Several led to peer-reviewed publications co-authored with the student, marked below.
Source	Verifiable on the University of Bologna thesis repository: AMSLaurea
2026	
	Master's theses
F. Gaeta	Observability through a telemetry framework for distributed web apps: error and performance monitoring for Technogym Mywellness CRM
2024	
	Master's theses
N. Malucelli	Neighboring-based Strategies for Multi-Agent Reinforcement Learning [12]
F. Venturini	Multi-Agent Reinforcement Learning of Swarm Behaviours with Graph Neural Networks: prototype and first experiments [5]
F. Cavallari	ScaRLib: integrating VMAS for GPU accelerated simulations
	Bachelor's theses
L. Bacchini	Sviluppo di un sistema di visione artificiale per la rilevazione e localizzazione di marker ArUco in un contesto di aggregate computing [10]

Research Activity

RESEARCH COMMUNITY SERVICE AND DISSEMINATION

Conference Service

Legend	Venue and role acronyms are expanded once under <i>Abbreviations</i> , at the end of this section.
2026	ACSOS (Social Experience Chair) · AI4AS (Program Chair)
2025	AAAI (PC) · ACSOS (PC) · ECOOP (AEC) · ICDCSW (PC) · WOA (PC) · SAC (PC) · iFM (AEC)

Review Activity

Journals	9 venues.	
	● AMC Transaction on Internet Technology	● Elsevier Computer Networks
	● ACM Transactions on Autonomous and Adaptive Systems	● Discover Computing, Springer Nature
	● Future Generation Computer Systems	● Autonomous Agents and Multi-Agent Systems, Springer Nature
	● Pervasive and Mobile Computing	● Scientific Reports, Springer Nature
	● Elsevier Internet of Things	
Conferences and workshops	11 venues.	
	● COORDINATION (2024–2026)	● IJCNN (2025)
	● ACSOS (2024–2026)	● SAC (2025)
	● WCCI (2026)	● AAMAS (2024)
	● AAAI (2025)	● DSRT (2024)
	● ICAART (2025)	● WOA (2024)
	● ICDCSW (2025)	

International Experience

August– November 2025 **Visiting PhD Researcher**, *Trinity College Dublin*, Ireland
Host: Prof. Ivana Dusparic.

Presentations at International Conferences

- 2025 **SAC**: *Neighbor-based decentralized training strategies for multi-agent reinforcement learning* [12].
- 2025 **IJCNN**: *Sparse self-federated learning for energy efficient cooperative intelligence in Society 5.0* [11].
- 2024 **DSRT**: *A reusable simulation pipeline for many-agent reinforcement learning* [15].
- 2024 **COORDINATION**: *Field-based coordination for federated learning* [13].
- 2024 **ACSOS**: *Proximity-based self-federated learning* [14].
- 2024 **ACSOS Doctoral Symposium**: *Towards Self-Adaptive Cooperative Learning in Collective Systems* [17].
- 2024 **WOA**: *Towards intelligent pulverized systems: a modern approach for edge-cloud services* [18].

Talks

- 2026 **Three-Minute Thesis Competition**, one of the ten PhD finalists from across the University of Bologna
- 2026 **PhD Doctoral Symposium** — University of Bologna
- 2025 **SIESTA Summer School** — Università della Svizzera Italiana

PhD Schools

- 2025 SIESTA (Lugano, Switzerland)
- 2025 SpaceRaise (L'Aquila, Italy)
- 2024 Bertinoro International Spring School (Bertinoro, Italy)

Abbreviations

Roles	PC — Program Committee · AEC — Artifact Evaluation Committee
Conferences	AAAI — AAAI Conference on Artificial Intelligence · ACSOS — IEEE International Conference on Autonomic Computing and Self-Organizing Systems · COORDINATION — International Conference on Coordination Models and Languages · DisCoTec — International Federated Conference on Distributed Computing Techniques · ECOOP — European Conference on Object-Oriented Programming · SAC — ACM/SIGAPP Symposium on Applied Computing · ICDCSW — International Conference on Distributed Computing Systems Workshops · iFM — International Conference on Formal Methods in Software Engineering · WCCI — IEEE World Congress on Computational Intelligence · ICAART — International Conference on Agents and Artificial Intelligence · IJCNN — International Joint Conference on Neural Networks · DSRT — International Symposium on Distributed Simulation and Real Time Applications · AAMAS — International Conference on Autonomous Agents and Multi-Agents Systems
Workshops	AI4AS — Artificial Intelligence for Autonomous Computing Systems (at ACSOS) · WoA — Workshop “From Objects to Agents”

