Roberto Casadei

Curriculum Vitae (Aug 2021)   *PhD, Research Fellow*

Overview

Research Fellowship (DISI, UNIBO)   2019/11 → 2022/10
Theme   Engineering collective adaptive processes through aggregate computing   Università di Bologna

PhD in Computer Science and Engineering, "Excellent" defence   2016/11 → 2020/04
Thesis   Engineering Self-* Collective Processes for Cyber-Physical Ecosystems   Università di Bologna

Research, community, teaching   2016 →
Papers   31+ in journals/conf.proceedings; h-index 11 (SCOPUS), 13 (gscholar)
Service   ACSOS'21 PC, COORDINATION'21 PC, eCAS'21 Chair
Teach.   Teaching & tutoring in Bachelor's and Master's Courses (UNIBO)

Open-source/academic software projects
Notably   SCAFI (Lead Developer), Alchemist (Contributor)

Research & Education experience abroad
2018   TU Wien (Austria) – Visiting PhD student
2017   University of St Andrews (Scotland) – Visiting PhD student
2012   University of Limerick (Ireland) – Erasmus Programme

Work experience as Software Engineer (part-time, while studying)   2014/03 → 2015/12
Notably   Backend, Front-end, Web and App Developer (.NET)

Scholarships & awards
Notably   IEEE TCSC PhD Thesis Award; Prize G. Bassi'17

Scholarships
Notably   PhD scholarship (MIUR); Mobility Grants (MarcoPolo, conferences)

Recent activity

Summary I am currently a research fellow at the Department of Computer Science & Engineering of the University of Bologna (UNIBO). I have 31+ publications at international journals and conferences; my current H-Index is 13 (GScholar), 11 (SCOPUS). I got a PhD in *CS & Eng.* from UNIBO, with a thesis on "Engineering Collective Adaptive Processes for Cyber-Physical Ecosystems" (supervised by Prof. Viroli), 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 as a Master graduate/student. In 2014-15, I have also worked as a part-time software engineer. I also enjoy teaching; I am Adjunct Professor in the BEng course *Object-Oriented Programming*, a.y. 2020-21, at UNIBO, Cesena.

Research Themes

In a nutshell, my research interests and activity revolve around two main themes: **software engineering** and **distributed artificial intelligence**. In particular, I focus on programming paradigms, languages, architectures, and design patterns for addressing issues in distributed systems, multi-agent systems, self-* systems, collective systems, and intelligent systems.

Research Community Service

Frontiers in Robotics & AI (Q2) - Guest Associate Editor   2021–2022
"QA & Risk Mitigation in Large-Scale Distributed Systems"

MDPI Electronics (Q2) - Guest Editor   2021–2022
"Mobile Cyber-Physical Collectives"

MDPI Electronics - Topical Advisory Panel   2021–
MDPI Electronics Journal

eCAS'21 Workshop Chair   2021
6th eCAS Workshop on Engineering Collective Adaptive Systems   Washington DC, USA

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

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

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

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

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

ACSOS'21 Publicity Chair   2021
2nd IEEE International Conference on Autonomic Computing and Self-Organizing   Washington DC, USA
Systems

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

MDPI Electronics - Topic Board Member   2020–2021
MDPI Electronics Journal - Topic Editors

eCAS'20,'17 Program Committee Member   2020
5th eCAS Workshop on Engineering Collective Adaptive Systems   Washington, USA
Same role in the past: 2017, Tucson USA (2nd eCAS)

eCAS'19 Workshop Chair   2019
4th eCAS Workshop on Engineering Collective Adaptive Systems   Ulmea, Sweden

SASO'18 Web Chair (Organizing Committee Member)   2018
12th IEEE International Conference on Self-Adaptive and Self-Organizing Systems   Trento, Italy

Research Contracts

Research Contract @ UNIBO   2019–2022 (3 years)
Theme   Engineering evolving collective adaptive systems for modern infras-   UNIBO, Cesena
               tructures
Supervisor Prof. Mirko Viroli

Qualifications

Qualification for teaching *Computer Science and Technologies* (c.c.   since 2021
A041) in Secondary School
I got this qualification by passing the ordinary public competition for STEM
subjects in 2021 (see next).

