



Emanuele Iannone

Ph.D. in Computer Science

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Personal Information


Full Name Emanuele Iannone
Nationality Italian
Birth September 1, 1996


Job Positions

2023 – cur.  **Research Assistant**, Institute of Software Security, Hamburg University of Technology (TUHH)
Role: Design novel automated vulnerability repair solutions in the context of Horizon EU project “Cybersecurity for AI-Augmented Systems” (SEC4AI4SEC, grant ID: 101120393)
Start: Nov 2023

Education

2020 – 2024  **Doctor of Philosophy (Ph.D.) in Computer Science**, University of Salerno
Advisor: Prof. Fabio Palomba
Thesis title: *There’s Something About Vulnerabilities: Empirical Comprehension and Novel Automated Approaches.*
Research Topic: Detection and Assessment of Software Vulnerabilities in Software Maintenance and Evolution.

2018 – 2020  **M.Sc. Computer Science**, University of Salerno
Final Mark: 110/110 cum laude
Supervisors: Prof. Fabio Palomba, Prof. Andrea De Lucia
Thesis title: *Toward Automatic Exploit Generation of Known API Vulnerabilities.*

2015 – 2018  **B.Sc. Computer Science**, University of Salerno
Final Mark: 110/110 cum laude
Supervisor: Prof. Andrea De Lucia
Thesis title: *Automated Refactoring of Energy-Related Code Smells of Android Applications.*

Research Internships

2022 **Visiting Ph.D. Student at University of Luxembourg (UniLu)**
Period: Oct 2022 - Dec 2022 (2 mo)
Supervisor: Prof. Tegawendé F. Bissyande
Research Work: *Synthesizing Commit Messages from Bug Reports with Pre-trained Transformers.*

Visiting Ph.D. Student at Tampere University (TUNI)
Period: May 2022 - Jun 2022 (1 mo)
Supervisor: Prof. Davide Taibi
Research Work: *Detecting Vulnerability in Open-Source Software with Crowd Sourced Information.*

Research Summary

My research falls within Empirical Software Engineering, a sub-domain of Software Engineering that focuses on conducting experiments on software systems (products, processes, and resources) and developers. In my daily research, I use quantitative and qualitative methods to investigate various phenomena occurring during the maintenance and evolution of software systems.

I have concretely contributed to the following research topics:

👉 **Software Vulnerability Analysis.** My main research topic concerns the analysis of detection and assessment techniques for software vulnerabilities and, more in general, security issues. Specifically, I investigated how vulnerabilities appear and live in software systems' source code [J2], aiming to experiment with machine learning models for their early detection (at the commit level) [J3] and propose novel solutions for fine-grained assessment [C2]. Besides, I have also investigated what other factors can influence the security of software applications, like code refactoring [J4]. Part of my research on this topic during my Ph.D. program has been summarized in a Doctoral Symposium paper [C5].

👉 **Software Analytics.** I regularly employ a wide range of automated tools to extract information (source code, issue text, commit logs) from software projects hosted on public repositories like GITHUB. Most of my work analyzes the evolution of certain key aspects in modern software development, like security [J2], code readability [C3], and other socio-technical factors [J1].

👉 **Source Code Refactoring.** Being interested in software quality, I have investigated the effect of software refactoring on different non-functional aspects, such as code readability [C3] and security [J4].

👉 **Green Mobile Software Engineering.** My first experiences in research started with problems concerning the energy consumption of mobile applications. I have developed and experimented with new automated solutions that assist developers in detecting and removing possible causes of energy waste, either via source code analysis [C1] or predictive models [C4].

Reviewing Activities

Journals

- 👉 I have refereed articles for several Software Engineering-themed journals, such as:
- 👉 *IEEE Transactions on Software Engineering (TSE)*
 - 👉 *ACM Transactions on Software Engineering and Methodology (TOSEM)*
 - 👉 *Springer's Empirical Software Engineering (EMSE)*
 - 👉 *Springer's Automated Software Engineering Journal (AUSE)*
 - 👉 *Wiley's Journal of Software: Evolution and Process (JSEP)*
 - 👉 *Elsevier's Science of Computer Programming (SCICO)*





