Luca **Negrini**

Software Engineer and Static Analysis Specialist @ Corvallis Srl

Nationality: Italian · Date of birth: 01/10/1993

Email | Homepage | GitHub | Linkedin | Twitter | Scholar | DBLP

Experience

Corvallis Srl (previously JuliaSoft Srl)

Verona, Italy

Software Engineer & Research Scientist

Apr 2018 - present

Developer of the Julia Static Analyzer (now part of CodeSonar by GrammaTech, Inc.): software development and engeneering in Java and C#, with smallller involvments in C, C++ and Python projects.
R&D team member, extending the analyzer to new language versions, new frameworks and libraries ([C1]), and improving its semantic analyses. Research topics: static analysis of object oriented software, tools for static analysis, abstract interpretation.
Pre-sales and customer support teams member.

Education

PhD in Computer Science

Venice, Italy

Università Ca' Foscari Venezia

Sept 2019 - Jan 2023

Co-funded by Corvallis Srl
Research topics: multilanguage static analysis, string analysis
Thesis title: "A generic framework for multilanguage analysis - Design of an abstract interpretation-based static analyzer"
Advisor: Prof. Agostino Cortesi
External reviewers: Prof. Peter Müller, Prof. Antoine Miné
Defence committee: Prof. Peter Müller, Prof. Pavel Laskov, Sebastiano Vascon, Ph.D.
Defended on: January 27th, 2023
Awarded with Summa cum laude

Università degli Studi di Verona

Verona, Italy

Master Degree in Computer Science

Sept 2015 - Mar 2018

Grade: 110/110 cum laude
Thesis title: "Automatic application splitting - Allowing abstract interpretation-based static analyzers to scale up to industrial software"
Advisor: Prof. Fausto Spoto
Co-advisor: Prof. Pietro Ferrara

Università degli Studi di Verona

Verona, Italy

Bachelor Degree in Computer Science

Sept 2012 - Mar 2016

Grade: 90/110

ITIS Guglielmo Marconi

Verona, Italy

High School Diploma in Computer Science

Sept 2007 - Jun 2012

Grade: 93/100

Internships

INRIA Paris, Team ANTIQUE

Paris, France

PhD Internship

Jan 2022 - Mar 2022

Research topics: static analysis for Data Science: analyzing JuPyter notebooks
Advisor: Caterina Urban, Ph.D.

JuliaSoft Srl

Verona, Italy

Master Internship

Sept 2017 - Feb 2018

Research topics: scaling static analysis to industrial software
Advisor: Pietro Ferrara, Ph.D.

Research Interests

My research interests are focuses on the application of static analysis techniques based on rigorous mathematical frameworks to software, with particular attention to their industrial usefulness. I mostly work with the abstract interpretation framework, that achieves computability by over-approximating all possible program executions, enabling the design of sound analyses at the cost of false alarms. My work is centered around developing novel static analyses that can have an impact on industrial software.

Keywords: static analysis, abstract interpretation, program analysis, software engineering.

Publications

Conferences and Workshops

[C6] (to appear) L. Olivieri, T. Jensen, L. Negrini, F. Spoto, *"MichelsonLiSA: A Static Analyzer for Tezos"*. To appear in 4^{th} Workshop on Blockchain theoRy and ApplicatIoNs (BRAIN 2023).

[C5] (to appear) L. Negrini, V. Arceri, P. Ferrara, A. Cortesi, *"A generic framework for multilanguage analysis"*. To appear in Challenges of Software Verification (CSV 2023).

[C4] L. Olivieri, F. Tagliaferro, V. Arceri, M. Ruaro, L. Negrini, A. Cortesi, P. Ferrara, F. Spoto, E. Tallin. *"Ensuring Determinism in Blockchain Software with GoLiSA: An Industrial Experience Report"*. In Proceedings of the 11^{th} ACM SIGPLAN International Workshop on the State Of the Art in Program Analysis (SOAP 2022).
DOI: 10.1145/3520313.3534658

[C3] P. Ferrara, L. Negrini, V. Arceri, A. Cortesi. *"Static analysis for dummies: experiencing LiSA"*. In Proceedings of the 10^{th} ACM SIGPLAN International Workshop on the State Of the Art in Program Analysis (SOAP 2021).
DOI: 10.1145/3460946.3464316

