Roberto Casadei, PhD

CV (2023–10–28) *Assistant Professor*

Overview (highlights)

Current position: **Tenure-Track Assistant Professor (RTD-B)** 2023/10 → 2026/09 (est.)
Theme Informatics — Università di Bologna (IT)

Education: **PhD in Computer Science and Engineering** 2016/11 → 2020/04
Thesis Engineering Self-* Collective Processes for Cyber-Physical Ecosystems — Università di Bologna (IT)

Research record & recent service:

Bibliometrics: 56+ in journals/conf.proceedings; H-index 18 (gscholar), 10 pubs in SCImago Q1 journals
Organisation: Workshop Chair of ASMECC'23, DISCOLI'22/23, eCAS'21/19; DisCoTec'23 AEC Chair; ACSOS'22 Proceedings Chair; Senior PC member of ACSOS'23; PC member in many conf.
Editorial: JAISCR Editorial Board; Guest Editor in Robotics & AI; Top. Advisory Board of Electronics

Teaching

- Software Design & Development (30h, B. in Comp. Systems Technologies, UNIBO) a.y. 22-23, 23-24
- Algorithms and Data Structures (44h, B. in Comp. Systems Technologies, UNIBO) a.y. 23-24
- Mobile System Programming Workshop (16h, B. in Comp. Systems Technologies, UNIBO) a.y. 23-24
- Object-Oriented Programming (30h, B. in Comp. Science & Eng., UNIBO) a.y. 20-21, 21-22, 22-23
- Foundations of Informatics (30h, B. in Electrical/Biomedical Engineering) a.y. 20-21, 21-22, 22-23

Open-source/academic software projects

Notably SCAFI aggregate programming toolkit (Lead Developer), Alchemist simulator (Contributor)

Research & Education experience abroad

2018 TU Wien (Austria) – Visiting PhD student (2 months)
2017 University of St Andrews (Scotland) – Visiting PhD student (3 months)
2012 University of Limerick (Ireland) – Erasmus Programme (4 months)

Scholarships, awards, qualifications

Awards ECOOP'22 Distinguished Artifact; IEEE TCSC Outstanding PhD Thesis; Prize G. Bassi'17
Scholarships PhD scholarship (MIUR); Mobility Grants (MarcoPolo, conferences)
Qualifications Associate professor 09/H1 & 01/B1 (ASN 21-23); High-school professor A041 (1st winner); PhD admission/funding (1st winner)

Recent Activity

Summary I am currently a tenure-track assistant professor (RTD-B) at the Department of Computer Science & Engineering of the University of Bologna (UNIBO). I got the qualification as associate professor for 09/H1 and 01/B1 (ASN Fascia II) in 2022/23. I have 56+ publications at international journals and conferences; my current H-Index is 18 (GScholar), 16 (SCOPUS). I got a PhD in *CS & Eng.* from UNIBO, with a thesis awarded by the IEEE TCSC. I have been a visiting PhD student as the University of St Andrews (refereed by Prof. Simon Dobson) and at TU Wien (refereed by Prof. Schahram Dustdar). I got awards for research, service, and as a student. I am Adjunct Professor in various courses at BEng Degrees in Computer Science and Engineering. I participate(d) to PRIN projects like *Fluidware* and *COMMON-WEARS* (Task Leader).

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Research Themes in a Nutshell

In a nutshell, my research interests and activity revolve around two main themes: **software engineering** and **distributed artificial intelligence**. In particular, I focus on paradigms, models, and techniques fostering intelligence and autonomy in multi-agent and socio-technical systems. My research applies in the context of IoT-edge-cloud continua, large-scale CPSs, self-* systems, swarm robotics, and collective intelligence.

Qualifications

★ **(ASN Fascia II) National Scientific qualification as associate professor in the Italian higher education system (Call 2021/2023, Ministerial Decree n. 553/2021 and 589/2021) for the disciplinary field of 01/B1 - Informatics** 2023-02 → 2033-02

I got this qualification by passing a CV evaluation by a committee on the basis of bibliometrics, publications, and qualifications.

★ **(ASN Fascia II) National Scientific qualification as associate professor in the Italian higher education system (Call 2021/2023, Ministerial Decree n. 553/2021 and 589/2021) for the disciplinary field of 09/H1 - Information processing systems** 2022-02 → 2031-02

I got this qualification by passing a CV evaluation by a committee on the basis of bibliometrics, publications, and qualifications.

Qualification for teaching *Computer Science and Technologies* (c.c. A041) in Italian Secondary School since 2021

I got this qualification by passing the ordinary public competition for STEM subjects in 2021 with a score of 192/200 (Rank #1).

Participation in University Boards and Committees

- Member of the Board for the Review (Riesame) of the Course Degree (since 2023-10), First Cycle Degree/Bachelor in Computer Systems Technologies (Qualifying Vocational Degree Programme), University of Bologna
- Member of the Board for the Apprenticeships (Commissione Tirocini) (since 2023-10), First Cycle Degree/Bachelor in Computer Systems Technologies (Qualifying Vocational Degree Programme), University of Bologna
- Member of the Graduation Board (Sottocommissione di Laurea) (2023-07-17, 2022-11-30, 2022-05-25), First Cycle Degree/Bachelor in Computer Science and Engineering, University of Bologna
- Member of the Board for the "Admission to years following the first one", First Cycle Degree/Bachelor in Computer Systems Technologies (Qualifying Vocational Degree Programme), University of Bologna
- Member of the Board for the Selection of a Research Contract (Assegno di ricerca) for project "Study, implementation, and validation of a prototype for an interconnected Digital Platform for remote software update of industrial machines" (*"Studio, realizzazione, e validazione di un prototipo di Piattaforma Digitale interconnessa per l'aggiornamento del software da remoto per macchine industriali"*)
- Member of the Board for "Ruslan Shaiakhmetov's Annual Report 2022-2023"
- Member of the Board for the "Extraordinary Selection" (2022-09-19), First Cycle Degree/Bachelor in Computer Systems Technologies (Qualifying Vocational Degree Programme), University of Bologna
- Member of the Board for the "Competition Test for the Admission to the Degree Course" (2022-07-21, 2022-07-19), First Cycle Degree/Bachelor in Computer Systems Technologies (Qualifying Vocational Degree Programme), University of Bologna

Research Community Service and Participation

Memberships

IEEE Technical Committee on Computational Collective Intelligence - Member 2022–

Editorial Roles

★ **Journal of Artificial Intelligence and Soft Computing Research (Q1) - Editorial Board Member** 2023–
https://sciendo.com/journal/JAISCR?tab=editorial-board
JAISCR is an international journal, published by Sciendo (De Gruyter Open), publishing research on AI and soft computing.
Metrics: 2021 Journal Impact Factor: 2.675. SCImago Quartile 2022: Q1.

Frontiers in Robotics and AI (Q2) – Multi-Robot Systems section – Review Editor 2023–
https://www.frontiersin.org/journals/robotics-and-ai/editors

MDPI Electronics (Q2) - Topical Advisory Panel Member 2021–
MDPI Electronics Journal
Core responsibilities include: (1) providing regular reviews; (2) setting up special issues; (3) providing support for special issues; (4) promoting the journal e.g. at conferences; (5) supporting editorial board members.

MDPI Electronics (Q2) - Topic Board Member 2020–2021
MDPI Electronics Journal - Topic Editors

Guest Editorial Roles

Science of Computer Programming (Q3) - Software Track - Managing Guest Editor - Special Issue "Selected Software Artifacts from the Papers of DisCoTec 2023 - 18th International Federated Conference on Distributed Computing Techniques" 2023–2024
I am the managing guest editor for this Special Issue gathering software artifacts from high-quality submissions at DisCoTec'23. Co-guest editors include Dr. Vinicius Vielmo Cogo, Dr. Tom van Dijk, and Prof. Alceste Scalas.
Metrics: SCImago Quartile 2022: Q2.

Frontiers in Robotics & AI (Q2) - Guest Associate Editor - Special Issue "Mobile Cyber-Physical Collectives" 2021–2022
I am guest associate editor for a special issue, also called a research topic, entitled "Mobile Cyber-Physical Collectives". I have prepared, together with Prof. Lukas Esterle, the special issue proposal, contacted potential authors, run publicity campaigns, and been handling the review activity for submitted papers. Co-guest editors include Prof. Lukas Esterle, Prof. Rose Gamble, Dr. Paul Harvey, and Prof. Elizabeth F. Wanner.
Metrics: SCImago Quartile 2021-22: Q2.

Event Chairing

ASMECC'23 Workshop Chair — 2023
1st ASMECC Workshop on Autonomic and Self-* Management for the Edge-Cloud Continuum (co-located with the 4th IEEE International Conference on Autonomic Computing and Self-Organizing Systems - ACSOS 2023). The event has been being co-chaired with Stefano Forti (University of Pisa) and Lukas Esterle (Aarhus University). — Toronto, Canada

DISCOLI'23 Workshop Chair — 2022
2nd DISCOLI Workshop on DIStributed COLlective Intelligence (co-located with the 19th International Conference on Distributed Computing in Smart Systems and the Internet of Things, DCOSS-IoT'23). — Pafos, Cyprus
As Workshop Chair, I have prepared/submitted the workshop proposal, run publicity campaigns, selected the program committee, handled the peer review process, took the decisions regarding the final program, and chaired the workshop event. The event has been co-chaired with Noel Crespi (Institut Polytechnique de Paris), Claudio Savaglio (University of Calabria), and Christos Tsigkanos (University of Athens).

DISCOLI'22 Workshop Chair — 2022
1st DISCOLI Workshop on DIStributed COLlective Intelligence (co-located with the 42nd IEEE International Conference on Distributed Computing Systems, ICDCS'22). — Bologna, Italy
As Workshop Chair, I have prepared/submitted the workshop proposal, run publicity campaigns, selected the program committee, handled the peer review process, took the decisions regarding the final program, and chaired the workshop event. The event has been co-chaired with Min Chen (Huazhong University of Science and Technology), Franco Zambonelli (University of Modena and Reggio Emilia), and Mengchu Zhou (New Jersey Institute of Technology).

eCAS'21 Workshop Chair — 2021
6th eCAS Workshop on Engineering Collective Adaptive Systems (co-located with ACSOS'21) — Washington DC, USA
As Workshop Chair, I prepared/submitted the workshop proposal, run publicity campaigns, selected the program committee, handled the peer review process, and planned/run the workshop day. The event has been co-chaired with Lukas Esterle (Aarhus University).

eCAS'19 Workshop Chair — 2019
4th eCAS Workshop on Engineering Collective Adaptive Systems (co-located with SASO'19) — Ulmea, Sweden
As Workshop Chair, I prepared/submitted the workshop proposal, run publicity campaigns, selected the program committee, handled the peer review process, and planned/run the workshop day. The event has been co-chaired with Soura Dasgupta (University of Iowa).

Participation in steering committees

★ **ASMECC Workshop Steering Committee Member** — 2023–now
ASMECC Workshop on Autonomic and Self-* Management for the Edge-Cloud Continuum. As a SC member, I contribute to the strategic guidance of the workshop, including e.g. the appointment of workshop chairs and the promotion of related initiatives.

