Luca **Rinaldi**

PH.D. STUDENT · HIGH-PERFORMANCE COMPUTING

born in 1991 and resident in Pisa (Italy)

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Education

Università di Pisa
Pisa, Italy

PH.D. STUDENT — *November 2017 - Exp. November 2020*

My research activity is focused on High-Performance Computing, and in particular design and build tools and libraries to support parallel programming. Right now I am focusing on the Actor Model as a concurrency model and I analyze possible improvement to the model by integrating it with some Structured Parallel programming based on Parallel Patterns. My immediate research objective is to design a high-level library to support Parallel Patterns on top of an Actor Model.

- Thesis: Combine the Actor Model with Parallel Patterns
- Prototype: `//github.com/ParaGroup/caf-pp`

Università di Pisa
Pisa, Italy

ACADEMIC ENGLISH COURSE — *February 2018 - April 2018*

- An English course about scientific paper writing
- Level: C1

Università di Pisa & SSSUP Sant'Anna
Pisa, Italy

MSC IN COMPUTER SCIENCE & NETWORKING — *September 2014 - March 2017*

- Degree: 109/110
- Thesis: Orchestrating applications with TOSCA and Docker
- Prototype: `//github.com/di-unipi-socc/TosKer`

Università di Perugia
Perugia, Italy

BSC IN COMPUTER SCIENCE — *September 2011 - September 2014*

- Degree: 110 with honor
- Thesis: Mean-payoff Game: Algorithms and Optimization

Experience

ATS - Advanced Technology Solutions `//atscom.it`
Milan, Italy

INTERNSHIP — *June 2019 - June 2019*

I was in charge of studying and analyzing the architecture of their product for financial applications. The software was developed using C++ and the Actor Model abstraction and needs critical requirements of latency. I proposed some possible refactoring and optimization by using the Structured Parallel Programming approach.

Università di Pisa `//di.unipi.it`
Pisa, Italy

RESEARCH ASSISTANT — *March 2017 - October 2017*

As a grant holder at theSOCC research group, I was involved in research activities on Microservice-based applications, Deploying and Orchestrating applications and Cloud computing.

Dini scientific high school `//liceodini.it`
Pisa, Italy

COMPUTER SCIENCE TEACHER — *October 2016 - May 2017*

As an external expert hired by the school, I co-designed and taught a course of Computational Thinking, tailored for children that are 13-14 years old. The course was focused on problem solving and game development, and it used Python programming language as a teaching tool.

Fibonacci Middle School
Pisa, Italy

COMPUTER SCIENCE TEACHER — *October 2015 - January 2016*

As an external expert hired from the school, I designed and taught a course of Computational Thinking, tailored for children that are 11-12 years old. The course was mainly focused on the Scratch programming language but also covered the installation of an OS on the lab machines (Edubuntu).

Xpreso `//xpreso.com`
Dublin, Ireland

INTERNSHIP — *August 2015 - August 2015*

I was in charge of analysing data and try to find better statistic metrics that can be later added to their Dashboard. At the end of the study, I also implemented a PHP/AngularJS application to dynamically compute that new statistics on a snapshot of the databases, to better evaluate their performance.

Papers

Improving the Performance of Actors on Multi-cores with Parallel Patterns — *Journal paper*

International Journal of Parallel Programming — *June 2020*

Luca Rinaldi, Massimo Torquati, Daniele De Sensi, Gabriele Mencagli, Marco Danelutto

Are Actors Suited for HPC on Multi-Cores? — *Conference (no proceedings)*

12th International Symposium on High-Level Parallel Programming and Applications (HLPP) — *June 2019, Linköping (Sweden)*

Luca Rinaldi, Massimo Torquati, Daniele De Sensi, Gabriele Mencagli, Marco Danelutto

Accelerating Actor-Based Applications with Parallel Patterns — *Conference paper*

27th Euromicro International Conference on Parallel, Distributed and Network-Based Processing (PDP) — *February 2019, Pavia (Italy)*

Luca Rinaldi, Massimo Torquati, Gabriele Mencagli, Marco Danelutto, Tulio Menga

Enforcing Reference Capability in FastFlow with Rust — *Conference paper*

Parallel Computing: Technology Trends, Proceedings of the International Conference on Parallel Computing (PARCO) — *October 2019, Prague (Czech Republic)*

Luca Rinaldi, Massimo Torquati, Gabriele Mencagli, Marco Danelutto, Tulio Menga

TosKer: A synergy between TOSCA and Docker for orchestrating multi-component applications — *Journal paper*

Journal of Software Practice and Experience — *February 2018*

Antonio Brogi, Davide Neri, Luca Rinaldi and Jacopo Soldani

Orchestrating incomplete TOSCA applications with Docker — *Journal paper*

Journal of Science of Computer Programming — *December 2017*

Antonio Brogi, Davide Neri, Luca Rinaldi and Jacopo Soldani

TosKer: Orchestrating applications with TOSCA and Docker — *Workshop paper*

3rd International Workshop on Cloud Adoption and Migration (CloudWays 2017) — *27 September 2017, Oslo (Norway)*

Antonio Brogi, Luca Rinaldi and Jacopo Soldani

From (incomplete) TOSCA specifications to running applications, with Docker — *Workshop paper*

15th International Workshop on Foundations of Coordination Languages and Self-Adaptative Systems (FOCLASA 2017) — *4-8 September 2017, Trento (Italy)*

Antonio Brogi, Davide Neri, Luca Rinaldi and Jacopo Soldani

Towards a reference dataset of microservice-based applications — *Workshop paper*

Microservices: Science and Engineering (MSE 2017) — *4 September 2017, Trento (Italy)*

Antonio Brogi, Andrea Canciani, Davide Neri, Luca Rinaldi and Jacopo Soldani

Projects

CAF-PP `//github.com/ParaGroup/caf-pp` — *Research project (C++)*

Parallel Pattern library for the C++ Actor Framework (CAF) — *September 2019 - ongoing*

Efficient and optimized Parallel Patterns implementation for the Actor Model. The library especially targets multi-cores and it exploits shared-memory to efficient implement Parallel patterns. The Parallel patterns provided so far are: Pipeline, Farm, Map, Divide&Conquer.

ff_buffer.rs `//github.com/lucarin91/ff_buffer` — *Research project (Rust)*

Wrapper of FastFlow queue for Rust — *October 2019 - December 2019*

A wrapper of the C++ FastFlow lock-free queue for Rust. The library is a simple interface that mimics the mpsc queue of standard Rust and internally uses the C++ implementation of the FastFlow unbounded lock-free buffer.

TosKer `//github.com/di-unipi-socc/TosKer` — *Research project (Python)*

Orchestrate application with TOSCA and Docker — *August 2016 - August 2017*

TosKer is an orchestrator engine capable of automatically deploying and managing multi-component applications specified in OASIS TOSCA on Docker. This project was the subject of my Master's Thesis and I am still developing it as my main research activity at the University of Pisa.

GolfScript-rs `//github.com/lucarin91/golfscript-rs` — *Personal project (Rust)*

A simple GolfScript interpreter — *March 2020 - ongoing*

A fork and extended version of a GolfScript interpreter written in Rust. The interpreter almost supports all the base language features and a simple set of unit tests. The future development will improve performance and some benchmark against the reference version written in Ruby.