Experiences Abroad

Visiting PhD student @ TU Wien (Austria)   2018, 2 months
Collaboration on collective adaptive systems and edge computing.
Foreign reference professor: Prof. Schahram Dustdar

Visiting PhD student @ St Andrews (Scotland)   2017, 3 months
Collaboration on topological methods and distributed computing.   Marco Polo scholarship
Foreign reference professor: Prof. Simon Dobson

Erasmus @ Limerick (Ireland)   2012, 4 months
Taking exams on specific BEng courses.   Erasmus scholarship

Scholarships

Computer Science and Engineering PhD Scholarship   2016/11 → 2019/10
First classified in the general merit ranking for admission to the PhD Programme   Università di Bologna
and scholarship assignment.

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 conference series.

Study Scholarship   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.

Scholarship for meritorious students
2015
I am 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

Awards

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.

Best master 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)

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

Public Competitions

1st WINNER - Ordinary Public Competition for Recruitment (and Qualification) of Secondary School Teachers - STEM (Science, Technology, Engineering and Mathematics) - Competition class A041 (Computer science and technologies) - Region: Emilia-Romagna
2021
Modena
I won the public regional competition at position 1 with a score of 192/200 points after one written part (a test of 50 questions about computer science topics like computational models, operating systems, networks, programming, and web techologies) and one oral part (about the design of a didactical activity).

Selected Publications

1. 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* (2021), p. 110908

   - Q1 (Scimago Quartile as of 2019); 0 cits. (Gscholar)
   - **CRediT:** Methodology, Software, Validation, Writing - original draft, Writing - review & editing

2. **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

   - Q1 (Scimago Quartile as of 2019); 4 cits. (Gscholar)
   - **CRediT:** Conceptualization, Methodology, Software, Validation, Investigation, Writing - original draft, Writing - review & editing, Visualization

3. **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

- ○ Q2 (Scimago Quartile as of 2019); 2 cits. (Gscholar)
- ○ **CRediT:** Conceptualization, Investigation, Writing - original draft

4. 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

- ○ Q1 (Scimago Quartile as of 2019, Engineering subject area); 1 cits. (Gscholar)
- ○ **Contribution:** I actively carried out the first draft, the revisions, and developed the sections of introduction, concepts, and application domains.

5. 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* (2020)

- ○ Q1 (Scimago Quartile as of 2019); 5 cits. (Gscholar)
- ○ **CRediT:** Conceptualization, Methodology, Software, Validation, Writing - original draft, Writing - review & editing, Visualization. This work builds on a previous publication at COORDINATION which I developed as first author. I developed mainly the introduction, related literature survey, and – prominently – the pattern characterisation. I also contributed to defining the evaluation framework and case studies.

6. 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

- ○ Q2 (Scimago Quartile); 20 cits. (Gscholar)
- ○ **Contribution:** I contributed to the literature review, discussion of algorithms, presentation of ScaFi, and specific topics in perspectives and roadmaps.

7. **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

- ○ Q1 (Scimago Quartile); 47 cits. (Gscholar)
- ○ **Contribution:** I largely contributed to the conceptualisation, writing, and modelling parts.
- ○ This work describes an approach to opportunistic edge computing that leverages collective-based services.

8. **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

- ○ A- (GGS Rating); 8 cits. (Gscholar)
- ○ **Contribution:** I largely contributed to conceptualisation, writing, modelling, and evaluation.
- ○ This work describes an engineering approach to resilient IoT based on splitting a system into multiple feedback-regulated areas.

9. **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* (2018)

   - Q1 (Scimago Quartile); 96 cits. (Gscholar)
   - **Contribution:** I largely contributed to the conceptualisation, writing, modelling parts, and case study definition.
   - This work describes an approach of opportunistic computing for the IoT.

10. **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

    - Q3 (Scimago Quartile); 14 cits. (Gscholar)
    - **Contribution:** I largely contributed to conceptualisation, writing, software, implementation, and experiments.
    - This work combines trust with aggregate computing, enabling a form of protection from attackers of self-organising computations (like gradients and more complex behaviours built on gradients).