Participation in organising committees

★ ACSOS'24 Artifact Evaluation Chair 2023-24
5th IEEE International Conference on Autonomic Computing and Self-Organizing Systems — Aarhus, Denmark

★ DisCoTec'24 Artifact Evaluation Chair 2024
Groningen, Netherlands

CyberSciTech'23 Track Chair 2023
The 8th IEEE Cyber Science and Technology Congress — Abu Dhabi, UAE

★ DisCoTec'23 Artifact Evaluation Chair 2023
DisCoTec 2023 (18th International Federated Conference on Distributed Computing Techniques) is one of the major events sponsored by the IFIP and the EAPLS. It gathers three conferences: COORDINATION'23, DAIS'23, FORTE'23. — Lisbon, Portugal
As Artifact Evaluation Chair of DisCoTec, I organise and supervise the artifact evaluation process for the entire multi-conference, coordinating with the AECs of the individual conferences, and organise a journal special issue for a selection of the artifact papers.

CyberSciTech'22 Track 3 "Cyber Physical Computing & Systems" Chair 2022
The 7th IEEE Cyber Science and Technology Congress — Calabria, Italy
I co-chair the Track on "Cyber Physical Computing & Systems".

★ ACSOS'22 Publication/Proceedings Chair 2021
3rd IEEE International Conference on Autonomic Computing and Self-Organizing Systems — Washington DC, USA
As Publication Chair, I am responsible for managing the production of all material to be published in relation to the conference. The activity requires to interact with IEEE, prepare the conference proceedings according to IEEE guidelines, and check proper inclusion of all material (accepted&presented papers, tutorial abstracts, workshop papers..) to ensure proper publication on IEEE Xplore.

eCAS'22 Web Chair 2022
7th eCAS Workshop on Engineering Collective Adaptive Systems — Virtual

ACSOS'21 Publicity Chair 2021
2nd IEEE International Conference on Autonomic Computing and Self-Organizing Systems — Washington DC, USA
As Publicity Chair, I was responsible to develop the communications/audience development plan along the various organisation milestones. Tasks included promoting the CfP and the conference through various channels (mailing-lists, websites, social media), sending reminders for events, and using social media to fuel participation.

SASO'18 Web Chair 2018
12th IEEE International Conference on Self-Adaptive and Self-Organizing Systems — Trento, Italy
As a Web Chair, I was responsible for setting up and publishing content on the conference website and social media. As such, I interacted with many of the other OC members to ensure prompt publication of conference-related information.

Participation in program committees

CCNC'24 Technical Program Committee Member IEEE Consumer Communications & Networking Conference — 2023-24, Las Vegas, USA

★ AAAI'24 Program Committee Member 2023-24
38th AAAI Conference on Artificial Intelligence (AAAI 2024) Vancouver, Canada
Sponsored by the Association for the Advancement of Artificial Intelligence, AAAI is an A++ conference (GGS rating).

SAC'24 IRMAS track Program Committee Member 2023-24
IRMAS - Intelligent Robotics and Multi-Agent Systems technical track on the 39th ACM Symposium on Applied Computing (SAC 2024) Avila, Spain

DASC/PiCOM/CBDCom/CyberSciTech'23 Program Committee Member 2023
8th IEEE Cyber Science and Technology Congress (CyberSciTech 2023) Calabria, IT

ICCCI'23 Program Committee Member 2023
15th International Conference on Computational Collective Intelligence Budapest, Hungary

ECOOP/ISSTA'23 SRC Program Committee Member 2023
ACM Student Research Competition (SRC) at the European Conference on Object-Oriented Programming (ECOOP) / International Symposium on Software Testing and Analysis (ISSTA) 2023 Washington, USA

★ ACSOS'23 Senior Program Committee Member 2023
4th IEEE International Conference on Autonomic Computing and Self-Organizing Systems Toronto, Canada
As a Senior PC member, my responsibility is to oversee the review process for 4-5 papers, lead discussions among the reviewers, write a meta-review, and make a recommendation on acceptance to the PC chairs.

SAC'23 IRMAS track Program Committee Member 2022-23
IRMAS - Intelligent Robotics and Multi-Agent Systems technical track on the 38th ACM Symposium on Applied Computing (SAC 2023) Tallinn, Estonia

★ AAAI'23 Program Committee Member 37th AAAI Conference on Artificial Intelligence (AAAI 2023) 2022-23 Washington, DC, USA

WOA'23 Program Committee Member 2023
24th Workshop "From Objects to Agents" Rome, Italy

DASC/PiCOM/CBDCom/CyberSciTech'22 Program Committee Member 2022
7th IEEE Cyber Science and Technology Congress (CyberSciTech 2022) Calabria, IT

ACSOS'22 Program Committee Member 2022
3rd IEEE International Conference on Autonomic Computing and Self-Organizing Systems Virtual

COORDINATION'22 Artifact Evaluation Committee Member 2022
24th International Conference on Coordination Models and Languages Lucca, Italy

eCAS'22 Program Committee Member 2022
7th eCAS Workshop on Engineering Collective Adaptive Systems Virtual

WOA'22 Program Committee Member 2022
23rd Workshop "From Objects to Agents" Genova, Italy

ALPACA'22 Technical Program Committee Member 2022
1st Workshop on Adaptive, Learning PervAsive Applications (ALPACA) Pisa, Italy

ACSOS'21 Program Committee Member 2021
2nd IEEE International Conference on Autonomic Computing and Self-Organizing Systems Virtual

COORDINATION'21 Program Committee Member 2021
23rd International Conference on Coordination Models and Languages Valletta, Malta

MODELS'21 Student Research Competition Committee Member 2021
ACM/IEEE 24th International Conference on Model Driven Engineering Languages and Systems (MODELS 2021) Virtual Conference

PLDI'21 Artifacts Program Committee Member 2021
42nd ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI 2021) Virtual Conference

WOA'21 Program Committee Member 2021
22nd Workshop "From Objects to Agents" Bologna, Italy

CLOUD COMPUTING'21 Program Committee Member 2021
12th International Conference on Cloud Computing, GRIDs, and Virtualization Porto, Portugal

eCAS'20 Program Committee Member 2020
5th eCAS Workshop on Engineering Collective Adaptive Systems Washington, USA

eCAS'17 Program Committee Member 2017
2nd eCAS Workshop on Engineering Collective Adaptive Systems Tucson, USA

Peer review activity in international journals

- **Excellent reviewer** according to my Web of Science™ profile (according to the feedback provided by associate editors)
- 20 verified reviews on my Web of Science™ profile

○ ACM Transactions on Autonomous and Adaptive Systems ○ IEEE Transactions on Intelligent Transportation Systems ○ IEEE Internet of Things ○ IEEE Transactions on Services Computing ○ Elsevier Engineering Applications of Artificial Intelligence ○ Elsevier Pervasive and Mobile Computing ○ Elsevier Systems and Software ○ Elsevier Science of Computer Programming ○ Hindawi Scientific Programming ○ MDPI Robotics ○ MDPI Sensors ○ MDPI Applied Sciences ○ MDPI Informatics ○ IOS Press Intelligenza Artificiale ○ Springer Software and Systems Modeling ○ Springer Autonomous Agents and Multi-Agent Systems ○ World Scientific International Journal of Information Technology & Decision Making

Other review activity (books)

I am in the reviewer pool of *Manning Publications*, a well-known publisher of books on computer technology topics. The evidence of this activity lies in the "Acknowledgments" sections of the books that I reviewed. These include:

- Software Mistakes and Tradeoffs: How to make good programming decisions (Tomasz Lelek and Jon Skeet, 2022, Manning)
- Quantum Computing in Action (Johan Vos, 2022, Manning)
- Programming with Types (Vlad Riscutia, 2019, Manning)
- Classic Computer Science Problems in Python (David Kopec, 2019, Manning)

Talks at Conferences and Events

Presentations of peer-reviewed papers

Self-Organisation Programming: a Functional Reactive Macro Approach — 2023/09
Event 4th IEEE International Conference on Autonomic Computing and Self-Organizing Systems (ACSOS 2023) — Toronto, CA

[Tutorial] Programming (and Learning) Self-Adaptive & Self-Organising Behaviour with ScaFi: for Swarms, Edge-Cloud Ecosystems, and More — 2023/09
Event 4th IEEE International Conference on Autonomic Computing and Self-Organizing Systems (ACSOS 2023) — Toronto, CA

Programming Distributed Collective Processes for Dynamic Ensembles and Collective Tasks — 2023/06
Event 25th International Conference on Coordination Models and Languages (COORDINATION 2023) — Lisbon, PT

Towards Automated Engineering for Collective Adaptive Systems: Vision and Research Directions — 2022/09
Event 1st International Workshop on COMMunity-OrieNted WEARrable Computing Systems (COMMON-WEARS 2022) — Falerna, ITA

FScaFi: A Core Calculus for Collective Adaptive Systems Programming — 2021/10
Event 10th International Symposium On Leveraging Applications of Formal Methods, Verification and Validation — Rhodes, GRC

Augmented Collective Digital Twins for Self-Organising Cyber-Physical Systems — 2021/10
Event SISSY Workshop on Self-Improving System Integration — Online

Tuple-Based Coordination in Large-Scale Situated Systems — 2021/06
Event 23rd International Conference on Coordination Models and Languages — Online

Collective Adaptive Systems as Coordination Media: The Case of Tuples in Space-Time — 2020/08
Event 5th eCAS Workshop on Engineering Collective Adaptive Systems — Online

Engineering Resilient Collaborative Edge-enabled IoT — 2019/07
Event 16th IEEE International Conference on Services Computing — Milan, ITA

Aggregate Processes in Field Calculus — 2019/06
Event 21th International Conference on Coordination Models and Languages — Copenaghen, DNK

On Context-Orientation in Aggregate Programming — 2019/06
Event 4th eCAS Workshop on Engineering Collective Adaptive Systems — Umeå, SWE

Coordinating Computation at the Edge: a Decentralized, Self-Organizing, Spatial Approach — 2019/06
Event 4th IEEE International Conference on Fog and Mobile Edge Computing — Rome, ITA

Collective Abtractions & Platforms for Large-Scale Self-Adaptive IoT — 2018/09
Event 3rd eCAS Workshop on Engineering Collective Adaptive Systems — Trento, ITA

From Field-Based Coordination to Aggregate Computing — 2018/06
Event 20th International Conference on Coordination Models and Languages — Madrid, ESP

Compositional Blocks for Optimal Self-Healing Gradients 2017/09
Event 11th IEEE International Conference on Self-Adaptive and Self-Organizing Systems (SASO'17) Tucson, AZ, USA

Practical Aggregate Programming in Scala 2016/10
Event Scala Symposium 2016 Amsterdam, NLD

Programming Actor-based Collective Adaptive Systems 2016/10
Event AGERE'16 (international workshop on agents and actors) Amsterdam, NLD

On Execution Platforms for Large-Scale Aggregate Computing 2016/09
Event Workshop on Collective Adaptation in Very Large Scale Ubicomp: Towards a Superorganism of Wearables, Ubicomp/ISWC Adjunct Heidelberg, DEU

