Luca **Negrini**

Research fellow @ Università Ca' Foscari Venezia

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

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

Experience

Università Ca' Foscari Venezia   *Venice, Italy*
Research Fellow   *Jul 2023 - present*

Supervisor: Pietro Ferrara (Assistant Professor).
Research project: static analysis of robotic software by abstract interpretation, with the goal of extending the LiSA library for the analysis of such software based on ROS.
Member of the SSV research group.

Corvallis Srl (previously JuliaSoft Srl)   *Verona, Italy*
Software Engineer & Research Scientist   *Apr 2018 - Jun 2023*

Developer of the Julia Static Analyzer (now part of CodeSonar by GrammaTech, Inc.): software development and engeneering in Java and C#, with smalller 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

Master Internship

    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

[C7]   L. Negrini, G. Shabadi, C. Urban, *"Static Analysis of Data Transformations in Jupyter Notebooks".* In Proceedings of the 12th ACM SIGPLAN International Workshop on the State Of the Art in Program Analysis (SOAP 2023).
DOI: 10.1145/3589250.3596145

[C6]   L. Olivieri, L. Negrini, V. Arceri, F. Tagliaferro, P. Ferrara, A. Cortesi, F. Spoto, *"Information Flow Analysis for Detecting Non-Determinism in Blockchain"*. To appear in 36th European Conference on Object-Oriented Programming (ECOOP 2023).
DOI: 10.4230/LIPIcs.ECOOP.2023.23

[C5]   L. Olivieri, T. Jensen, L. Negrini, F. Spoto, *"MichelsonLiSA: A Static Analyzer for Tezos"*. In 2023 IEEE International Conference on Pervasive Computing and Communications Workshops and other Affiliated Events (PerCom Workshops) (BRAIN 2023).
DOI: 10.1109/PerComWorkshops56833.2023.10150247

[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 11th 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 10th 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

Journals and Chapters

[J1]   L. Negrini, V. Arceri, P. Ferrara, A. Cortesi, *"LiSA: A Generic Framework for Multilanguage Static Analysis"*. In Challenges of Software Verification (CSV 2023).
DOI: 10.1007/978-981-19-9601-6_2

Extended Abstracts

[A1]   L. Negrini, P. Ferrara, *"SARL: Framework Modeling for Static Analysis"*, In The Ninth Workshop on Tools for Automatic Program Analysis (TAPAS 2018).

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

17/06/2023	Static Analysis of Data Transformations in Jupyter Notebooks, SOAP 2023, Orlando, FL, USA & Virtual conference
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

2023	**Lectures (4 hrs), Online tutor**, Università Ca' Foscari Venezia, "Software Correctness, Security and Reliability"
2022	**Lectures (4 hrs), Online tutor**, Università Ca' Foscari Venezia, "Software Correctness, Security and Reliability"
2021/2022	**Lab tutor**, Università Ca' Foscari Venezia, "Programmazione ad Oggetti - Mod. 1"
2021	**Lectures (4 hrs), Online tutor**, Università Ca' Foscari Venezia, "Software Correctness, Security and Reliability"
2020	**Online tutor**, Università Ca' Foscari Venezia, "Software Correctness, Security and Reliability"

Community Service

CONFERENCES AND JOURNAL ACTIVITIES

2023	**Artifact evaluation committee member**, SAS 2023, The 30th Static Analysis Symposium
2023	**Reviewer**, SOAP 2023, The 12th ACM SIGPLAN International Workshop on the State of the Art in Program Analysis
2023	**Reviewer**, ICCCI 2023, The 15th International Conference on Computational Collective Intelligence
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