[C2] L.Negrini, V. Arceri, P. Ferrara, A. Cortesi, *"Twinning Automata and Regular Expressions for String Static Analysis"*, in Verification, Model Checking, and Abstract Interpretation (VMCAI 2021).
DOI: 10.1007/978-3-030-67067-2_13

[C1] P. Ferrara and L. Negrini, *"SARL: OO Framework Specification for Static Analysis"*. In Working Conference on Verified Software: Theories, Tools, and Experiments (VSTTE 2020).
DOI: 10.1007/978-3-030-63618-0_1

Ph.D. Thesis

[T1] L. Negrini, *"A generic framework for multilanguage analysis"*. Ph.D. thesis defended at Università Ca' Foscari Venezia on January 27th, 2023.

Talks

Conferences and Workshops

18/01/2021 Twinning Automata and Regular Expressions for String Static Analysis, VMCAI 2021, Virtual conference
20/07/2020 SARL: OO Framework Specification for Static Analysis, VSTTE 2020, Virtual conference
28/08/2018 SARL: Framework Modeling for Static Analysis, TAPAS 2018, Freiburg im Breisgau, Germany

Seminars

15/06/2022 Using LiSA for analyzing an IoT network, Università Ca' Foscari Venezia, Online seminar
19/01/2022 Multi-language analysis with LiSA, INRIA Paris, Team ANTIQUE internal seminar
30/06/2021 Modular Multi-language analysis in LiSA, Università Ca' Foscari Venezia, Online seminar

Teaching

Mar-May 2022 **Lectures (4 hrs), Online tutor**, Università Ca' Foscari Venezia, "Software Correctness, Security and Reliability"
Sept-Jan 2021/22 **Online tutoring**, Università Ca' Foscari Venezia, "Programmazione ad Oggetti - Mod. 1"
Mar-May 2021 **Lectures (4 hrs), Online tutor**, Università Ca' Foscari Venezia, "Software Correctness, Security and Reliability"
Mar-May 2020 **Online tutoring**, Università Ca' Foscari Venezia, "Software Correctness, Security and Reliability"

Community Service

Conferences and Journal activities

2022	**Artifact evaluation committee member**, SAS 2022, The 29th Static Analysis Symposium
2022	**Program committee member**, VALID 2022, The Fourteenth International Conference on Advances in System Testing and Validation Lifecycle
2021	**Program committee member**, VALID 2021, The Thirteenth International Conference on Advances in System Testing and Validation Lifecycle

Projects

LiSA

As part of my PhD research project, I started the development of LiSA, together with the Software and System Verification group @ Ca' Foscari University of Venice, Italy. LiSA (Library for Static Analysis) eases the creation and implementation of static analyzers based on the Abstract Interpretation theory. LiSA provides an analysis engine that works on a generic and extensible control flow graph representation of the program to analyze. Abstract interpreters in LiSA are built for analyzing such representation, providing a unique analysis infrastructure for all the analyzers that will rely on it.

Building an analyzer upon LiSA boils down to writing a parser for the language that one aims to analyze, translating the source code or the compiled code towards the control flow graph representation of LiSA. Then, simple checks iterating over the results provided by the semantic analyses of LiSA can be easily defined to translate semantic information into warnings that can be of value for the final user.

LiSA is distributed under the MIT license, and is available on GitHub.

Tarsis

Tarsis is a new abstract domain for string values based on finite state automata. Standard finite state automata abstract domain has been shown to provide precise abstractions of string values when all the components of such strings are known, but with high computational cost. Instead of considering standard finite automata built over an alphabet of single characters, Tarsis considers automata that are built over an alphabet of strings, comprising a special value to represent statically unknown strings. Tarsis is maintained by the Software and System Verification group @ Ca' Foscari University of Venice, Italy, and it is available on GitHub.

Languages

Italian	Mother language
English	Intermediate spoken and written

Interests

Professional	Software Engineering, Software Development
Scientific	Program Verification, Static Analysis, Abstract Interpretation, Cybersecurity