

Luca Rinaldi

PH.D. STUDENT · PARALLEL PROGRAMMING MODELS

born in 1991 and resident in Pisa (Italy)

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Education

Università di Pisa

Pisa, Italy

PH.D. STUDENT

November 2017 - Exp. December 2020

My research activity is focused on High-Performance Computing, and in particular on design and build tools/libraries to support parallel programming. I am currently 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](https://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](https://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](https://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 it 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](https://di.unipi.it)

Pisa, Italy

RESEARCH ASSISTANT

March 2017 - October 2017

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

CardZbox project

Pisa, Italy

TECHNICAL MANAGER

May 2016 - May 2017

I was involved in designing, prototyping, and testing the CardZbox mobile app offering a hybrid experience to play board and social games. The project won the Lucca Start&Up Award and it was brought for early-stage testing at the Lucca Comics convention in 2016.

Xpreso [//xpreso.com](https://xpreso.com)

Dublin, Ireland

INTERNSHIP

August 2015 - August 2015

I was in charge of analysing data and trying to find better statistic metrics that could 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.

Teaching Activity

Università di Pisa [//di.unipi.it](https://di.unipi.it)

Pisa, Italy

TEACHING ASSISTANT

2nd semester of 2018 and 2019

For two consecutive years, I assisted the Operating System Laboratory course of the Computer Science Bachelor Degree at the University of Pisa. The laboratory course teaches the students the basis of Operating System programming in C and some Bash scripting skills.

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

Fibonacci Middle School

Pisa, Italy

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

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 efficiently implement Parallel patterns. The Parallel patterns provided so far are: Pipeline, Farm, Map, Divide&Conquer.

ff_buffer.rs //github.com/lucarini91/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 Thesis and my initial research activity at the University of Pisa.

GolfScript-rs //github.com/lucarin91/golfscript-rs

Personal project (Rust)

A SIMPLE GOLFSRIPT 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 performances and some benchmarks against the reference version written in Ruby.

Honors & Awards

2017 **3-years PhD Scholarship**, fund my PhD studies and research

Pisa, Italy

2016 **Lucca Start&Up Award**, cardZbox project

Pisa, Italy

2014 **Master in Computer Science & Networking**, third ranked in closed selection

Pisa, Italy

Volunteering

Pisa CoderDojo //pisa.coderdojo.it

Pisa, Italy

MENTOR AND CO-FOUNDER

February 2015 - July 2018

Together with some friends, I found the CoderDojo local field in Pisa. Coderdojo is a community of free programming workshops for young people between 7 and 17. In the Pisa CoderDojo, we mostly teach Scratch, Python, and the micro:bit board.

Skills

Programming	C · C++20 · Rust · Python · JavaScript · TypeScript · Java
Web	Express.js · Flask · AngularJS · React
Mobile	Android · Apache Cordova · Ionic
Database	MongoDB · PostgreSQL · SQLite
Operating system	Debian/Ubuntu · Arch Linux
Languages	Italian · English