PARTICIPATION AND COLLABORATION IN RESEARCH GROUPS

- Participation in the research activity of the group coordinated by **Prof. Mirko Viroli** (University of Bologna, Italy), notably including **Prof. Roberto Casadei** and **Prof. Danilo Pianini**. This is the research group with which I have collaborated most extensively, on aggregate computing, macroprogramming, collective adaptive systems,

cyber-physical swarms, and cooperative learning.

- Collaboration with **Prof. Ivana Dusparic** (Trinity College Dublin, Ireland) on scalable and distributed reinforcement learning and novelty driven transfer learning.
- Collaboration with **Prof. Lukas Esterle** (Aarhus University, Denmark) on distributed collective intelligence and decentralised federated learning.
- Collaboration with **Prof. Sara Montagna** (University of Urbino Carlo Bo, Italy) on federated learning and digital twin aggregates for smart healthcare.
- Collaboration with the research group of **Prof. Antonio Liotta** (University of Bozen, Italy), notably including **Dr. Laura Eهران** (University of Bozen, Italy) and **Dr. Lucia Cavallaro** (Radboud University, The Netherlands), in the context of the COMMON-WEARS project. The work addressed the role of sparsification in neural networks for distributed federated learning.
- Collaboration with **Dr Riccardo Venanzi** and **Dr Giovanni Delnevo** (University of Bologna, Italy), notably including Manuel Andruccioli, Angela Cortecchia and Nicolas Farabegoli on middlewares for robot swarms.

PARTICIPATION IN RESEARCH PROJECTS

- 2023–2025 **COMMONS-WEARS (PRIN)**. Research on community-oriented wearable computing, collective systems, and machine learning for healthcare and emergency response. Principal contributions addressed federated learning for decentralised, large-scale applications [13, 14, 11] and [6, 1].

THIRD MISSION AND PUBLIC ENGAGEMENT

- 2026 **Presentation at UniJunior: “Collective Intelligence: From Nature to Robots”**
Outreach lesson for children aged 11–13 on collective intelligence, swarm robotics, and cooperation in robot groups, inspired by collective behaviours in nature. <https://www.unijunior.it/calendario/campus-di-cesena-romagna/lintelligenza-collettiva-dalla-natura-ai-robot-cesena>
- 2025 **Presenting Project Emerge at Researchers’ Night**
Demonstrated Project Emerge, an open-source swarm-robotics platform, to the general public. <https://experiment.com/projects/project-emerge-an-open-source-swarm-robotics-platform>
- 2024 **Presenting Aggregate Computing at Researchers’ Night**
Presented aggregate computing with physical robots, highlighting the potential of the paradigm.

Background and Skills

EDUCATION

- 2023–ongoing **PhD in CS & Software Engineering**, *UniBO*, Cesena
Supervisor: Prof. M. Viroli.
- 2021–2023 **Master’s in CS & Software Engineering**, *UniBO*, Cesena, 110/110 cum laude
Focus: distributed systems, aggregate computing, and MARL.
Thesis: *Aggregate Computing and Many-Agent Reinforcement Learning: Towards a Hybrid Toolchain*.
- 2018–2021 **Bachelor’s in CS & Software Engineering**, *UniBO*, Cesena, 109/110
Thesis: *Classification of chest x-ray for Covid-19 diagnosis with Convolutional Neural Networks and Vision Transformer*.

SPOKEN LANGUAGES

Italian	C2 native speaker
English	C1 advanced
Spanish	B1 intermediate

TECHNICAL SKILLS

How to read the scale **1:** used once or basic exposure; **2:** limited practical experience; **3:** regular working knowledge; **4:** able to give a seminar on the subject; **5:** able to write a book on the subject.