11. Giorgio Audrito, **Roberto Casadei**, Ferruccio Damiani, and Mirko Viroli. "Compositional Blocks for Optimal Self-Healing Gradients". In: *Self-Adaptive and Self-Organising Systems (SASO), IEEE International Conference on*. IEEE. 2017

    - 32 cits. (Gscholar)
    - **Contribution:** I largely contributed to the evaluation and experimental parts.
    - This work proposes novel algorithms and components to develop efficient self-healing gradients (self-organising distance estimation computations).

Peer-reviewed Publications

Bibliometrics

- **H-index**: 13 (Gscholar), 11 (Scopus).
- **i10-index**: 18 (Gscholar).
- **Number of citations**: 519 (Gscholar), 349 (Scopus).
- **Number of publications:** 31 (30 in Scopus).
- **Number of Q1 journal publications:** 6.

All my publications (ordered by year, descending):

1. **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

2. 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

3. **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. URL: https://www.mdpi.com/2224-2708/10/2/27

4. 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* (2021), p. 110908

5. **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

6. **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

7. **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*. Springer, 2020, pp. 344–360. ISBN: 978-3-030-61470-6

8. 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

9. 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* (2020)

10. R. Casadei, M. Viroli, and A. 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 Companion (ACSOS-C)*. 2020, pp. 139–144

11. 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

12. **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

13. **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

14. **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

15. **Roberto Casadei**, Danilo Pianini, Guido Salvaneschi, and Mirko Viroli. "On Context-Orientation in Aggregate Programming". In: *2019 IEEE 4th International Workshops on Foundations and Applications of Self* Systems (FAS* W)*. IEEE. 2019, pp. 92–97

16. Danilo Pianini, **Roberto Casadei**, and Mirko Viroli. "Security in Collective Adaptive Systems: A Roadmap". In: *2019 IEEE 4th International Workshops on Foundations and Applications of Self* Systems (FAS* W)*. IEEE. 2019, pp. 86–91

17. 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

18. **Roberto Casadei**, Danilo Pianini, Mirko Viroli, and Antonio Natali. "Self-organising Coordination Regions: A Pattern for Edge Computing". In: *International Conference on Coordination Languages and Models*. Springer. 2019, pp. 182–199

19. **Roberto Casadei**, Mirko Viroli, Giorgio Audrito, Danilo Pianini, and Ferruccio Damiani. "Aggregate Processes in Field Calculus". In: *International Conference on Coordination Languages and Models*. Springer. 2019, pp. 200–217

20. **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)*. IEEE. 2018, pp. 106–111

21. 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*. ACM. 2018, pp. 271–276

22. **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* (2018)

23. **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

24. Mirko Viroli, Jacob Beal, Ferruccio Damiani, Giorgio Audrito, **Roberto Casadei**, and Danilo Pianini. "From Field-Based Coordination to Aggregate Computing". In: *International Conference on Coordination Languages and Models*. Springer. 2018, pp. 252–279

25. **Roberto Casadei** and Mirko Viroli. "Programming actor-based collective adaptive systems". In: *Programming with Actors*. Springer, 2018, pp. 94–122

26. Giorgio Audrito, **Roberto Casadei**, Ferruccio Damiani, and Mirko Viroli. "Compositional Blocks for Optimal Self-Healing Gradients". In: *Self-Adaptive and Self-Organising Systems (SASO), IEEE International Conference on*. IEEE. 2017

27. **Roberto Casadei**, Alessandro Aldini, and Mirko Viroli. "Combining trust and aggregate computing". In: *International Conference on Software Engineering and Formal Methods*. Springer. 2017, pp. 507–522

28. Giorgio Audrito, Ferruccio Damiani, Mirko Viroli, and **Roberto Casadei**. "Run-Time Management of Computation Domains in Field Calculus". In: *Foundations and Applications of Self* Systems, IEEE International Workshop on*. IEEE. 2016, pp. 192–197