Towards Aggregate Programming in Scala 2016/06
Event 1st International Workshop on Programming Models and Languages for Distributed Computing (PMLDC) – co-located with ECOOP Rome, ITA

Other talks

Introduction to the 1st DISCOLI workshop on distributed collective intelligence 2022/06
Bologna, IT
Event 1st DISCOLI Workshop on DIStributed COLlective Intelligence

6th eCAS Workshop on Engineering Collective Adaptive Systems: Introduction to the workshop 2021/10
Online
Event 6th eCAS Workshop on Engineering Collective Adaptive Systems

Collaborations with Research Groups

- Participation in the research activity of the research group coordinated by **Prof. Mirko Viroli (University of Bologna, Italy)**. This is the research group with which Roberto has collaborated mostly in his career and that led to more than 50+ publications in international journals and conference proceedings. (2016→)
- Collaboration with the research group coordinated by **Prof. Ferruccio Damiani (University of Turin, Italy)** on themes related to field-based coordination and distributed computation. Output of this collaboration includes 7+ articles published on international journals and 8+ papers on proceedings of international conferences. (2016→)
- Collaboration with the research group coordinated by **Prof. Giancarlo Fortino (University of Calabria, Italy)**, on themes revolving around the software engineering of opportunistic services in the Internet of Things and edge computing. Output of this collaboration includes 3 articles published on international journals and 2+ paper on proceedings of international conferences. Moreover, collaboration continues in the context of the Fluidware project. (2019→)
- Collaboration with **Danny Weyns (Katholieke Universiteit Leuven, Belgium)** on self-adaptive software architectures. Output of this collaboration includes 2 articles accepted on international journals and 2 papers in the proceedings of international conferences. (2020→)
- Collaboration with the research group coordinated by **Prof. Franco Zambonelli (University of Modena e Reggio Emilia, Italy; IEEE Fellow, ACM Distinguished Scientist)**, especially in the context of Fluidware project. Output of this collaboration includes 1+ articles accepted on an international journal and 2+ papers published in the proceedings of international conferences. (2019→)
- Collaboration with **Prof. Lukas Esterle (University di Aarhus, Danimarca)**, on themes related to collective adaptive systems. Output of this collaboration includes one paper published in an international

journal (ACM TAAS). We have also co-chaired the eCAS'21 workshop and co-edited one special issue. (2020→)

- Collaboration with **Prof. Alessandro Ricci (University di Bologna, Italy)**, on themes related to coordination and multi-agent systems. Output of this collaboration includes two papers published in the proceedings of international conferences. (2020→)
- Collaboration with **Prof. Guido Salvaneschi (University of St.Gallen)** on programming languages for distributed computing. Output of this collaboration includes 2+ papers published in the proceedings of international conferences. (2019→)
- Collaboration with **Prof. Volker Stolz (University of Oslo)** on themes related to distributed runtime verification and monitoring. Output of this collaboration includes 1 article published on an international journal. (2020→2021)
- Collaboration with **Prof. Simon Dobson (University of St Andrews)**, on themes related to sensor systems and complex networks. The collaboration included a 3-month visit period at the University of St Andrews. Output of this collaboration includes 1 article accepted on an international IEEE magazine. (2017→2020)
- Collaboration with the research group coordinated by **Prof. Schahram Dustdar (TU Wien, Austria; IEEE Fellow, ACM Distinguished Scientist)**, on themes related to the engineering of resilient, collaborative, Internet of Things systems. This collaboration started with my 2-month visit at TU Wien (Austria). Output of this collaboration includes 1 paper published in the proceedings of an international conference. (2018)
- Collaboration with **Prof. Antonio Bucchiarone (Fondazione Bruno Kessler, Trento, Italy)** on themes related to collective adaptive systems. Output of this collaboration includes 1 article accepted on an international IEEE magazine. (2019)
- Collaboration with **Prof. Alessandro Aldini (University of Urbino Carlo Bo', Italy)**, on the intersection of computational trust techniques and collective adaptive systems. Output of this collaboration includes 1 article published on an international journal and 1 paper in the proceedings of an international conference. (2017→2018).
- Collaboration with **Dr. Jacob Beal (Raytheon BBN Technologies, USA)** on aggregate computing. Output of this collaboration includes 1 article accepted on an international journal and 1 paper published in the proceedings of an international conference. (2018→2019)
- Collaboration with the research group coordinated by **Prof. Andrea Omicini (University of Bologna, Italy)**, on themes related to the engineering of multi-agent systems. Output of this collaboration includes 1 paper published in the proceedings of an international conference. (2018)

Participation in Funded Research Projects

Roles

- **Task Leader** for Task 1.2 "Collective Opportunistic Computing Model" within Work Package 1 "Model" in the PRIN Project "COMMON-WEARS" (2020HCWWLP).

Participation

- Fixed-Term Researcher (RTD-A) in **Programma Operativo Nazionale (PON) "Research & Innovation" 2014-2020 – RTDA_GREEN project (CUP J41B21012140007)**.
- Participation as scientific collaborator in **PRIN Italian Project COMMunity-OrieNted WEARrable Computing Systems (COMMON-WEARS, no. 2020HCWWLP)**, coordinated by Prof. Giancarlo Fortino and involving a consortium of four universities: University of Calabria, University of Bologna, University of Turin, and Rome Biomedical Campus University. I have participated to all the project meetings,

including the COMMON-WEARS Workshop at the 7th IEEE Cyber Science and Technology Congress. I have (co-)authored 2+ articles acknowledging the COMMON-WEARS project. See the COMMON-WEARS website for information about the consortium, participants, and publications. (2022→)

- Participation as scientific collaborator in **PRIN Italian Project Fluidware (2017KRC7KT)**, coordinated by Prof. Franco Zambonelli and involving a consortium of four universities: University of Modena and Reggio Emilia, University of Bologna, University of Camerino, and University of Calabria. The project revolves around models and techniques for adaptive distributed computing. I have participated to all the project meetings, and given various talks (such as #1, #2). In particular, this collaboration activity led to two articles published in international journals and one paper on the proceedings of international conferences. In total, I have (co-)authored 8 articles acknowledging the FluidWare project. See the FluidWare website for information about the consortium, participants, and publications. (2019→2023)

Research for Public and Private Institutions

Research in Academia

- **Fixed-Term Senior Researcher (RTD-B)** on project "Informatics" (Department of Computer Science and Engineering, Alma Mater Studiorum - Università di Bologna, Italy). (2023-10→ est. 2026-09)
- **Fixed-Term Junior Researcher (RTD-A)** on project "Techniques & strategies for Green Autonomic Internet of Things (GA-IoT)" (Department of Computer Science and Engineering, Alma Mater Studiorum - Università di Bologna, Italy), supervised by Prof. Mirko Viroli. (2022-02→2023-10)
- **Research fellowship (Assegno di Ricerca)** on project "Engineering evolving collective adaptive systems for smart infrastructures" (Department of Computer Science and Engineering, Alma Mater Studiorum - Università di Bologna, Italy), supervised by Prof. Mirko Viroli. (2021→2022)
- **Research fellowship (Assegno di Ricerca)** on project "Engineering evolving collective adaptive systems for modern infrastructures" (Department of Computer Science and Engineering, Alma Mater Studiorum - Università di Bologna, Italy), supervised by Prof. Mirko Viroli. (2020→2021)
- **Research fellowship (Assegno di Ricerca)** on project "Engineering collective adaptive processes through aggregate computing" (Department of Computer Science and Engineering, Alma Mater Studiorum - Università di Bologna, Italy), supervised by Prof. Mirko Viroli. (2019→2020)

Participation in Projects with Companies

- Participation as scientific collaborator in project on "cybersecurity and threat attribution" by YOROI S.R.L. and University of Bologna. (2021→2022)
- Participation as scientific collaborator in project "Realizzazione di un Compilatore da specifica di alto livello a comandi PLC per macchine monolama per la lavorazione del legno" by the University of Bologna and SCM Group S.p.A. (2020→2021)
- Participation as scientific collaborator in project "Realizzazione tramite Model Driven Engineering di un sistema di reporting moderno per l'ERP Star4" by the University of Bologna and Formula Impresoft S.R.L. (2020→2021)
- Participation as scientific collaborator in project PG/2016/667492 "Re-ingegnerizzazione da Cobol a .NET di una piattaforma gestionale intersettoriale" by University of Bologna and Harvard Group (now Impresoft S.R.L.). (2017→2018)
- Research activity "Software infrastructures for the management of IoT systems" on scholarship issued by the Department of Computer Science and Engineering (Alma Mater Studiorum - Università di Bologna), on funds by Centro Studi - Orizzonti Holding. The research focussed on technologies for IoT, process mining, and microservices, and their application to large-scale and small-scale retail. (2016→2017)

Experiences Abroad

Visiting PhD student @ Technische Universität Wien (Austria) 2018, 2 months
Collaboration with the research group coordinated by *Prof. Schahram Dustdar (TU Wien, Austria; IEEE Fellow, ACM Distinguished Scientist)*, on themes related to the engineering of resilient, collaborative, Internet of Things systems. This collaboration started with my 2-month visit at TU Wien (Austria). Output of this collaboration includes one paper published in the proceedings of an international conference.

Visiting PhD student @ University of St Andrews (Scotland) 2017, 3 months
Collaboration with *Prof. Simon Dobson (University of St Andews)*, on themes related to collective adaptive systems. Output of this collaboration includes one article accepted on an international IEEE magazine. Marco Polo scholarship

Erasmus @ University of Limerick (Ireland) 2012, 4 months
Taking exams on specific BEng courses (see Education section). Erasmus scholarship

Scholarships and Grants

Computer Science and Engineering PhD Scholarship 2016/11 → 2019/10
This scholarship, granted by the Italian Ministry of Education, Universities, and Research (MIUR), covered all the 3 years of my PhD in Computer Science and Engineering at Alma Mater Studiorum–Università di Bologna (Italy). I got this scholarship by winning the corresponding public competition based on qualifications and interview. Università di Bologna (IT)

Travel/Conference Grant – DisCoTec 2019 2019
Issuer Denmarks Tekniske Universitet (DTU)
This selective grant covered my participation to the COORDINATION 2019 conference in Copenhagen, Denmark.

Mobility Grant – Marco Polo 2016 2017
Issuer Department of Computer Science and Engineering (DISI), UNIBO
This selective grant covered my PhD abroad period in St Andrews, Scotland.

Travel/Conference Grant – Scala Symposium 2016 2016
Issuer École polytechnique fédérale de Lausanne (EPFL)
Grant issued by École polytechnique fédérale de Lausanne (EPFL) for presentation at the Scala Symposium 2016, co-located with the SPLASH'16 conference.

Study Scholarship (Borsa di Studio) 2016/09 → 2016/11
Issuer Department of Computer Science and Engineering (DISI), UNIBO University of Bologna
Financ. Centro Studi - Orizzonti Holding SPA
Theme Software Infrastructures for the Management of IoT Systems
This scholarship supported a study of proof-of-concept IoT solutions for the retail market. In this context, I got familiarity with microservices, Docker, and process mining. I renounced to the scholarship once I got formally admitted to the PhD Programme, for incompatibility of the scholarships.

