# Roberto Casadei

**Curriculum Vitae** *1990, PhD Student in CS&Eng*

## Overview

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|---|---|
| **PhD Programme in Computer Science and Engineering** | 2016/11 → now |
| Theme — Engineering complex distributed computations for the Internet of Things | Università di Bologna |

**Research, community, teaching** — 2016 →

Papers — 11 papers in journals and conferences; h-index 4 (SCOPUS)
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

**Scholarships & awards for accomplishments as a university student**

Notably — Prize G. Bassi 2017

## Looking for

Computer Science Research and Software Engineering challenges, where abstractions, patterns, methods, management, and learning meet to create value.

## Recent activity

**Summary** I graduated cum laude in *Computer Science and Engineering* at UniBo, 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 adaptive SW systems engineering. In 2014-2015, while studying, I also have worked as a part-time Software Engineer at a local software house, and still managed to graduate in time as a regular student and achieve brilliant results—recognised with awards. 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*.

## Education

### PhD Programme in Computer Science and Engineering
2016/11 → now
Università di Bologna

**Theme**    Engineering complex distributed computations for the Internet of Things

**Courses**
- Spatial Multiagent Systems and Aggregate Computing: New Directions for Spatial Computing
- Approximation Algorithms (BISS'17)
- Kleene Algebra with Tests and Applications to Network Programming (BISS'17)

### 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

## Experiences Abroad

**Visiting PhD student @ TU Wien (Austria)**                    2018, 2 months
Collaboration on collective adaptive systems and coordination at the edge.

**Visiting PhD student @ St Andrews (Scotland)**               2017, 3 months
Collaboration on topological methods and distributed computing.     Marco Polo scholarship

**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 (Italy)
Faenza for *Best Master Graduate Student* across all Engineering faculties of
Romagna (district 2072) based on Grade Average and number of laudes.

**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**           $2016/11 \rightarrow$ now
First classified in the general merit ranking for admission to the PhD Programme    Università di Bologna
and scholarship assignment.

**Study Scholarship**                                          $2016/09 \rightarrow 2016/11$
**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      Università di Bologna
students of the University of Bologna in academic year 2014/2015 (section
common to all Engineering and Architecture faculties), granting a scholarship.

## Papers

**Journals** 1. **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)

2. **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** 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

2. 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

3. 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

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

5. 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

6. **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

7. 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

8. **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

9. 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

10. **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

| **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 – co-located with SPLASH | Amsterdam (Netherlands) |

| **Programming Actor-based Collective Adaptive Systems** | 2016/10 |
|---|---|
| Event   AGERE'16 (international workshop on agents and actors) – co-located with SPLASH | Amsterdam (Netherlands) |

| **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 (VLSU'16), Ubicomp/ISWC Adjunct | Heidelberg (Germany) |

| **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 (Italy) |

## Contributions (open-source/academic projects)

**SCAFI (Lead developer)**                                    2016 → now
Scala with Computational Fields (SCAFI): a framework for Aggregate Computing in Scala. It includes the following: field calculus DSL, simulator, distributed platform.

**ALCHEMIST (Contributor)**                                   2017
Alchemist is a meta-simulator tailored to pervasive computing.

**Slides @ Slideshare**
Slides with notes about computer science, lectures, and talks.

## Teaching

**Teaching**                                                  2018
Teaching in the context of the BBS open-program *Internet of Things* in modules    Bologna Business School
*Distributed Systems* (on cloud-native apps) and *Software Production* (on testing)    Bologna

**Tutoring Contract**                                         2017, 2018, 2019
60 hours tutoring in the integrated Computer Science and Engineering Master's    Università di Bologna
Degree course *Development of Software Systems* (*Programming and Development*    Cesena, via Sacchi 3
*Paradigms* and *Concurrent and Distributed Programming*)

**Educator**                                                  2017, 2018
60+30 hours teaching the basics of programming in JavaScript and Python in    Form-Art
the context of IFTS (Istruzione e Formazione Tecnica Superiore), courses funded    Università di Bologna
by Regione Emilia-Romagna.                                    Cesena, via Sacchi 3

## Service

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

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

## Experience

**Software Engineer**                                         2015/09 → 2015/12
Web application development in ASP.NET MVC and JavaScript within a    Apex-Net (WEDO)
Scrum/Kanban process framework.                               Cesena (Italy)

**Software Engineer**                                         2014/03 → 2014/09
Development of a Windows 8.1 application in C#/XAML and development of    Apex-Net (WEDO)
the related WCF back-end service for SharePoint integration.    Cesena (Italy)

**IT Book reviewer**                                          2007 → 2011
During the years of high school, I used to write reviews of computer science    programmazione.it
books for an Italian e-zine (and the next years, more informally, for a personal blog).

## 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.

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|---|---|
| **Paradigms** | Imperative; OOP; Functional; Reactive; 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 **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

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|---|---|
| **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 megaflora
- Football, tennis

## Miscellaneous

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

## 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

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