

Andrea Fioraldi's Curriculum Vitae

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Born: [REDACTED], 1996—[REDACTED], Italy
Nationality: Italian

Areas of specialization

System and Software Security • Software Testing

Honors and Awards

- 2017 First place in Binary Analysis (ex aequo) at CyberChallenge.IT 17.
- 2017 Second place in Penetration Testing at CyberChallenge.IT 17.
- 2017 Third place with the Italian National Cybersecurity Team at European CyberSecurity Challenge (ECSC).
- 2018 Seventh place at DEF CON 26 CTF (World Finals) with the [mHACKeroni](#) team.
- 2018 First place at Chaos Communication Congress CTF with the [mHACKeroni](#)+KJC team.
- 2019 Fifth place at DEF CON 27 CTF (World Finals) with the [mHACKeroni](#) team.

MSc Degree

- 2020 I got a MSc Degree in Engineering in Computer Science at Sapienza University of Rome with a degree of 110/110 cum laude.
My thesis is "Program State Abstraction for Feedback-Driven Fuzz Testing using Likely Invariants".

BSc Degree

- 2018 I got a BSc Degree in Computer Engineering at Sapienza University of Rome with a degree of 110/110 cum laude.
My thesis is "Symbolic Execution and Debugging Synchronization".

Relevant Projects

ORGANIZATIONS AND EVENTS

- 2017 Co-founder of [TheRomanXploit](#) (TRX) academic Capture The Flag team.

- 2018 Co-founder of the [mHACKeroni](#) joint Capture The Flag team.
- 2018 Founder of the [DEF CON 11396 Rome](#), a group that meets every month to do talks on advanced security topics at Sapienza.

SOFTWARE (EXCERPT)

- 2017 [Carbonara](#), a malware research platform designed to recognize duplicated functions between binaries at scale and speed-up the static malware analysis process.
- 2018 [angrdbg](#), an abstract library used to implement synchronization between a concrete execution environment (typically a debugger) and the [angr](#) symbolic execution engine.
- 2018 [IDAngr](#), an IDA Pro debugger plugin that implements the [angrdbg](#) API in IDA with an user-friendly GUI.
- 2018 [angrgdb](#), create an [angr](#) state from the current GDB state on top of [angrdbg](#).
- 2019 [AFL++](#), AFLplusplus is the daughter of the American Fuzzy Lop fuzzer and was created initially to incorporate all the best features developed in the years for the fuzzers in the AFL family and not merged in AFL.
- 2019 [frida-fuzzer](#), an injectable fuzzer based on Frida that enables in-process fuzzing of Android/iOS APIs.
- 2020 [QEMU-AddressSanitizer](#), QASan is a custom QEMU 3.1.1 that detects memory errors in the guest using AddressSanitizer.

Research Interests

My main interest is Software Testing for security, both with source code and binary-only. I'm comfortable with techniques such as Feedback-driven Fuzzing, Symbolic Execution, Dynamic Binary Instrumentation, Taint Tracking and more.

Currently I am researching new methodologies to overcome roadblocks in Fuzzing.

I am interested also in vulnerability auditing, binary exploitation and malware analysis as possible side topics of my research.

I am an enthusiast about Programming Languages. I built several educational programming languages both for my education and for the education of the young teammates of the TRX team about interpreters vulnerabilities and exploitation.

Publications

ACADEMIC

- 2020 Fioraldi Andrea and D'Elia Daniele Cono and Coppa Emilio, *WEIZZ: Automatic Grey-box Fuzzing for Structured Binary Formats* in Proceedings of the 29th ACM SIGSOFT International Symposium on Software Testing and Analysis.
- 2020 Andrea Fioraldi, Dominik Maier, Heiko Eißfeldt, and Marc Heuse. *AFL++: Combining incremental steps of fuzzing research* in 14th USENIX Workshop on Offensive Technologies (WOOT 20). USENIX Association, Aug. 2020.
- 2020 Andrea Fioraldi, Daniele Cono D'Elia, and Leonardo Querzoni. *Fuzzing binaries for memory safety errors with QASan* in 2020 IEEE Secure Development Conference (SecDev), 2020.

OTHER

- 2019 Fioraldi Andrea, *Compare coverage for AFL++ QEMU*, <https://andrea Fioraldi.github.io/articles/2019/07/20/aflpp-qemu-compcov.html>

2019

Fioraldi Andrea, *Sanitized Emulation with QASan*, <https://andreaforaldi.github.io/articles/2019/12/20/sanitized-emulation-with-qasan.html>

Technical Skills

PROGRAMMING LANGUAGES

I am very proficient with C, C++, Python, ASM x86 and I am familiar with Javascript, Java, Scala, C#.

OPERATING SYSTEMS

I am skilled in writing code for POSIX systems and I am not bad with MS Windows (userspace development). I know the internals of the Linux operating system and I am familiar with the kernel codebase.

SECURITY TOOLS

I know very well how to use IDA Pro, GDB, Frida and Intel PIN and I also know how to use and the internals of American Fuzzy Lop, QEMU TCG and angr. I have a limited past experience with radare2.

Past Works

2020

Student researcher in the S3 Lab of EURECOM under the supervision of Prof. D. Balzarotti.

Voluntary

2018-2020

Binary exploitation teacher at CyberChallenge.IT in Rome

2020

Google Summer of Code admin and mentor for the AFL++ organization

Hobbies and Passions

Play the trumpet • Homebrewing • Trekking • Mountain bike

Last updated: October 19, 2020 • Typeset in Xe_{La}T_EX

<https://raw.githubusercontent.com/andreaforaldi/CurriculumVitae/master/cv.pdf>

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