Awards

Research Awards

★ ECOOP 2022 Distinguished Artifact Award 2022
Our artifact, submitted to the Artifacts track of the 36th European Conference on Object-Oriented Programming (ECOOP 2022), has been awarded with the "Distinguished Artifact" award by the ECOOP'22 Artifact Evaluation Committee. Three artifacts were distinguished among a total of 53 artifacts accepted at ECOOP'22. Berlin (Germany)

★ IEEE TCSC Outstanding PhD Dissertation Award 2020 2020
I was selected as winner for an international PhD thesis award promoted by the IEEE Technical Committee on Scalable Computing. The selection committee for the 2020 edition of the award was formed by Prof. Hai Jiang (chair), Prof. Bernady O. Apduhan, Prof. Beniamino di Martino, and Dr. Eng. Didier El Baz. *"The IEEE TCSC Outstanding PhD Dissertation Award is an annual award to recognize candidates that have recently received a PhD degree for no more than 2 years and have written an outstanding PhD dissertation in the field of the scalable computing with applications. This award is established to encourage doctoral research that combines theory and practice or makes in-depth technical contributions, having the potential to contribute to the IEEE TCSC."*

Academic Service Awards

ACSOS'22 Outstanding Service Award 2022
I was presented with the *Outstanding Service Award*, by the General Chairs Sven Tomforde and Kirstie Bellman, for having served as **Proceedings Chair** for the 3rd IEEE International Conference on Autonomic Computing and Self-Organizing Systems (ACSOS 2022).

ACSOS'21 Outstanding Service Award 2021
I was presented with the *Outstanding Service Award*, by the General Chairs Jean Botev, Tarek El-Ghazawi, and Christopher Stewart, for having served as **Publicity Chair** for the 2nd IEEE International Conference on Autonomic Computing and Self-Organizing Systems (ACSOS 2021).

Student Awards

Best District-2072 MEng graduate student (G.Bassi 2017 prize) 2017
I was selected as winner of prize *Gianni Bassi*, with 5000€ scholarship, issued by Rotary Club Faenza for *Best Master Graduate Student* across all Engineering faculties of Romagna (district 2072) based on Grade Average and number of laudes. Faenza (Italy)

Prize for meritorious students (UNIBO) a.y. 2014-15
I was selected among the ex-aequo winners of the public competition for meritorious students of the University of Bologna in academic year 2014/2015 (section common to all Engineering and Architecture faculties), granting a scholarship. Università di Bologna (IT)

High school graduation award 2009
I was given the "Roberto Ruffilli" acknowledgment for high-school graduation with score 100/100 (cum laude). Cesena (Italy)

Selected Publications

A selection of 12 significant publications follows.

1. **Roberto Casadei**. "Macroprogramming: Concepts, State of the Art, and Opportunities of Macroscopic Behaviour Modelling". In: *ACM Comput. Surv.* 55.13s (2023). ISSN: 0360-0300. DOI: 10.1145/3579353
   - **Metrics:** Q1 (SCImago Quartile 2022); 2022 IF 16.6
   - **Short summary:** This work provides the first comprehensive view of macroprogramming research. It is a long survey that provides a mapping study, a discussion of the key concepts and principles of the paradigm, a taxonomy of macroprogramming approaches, an analysis of more than 50 primary works on macroprogramming, and a discussion of related research opportunities and challenges.
2. Giorgio Audrito, **Roberto Casadei**, Ferruccio Damiani, and Mirko Viroli. "Computation Against a Neighbour: Addressing Large-Scale Distribution and Adaptivity with Functional Programming and Scala". In: *Logical Methods in Computer Science* Volume 19, Issue 1 (Jan. 2023). DOI: 10.46298/lmcs-19(1:6)2023. URL: https://lmcs.episciences.org/10826
   - **Corresponding author**
   - **Metrics:** Q2 (SCImago Quartile 2022); 2022 IF 0.6
   - **Short summary:** This work describes the *neighbour calculus*, a variant of the field calculus that simplifies the embedding of field computations as internal DSLs in functional programming languages. This provides the formal framework behind ScaFi, a Scala language and toolkit for aggregate computing systems.
3. Danilo Pianini, Federico Pettinari, **Roberto Casadei**, and Lukas Esterle. "A Collective Adaptive Approach to Decentralised k-Coverage in Multi-robot Systems". In: *ACM Trans. Auton. Adapt. Syst.* 17 (2022), 4:1–4:39. DOI: 10.1145/3547145. URL: https://doi.org/10.1145/3547145
   - **Metrics:** Q2 (SCImago Quartile 2022); 2022 IF 2.7
   - **Short summary:** This work addresses the online multi-object k-coverage problem (OMOkC) problem through a collective adaptive systems approach, and accordingly provides novel algorithms improving over state-of-the-art solutions as well as a toolchain and simulation for experimenting with mobile robots with field of view.
4. Giorgio Audrito, **Roberto Casadei**, Ferruccio Damiani, Guido Salvaneschi, and Mirko Viroli. "Functional Programming for Distributed Systems with XC". in: *36th European Conference on Object-Oriented Programming, ECOOP 2022, June 6-10, 2022, Berlin, Germany*. Ed. by Karim Ali and Jan Vitek. Vol. 222. LIPIcs. Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2022, 20:1–20:28. DOI: 10.4230/LIPIcs.ECOOP.2022.20. URL: https://doi.org/10.4230/LIPIcs.ECOOP.2022.20
   - **Corresponding author**
   - **Metrics:** Class 1/A+ conference (GGS Conf Rating 2021)
   - **Short summary:** In this work, we present a a more general variant of the field calculus supporting differentiated messages and describe its support for distributed programming of resilient systems, with a narrative tailored to the programming language community.
5. Gianluca Aguzzi, **Roberto Casadei**, Danilo Pianini, and Mirko Viroli. "Dynamic Decentralization Domains for the Internet of Things". In: *IEEE Internet Computing* 26.6 (2022), pp. 16–23. DOI: 10.1109/mic.2022.3216753. URL: https://doi.org/10.1109/mic.2022.3216753
   - **Corresponding author**
   - **Metrics:** Q1 (SCImago Quartile 2022); 2022 IF 3.2
   - **Short summary:** In this work, we present a pattern and API for developing adaptive IoT systems for situation recognition and action.

6. **Roberto Casadei**, Giancarlo Fortino, Danilo Pianini, Andrea Placuzzi, Claudio Savaglio, and Mirko Viroli. "A Methodology and Simulation-Based Toolchain for Estimating Deployment Performance of Smart Collective Services at the Edge". In: *IEEE Internet of Things Journal* 9.20 (2022), pp. 20136–20148. DOI: 10.1109/JIOT.2022.3172470

   - **Metrics:** Q1 (SCImago Quartile 2022); 2022 IF 10.6
   - **Short summary:** In this work, we present a methodology and toolchain for evaluating deployments of self-organizing systems developed through aggregate computing, across the IoT-fog-cloud continuum.

7. Giorgio Audrito, **Roberto Casadei**, Ferruccio Damiani, Volker Stolz, and Mirko Viroli. "Adaptive distributed monitors of spatial properties for cyber-physical systems". In: *Journal of Systems and Software* 175 (2021), p. 110908. DOI: 10.1016/j.jss.2021.110908

   - **Metrics:** Q1 (SCImago Quartile 2021); 2021 IF 3.514; 13 cits. (Scopus)
   - **Short summary:** In this work, we propose a compositional mapping of Spatial Logic for Closure Spaces (SLCS) constructs to field calculus constructs, enabling the direct encoding of SLCS formulas as decentralised monitors for runtime verification of spatial properties. We formally prove the generated monitors are correct and optimally self-stabilising, and validate the response to variable dynamics by means of simulations of crowd monitoring/control scenarios.

8. **Roberto Casadei**, Mirko Viroli, Giorgio Audrito, Danilo Pianini, and Ferruccio Damiani. "Engineering collective intelligence at the edge with aggregate processes". In: *Engineering Applications of Artificial Intelligence* 97 (2021), p. 104081. ISSN: 0952-1976. DOI: https://doi.org/10.1016/j.engappai.2020.104081

   - **Metrics:** Q1 (SCImago Quartile 2021); 2021 IF 7.802; 27 cits. (Scopus)
   - **Short summary:** Aggregate processes are a programming abstraction, introduced as an extension to the field calculus and implemented in the ScaFi aggregate programming DSL, that captures *concurrent dynamic collective computations*. Its versatility in supporting collective intelligence and self-organisation is shown through simulations of IoT/edge computing scenarios.

9. Giorgio Audrito, **Roberto Casadei**, Ferruccio Damiani, Danilo Pianini, and Mirko Viroli. "Optimal resilient distributed data collection in mobile edge environments". In: *Computers & Electrical Engineering* (2021), p. 107580. ISSN: 0045-7906. DOI: https://doi.org/10.1016/j.compeleceng.2021.107580. URL: https://www.sciencedirect.com/science/article/pii/S0045790621005140

   - **Metrics:** Q1 (SCImago Quartile 2021); 2021 IF 4.152; 10 cits. (Scopus)
   - **Short summary:** New algorithms for dynamic spatial data collection/summarisation are introduced, supporting better reactivity and resilience in highly-variable scenarios than state-of-the-art algorithms. Results are validated through controlled experiments and a simulated case study in edge data mining.

10. Danilo Pianini, **Roberto Casadei**, Mirko Viroli, and Antonio Natali. "Partitioned integration and coordination via the self-organising coordination regions pattern". In: *Future Generation Computer Systems* 114 (Jan. 2021), pp. 44–68. DOI: 10.1016/j.future.2020.07.032. URL: https://doi.org/10.1016/j.future.2020.07.032

    - **Corresponding author**
    - **Metrics:** Q1 (SCImago Quartile 2021); 2021 IF 7.307; 29 cits. (Scopus)
    - **Short summary:** This work presents a very general design pattern for decentralised feedback-regulated self-integration in dynamic environments. The *Self-organising Coordination Regions (SCR)* pattern consists of a dynamic distributed process involving leader election, coalition formation, and feedback loops between leaders and subordinates. The paper shows SCR has many known uses in literature and enjoys great versatility, shown via case studies in edge computing and hierarchical networks.

11. **Roberto Casadei**, Giancarlo Fortino, Danilo Pianini, Wilma Russo, Claudio Savaglio, and Mirko Viroli. "A development approach for collective opportunistic Edge-of-Things services". In: *Information Sciences* 498 (2019), pp. 154–169. DOI: 10.1016/j.ins.2019.05.058
    - **Metrics:** Q1 (SCImago Quartile 2019); 2019 IF 5.910; 54 cits. (Scopus)
    - **Short summary:** This work describes an approach to opportunistic edge computing that leverages collective-based services. In particular, it proposes a *Collective IoT Service* design abstraction. Experimental evaluation is performed through a crowd management case study, comparing Edge vs. Cloud deployments w.r.t. reactivity and precision.
12. **Roberto Casadei**, Giancarlo Fortino, Danilo Pianini, Wilma Russo, Claudio Savaglio, and Mirko Viroli. "Modelling and simulation of Opportunistic IoT Services with Aggregate Computing". In: *Future Generation Computer Systems* 91 (2018), pp. 252–262. DOI: 10.1016/j.future.2018.09.005
    - **Metrics:** Q1 (SCImago Quartile 2018); 2018 IF 5.768; 118 cits. (Scopus)
    - **Short summary:** This work describes an aggregate approach of opportunistic computing for the IoT. The approach is based on the integration of the IoT Service Metamodel and the Aggregate Computing metamodel. Validation is performed with a simulated crowd safety case study.