29. **Roberto Casadei**, Danilo Pianini, and Mirko Viroli. "Simulating large-scale aggregate MASs with Alchemist and Scala". In: *Computer Science and Information Systems (FedCSIS), 2016 Federated Conference on*. IEEE. 2016, pp. 1495–1504

30. 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. URL: http://doi.acm.org/10.1145/2968219.2979129

31. **Roberto Casadei** and Mirko Viroli. "Towards Aggregate Programming in Scala". In: *First Workshop on Programming Models and Languages for Distributed Computing*. PMLDC '16. Rome, Italy: ACM, 2016, 5:1–5:7. ISBN: 978-1-4503-4775-4. DOI: 10.1145/2957319.2957372. URL: http://doi.acm.org/10.1145/2957319.2957372

Talks

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

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

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

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

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

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

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

From Field-Based Coordination to Aggregate Computing

Event   20th International Conference on Coordination Models and Languages

2018/06
Madrid (ESP)

Compositional Blocks for Optimal Self-Healing Gradients

Event   11th IEEE International Conference on Self-Adaptive and Self-Organizing Systems (SASO'17)

2017/09
Tucson, Arizona (USA)

Practical Aggregate Programming in Scala

Event   Scala Symposium 2016

2016/10
Amsterdam (NLD)

Programming Actor-based Collective Adaptive Systems

Event   AGERE'16 (international workshop on agents and actors)

2016/10
Amsterdam (NLD)

On Execution Platforms for Large-Scale Aggregate Computing

Event   Workshop on Collective Adaptation in Very Large Scale Ubicomp: Towards a Superorganism of Wearables, Ubicomp/ISWC Adjunct

2016/09
Heidelberg (DEU)

Towards Aggregate Programming in Scala

Event   1st International Workshop on Programming Models and Languages for Distributed Computing (PMLDC) – co-located with ECOOP

2016/06
Rome (ITA)

Teaching

Engineering Intelligent Collective Systems

Course   PhD Programme on Computer Science and Engineering
Activity I run a module of 10 hours on research themes pertaining to collective adaptive systems engineering.

2021
Online

Foundations of Informatics A - Module 2

Course   First cycle degree programme (L) in Electronics Engineering for Energy and Information
Activity I run 30CFU of teaching and laboratory material preparation and assessment on imperative, structured programming in C.

a.y. 2020-21
Cesena

Object-Oriented Programming - Module 3

Course   First cycle degree programme (L) in Computer Science and Engineering
Activity I run 30CFU of teaching and laboratory material preparation and assessment on OOP in Java and related programming tools (version control, Eclipse, JavaFX, Gradle, etc.).

a.y. 2020-21
Cesena

Tutor for course modules *Programming and Development Paradigms* and *Concurrent and Distributed Programming*

Course   Second cycle degree programme (LM) in Computer Science and Engineering (cod. 8614)
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).

2016-17, 2017-18,
2018-19, 2019-20,
2020-21
Cesena

Tutor for course module *Object-Oriented Programming*

Course   First cycle degree programme (L) in Computer Science and Engineering
Activity As a tutor, I prepare exercises (on OOP in Java) and help students in doing them and following the course.

2019-20
Cesena

Seminars in the BBS open-program *Internet of Things*, modules *Software Production* and *Distributed Systems*   2018
<div align="right">Bologna Business School</div>

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
<div align="right">Cesena</div>

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
<div align="right">Cesena</div>

Activity	60 hours teaching the basics of programming in JavaScript to high-school graduates.

(Co-)supervised theses

Full list available in amslaurea.unibo.it.