Conferences

- 2024 👉 **Program Committee Member**, NIER Track
40th International Conference on Software Maintenance and Evolution (ICSME 2024)
- 2023 👉 **Program Committee Member**, Data and Tool Showcase Track
20th International Conference on Mining Software Repositories (MSR 2024)
- 👉 **Program Committee Member**, Research Track
31th IEEE International Conference on Software Analysis, Evolution and Reengineering (SANER 2024)
- 👉 **Program Committee Member**, RENE/NIER Track
15th Symposium on Search-Based Software Engineering (SSBSE 2023)
- 👉 **Program Committee Member**, Research Track
10th International Conference on Mobile Software Engineering and Systems (MOBILESoft 2023)
- 👉 **"Junior" Program Committee Member**, Research Track
20th International Conference on Mining Software Repositories (MSR 2023)
- 2022 👉 **Invited Reviewer**
26th ACM Conf. on Computer-Supported Cooperative Work & Social Computing (CSCW 2023)




Reviewing Activities (continued)

-  **Program Committee Member**, RENE/NIER Track
14th Symposium on Search-Based Software Engineering (SSBSE 2022)
-  **Program Committee Member**, NIER Track
37th IEEE/ACM International Conference on Automated Software Engineering (ASE 2022)
-  **“Shadow” Program Committee Member**
19th International Conference on Mining Software Repositories (MSR 2022)
-  **Program Committee Member**
1st International Workshop on Software Quality Assurance for Artificial Intelligence (SQA4AI 2022)
- 2021  **Invited Reviewer**
25th ACM Conference On Computer-Supported Cooperative Work And Social Computing (CSCW 2022)
-  **Program Committee Member**
16th International Conference on Software Engineering Advances (ICSEA 2021)





Community Services and Event Organization

- 2024  **Workshop Co-Chair**
1st International Workshop on Security Testing for Complex Software Systems (SECUTE 2024), co-located with EASE 2024
- 2023  **Local Arrangement Team**
15th Seminar on Advanced Techniques & Tools for Software Evolution (SATToSE 2023) + 16th International Summer School on Software Engineering (ISSSE 2023)
- 2022  **Student Volunteer**
44th IEEE/ACM International Conference on Software Engineering (ICSE 2022) + Co-located Events
- 2021  **Publicity Co-Chair**
29th IEEE/ACM International Conference on Program Comprehension (ICPC 2021)















Invited Talk and Guest Lectures

- 2023  **MSR for Vulnerability Prediction: Mining Vulnerability-Contributing Commits**
*Cybersecurity Data Science, M.Sc. Information and Communication Systems
Hamburg University of Technology (TUHH), Hamburg, Germany (May 31, 2023)*
- 2022  **MSR for Vulnerability Prediction: Lessons Learned, Challenges, and Recommendations**
*1st Summer School on Security Testing and Verification
KU Leuven, Leuven, Belgium (September 22, 2022)*
- 2021  **Automated Test Case Generation: Toward Its Application in Exploit Generation for Known Vulnerabilities**
*SAP Security Research Exchange Meeting
Online (July 8, 2021)*














Conference and School Participations

- 2023  **[ASE 2023] 38th IEEE/ACM Int. Conference on Automated Software Engineering**
September 12 – 14, 2023, Kirchberg, Luxembourg
 Presentation of [J2]
-  **[ISSSE 2023] 16th Int. Summer School on Software Engineering**
June 12 – 15, 2023, Fisciano, Italy
-  **[SATToSE 2023] 15th Seminar on Advanced Techniques & Tools for Software Evolution**
June 12 – 13, 2023, Fisciano, Italy











Conference and School Participations (continued)

- 2022  **[ICSME 2022] 38th IEEE Int. Conf. on Software Maintenance and Evolution**
October 04 – 07, 2022, Limassol, Cyprus
 Presentation of [C5,J3]
-  **[SCAM 2022] 22nd IEEE Int. Working Conf. on Source Code Analysis and Manipulation**
October 03 – 04, 2022, Limassol, Cyprus
-  **1st Summer School on Security Testing and Verification**
September 20 – 22, 2022, Leuven, Belgium
 Invited Speaker
-  **[MOBILESoft 2022] 9th IEEE/ACM Int. Conf. on Mobile Software Eng. and Systems**
May 17 – 18, 2022, Virtual
 Presentation of [C4]
-  **[SANER 2022] 29th IEEE Int. Conf. on Software Analysis, Evolution and Reengineering**
March 15 – 18, 2022, Virtual
- 2021  **[ISSSE 2021] 15th Int. Summer School on Software Engineering**
June 06 – 15, 2022, Virtual
-  **[ICPC 2021] 29th IEEE/ACM Int. Conference on Program Comprehension**
May 18 – 21, 2021, Virtual
 Presentation of [C2]
- 2020  **[ICPC 2020] 28th IEEE/ACM Int. Conference on Program Comprehension**
July 13 – 15, 2021, Virtual
 Presentation of [C1]
- 2019  **[ISSSE 2019] 14th Int. Summer School on Software Engineering**
June 17 – 21, 2019, Fisciano, Italy

