



Roberto Casadei

Curriculum Vitae

1990, PhD Student in CS&Eng



Overview

Research Contract

Theme Engineering collective adaptive processes through aggregate computing

2019/11 → 2020/10

Università di Bologna

PhD Programme in Computer Science and Engineering

Thesis Engineering Self-Adaptive Collective Processes for Cyber-Physical Ecosystems

2016/11 → 2019/11

Università di Bologna

Research, community, teaching

2016 →

Papers 20 papers in journals and conferences; h-index 9 (Scholar)

Service eCAS'19 Workshop Chair, eCAS'17 PC member

Edu Teaching in BBS open-program IoT; MEng tutoring; IFTS'17-18

Involvement in open-source/academic software projects

Notably SCAFI (Lead Developer), Alchemist (Contributor)

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 for accomplishments as a university student

Notably Prize G. Bassi 2017

Recent activity

Summary I graduated cum laude in *Computer Science and Engineering* at Alma Mater Studiorum-Università di Bologna, with a thesis on Aggregate Computing, in which my skills in advanced SW development have embraced cutting-edge research themes in the field of complex, distributed, adaptive SW systems engineering. In 2014-2015, while studying, I also have worked as a part-time Full-Stack Software Engineer at Apex-Net (now WeDo Srl). In late 2016, I started my PhD with research theme *Engineering complex distributed computations for the IoT*. I visited St Andrews University and TU Wien for 3 and 2 months, respectively, working on collective adaptation in distributed, situated systems. I also enjoyed teaching, in the context of Master courses (tutoring), IFTS, and the BBS open-program *Internet of Things*. Currently, I am a PhD candidate with 20+ publications, H-Index 7 (SCOPUS), and I am engaged in a 1-year research contract.

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Education

PhD Programme in Computer Science and Engineering

Theme Engineering complex distributed computations for the Internet of Things

2016/11 → now
Università di Bologna

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)

Master's Degree in Computer Science and Engineering

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

2013/09 → 2016/03
Università di Bologna

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

Courses

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

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

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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

Awards

Best master graduate student (G.Bassi 2017 prize)

2017

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

"Roberto Ruffilli" acknowledgment for high-school graduation with score 100/100.

Cesena (Italy)

Scholarships

Computer Science and Engineering PhD Scholarship

2016/11 → 2019/10

First classified in the general merit ranking for admission to the PhD Programme and scholarship assignment.

Università di Bologna

Travel/Conference Grant – DisCoTec 2019

2019

Issuer Denmark Tekniske Universitet (DTU)

Mobility Grant – Marco Polo 2016

2017

Issuer Department of Computer Science and Engineering (DISI), UNIBO

Travel/Conference Grant – Scala Symposium 2016

2016

Issuer École polytechnique fédérale de Lausanne (EPFL)

Study Scholarship

2016/09 → 2016/11

Issuer Department of Computer Science and Engineering (DISI)

University of Bologna

Theme Software Infrastructures for the Management of IoT Systems

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

Papers

- Journals**
1. 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
 2. **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
 3. **Roberto Casadei**, Giancarlo Fortino, Danilo Pianini, Wilma Russo, Claudio Savaglio, and Mirko

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Viroli. “Modelling and simulation of Opportunistic IoT Services with Aggregate Computing”. In: *Future Generation Computer Systems* (2018)

4. **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

- Conferences**
1. **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](https://doi.org/10.1109/SCC.2019.00019)
 2. **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](https://doi.org/10.1109/FMEC.2019.8795355)
 3. **Roberto Casadei**, Danilo Pianini, Guido Salvaneschi, and Mirko Viroli. “On Context-Oriented Orientation in Aggregate Programming”. In: *2019 IEEE 4th International Workshops on Foundations and Applications of Self* Systems (FAS* W)*. IEEE. 2019, pp. 92–97
 4. 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
 5. **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
 6. **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
 7. **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
 8. 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
 9. 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
 10. **Roberto Casadei** and Mirko Viroli. “Programming actor-based collective adaptive systems”. In: *Programming with Actors*. Springer, 2018, pp. 94–122
 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
 12. **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

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13. 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
14. **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
15. 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](https://doi.org/10.1145/2968219.2979129). URL: <http://doi.acm.org/10.1145/2968219.2979129>
16. **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](https://doi.org/10.1145/2957319.2957372). URL: <http://doi.acm.org/10.1145/2957319.2957372>

Talks

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	Copenhagen (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 Abstractions & 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, Arizona (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)

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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)

Contributions (open-source/academic projects)

SCAFI (Lead developer)

A framework for Aggregate Computing in Scala. It includes the following: field calculus DSL, simulator, distributed platform.

ALCHEMIST (Contributor)

Alchemist is a meta-simulator tailored to pervasive computing, on the JVM.

Miscellaneous Contributions

– org.protelis.protelisdock: Kotlin gradle plugin to generate Protelis docs, via dokka

Slides @ Slideshare

Slides with notes about computer science, lectures, and talks.

Teaching

Teaching

Teaching in the context of the BBS open-program *Internet of Things* in modules *Distributed Systems* (on cloud-native apps) and *Software Production* (on testing)

2018
Bologna Business School
Bologna

Tutoring

- Master's Degree course *Development of Software Systems (Programming and Development Paradigms and Concurrent and Distributed Programming)* (a.y. 2016-17, 2017-18, 2018-19, 2019-20)
- Bachelor's Degree course *Object-Oriented Programming* (a.y 2019-20)

2017–2019
Università di Bologna
Cesena, via Sacchi 3

Educator

60+30 hours teaching the basics of programming in JavaScript and Python in the context of IFTS (Istruzione e Formazione Tecnica Superiore), courses funded by Regione Emilia-Romagna.

2017, 2018
Form-Art
Università di Bologna
Cesena, via Sacchi 3

Service

eCAS'19 Workshop Chair

4th eCAS Workshop on Engineering Collective Adaptive Systems

SASO'19
Ulmea, Sweden

eCAS'17 Program Committee Member

2nd eCAS Workshop on Engineering Collective Adaptive Systems

SASO'17
Tucson, AZ, USA

Reviewer Activity

Books

Publisher: Manning Publications

- Programming with Types (Vlad Riscutia, 2019)*
- Classic Computer Science Problems in Python (David Kopec, 2019)*

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Experience

Software Engineer

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

2015/09 → 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](#)).

2007 → 2011
[programmazione.it](#)

Certifications

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

2011
Bologna (Italy)

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.

Interests and hobbies

Epistemic

- Complex Systems Science
- Knowledge and its organisation
- Self-aware, introspective dialogue
- Philosophy and the art of thinking

Other

- Nature, animals, charismatic megafauna
- Football, tennis

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Miscellaneous

2011 Ex aequo finalist in a poetry contest (Premio di Poesia "E. Cantone", Lions Club del Rubicone).

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About me

Fond of learning, extremely curious and passionate. Historically devoted to horizontal investigation of computer science. Recently, more and more interested in the conceptual underpinnings and the scientific core. Continuously interested in the nature of knowledge and its methods. Open and attracted to multi-disciplinary endeavours. Freshly infatuated with systemics and complexity science.

References

- Prof. Mirko Viroli, mirko.viroli@unibo.it – PhD Advisor, MEng Thesis Supervisor
- Prof. Alessandro Ricci, a.ricci@unibo.it – BEng 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”.

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