Peer-Reviewed Publications and Bibliometrics

Bibliometrics

- **H-index**: 18 (Gscholar), 16 (Scopus). **i10-index**: 28 (Gscholar).
- **Number of citations**: 994 (Gscholar), 736 (Scopus).
- **Number of publications:** 56 (54 in Scopus).
- **Number of journal publications:** 21.
    - **Number of Q1 journal publications:** 10.
    - **Number of Q2 journal publications:** 8.
    - **Number of Q3 journal publications:** 3.

All my publications (ordered by Venue and Year DESC).

Journal publications

1. **Roberto Casadei**. "Macroprogramming: Concepts, State of the Art, and Opportunities of Macroscopic Behaviour Modelling". In: *ACM Comput. Surv.* 55.13s (2023). ISSN: 0360-0300. DOI: 10.1145/3579353
2. **Roberto Casadei**. "Artificial Collective Intelligence Engineering: A Survey of Concepts and Perspectives". In: *Artificial Life* (July 2023), pp. 1–35. ISSN: 1064-5462. DOI: 10.1162/artl_a_00408. URL: https://doi.org/10.1162/artl_a_00408
3. Giorgio Audrito, **Roberto Casadei**, Ferruccio Damiani, and Mirko Viroli. "Computation Against a Neighbour: Addressing Large-Scale Distribution and Adaptivity with Functional Programming and Scala". In: *Logical Methods in Computer Science* Volume 19, Issue 1 (Jan. 2023). DOI: 10.46298/lmcs-19(1:6)2023. URL: https://lmcs.episciences.org/10826
4. **Roberto Casadei**, Giancarlo Fortino, Danilo Pianini, Andrea Placuzzi, Claudio Savaglio, and Mirko Viroli. "A Methodology and Simulation-Based Toolchain for Estimating Deployment Performance of Smart Collective Services at the Edge". In: *IEEE Internet of Things Journal* 9.20 (2022), pp. 20136–20148. DOI: 10.1109/JIOT.2022.3172470
5. Gianluca Aguzzi, **Roberto Casadei**, Danilo Pianini, and Mirko Viroli. "Dynamic Decentralization Domains for the Internet of Things". In: *IEEE Internet Computing* 26.6 (2022), pp. 16–23. DOI: 10.1109/mic.2022.3216753. URL: https://doi.org/10.1109/mic.2022.3216753

6. Gianluca Aguzzi, Giorgio Audrito, **Roberto Casadei**, Ferruccio Damiani, Gianluca Torta, and Mirko Viroli. "A field-based computing approach to sensing-driven clustering in robot swarms". In: *Swarm Intelligence* (2022). ISSN: 1935-3820. DOI: 10.1007/s11721-022-00215-y. URL: https://doi.org/10.1007/s11721-022-00215-y
7. Danilo Pianini, Federico Pettinari, **Roberto Casadei**, and Lukas Esterle. "A Collective Adaptive Approach to Decentralised k-Coverage in Multi-robot Systems". In: *ACM Trans. Auton. Adapt. Syst.* 17 (2022), 4:1–4:39. DOI: 10.1145/3547145. URL: https://doi.org/10.1145/3547145
8. **Roberto Casadei**, Mirko Viroli, Gianluca Aguzzi, and Danilo Pianini. "ScaFi: A Scala DSL and Toolkit for Aggregate Programming". In: *SoftwareX* 20 (2022), p. 101248. ISSN: 2352-7110. DOI: https://doi.org/10.1016/j.softx.2022.101248. URL: https://www.sciencedirect.com/science/article/pii/S2352711022001662
9. **Roberto Casadei**, Danilo Pianini, Mirko Viroli, and Danny Weyns. "Digital Twins, Virtual Devices, and Augmentations for Self-Organising Cyber-Physical Collectives". In: *Applied Sciences* 12.1 (2022). ISSN: 2076-3417. DOI: 10.3390/app12010349. URL: https://www.mdpi.com/2076-3417/12/1/349
10. Giorgio Audrito, **Roberto Casadei**, Ferruccio Damiani, Volker Stolz, and Mirko Viroli. "Adaptive distributed monitors of spatial properties for cyber-physical systems". In: *Journal of Systems and Software* 175 (2021), p. 110908. DOI: 10.1016/j.jss.2021.110908
11. **Roberto Casadei**, Mirko Viroli, Giorgio Audrito, Danilo Pianini, and Ferruccio Damiani. "Engineering collective intelligence at the edge with aggregate processes". In: *Engineering Applications of Artificial Intelligence* 97 (2021), p. 104081. ISSN: 0952-1976. DOI: https://doi.org/10.1016/j.engappai.2020.104081
12. Danilo Pianini, **Roberto Casadei**, Mirko Viroli, and Antonio Natali. "Partitioned integration and coordination via the self-organising coordination regions pattern". In: *Future Generation Computer Systems* 114 (Jan. 2021), pp. 44–68. DOI: 10.1016/j.future.2020.07.032. URL: https://doi.org/10.1016/j.future.2020.07.032
13. Giorgio Audrito, **Roberto Casadei**, Ferruccio Damiani, Danilo Pianini, and Mirko Viroli. "Optimal resilient distributed data collection in mobile edge environments". In: *Computers & Electrical Engineering* (2021), p. 107580. ISSN: 0045-7906. DOI: https://doi.org/10.1016/j.compeleceng.2021.107580. URL: https://www.sciencedirect.com/science/article/pii/S0045790621005140
14. Danilo Pianini, **Roberto Casadei**, Mirko Viroli, Stefano Mariani, and Franco Zambonelli. "Time-Fluid Field-Based Coordination through Programmable Distributed Schedulers". In: *Logical Methods in Computer Science* Volume 17, Issue 4 (Nov. 2021). DOI: 10.46298/lmcs-17(4:13)2021. URL: https://lmcs.episciences.org/8755
15. **Roberto Casadei**, Gianluca Aguzzi, and Mirko Viroli. "A Programming Approach to Collective Autonomy". In: *Journal of Sensor and Actuator Networks* 10.2 (2021). ISSN: 2224-2708. DOI: 10.3390/jsan10020027
16. **Roberto Casadei**, Danilo Pianini, Andrea Placuzzi, Mirko Viroli, and Danny Weyns. "Pulverization in Cyber-Physical Systems: Engineering the Self-Organizing Logic Separated from Deployment". In: *Future Internet* 12.11 (2020), p. 203. DOI: 10.3390/fi12110203
17. Antonio Bucchiarone, Mirko D'Angelo, Danilo Pianini, Giacomo Cabri, Martina De Sanctis, Mirko Viroli, **Roberto Casadei**, and Simon Dobson. "On the Social Implications of Collective Adaptive Systems". In: *IEEE Technology and Society Magazine* 39.3 (2020), pp. 36–46. DOI: 10.1109/MTS.2020.3012324
18. Mirko Viroli, Jacob Beal, Ferruccio Damiani, Giorgio Audrito, **Roberto Casadei**, and Danilo Pianini. "From distributed coordination to field calculus and aggregate computing". In: *Journal of Logical and Algebraic Methods in Programming* (2019), p. 100486. ISSN: 2352-2208. DOI: 10.1016/j.jlamp.2019.100486
19. **Roberto Casadei**, Giancarlo Fortino, Danilo Pianini, Wilma Russo, Claudio Savaglio, and Mirko Viroli. "A development approach for collective opportunistic Edge-of-Things services". In: *Information Sciences* 498 (2019), pp. 154–169. DOI: 10.1016/j.ins.2019.05.058

20. **Roberto Casadei**, Alessandro Aldini, and Mirko Viroli. "Towards attack-resistant Aggregate Computing using trust mechanisms". In: *Science of Computer Programming* 167 (2018), pp. 114–137. DOI: 10.1016/j.scico.2018.07.006

21. **Roberto Casadei**, Giancarlo Fortino, Danilo Pianini, Wilma Russo, Claudio Savaglio, and Mirko Viroli. "Modelling and simulation of Opportunistic IoT Services with Aggregate Computing". In: *Future Generation Computer Systems* 91 (2018), pp. 252–262. DOI: 10.1016/j.future.2018.09.005

Conferences / workshops / collections publications

22. Gianluca Aguzzi, **Roberto Casadei**, and Mirko Viroli. "MacroSwarm: A Field-Based Compositional Framework for Swarm Programming". In: *Coordination Models and Languages - 25th IFIP WG 6.1 International Conference, COORDINATION 2023, Held as Part of the 18th International Federated Conference on Distributed Computing Techniques, DisCoTec 2023, Lisbon, Portugal, June 19-23, 2023, Proceedings*. Ed. by Sung-Shik Jongmans and Antónia Lopes. Vol. 13908. Lecture Notes in Computer Science. Springer, 2023, pp. 31–51. DOI: 10.1007/978-3-031-35361-1_2. URL: https://doi.org/10.1007/978-3-031-35361-1_2

23. Giorgio Audrito, **Roberto Casadei**, Ferruccio Damiani, Gianluca Torta, and Mirko Viroli. "Programming Distributed Collective Processes for Dynamic Ensembles and Collective Tasks". In: *Coordination Models and Languages - 25th IFIP WG 6.1 International Conference, COORDINATION 2023, Held as Part of the 18th International Federated Conference on Distributed Computing Techniques, DisCoTec 2023, Lisbon, Portugal, June 19-23, 2023, Proceedings*. Ed. by Sung-Shik Jongmans and Antónia Lopes. Vol. 13908. Lecture Notes in Computer Science. Springer, 2023, pp. 71–89. DOI: 10.1007/978-3-031-35361-1_4. URL: https://doi.org/10.1007/978-3-031-35361-1_4

24. **savaglio2023dcoss-iot-collective-sa**

25. Giorgio Audrito, **Roberto Casadei**, Ferruccio Damiani, Guido Salvaneschi, and Mirko Viroli. "Functional Programming for Distributed Systems with XC". in: *36th European Conference on Object-Oriented Programming, ECOOP 2022, June 6-10, 2022, Berlin, Germany*. Ed. by Karim Ali and Jan Vitek. Vol. 222. LIPIcs. Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2022, 20:1–20:28. DOI: 10.4230/LIPIcs.ECOOP.2022.20. URL: https://doi.org/10.4230/LIPIcs.ECOOP.2022.20

26. Giorgio Audrito, **Roberto Casadei**, and Gianluca Torta. "On the Dynamic Evolution of Distributed Computational Aggregates". In: *2022 IEEE International Conference on Autonomic Computing and Self-Organizing Systems Companion (ACSOS-C)*. IEEE, Sept. 2022. DOI: 10.1109/acsosc56246.2022.00024. URL: https://doi.org/10.1109/acsosc56246.2022.00024