Teaching Assistance


- 2023  **Software Security**, M.Sc. Information and Communication Systems, TU Hamburg
Prof. Riccardo Scandariato
 Lecture: Infrastructure-as-Code Security and Automated Vulnerability Repair
-  **Software Management and Evolution**, M.Sc. Computer Science, University of Salerno
Prof. Andrea De Lucia
 Examination Committee Member
-  **Software Dependability**, M.Sc. Computer Science, University of Salerno
Prof. Dario Di Nucci
 Tutorial #3: *Dynamic Security Analysis with OWASP ZAP.*
 Tutorial #2: *Static Security Analysis with FindSecBugs and OWASP Dependency Check.*
 Tutorial #1: *Automated Test Case Generation with EvoSuite and Randoop.*
 Examination Committee Member
-  **Software Engineering**, B.Sc. Computer Science, University of Salerno
Prof. Andrea De Lucia
 Examination Committee Member
- 2022  **Software Management and Evolution**, M.Sc. Computer Science, University of Salerno
Prof. Andrea De Lucia, Prof. Dario Di Nucci
 Examination Committee Member

Teaching Assistance (continued)

-  **Software Dependability**, M.Sc. Computer Science, University of Salerno
Prof. Fabio Palomba, Prof. Dario Di Nucci
👉 Lecture #2: *Automated Test Case Generation & Automated Exploit Generation.*
👉 Lecture #1: *Software Vulnerabilities: Dynamic Analysis and Predictive Modeling.*
👉 Examination Committee Member
- 2021  **Software Engineering**, B.Sc. Computer Science, University of Salerno
Prof. Andrea De Lucia
👉 Lecture: *Implementing Unit and Integration Tests with JUnit, Mockito, and DBUnit.*
👉 Examination Committee Member
-  **Fundamentals of Artificial Intelligence**, B.Sc. Computer Science, University of Salerno
Prof. Fabio Palomba
👉 Lecture: *Genetic Algorithms for Single- and Many-Objective Optimization.*
👉 Examination Committee Member
-  **Software Management and Evolution**, M.Sc. Computer Science, University of Salerno
Prof. Andrea De Lucia
👉 Lecture #2: *Machine Learning Techniques for Bug and Vulnerability Prediction.*
👉 Lecture #1: *Energy Smells: Detection and Refactoring.*
👉 Examination Committee Member
-  **Software Dependability**, M.Sc. Computer Science, University of Salerno
Prof. Fabio Palomba
👉 Lecture #2: *Genetic Algorithms and Their Application for Software Security.*
👉 Lecture #1: *Dynamic Security Analysis and Software Composition Analysis.*
👉 Examination Committee Member
- 2020  **Fundamentals of Artificial Intelligence**, B.Sc. Computer Science, University of Salerno
Prof. Fabio Palomba
👉 Lecture: *Genetic Algorithms: Theory and Practice.*
👉 Examination Committee Member
-  **Software Engineering**, B.Sc. Computer Science, University of Salerno
Prof. Andrea De Lucia
👉 Examination Committee Member
-  **Object-Oriented Programming**, B.Sc. Computer Science, University of Salerno
Prof. Carmine Gravino
👉 Teaching Assistant
-  **Web Development**, B.Sc. Computer Science, University of Salerno
Prof. Rita Francese
👉 Teaching Assistant
- 2018  **Object-Oriented Programming**, B.Sc. Computer Science, University of Salerno
Prof. Carmine Gravino
👉 Teaching Assistant
-  **Software Engineering**, B.Sc. Computer Science, University of Salerno
Prof. Andrea De Lucia
👉 Teaching Assistant

Miscellaneous

Awards and Achievements








- 2022  **SANER 2022 Distinguished Paper Award**
Toward Understanding The Impact of Refactoring on Program Comprehension [C3].

