europass Curriculum vitae

PERSONAL INFORMATION

Luca Martini

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Gender Male | Date of birth 1982/05/03 | Nationality Italian

CURRENT POSITION

Full-stack developer in NWG Energia srl

WORK EXPERIENCE

from 2018/03 to today — Full-stack developer

NWG Energia srl

As a JavaScript full-stack developer, I have been hired to migrate the current LAMP stack to a more modern architecture using React for the front-end part, and Node.js for the back-end. Involved development methodologies include continuous integration with the Agile software development.

Sectors: JavaScript Software Developing

from 2015/10 to 2018/03 — Software developer / designer

Cynny S.P.A.

C++ and JavaScript software developer/designer for the Cynny infrastructure.

Specifically, I have been working on the development and implementation of:

- the Morphcast technology running in-browser. It is the main Cynny product. A single-page web app, fully developed in javascript ES2015. The most important third-party JS libraries used to develop it comprehend Webpack for the bundling, Karma+Jasmine for the test-driven development and Vue.js for the front-end part.
- Morphcast creator: a desktop app written in C++ and Qt/QML, to demonstrate the possibility for clients to create Morphcast videos. It used the Cynny Giotto SDK (see below).
- Cynet: a Chord protocol for a P2P-distributed hash table on the Cynny servers, implemented as a C++ plugin for Node.js, written with libuv and Chrome V8. Its plan was to reliably serve, update and duplicate data, in an environment where many connected nodes could go frequently down. The C++/JS code was written using also CMake, Valgrind (since memory consumption was critical), SQLite for the database management, and Google tests and Mocha for the unit tests.
- Giotto: an SDK for the Cynny mobile and desktop apps (in C++11). It is the common library all Cynny apps use to communicate with the Cynny servers. This multithreading synchronization middleware was developed using also third-party libraries like CMake, SQLite (for the synchronized internal database), Djinni (for the interface bindings with Objective-C and Android), and Catch as the testing suite.

Sectors: C++ and JavaScript Software Developing and Design

from 2014/12 to 2015/10 — Post doc. on experimental physics

University of Pisa & INFN Pisa

Post doc. on the development of an algorithm for the reconstruction of tracks at the first trigger level in CMS at HL-LHC (CERN)

During this period I spent my time mainly in the following activities:

- Statistical analyses of the LHC collisions (with software written in C++), and consequent publication of experimental physics papers
- R&D on a fast tracking detector for the next generation of LHC (also this in C++)
- Teaching assistant in a master physics course
- Person in charge of part of the CMS software triggers (those relative to the CMS heavy-flavour programme)

The statistical analyses were performed mainly using the CERN C++ROOT library.

Sectors: High Energy Physics, C++ Software Developing, Data Analysis, Group Leadership

from 2012/12 to 2014/12

Post doc. on experimental physics

University of Pisa & INFN Pisa

Post doc. on L1 trigger software and hardware development for High Luminosity-LHC for the CMS experiment at CERN (CH).

During this period I continued my activity in the heavy-flavour studies group.

- The most important result obtained was the publication of the observation of the $B_s^0 \to \mu^+\mu^-$ decay with the combined analyses of the CMS and LHCb data (`https://cds.cern.ch/record/1970675`). The different datasets were combined using an unbinned likelihood that was taking into account the correlated parameters. This paper was also recently celebrated on the CMS homepage.
- In the second year I started the study of the feasibility of a L1 (hardware) track trigger for HL-LHC.

The statistical analyses were performed using Monte Carlo methods to infer efficiency estimates and their statistic and systematic uncertainties.

The software was written in C++, mainly using the CERN ROOT statistical framework.

Sectors: High Energy Physics, C++ Software Developing, Data Analysis, Group Leadership

from 2009/09 to 2012/12

Ph.D. on experimental physics

University of Siena & INFN Pisa

Ph.D. student at the CMS experiment at CERN.

My work contributed to the publication of the first measurements of the J/ψ and $\psi(2S)$ meson production cross-sections at 7 and 8 TeV of energy, and also to the first observation of the rare decay $B_s^0 \to \mu^+\mu^-$. The observation of the latter is the main topic of my Ph.D. thesis. Monte Carlo methods were used to extract the detector efficiencies. Statistical and systematic uncertainties were taken into account for the theoretical and experimental parameters. The final selection was optimized through a multivariate analysis, using a boosted decision tree algorithm. The extraction of the B_s^0 signal was performed with an unbinned maximum likelihood fit, that was taking into account correlation of the many parameters and their uncertainty. The statistical significance against the null hypothesis was extracted through the likelihood ratio.

During the first half of 2011 I was also responsible of the research and development of the heavy-flavour physics triggers of CMS.

Sectors: High Energy Physics, C++ Software Developing, Data Analysis

from 2011/01 to 2011/12

CERN associate

CERN & INFN Pisa

Associate position at CERN, CH.

During this 1-year position I spent most of the time making analyses for the heavy-flavour group of the CMS collaboration. Besides the publication of the J/ψ and $\psi(2S)$ cross-sections, I started to study the feasibility of a measurement of the $B_s^0 \to \mu^+\mu^-$ rare decay using the first-year CMS data.

I also was part of the analysts of the triggers (the selection of the collision data on-the-fly) for the heavy-flavour group.

The software analyses were performed mainly in C++and using the CERN ROOT statistical library.

Sectors: High Energy Physics, C++ Software Developing, Data Analysis

EDUCATION AND TRAINING

2013/12/04

Ph.D. on experimental physics

EQF level 8

University of Siena (Italy)

Main topics: High Energy Physics, Mathematics, Information Technologies

Final vote: Excellent

2009/07/21 **Master degree on Physics of Fundamental Interactions** EQF level 7

University of Pisa (Italy)

Main topics: High Energy Physics, Mathematics, Information Technologies

Final vote: 110/110 cum laude

2006/02/20 **Bachelor degree on General Physics** EQF level 6

University of Pisa (Italy)

Main topics: Physics, Mathematics, Information Technologies

Final vote: 110/110

PERSONAL SKILLS

Mother tongue: Italian

Other languages

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C1	C1	C1	C1	C1

Communication skills
- Excellent communication and public-speaking skills, gained participating as speaker in many international conferences and also as a teacher at university and high-school courses.

Organizational / managerial skills
- Sense of organization and team work
- Leadership, having been responsible of teams of up to about ten people

Job-related skills
- Problem modeling
- Statistical analysis, Monte Carlo methods, likelihood fits, multivariate analyses
- Software development and design, C++ (8 years) and JavaScript (2 years) languages, main software patterns, Test-Driven Development

Other skills
- Initiative, desire to do and to learn new things

Driving License
- B

ADDITIONAL INFORMATION

Publications
- Co-author in the CMS collaboration (more than 300 published physics papers)
- Single author of 4 High Energy Physics papers

Conferences
- Speaker in 7 international physics conferences

Honours and awards
- Conversi award for the 2014 best high energy physics Ph.D. thesis, by INFN

LinkedIn profile: `www.linkedin.com/in/luca-martini`

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