27. Gianluca Aguzzi, **Roberto Casadei**, and Mirko Viroli. "Addressing Collective Computations Efficiency: Towards a Platform-level Reinforcement Learning Approach". In: *2022 IEEE International Conference on Autonomic Computing and Self-Organizing Systems (ACSOS)*. IEEE, Sept. 2022. DOI: 10.1109/acsos55765.2022.00019. URL: https://doi.org/10.1109/acsos55765.2022.00019

28. Danilo Pianini, **Roberto Casadei**, and Mirko Viroli. "Self-stabilising Priority-Based Multi-Leader Election and Network Partitioning". In: *2022 IEEE International Conference on Autonomic Computing and Self-Organizing Systems (ACSOS)*. IEEE, Sept. 2022. DOI: 10.1109/acsos55765.2022.00026. URL: https://doi.org/10.1109/acsos55765.2022.00026

29. **Roberto Casadei**, Stefano Mariani, Danilo Pianini, Mirko Viroli, and Franco Zambonelli. "Space-Fluid Adaptive Sampling: A Field-Based, Self-organising Approach". In: *Coordination Models and Languages - 24th IFIP WG 6.1 International Conference, COORDINATION 2022, Held as Part of the 17th International Federated Conference on Distributed Computing Techniques, DisCoTec 2022, Lucca, Italy, June 13-17, 2022, Proceedings*. Ed. by Maurice H. ter Beek and Marjan Sirjani. Vol. 13271. Lecture Notes in Computer Science. Springer, 2022, pp. 99–117. DOI: 10.1007/978-3-031-08143-9_7. URL: https://doi.org/10.1007/978-3-031-08143-9_7

30. Gianluca Aguzzi, **Roberto Casadei**, and Mirko Viroli. "Towards Reinforcement Learning-based Aggregate Computing". In: *Coordination Models and Languages - 24th IFIP WG 6.1 International Conference, COORDINATION 2022, Held as Part of the 17th International Federated Conference on Distributed Computing Techniques, DisCoTec 2022, Lucca, Italy, June 13-17, 2022, Proceedings*. Ed. by Maurice H. ter Beek and Marjan Sirjani. Vol. 13271. Lecture Notes in Computer Science. Springer, 2022, pp. 72–91. DOI: 10.1007/978-3-031-08143-9_5. URL: https://doi.org/10.1007/978-3-031-08143-9_5

31. **Roberto Casadei**, Danilo Pianini, Gianluca Aguzzi, Giorgio Audrito, Gianluca Torta, Marco Ottina, Ferruccio Damiani, and Mirko Viroli. "Towards Automated Engineering for Collective Adaptive Systems: Vision and Research Directions". In: *2022 IEEE Intl Conf on Dependable, Autonomic and Secure Computing, Intl Conf on Pervasive Intelligence and Computing, Intl Conf on Cloud and Big Data Computing, Intl Conf on Cyber Science and Technology Congress (DASC/PiCom/CBDCom/CyberSciTech)*. IEEE, Sept. 2022. DOI: 10.1109/dasc/picom/cbdcom/cy55231.2022.9927839. URL: https://doi.org/10.1109/dasc/picom/cbdcom/cy55231.2022.9927839

32. Gianluca Aguzzi, **Roberto Casadei**, and Mirko Viroli. "Machine Learning for Aggregate Computing: a Research Roadmap". In: *42nd IEEE International Conference on Distributed Computing Systems, ICDCS Workshops, Bologna, Italy, July 10, 2022*. IEEE, 2022, pp. 119–124. DOI: 10.1109/ICDCSW56584.2022.00032. URL: https://doi.org/10.1109/ICDCSW56584.2022.00032

33. **Roberto Casadei**, Andrea Placuzzi, Mirko Viroli, and Danny Weyns. "Augmented Collective Digital Twins for Self-Organising Cyber-Physical Systems". In: *IEEE International Conference on Autonomic Computing and Self-Organizing Systems, ACSOS 2021, Companion Volume, Washington, DC, USA, September 27 - Oct. 1, 2021*. IEEE, 2021, pp. 160–165. DOI: 10.1109/ACSOS-C52956.2021.00051

34. Gianluca Aguzzi, **Roberto Casadei**, Danilo Pianini, Guido Salvaneschi, and Mirko Viroli. "Towards Pulverised Architectures for Collective Adaptive Systems through Multi-Tier Programming". In: *IEEE International Conference on Autonomic Computing and Self-Organizing Systems, ACSOS 2021, Companion Volume, Washington, DC, USA, September 27 - Oct. 1, 2021*. IEEE, 2021, pp. 99–104. DOI: 10.1109/ACSOS-C52956.2021.00033

35. Giorgio Audrito, **Roberto Casadei**, and Gianluca Torta. "Towards Integration of Multi-Agent Planning with Self-Organising Collective Processes". In: *IEEE International Conference on Autonomic Computing and Self-Organizing Systems, ACSOS 2021, Companion Volume, Washington, DC, USA, September 27 - Oct. 1, 2021*. IEEE, 2021, pp. 297–298. DOI: 10.1109/ACSOS-C52956.2021.00042

36. Giorgio Audrito, **Roberto Casadei**, and Gianluca Torta. "Fostering resilient execution of multi-agent plans through self-organisation". In: *IEEE International Conference on Autonomic Computing and Self-Organizing Systems, ACSOS 2021, Companion Volume, Washington, DC, USA, September 27 - Oct. 1, 2021*. IEEE, 2021, pp. 81–86. DOI: 10.1109/ACSOS-C52956.2021.00076

37. **Roberto Casadei**, Mirko Viroli, Alessandro Ricci, and Giorgio Audrito. "Tuple-Based Coordination in Large-Scale Situated Systems". In: *Coordination Models and Languages - 23rd IFIP WG 6.1 International Conference, COORDINATION 2021, Proceedings*. Vol. 12717. Lecture Notes in Computer Science. Springer, 2021, pp. 149–167. DOI: 10.1007/978-3-030-78142-2_10

38. Gianluca Aguzzi, **Roberto Casadei**, Niccolò Maltoni, Danilo Pianini, and Mirko Viroli. "ScaFi-Web: A Web-Based Application for Field-Based Coordination Programming". In: *Coordination Models and Languages - 23rd IFIP WG 6.1 International Conference, COORDINATION 2021, Proceedings*. Vol. 12717. Lecture Notes in Computer Science. Springer, 2021, pp. 285–299. DOI: 10.1007/978-3-030-78142-2_18

39. **Roberto Casadei**, Mirko Viroli, Giorgio Audrito, and Ferruccio Damiani. "FScaFi : A Core Calculus for Collective Adaptive Systems Programming". In: *Leveraging Applications of Formal Methods, Verification and Validation: Engineering Principles - 9th International Symposium on Leveraging Applications of Formal Methods, ISoLA 2020, Rhodes, Greece, October 20-30, 2020, Proceedings, Part II*. vol. 12477. Lecture Notes in Computer Science. Springer, 2020, pp. 344–360. DOI: 10.1007/978-3-030-61470-6_21

40. **Roberto Casadei**, Mirko Viroli, and Alessandro Ricci. "Collective Adaptive Systems as Coordination Media: The Case of Tuples in Space-Time". In: *2020 IEEE International Conference on Autonomic Computing and Self-Organizing Systems, ACSOS 2020, Companion Volume, Washington, DC, USA, August 17-21, 2020*. IEEE, 2020, pp. 139–144. DOI: 10.1109/ACSOS-C51401.2020.00045

41. **Roberto Casadei**, Christos Tsigkanos, Mirko Viroli, and Schahram Dustdar. "Engineering Resilient Collaborative Edge-Enabled IoT". in: *2019 IEEE International Conference on Services Computing (SCC)*. 2019, pp. 36–45. DOI: 10.1109/SCC.2019.00019

42. **Roberto Casadei** and Mirko Viroli. "Coordinating Computation at the Edge: a Decentralized, Self-Organizing, Spatial Approach". In: *2019 Fourth International Conference on Fog and Mobile Edge Computing (FMEC)*. 2019, pp. 60–67. DOI: 10.1109/FMEC.2019.8795355

43. **Roberto Casadei**, Danilo Pianini, Guido Salvaneschi, and Mirko Viroli. "On Context-Orientation in Aggregate Programming". In: *IEEE 4th International Workshops on Foundations and Applications of Self* Systems, FAS*W@SASO/ICCAC 2019, Umea, Sweden, June 16-20, 2019*. IEEE, 2019, pp. 92–97. DOI: 10.1109/FAS-W.2019.00035

44. Danilo Pianini, **Roberto Casadei**, and Mirko Viroli. "Security in Collective Adaptive Systems: A Roadmap". In: *IEEE 4th International Workshops on Foundations and Applications of Self* Systems, FAS*W@SASO/ICCAC 2019, Umea, Sweden, June 16-20, 2019*. IEEE, 2019, pp. 86–91. DOI: 10.1109/FAS-W.2019.00034. URL: https://doi.org/10.1109/FAS-W.2019.00034

45. Stefano Mariani, **Roberto Casadei**, Fabrizio Fornari, Giancarlo Fortino, Danilo Pianini, Barbara Re, Wilma Russo, Claudio Savaglio, Mirko Viroli, and Franco Zambonelli. "Case Studies for a New IoT Programming Paradigm: Fluidware". In: *Proceedings of the 1st Workshop on Artificial Intelligence and Internet of Things*. Vol. 2502. CEUR Workshop Proceedings. CEUR-WS.org, 2019, pp. 82–96. URL: http://ceur-ws.org/Vol-2502/paper6.pdf

46. **Roberto Casadei**, Danilo Pianini, Mirko Viroli, and Antonio Natali. "Self-organising Coordination Regions: A Pattern for Edge Computing". In: *Coordination Models and Languages - 21st IFIP WG 6.1 International Conference, COORDINATION 2019, Held as Part of the 14th International Federated Conference on Distributed Computing Techniques, DisCoTec 2019, Kongens Lyngby, Denmark, June 17-21, 2019, Proceedings*. Vol. 11533. Lecture Notes in Computer Science. Springer, 2019, pp. 182–199. DOI: 10.1007/978-3-030-22397-7_11

47. **Roberto Casadei**, Mirko Viroli, Giorgio Audrito, Danilo Pianini, and Ferruccio Damiani. "Aggregate Processes in Field Calculus". In: *Coordination Models and Languages - 21st IFIP WG 6.1 International Conference, COORDINATION 2019, Held as Part of the 14th International Federated Conference on Distributed Computing Techniques, DisCoTec 2019, Kongens Lyngby, Denmark, June 17-21, 2019, Proceedings*. Vol. 11533. Lecture Notes in Computer Science. Springer, 2019, pp. 200–217. DOI: 10.1007/978-3-030-22397-7_12

48. **Roberto Casadei** and Mirko Viroli. "Collective Abstractions and Platforms for Large-Scale Self-Adaptive IoT". in: *2018 IEEE 3rd International Workshops on Foundations and Applications of Self* Systems (FAS*W), Trento, Italy, September 3-7, 2018*. IEEE, 2018, pp. 106–111. DOI: 10.1109/FAS-W.2018.00033. URL: https://doi.org/10.1109/FAS-W.2018.00033