Skills





Languages	Italian (Native), English (Fluent)
Technology	JAVA, PYTHON, C, R, HTML, CSS, JAVASCRIPT, ANGULAR, IONIC, CAPACITOR, MYSQL, SQLITE, NEO4J, SPRING BOOT, ANDROID, GIT, BASH, DOCKER, L ^A T _E X



Publications

Journal Articles

- [J4] **E. Iannone**, Z. Codabux, V. Lenarduzzi, A. De Lucia, and F. Palomba, “Rubbing salt in the wound? a large-scale investigation into the effects of refactoring on security,” *Empirical Software Engineering*, vol. 28, no. 4, p. 89, 2023, ISSN: 1573-7616.  DOI: 10.1007/s10664-023-10287-x.  [Online]. Available: <https://doi.org/10.1007/s10664-023-10287-x>.
- [J3] F. Lomio, **E. Iannone**, A. De Lucia, F. Palomba, and V. Lenarduzzi, “Just-in-time software vulnerability detection: Are we there yet?” *Journal of Systems and Software*, p. 111 283, 2022, ISSN: 0164-1212.  DOI: <https://doi.org/10.1016/j.jss.2022.111283>.  [Online]. Available: <https://www.sciencedirect.com/science/article/pii/S016412122200437>.
- [J2] **E. Iannone**, R. Guadagni, F. Ferrucci, A. De Lucia, and F. Palomba, “The secret life of software vulnerabilities: A large-scale empirical study,” *IEEE Transactions on Software Engineering*, pp. 1–1, 2022.  DOI: 10.1109/TSE.2022.3140868.
- [J1] M. De Stefano, **E. Iannone**, F. Pecorelli, and D. A. Tamburri, “Impacts of software community patterns on process and product: An empirical study,” *Science of Computer Programming*, vol. 214, p. 102 731, 2022, ISSN: 0167-6423.  DOI: <https://doi.org/10.1016/j.scico.2021.102731>.  [Online]. Available: <https://www.sciencedirect.com/science/article/pii/S0167642321001246>.

Conference Proceedings

- [C5] **E. Iannone** and F. Palomba, “The phantom menace: Unmasking security issues in evolving software,” in *2022 IEEE International Conference on Software Maintenance and Evolution (ICSME)*, 2022, pp. 612–616.  DOI: 10.1109/ICSME55016.2022.00085.
- [C4] **E. Iannone**, M. De Stefano, F. Pecorelli, and A. De Lucia, “Predicting the energy consumption level of java classes in android apps: An exploratory analysis,” in *2022 IEEE/ACM 9th International Conference on Mobile Software Engineering and Systems (MobileSoft)*, 2022, pp. 1–5.  DOI: 10.1145/3524613.3527805.
- [C3] G. Sellitto, **E. Iannone**, Z. Codabux, V. Lenarduzzi, A. De Lucia, F. Palomba, and F. Ferrucci, “Toward understanding the impact of refactoring on program comprehension,” in *2022 IEEE International Conference on Software Analysis, Evolution and Reengineering (SANER)*, 2022, pp. 731–742.  DOI: 10.1109/SANER53432.2022.00090.
- [C2] **E. Iannone**, D. Di Nucci, A. Sabetta, and A. De Lucia, “Toward automated exploit generation for known vulnerabilities in open-source libraries,” in *2021 IEEE/ACM 29th International Conference on Program Comprehension (ICPC)*, 2021, pp. 396–400.  DOI: 10.1109/ICPC52881.2021.00046.

- [C1] **E. Iannone**, F. Pecorelli, D. Di Nucci, F. Palomba, and A. De Lucia, “Refactoring android-specific energy smells: A plugin for android studio,” in *Proceedings of the 28th International Conference on Program Comprehension*, ser. ICPC '20, Seoul, Republic of Korea: Association for Computing Machinery, 2020, pp. 451–455, ISBN: 9781450379588.  DOI: 10.1145/3387904.3389298.  [Online]. Available: <https://doi.org/10.1145/3387904.3389298>.