Programming Languages

Bash	●●●●●	Haskell	●●●●●	Python	●●●●●
C	●●●●●	Java	●●●●●	Prolog	●●●●●
C++	●●●●●	JavaScript	●●●●●	Scala	●●●●●
C#	●●●●●	Kotlin	●●●●●	TypeScript	●●●●●

Markup and Data Languages

CSS	●●●●●	Markdown	●●●●●	SQL	●●●●●
HTML	●●●●●	OWL	●●●●●	Typst	●●●●●
JSON	●●●●●	RDF	●●●●●	XML	●●●●●
LaTeX	●●●●●	SPARQL	●●●●●	YAML	●●●●●

Libraries and Frameworks

Akka	●●●●●	NetworkX	●●●●●	Scala Native	●●●●●
Astro	●●●●●	NumPy	●●●●●	ScalaTest	●●●●●
Cats	●●●●●	Pandas	●●●●●	scikit-learn	●●●●●
Gymnasium	●●●●●	PettingZoo	●●●●●	SciPy	●●●●●
Jetpack Compose	●●●●●	Plotly	●●●●●	Seaborn	●●●●●
Kotlin Multiplatform	●●●●●	pytest	●●●●●	TensorFlow	●●●●●
Matplotlib	●●●●●	PyTorch	●●●●●	TorchRL	●●●●●
Monix	●●●●●	PyTorch Geometric	●●●●●	VMAS	●●●●●
Mockito	●●●●●	React	●●●●●	Vue	●●●●●
MUnit	●●●●●	Scala.js	●●●●●	ZIO	●●●●●

LLM and RAG Tools

ChromaDB	●●●●●	LangChain4j	●●●●●	Google Gen AI SDK	●●●●●
Hugging Face	●●●●●	llama.cpp	●●●●●	OpenAI SDK	●●●●●
LangChain	●●●●●	Ollama	●●●●●		

Development Tools and Platforms

Claude Code	●●●●●	IntelliJ IDEA	●●●●●	PyCharm	●●●●●
Codex	●●●●●	Jupyter	●●●●●	Python venv	●●●●●
Docker	●●●●●	Linux	●●●●●	Qwen CLI	●●●●●
Docker Compose	●●●●●	Maven	●●●●●	sbt	●●●●●
Gemini CLI	●●●●●	Node.js	●●●●●	SLURM	●●●●●
Git	●●●●●	npm	●●●●●	SSH	●●●●●
GitHub Actions	●●●●●	OpenCode	●●●●●	uv	●●●●●
Gradle	●●●●●	pip	●●●●●	VS Code	●●●●●
Hugo	●●●●●	Poetry	●●●●●		

Creative and Communication Tools

Blender	●●●●●	draw.io	●●●●●	Inkscape	●●●●●
Canva	●●●●●	GIMP	●●●●●		

References and Declarations

REFEREES

- M. Viroli Prof. Mirko Viroli, Full Professor, Department of Computer Science and Engineering (DISI), Alma Mater Studiorum — Università di Bologna.
Prof. Viroli was my Master's thesis and PhD advisor.
- D. Pianini Prof. Danilo Pianini, Associate Professor, Department of Computer Science and Engineering (DISI), Alma Mater Studiorum — Università di Bologna.
Prof. Pianini has been my PhD co-supervisor.
- R. Casadei Prof. Roberto Casadei, Senior Assistant Professor, Department of Computer Science and Engineering (DISI), Alma Mater Studiorum — Università di Bologna.

Further Referees from Academia

Further referees for my academic profile include:

- Prof. Ivana Dusparic — Trinity College Dublin, Ireland
- Prof. Lukas Esterle — Aarhus University, Denmark
- Prof. Sara Montagna — University of Urbino Carlo Bo, Italy
- Prof. Alessandro Papadopoulos — Mälardalen University, Sweden
- Prof. Giovanni Ciatto — Alma Mater Studiorum, Università di Bologna, Italy
- Prof. Andrea Omicini — Alma Mater Studiorum, Università di Bologna, Italy
- Prof. Alessandro Ricci — Alma Mater Studiorum, Università di Bologna, Italy
- Prof. Antonio Liotta — Free University of Bozen-Bolzano, Italy
- Prof. Lucia Cavallaro — Radboud University, the Netherlands