

Emanuele Iannone

Ph.D. Student

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🎓 <https://bit.ly/3R7SIck>

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Personal Information

Full Name	Emanuele Iannone
Nationality	Italian
Birth	September 1, 1996 Salerno, Italy
Address	Via Enea, 7 84098 Pontecagnano Faiano (SA), Italy

Education

- 2020 – cur. 🎓 **Doctor of Philosophy (Ph.D.) in Computer Science**, University of Salerno
Advisors: Prof. Fabio Palomba, Prof. Andrea De Lucia
Research Topic: *Software Vulnerabilities Detection and Assessment in Evolving Software.*
- 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 Crowdsourcing.*

Research

My research revolves around 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, irrespective of the specific topic, I use quantitative and qualitative methods to investigate various phenomena occurring during the maintenance and evolution of software systems. I have contributed to the following 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 in the source code of evolving software [J2], aiming to experiment with different ML models for their early detection [J3] and proposing novel solutions for fine-grained assessment [C2]. Besides, I have also investigated what other factors can influence the security of software applications, e.g., refactoring [J4]. Part of my research on this topic during my Ph.D. program has been summarized in a Doctoral Symposium paper [C5].

👉 **Mining Software Repositories.** 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].

👉 **Software 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 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 reviewed articles for several Software Engineering-themed journals, such as:

- 👉 *IEEE Transactions on Software Engineering (TSE)*
- 👉 *Springer's Empirical Software Engineering (EMSE)*
- 👉 *Elsevier's Science of Computer Programming (SCICO)*
- 👉 *Wiley's Journal of Software: Evolution and Process (JSEP)*
- 👉 *ACM Transactions on Software Engineering and Methodology (TOSEM)*



Conferences

- 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)
- 👉 **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)




Reviewing Activities (continued)

- 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

- 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 & Guest Lectures

- 2023  **MSR for Vulnerability Prediction: Mining Vulnerability-Contributing Commits**
Cybersecurity Data Science, M.Sc. Degree course
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  **[ISSSE 2023] 16th International Summer School on Software Engineering**
September 12 – 15, 2023, Fisciano, Italy
-  **[SATToSE 2023] 15th Seminar on Advanced Techniques & Tools for Software Evolution**
September 12 – 13, 2023, Fisciano, Italy
- 2022  **[ICSME 2022] 38th IEEE International Conf. on Software Maintenance and Evolution**
October 04 – 07, 2022, Limassol, Cyprus
 Presentation of [C5,J3]
-  **[SCAM 2022] 22nd IEEE International 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 International Summer School on Software Engineering**
June 06 – 15, 2022, Virtual














Conference and School Participations (continued)

- 📅 [ICPC 2021] **29th IEEE/ACM International Conference on Program Comprehension**
May 18 – 21, 2021, Virtual
📎 Presentation of [C2]
- 2020 📅 [ICPC 2020] **28th IEEE/ACM International Conference on Program Comprehension**
July 13 – 15, 2021, Virtual
📎 Presentation of [C1]
- 2019 ✈️ [ISSSE 2019] **14th International Summer School on Software Engineering**
June 17 – 21, 2019, Fisciano, Italy

Teaching

- 2023 📅 **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
- 📅 **Software Dependability**, M.Sc. Computer Science, University of Salerno
Prof. Fabio Palomba, Prof. Dario Di Nucci
👤 Guest Lecture #2: *Automated Test Case Generation & Automated Exploit Generation.*
👤 Guest 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
👤 Guest 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
👤 Guest 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
👤 Guest Lecture #2: *Machine Learning Techniques for Bug and Vulnerability Prediction.*
👤 Guest Lecture #1: *Energy Smells: Detection and Refactoring.*
👤 Examination Committee Member
- 📅 **Software Dependability**, M.Sc. Computer Science, University of Salerno
Prof. Fabio Palomba
👤 Guest Lecture #2: *Genetic Algorithms and Their Application for Software Security.*
👤 Guest Lecture #1: *Dynamic Security Analysis and Software Composition Analysis.*
👤 Examination Committee Member

Teaching (continued)

- 2020  **Fundamentals of Artificial Intelligence**, B.Sc. Computer Science, University of Salerno
Prof. Fabio Palomba
 Guest 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

Theses Co-Advising


- 2023  **NLP-based Technique for Mining Unstructured Data from Bug Reports**
B.Sc. Computer Science, University of Salerno
Student: Stefano Zarro
-  **Investigating the Evolution of Vulnerable Code Snippets Copied from Stack Overflow**
M.Sc. Computer Science, University of Salerno
Student: Grazia Varone
-  **Evaluating the Comprehension of Vulnerability Detection Tools for Android**
B.Sc. Computer Science, University of Salerno
Student: Alfredo Cannavaro
- 2022  **An Empirical Study on the Generalizability of Deep Learning Models for Vulnerability Prediction**
B.Sc. Computer Science, University of Salerno
Student: Simone Della Porta
-  **An Empirical Study on the Impact of Hyper-parameters of Deep Learning Models for Vulnerability Prediction**
B.Sc. Computer Science, University of Salerno
Student: Rocco Iuliano
-  **Building Vulnerability Prediction Models Using Genetic Algorithms: A Preliminary Investigation**
B.Sc. Computer Science, University of Salerno
Student: Alfonso Cannavale
-  **An Empirical Comparison on the Understandability of SHAP and LIME Explainable AI Frameworks**
B.Sc. Computer Science, University of Salerno
Student: Rebecca Di Matteo

Theses Co-Advising (continued)

- 2021  **An Empirical Comparison between Search-based Techniques and Deep Learning Techniques for Automated Test Case Generation**
M.Sc. Computer Science, University of Salerno
Student: Andrea Cupito
-  **Machine-Learning Techniques for Commit-level Vulnerability Detection**
B.Sc. Computer Science, University of Salerno
Student: Modammed Amine Sarraj
-  **GSURFACE: An IntelliJ Plugin for the Visualization of Security Metrics**
B.Sc. Computer Science, University of Salerno
Student: Luca Esposito
-  **Identification of Tangled Code Changes in Open-Source Repositories**
B.Sc. Computer Science, University of Salerno
Student: Marco Costante
-  **PANGEAUNTANGLER: a Technique for Just-In-Time Commits Untangling**
B.Sc. Computer Science, University of Salerno
Student: Salvatore Ambrosio
-  **SHALLWEGO: A Smart Crowdsourcing Platform for Assistive Mobility**
B.Sc. Computer Science, University of Salerno
Student: Hermann Senatore
-  **CODE4CODE: Artificial Intelligence Techniques for The Recommendation of Software Technologies**
B.Sc. Computer Science, University of Salerno
Student: Vincenzo Emanuele Martone
-  **Profiling Illegal Activities in the Deep and Dark Web via Latent Dirichlet Allocation and Genetic Algorithms**
B.Sc. Computer Science, University of Salerno
Student: Emanuele Fittipaldi

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>.