M.Sc. / M.Eng. degree

- A platform for aggregate computing over LoRaWAN network, Placuzzi, 2020

- A Reinforcement Learning approach to discriminate unsafe devices in aggregate computing systems, Volonnino, 2020

- Towards Aggregate Processes in a Field Calculus-Based Platform, Foschi, 2018

- Distributing Aggregate Computations on top of Akka Actors, Peruzzi, 2018

- Tecniche e algoritmi di aggregate computing a supporto di contesti di smart mobility, Berlini, 2017

- Design and Deployment of an Execution Platform based on Microservices for Aggregate Computing in the Cloud, Farneti, 2017

B.Sc. / B.Eng. degree

- Progettazione di un sistema di categorizzazione delle regressioni per il compilatore Rust, Pasini, 2020

- Sviluppo di un front-end di simulazione per applicazioni aggregate nel framework Scafi, Aguzzi, 2018

- Sviluppo di applicazioni distribuite con lo stack SMACK, Ciavatta, 2018

Reviewer Activity

Peer reviewing in Journals and Conferences (10+)

- IEEE Internet of Things

- IEEE Transactions on Intelligent Transportation Systems

- Springer Software and Systems Modeling

- Elsevier Journal on Pervasive and Mobile Computing (PMC)

- For more, see my publons profile

Books

○ *Programming with Types (Vlad Riscutia, 2019, Manning)*

○ *Classic Computer Science Problems in Python (David Kopec, 2019, Manning)*

Contributions (open-source/academic projects)

SCAFI (Lead developer)
ScaFi is a Scala toolkit for Aggregate Computing: it includes a field calculus DSL, simulator, and distributed platform. I lead the 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
Slides with notes about computer science, lectures, and talks.

Professional Experience

Software Engineer Web application development in ASP.NET MVC and JavaScript within a Scrum/Kanban process framework.	2014/09 → 2015/12 Apex-Net (WEDO) Cesena (Italy)
Software Engineer Development of a Windows 8.1 application in C#/XAML and development of the related WCF back-end service for SharePoint integration.	2014/03 → 2014/09 Apex-Net (WEDO) Cesena (Italy)
IT Book reviewer 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.	2007 → 2011 programmazione.it

Certifications

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

Education

PhD Programme in Computer Science and Engineering	2016/11 → 2020/04 Università di Bologna

Thesis Engineering self-adaptive collective processes for cyber-physical ecosystems

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

Exams
- Anthropology (30L)
- Psychology (30)
- Pedagogy, special pedagogy, and didactics for inclusion (30)
- General methodologies and technologies for didactics (30L)

Master's Degree in Computer Science and Engineering

2013/09 → 2016/03
Università di Bologna

Grade · Summa Cum Laude (Grade Average: 30/30, 6 laudes)

Thesis · Aggregate Programming in Scala: a Core Library and Actor-based Platform for Distributed Computational Fields

Exams
- Artificial Intelligence
- Programming and Paradigms
- Autonomous Systems
- Business Intelligence
- Computer Security
- Data Base Systems
- Distributed Systems
- Engineering Complex Adaptive Software Systems
- Programming Languages and Models of Computation
- Project Management
- Semantic Web
- Software Systems Engineering
- Web Services and Applications

Bachelor's Degree in Electronics, Informatics, and Telecommunications Engineering

2009/09 → 2013/03
Università di Bologna

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

Thesis · Reuse Mechanisms and Concurrency: from Actors to Agent-oriented Programming

Exams
- Automatic Controls
- Computer Networks
- Data Base Systems
- Digital Design Principles and Computer Architecture
- Economics and Business Organisation
- Electrotechnics
- Foundations of Informatics A
- Foundations of Informatics B
- General Physics A
- General Physics B
- Geometry and Algebra
- Mathematical Analysis A
- Mathematical Analysis for the Engineering Information Technology
- Operating Systems
- Operations Research
- Signal Processing
- Software Engineering
- Telecommunications Networks
- Web-related Technologies
- English Proficiency B1

Erasmus Programme

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

Courses
- Distributed Systems
- Human-Computer Interaction
- Real-time Systems
- Software Testing and Inspection

Skills and 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)
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
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.

References

Prof. Mirko Viroli

Role	Full Professor, Department of Computer Science and Engineering (DISI), Alma Mater Studiorum–Università di Bologna

Prof. Viroli was my PhD and Master Thesis supervisor.

Prof. Alessandro Ricci

Role	Associate Professor, Department of Computer Science and Engineering (DISI), Alma Mater Studiorum–Università di Bologna

Prof. Ricci was my Bachelor Thesis supervisor.

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".