49. Danilo Pianini, Giovanni Ciatto, **Roberto Casadei**, Stefano Mariani, Mirko Viroli, and Andrea Omicini. "Transparent Protection of Aggregate Computations from Byzantine Behaviours via Blockchain". In: *Proceedings of the 4th EAI International Conference on Smart Objects and Technologies for Social Good, GOODTECHS 2018, Bologna, Italy, November 28-30, 2018*. ACM, 2018, pp. 271–276. DOI: 10.1145/3284869.3284870

50. Mirko Viroli, Jacob Beal, Ferruccio Damiani, Giorgio Audrito, **Roberto Casadei**, and Danilo Pianini. "From Field-Based Coordination to Aggregate Computing". In: *Coordination Models and Languages - 20th IFIP WG 6.1 International Conference, COORDINATION 2018, Held as Part of the 13th International Federated Conference on Distributed Computing Techniques, DisCoTec 2018, Madrid, Spain, June 18-21,*

2018. Proceedings. Vol. 10852. Lecture Notes in Computer Science. Springer, 2018, pp. 252–279. DOI: 10.1007/978-3-319-92408-3_12

51. **Roberto Casadei** and Mirko Viroli. "Programming Actor-Based Collective Adaptive Systems". In: *Programming with Actors - State-of-the-Art and Research Perspectives*. Vol. 10789. Lecture Notes in Computer Science. Springer, 2018, pp. 94–122. DOI: 10.1007/978-3-030-00302-9_4

52. Giorgio Audrito, **Roberto Casadei**, Ferruccio Damiani, and Mirko Viroli. "Compositional Blocks for Optimal Self-Healing Gradients". In: *11th IEEE International Conference on Self-Adaptive and Self-Organizing Systems, SASO 2017, Tucson, AZ, USA, September 18-22, 2017*. IEEE Computer Society, 2017, pp. 91–100. DOI: 10.1109/SASO.2017.18

53. **Roberto Casadei**, Alessandro Aldini, and Mirko Viroli. "Combining Trust and Aggregate Computing". In: *Software Engineering and Formal Methods - SEFM 2017 Collocated Workshops: FOCLASA, Trento, Italy, September 4-5, 2017, Revised Selected Papers*. Vol. 10729. Lecture Notes in Computer Science. Springer, 2017, pp. 507–522. DOI: 10.1007/978-3-319-74781-1_34

54. Giorgio Audrito, Ferruccio Damiani, Mirko Viroli, and **Roberto Casadei**. "Run-Time Management of Computation Domains in Field Calculus". In: *2016 IEEE 1st International Workshops on Foundations and Applications of Self* Systems (FAS*W), Augsburg, Germany, September 12-16, 2016*. IEEE, 2016, pp. 192–197. DOI: 10.1109/FAS-W.2016.50

55. Mirko Viroli, **Roberto Casadei**, and Danilo Pianini. "Simulating Large-scale Aggregate MASs with Alchemist and Scala". In: *Proceedings of the 2016 Federated Conference on Computer Science and Information Systems, FedCSIS 2016, Gdańsk, Poland, September 11-14, 2016*. Vol. 8. Annals of Computer Science and Information Systems. IEEE, 2016, pp. 1495–1504. DOI: 10.15439/2016F407

56. Mirko Viroli, **Roberto Casadei**, and Danilo Pianini. "On Execution Platforms for Large-scale Aggregate Computing". In: *Proceedings of the 2016 ACM International Joint Conference on Pervasive and Ubiquitous Computing: Adjunct*. UbiComp '16. Heidelberg, Germany: ACM, 2016, pp. 1321–1326. ISBN: 978-1-4503-4462-3. DOI: 10.1145/2968219.2979129

57. **Roberto Casadei** and Mirko Viroli. "Towards Aggregate Programming in Scala". In: *First Workshop on Programming Models and Languages for Distributed Computing, PMLDC@ECOOP 2016, Rome, Italy, July 17, 2016*. ACM, 2016, p. 5. DOI: 10.1145/2957319.2957372

Edited volumes

58. **Roberto Casadei**, Elisabetta Di Nitto, Ilias Gerostathopoulos, Danilo Pianini, et al., eds. *IEEE International Conference on Autonomic Computing and Self-Organizing Systems, ACSOS 2022, Virtual, CA, USA, September 19-23, 2022*. IEEE, 2022. ISBN: 978-1-6654-7137-4. DOI: 10.1109/ACSOS55765.2022. URL: https://doi.org/10.1109/ACSOS55765.2022

59. **Roberto Casadei**, Elisabetta Di Nitto, Ilias Gerostathopoulos, Danilo Pianini, et al., eds. *IEEE International Conference on Autonomic Computing and Self-Organizing Systems Companion, ACSOS-C 2022, Virtual, CA, USA, September 19-23, 2022*. IEEE, 2022. ISBN: 978-1-6654-5142-0. DOI: 10.1109/ACSOS-C56246.2022. URL: https://doi.org/10.1109/ACSOS-C56246.2022

Artefacts

1. Gianluca Aguzzi, **Roberto Casadei**, Danilo Pianini, and Mirko Viroli. *Dynamic decentralization domains for the Internet of Things - Simulation Repository*. 2022. DOI: 10.21227/QGBP-W789. URL: https://ieee-dataport.org/documents/dynamic-decentralization-domains-internet-things-simulation-repository

2. Giorgio Audrito, **Roberto Casadei**, Ferruccio Damiani, Guido Salvaneschi, and Mirko Viroli. "Functional Programming for Distributed Systems with XC (Artifact)". In: *Dagstuhl Artifacts Ser.* 8.2 (2022), 08:1–08:4. DOI: 10.4230/DARTS.8.2.8. URL: https://doi.org/10.4230/DARTS.8.2.8

3. **Roberto Casadei**, Mirko Viroli, Gianluca Aguzzi, and Danilo Pianini. "ScaFi: A Scala DSL and Toolkit for Aggregate Programming". In: *SoftwareX* 20 (2022), p. 101248. ISSN: 2352-7110. DOI: https://doi.org/10.1016/j.softx.2022.101248. URL: https://www.sciencedirect.com/science/article/pii/S2352711022001662

Contributions (e.g. open-source/academic software projects)

SCAFI (Project Lead and Developer)
ScaFi is a Scala toolkit for Aggregate Computing: it includes a field calculus DSL, simulator, distributed platform, and more. It is a collection of project modules for a total of more than 140K LoC. I lead the project and development of ScaFi, check pull requests, and coordinate work.

ALCHEMIST (Contributor)
Alchemist is a meta-simulator tailored to pervasive computing, on the JVM. I issued pull requests mainly on the ScaFi-Alchemist incarnation.

Miscellaneous Contributions
– org.protelis.protelisdoc: Kotlin gradle plugin to generate Protelis docs, via dokka

Slides @ Slideshare
Presentations corresponding to lecture notes (mainly about computer science) and conference talks.

Certifications

TS: Microsoft .NET Framework - Application Development Foundation 2011
(License 8424975 - Prometric) Bologna (Italy)

Teaching

Teaching in PhD courses

Engineering Intelligent Collective Systems (phd course) 2021
Course PhD Programme on Computer Science and Engineering Cesena, UNIBO
Activity I run a module of 10 hours on research themes pertaining to collective adaptive systems engineering.

Teaching in BEng/BSc courses

95648 - Software Design and Development - 9 cfu a.y. 2023-24
Role I got the **responsibility** for the entire course. Cesena, UNIBO
Course First cycle degree programme (L) in Computer Systems Technologies
Activity I teach (for 30 hours) the basics of software design and development, object-oriented programming, and Java.

11929 - Algorithm and Data Structures - 6 cfu a.y. 2023-24
Role I got the **responsibility** for the entire course. Cesena, UNIBO
Degree First cycle degree programme (L) in Computer Systems Technologies (cod. 6007)
Activity I teach (for 44 hours) algorithm analysis and design, and data structures, with examples in pseudocode, C, and Python.

B3109 - Mobile System Programming Workshop Classes - 6 cfu a.y. 2023-24
Role I got the **responsibility** for the entire course. Imola, UNIBO
Course First cycle degree programme (L) in Computer Systems Technologies (cod. 6007 and cod. 5816)
Activity I teach (for 16 hours) mobile application development, with a focus on the Android platform and Kotlin programming.

09730 - Principles of Informatics - 6 cfu a.y. 2022-23
15305 - Foundations of Informatics A - 6 cfu Cesena, UNIBO
Role I got the **responsibility** for the entire course.
Course First cycle degree programme (L) in Electronics Engineering and in Biomedical Engineering
Activity I teach (for 30 hours) the fundamentals of computers science (representation of information, algorithms) and the basics of imperative, structured programming in C.

95648 - Software Design and Development - 9 cfu a.y. 2022-23
Role I got the **responsibility** for the entire course. Cesena, UNIBO
Course First cycle degree programme (L) in Computer Systems Technologies
Activity I teach (for 30 hours) the basics of software design and development, object-oriented programming, and Java.

70219 - Object-Oriented Programming - Module 3 a.y. 2022-23
Course First cycle degree programme (L) in Computer Science and Engineering Cesena, UNIBO
Activity I teach (for 30 hours) OOP in Java and related programming tools (version control, Eclipse, JavaFX, Gradle, etc.).

98214 - Intelligent Cyber-Physical Systems - Module 2 a.y. 2021-22
Course Minor "Smart Infrastructures" Cesena, UNIBO
Activity I teach (for 20 hours) about topics related to intelligent cyber-physical systems, including tutoring for projects.

09730 - Principles of Informatics – 9 cfu a.y. 2021-22
Role I got the **responsibility** for the entire course. Cesena, UNIBO
Course First cycle degree programme (L) in Electronics Engineering (cod. 5834) and Biomedical Engineering (cod. 9082)
Activity I run 3 CFUs (30 hours) of teaching and laboratory material preparation and assessment on the fundamentals of computers science (representation of information, algorithms) and the basics of imperative, structured programming in C.

70219 - Object-Oriented Programming - Module 3 a.y. 2021-22
Course First cycle degree programme (L) in Computer Science and Engineering Cesena, UNIBO
Activity I teach (for 30 hours) OOP in Java and related programming tools (version control, Eclipse, JavaFX, Gradle, etc.).

15305 - Foundations of Informatics A - Module 2 a.y. 2020-21
Course First cycle degree programme (L) in Electronics Engineering for Energy and Information (cod. 8767) Cesena, UNIBO
Activity I teach (for 30 hours) the fundamentals of computers science (representation of information, algorithms) and the basics of imperative, structured programming in C.

70219 - Object-Oriented Programming - Module 3 a.y. 2020-21
Course First cycle degree programme (L) in Computer Science and Engineering Cesena, UNIBO
Activity I teach (for 30 hours) OOP in Java and related programming tools (version control, Eclipse, JavaFX, Gradle, etc.).

