Livio Pompianu

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Education

PhD in Computer Science at University of Cagliari, Italy, **November 2014 – March 2018** Thesis: "Analysing blockchains and smart contracts: tools and techniques" | Advisor: Prof. Massimo Bartoletti

MSc in Computer Science at University of Cagliari, Italy, **October 2012 – September 2014** Final Mark: 109/110 Gpa: 28.55/30 Thesis: "A contract-oriented middleware" | Advisor: Prof. Massimo Bartoletti

BSc in Computer Science at University of Cagliari, Italy, **October 2009 - July 2012** Final Mark: 110/110 *with honours* Gpa: 27.95/30 Thesis: "Visual Engine for Reading On Network In Comprehensive Acceptation" | Advisor: Prof. Massimo Bartoletti

Research Activity

Postdoctoral Researcher at University of Cagliari. **October 2018 – Current**

Visiting PhD student at University of Stirling, UK. **February 2017 – May 2017** I coordinated a project involving my research group in the University of Cagliari (led by Dr. Massimo Bartoletti) and the research group of the University of Stirling (led by Dr. Andrea Bracciali). We studied and developed a general framework for blockchain analytics. This work helps researchers in several ways. 1. It avoids to build a new ad-hoc tool for each new analysis. 2. It provides a general blockchain model abstracting from any blockchain. 3. It offers an efficient way for querying blockchains. My visit contributed to the development of a longer-term research collaboration on the topic between the Universities involved. The results were part of my PhD thesis and published at SERIAL 2017.

Postgraduate Researcher at University of Cagliari. **March 2014 – September 2018** Developing distributed applications typically requires interacting with untrusted services. The main goal of my research was to exploit a theory of timed behavioural contracts to formalise, design and implement a message-oriented middleware where distributed services can be dynamically composed, and their interaction monitored to detect contract violations. I used JavaEE, Ocaml, Uppaal and JUnit. The results show that the middleware allows programmers to reduce the complexity of developing distributed applications, by relieving programmers from the need to explicitly deal with the misbehaviour of external services. The middleware was part of my MSc thesis and it was published at FACS 2015.

Intern at University of Cagliari. **February 2012 – June 2012** I led a team of 5 students with the goal to study and develop a web platform to help dyslexic children do homework. The system needed a voice synthesizer to read different kinds of books. I collaborated with different stakeholders: the health department of the Autonomous Region of Sardinia and researchers from the Law department of our University. I also developed several client modules using HTML, CSS, Javascript. The final result was part of my BSc thesis that was awarded the highest grade possible.

Member of the research groups

- Blockchain@Unica
- Trustworthy Computational Societies

Publications

- M. Bartoletti, B. Bellomy, L. Pompianu **A journey into Bitcoin metadata**. In Journal of Grid Computing 17(1), 3-22, 2019.

- M. Bartoletti, T. Cimoli, L. Pompianu, S. Serusi. **Blockchain for social good: a quantitative analysis**. In Proc. GOODTECHS 2018.

- M. Bartoletti, A. Bracciali, S. Lande, L. Pompianu. **A general framework for blockchain Analytics**. In Proc. MIDDLEWARE 2017, Serial Workshop.

- M. Bartoletti, L. Pompianu. **An empirical analysis of smart contracts: platforms, applications, and design patterns**. In Proc. FC 2017, Workshop on Trusted Smart Contracts.

- M. Bartoletti, L. Pompianu. **An analysis of Bitcoin OP RETURN metadata**. In Proc. FC 2017, Bitcoin Workshop.

- N. Atzei, M. Bartoletti, T. Cimoli, S. Lande, M. Murgia, A. S. Podda, L. Pompianu. **Contract-oriented programming with timed session types**. In Behavioural Types: from Theory to Tools, 2017.

- M. Bartoletti, T. Cimoli, M. Murgia, A. S. Podda, L. Pompianu. **A contract-oriented middleware**. In Proc. 12th International Conference on Formal Aspects of Component Software (FACS 2015).