Other teaching-related activities

Tutor for course modules *Programming and Development Paradigms* and *Concurrent and Distributed Programming* (five editions) a.y. 2016-17, 2017-18, 2018-19, 2019-20, 2020-21
Course Second cycle degree programme (LM) in Computer Science and Engineering (cod. 8614) Cesena, UNIBO
Activity As a tutor, I prepare exercises, help students in doing them and following the course, and do seminars on specialised topics. These courses cover advanced programming and paradigms (functional, logic, concurrent, distributed). The contract was of 40 hours (2016-17), 60 hours (2017-18), 60 hours (2018-19), 24 hours (2019-20), 60 hours (2020-21).

Tutor for course module *Object-Oriented Programming* a.y. 2019-20
Course First cycle degree programme (L) in Computer Science and Engineering Cesena, UNIBO
Activity As a tutor, I prepare exercises (on OOP in Java) and help students in doing them and following the course. The contract is for 56 hours.

Seminars in the BBS open-program *Internet of Things*, modules *Software Production* and *Distributed Systems* 2018
Bologna Business School
Activity I did two seminars to engineers and professionals on specialised topics: (1) software testing and (2) cloud-native application development.

30h in IFTS course "Technician for design and development of computer applications specialised in new digital technologies" 2018
Cesena
What Higher Technical Education and Training (IFTS) is an education programme funded by the Italian Ministry of Education (MIUR).
Activity 30 hours teaching the basics of programming in Python to high-school graduates.

60h in IFTS course "Technician for design and development of computer applications specialised in business problem solving" 2018
Cesena
Activity 60 hours teaching the basics of programming in JavaScript to high-school graduates.

(Co-)Supervised Theses and Students

Full list available in amslaurea.unibo.it.

M.Sc. / M.Eng. in Computer Science and Engineering degree theses

1. Gestione degli effetti in linguaggi di programmazione funzionale: tecniche di modellazione e interpretazione, Giacomo Cavalieri, 2023
2. *A functional-reactive perspective on the Aggregate Computing paradigm*, Francesco Dente, 2023
3. A platform for aggregate computing over LoRaWAN network, Andrea Placuzzi, 2020
4. A Reinforcement Learning approach to discriminate unsafe devices in aggregate computing systems, Chiara Volonnino, 2020
5. Una piattaforma client-server universale per Aggregate Computing, Loris Cangini, 2020

6. Towards Aggregate Processes in a Field Calculus-Based Platform, Davide Foschi, 2018
7. Distributing Aggregate Computations on top of Akka Actors, Manuel Peruzzi, 2018
8. Prototyping a scalable Aggregate Computing cluster with open-source solutions, Cristian Paolucci, 2018
9. Tecniche e algoritmi di aggregate computing a supporto di contesti di smart mobility, Filippo Berlini, 2017
10. Design and Deployment of an Execution Platform based on Microservices for Aggregate Computing in the Cloud, Thomas Farneti, 2017

B.Sc. / B.Eng. in Computer Science and Engineering degree theses

1. *Un'indagine sugli strumenti di supporto alle revisioni sistematiche della letteratura scientifica*, Edoardo Montanari, 2023
2. Progettazione di un ambiente di programmazione visuale block-based per ScaFi, Matteo Cerioni, 2022
3. Un framework per la graficazione di dati in Scala, Andrea Bianchi, 2022
4. Piattaforma a Supporto del Monitoraggio di Sistemi di Computazione Aggregata: Caso di Studio ScaFi-Web, Denys Grushchak, 2021
5. Progettazione di un sistema di categorizzazione delle regressioni per il compilatore Rust, Giacomo Pasini, 2020
6. Design e prototipazione di un middleware per applicazioni aggregate location-based, Linda Vitali, 2020
7. Sviluppo di una libreria in Scala di supporto alla creazione e configurazione di uno stack SMACK, Stefano Salvatori, 2018
8. Sviluppo di un front-end di simulazione per applicazioni aggregate nel framework Scafi, Gianluca Aguzzi, 2018
9. Sviluppo di applicazioni distribuite con lo stack SMACK, Emiliano Ciavatta, 2018
10. Indagine sull'utilizzo di Scala per progetti Android, Giuseppe Ettore Radaelli, 2017

Professional Experience

Full-Stack Software Engineer — 2014/09 → 2015/12
Apex-Net (WEDO), Cesena (Italy)

Web service (WCF) and application development in ASP.NET MVC and JavaScript within a Scrum/Kanban process framework.

- Server-side: ASP.NET MVC
- Client-side: ZURB Foundation, HTML, CSS3, JavaScript, JQuery, KnockoutJS
- Client-server interaction: Comet via SignalR
- Frameworks/libs: DevExpress ASP.NET MVC Extensions
- Web services: WCF (REST-style, SOAP XML & WS-*)

Mobile Software Engineer — 2014/03 → 2014/09
Apex-Net (WEDO), Cesena (Italy)

Development of a Windows 8.1 application in C#/XAML and development of the related WCF back-end service for SharePoint integration.

IT Book reviewer — 2007 → 2011
programmazione.it

During the years of high school, I used to write reviews of computer science books for an Italian e-zine (and the next years, more informally, for a personal blog) The website is dismissed: look it up on archive.org.

Education

PhD Programme in Computer Science and Engineering 2016/11 → 2020/04
Thesis Engineering self-adaptive collective processes for cyber-physical ecosystems Università di Bologna (IT)
Courses
- Spatial Multiagent Systems and Aggregate Computing: New Directions for Spatial Computing (2017, A. Omicini & M. Viroli)
- Approximation Algorithms (BISS'17, F. Grandoni)
- Kleene Algebra with Tests and Applications to Network Programming (BISS'17, A. Silva)
- Models and Algorithms for Matching and Assignment Problems (S. Martello)
- Developing, maintaining, and sharing software tools for research (D. Pianini)

24 CFU Training Programme – Anthropological, psycho-pedagogy disciplines and teaching methodologies and technologies 2018
Università di Bologna (IT)
Exams
- Anthropology, 30L/30
- Psychology, 30/30
- Pedagogy, special pedagogy, and didactics for inclusion, 30/30
- General methodologies and technologies for didactics, 30L/30

Master's Degree in Computer Science and Engineering 2013/09 → 2016/03
Grade Summa Cum Laude (Grade Average: 30/30, 6 laudes) Università di Bologna (IT)
Thesis Aggregate Programming in Scala: a Core Library and Actor-based Platform for Distributed Computational Fields (supervisor: Mirko Viroli)
Exams
- Artificial Intelligence (Vittorio Maniezzo), 30/30
- Programming and Paradigms (Alessandro Ricci), 30L/30
- Autonomous Systems (Andrea Omicini), 30L/30
- Business Intelligence (Stefano Rizzi), 30/30
- Computer Security (Gabriele D'Angelo), 30L/30
- Data Base Systems (Matteo Golfarelli), 30/30
- Distributed Systems (Andrea Omicini), 30/30
- Engineering Complex Adaptive Software Systems (Mirko Viroli), 30/30
- Programming Languages and Models of Computation (Gianluigi Zavattaro), 30/30
- Project Management (Marco Antonio Boschetti), 30L/30
- Semantic Web (Antonella Carbonaro), 30L/30
- Software Systems Engineering (Antonio Natali), 30/30
- Web Services and Applications (Mario Bravetti), 30L/30

Bachelor's Degree in Electronics, Informatics, and Telecommunications Engineering 2009/09 → 2013/03
Università di Bologna (IT)

Grade Summa Cum Laude (Grade Average: 29.29/30, 5 laudes)

Thesis Reuse Mechanisms and Concurrency: from Actors to Agent-oriented Programming (supervisor: Alessandro Ricci)

Exams
- Automatic Controls (Paolo Castaldi), 30L/30
- Computer Networks (Claudio Salati), 30L/30
- Data Base Systems (Alessandra Lumini), 30L/30
- Digital Design Principles and Computer Architecture (Luca Roffia), 30/30
- Economics and Business Organisation (Cinzia Daraio), 28/30
- Electrotechnics (Franco Mastri), 28/30
- Foundations of Informatics A (Mirko Viroli), 30/30
- Foundations of Informatics B (Andrea Roli), 30/30
- General Physics A (Maurizio Piccinini), 28/30
- General Physics B (Maurizio Piccinini), 26/30
- Geometry and Algebra (Michele Mulazzani), 30/30
- Mathematical Analysis A (Massimo Cicognani), 28/30
- Mathematical Analysis for the Engineering Information Technology (Massimo Cicognani), 28/30
- Operating Systems (Alessandro Ricci), 29/30
- Operations Research (Daniele Vigo), 30L/30
- Signal Processing (Davide Dardari), 28/30
- Software Engineering (Antonio Natali), 30L/30
- Telecommunications Networks (Franco Callegati), 30L/30
- Web-related Technologies (Mario Bravetti), 30/30
- English Proficiency B1

Erasmus Programme 2012/01 → 2012/05
University of Limerick (IRL)

Courses
- Distributed Systems (Reiner Dojen), A/A
- Human-Computer Interaction (Luigina Ciolfi), A/A
- Real-time Systems (Brian Adley), A/A
- Software Testing and Inspection (Norah Power), A/A

Skills and Technical Expertise

Note: this section is only indicative; current level of mastery can vary; by no means exhaustive.

Paradigms Imperative; OOP; Functional; Reactive; Async; Logic; Agent-Oriented

Languages Scala, Java/Kotlin, C#, C++, Ruby, Haskell, Python, JavaScript

Data E/R modeling; relational modelling; semantic web

Design/Arch. Design patterns; SOA/Microservices; cloud-native applications

Devops Docker; Kubernetes; CI/CD (Gradle, Travis, GitHub Actions)

Technologies
Cloud – Google Cloud Platform, Amazon Web Services, Heroku
Web dev. – HTML5; CSS3; jQuery; PHP
Frameworks – Akka; Spring; NodeJs; ASP.NET MVC; Rails; Vert.x; RabbitMQ
Data – MySQL; NoSQL (e.g. MongoDB)

Process
Agile sw dev. and practices: Scrum; (A)TDD/BDD.
Model-driven sw dev.: UML; DSL; code-generation (XText).
Collaborative sw dev.: version control (git); build automation (Gradle, sbt).

Languages

Italian Mother tongue.

English Proficient in both spoken and written English.

Referees

Prof. Mirko Viroli, Full Professor, Department of Computer Science and Engineering (DISI), Alma Mater Studiorum–Università di Bologna
Prof. Viroli was my PhD and Master Thesis advisor, and is currently my research fellowship supervisor.

Prof. Alessandro Ricci, Associate Professor, Department of Computer Science and Engineering (DISI), Alma Mater Studiorum–Università di Bologna
Prof. Ricci was my Bachelor Thesis supervisor and, more recently, has been a co-author in research publications.

Referees from academia
Other referees for my academic profile include: Prof. Simon Dobson, Prof. Ferruccio Damiani, Prof. Andrea Omicini, Prof. Lukas Esterle, Prof. Jacob Beal, Prof. Giancarlo Fortino, Prof. Schahram Dustdar, Prof. Franco Zambonelli.

I hereby authorize the use of my personal data in accordance to the GDPR (General Data Protection Regulation) 679/16 – "European regulation on the protection of personal data".