- M. Bartoletti, T. Cimoli, M. Murgia, A. S. Podda, L. Pompianu. **Compliance and subtyping in timed session types**. In Proc. 35th IFIP International Conference on Formal Techniques for Distributed Objects, Components, and Systems. (FORTE 2015). Pages 161-177.

Developer activity

Developer at Xorovo, Cagliari. **July 2012 – September 2012** My goal was to work on the Appdoit project. I developed several application modules using HTML, CSS, Javascript, JQuery and then I worked to test the whole application.

Author, developer, and maintainer of the open source projects

- BlockAPI - A **Scala** library for the development of custom analytics on blockchains.

- Bitcoin OP_RETURN Tool - A **Java** tool for extracting OP_RETURN metadata from the Bitcoin blockchain.

- Contract-oriented middleware - A **Java** middleware for contract-oriented applications.

Teaching activity

Teaching assistant at University of Cagliari. **March 2013 – Current** As teaching assistant I prepare my own material and conduct (in place of the professor) laboratory lectures of 3 hours. I have worked 5 times as teaching assistant of Programming 2 (150 bachelor students) and 4 times as teaching assistant of Security Fundamentals (40 master students). In both courses my work led to an increase in the final evaluation (from the students) about the quality of the course, with respect to previous years.

Lecturer at Scientific School on Blockchain and distributed ledger technology. **13 June 2019** I conducted a laboratory lecture about blockchain technology and smart contracts where I shown how to develop a smart contract for the Hyperledger Fabric blockchain using the Hyperledger Composer framework.

Lecturer at CyberChallenge. **March 2019 – June 2019** I was in charge of teaching cryptography and cybersecurity to high school and college students.

Lecturer at Tree. **October 2018 – January 2019** I was one of the lecturers of a Java course. I conducted 40 hours of lessons.

Lecturer at Scientific School on Blockchain and distributed ledger technology. **13 June 2018** I conducted a laboratory lecture about blockchain technology and smart contracts where I shown how to develop a smart contract for the Bitcoin blockchain.

Lecturer at Unitelsardegna, Cagliari. **September 2014 – November 2014** I was in charge of teaching to the owners of agricultural-related businesses material developed by full professors. The material includes certified email, digital signature and other tools required to dialogue with public administration. I simplified the professor's language making it understandable to such an audience, increasing the number of users who passed the final exam.

Talks

- A general framework for blockchain analytics - 12 December 2017 - Las Vegas, USA - Slide
- An empirical analysis of smart contracts: platforms, applications, and design patterns - 7 April 2017 - Sliema, Malta - Slide
- An analysis of OP RETURN metadata - 7 April 2017 - Sliema, Malta - Slide
- An analysis of OP RETURN metadata - 17 March 2017 - Stirling, Scotland
- Innova.re - 5,6 November 2015 - Cagliari, Italy

Miscellaneous

PhD courses and schools

- Scientific School on Blockchain and distributed ledger technology - 13 June 2019 - Pula, Italy
- Scientific School on Blockchain and distributed ledger technology - 13 June 2018 - Pula, Italy
- The Swiss Blockchain Summer School - 21-24 June 2017 - Lausanne, Switzerland
- Summer School in Computer Security and Privacy - 5-9 September 2016 - Pula, Italy
- Bertinoro International Spring School 2015 - 9-13 March 2015 - Bertinoro, Italy

Languages Italian (mother tongue), English (B2 Written-Spoken)

Research Interests Bitcoin, Ethereum, smart contracts, tools and techniques for blockchain analytics, languages and design patterns for smart contracts, computer security, programming languages, distributed systems.

Autorizzo il trattamento dei miei dati personali ai sensi del Dlgs 196 del 30 giugno 2003 e dell'art. 13 GDPR (Regolamento UE 2016/679) ai fini della ricerca e selezione del personale.

26 luglio 2019