Dario Di Nucci

NAME: Dario Di Nucci **DATE OF BIRTH:** 3rd September, 1988 **PLACE OF BIRTH:** Isernia, Italy	**ADDRESS:** Louis Hapstraat 198, 1040 Brussels, Belgium **PHONE:** +34 486 13 99 51 **E-MAIL:** dario.di.nucci@vub.be **WEBSITE:** http://dardin88.github.io

EDUCATION

2014/12 – 2018/03 **DOCTOR OF PHILOSOPHY (PH.D.) IN MANAGEMENT & INFORMATION TECHNOLOGY**
University of Salerno, Italy
Fully funded by University of Salerno. Advisor: Prof. Andrea De Lucia

2017/06 **13TH INTERNATIONAL SUMMER SCHOOL ON SOFTWARE ENGINEERING (ISSSE)**
University of Salerno, Fisciano, Italy

2017/03 – 2017/05 **VISITING STUDENT**
Delft University of Technology, The Netherlands
Supervision: Prof. Andy Zaidman

2016/05 – 2016/07 **VISITING STUDENT**
Delft University of Technology, The Netherlands
Supervision: Prof. Andy Zaidman

2016/06 **12TH INTERNATIONAL SUMMER SCHOOL ON SOFTWARE ENGINEERING (ISSSE)**
University of Salerno, Fisciano, Italy

2015/09 **INTERNATIONAL SUMMER SCHOOL ON SOFTWARE ENGINEERING (SE SCHOOL@UNIBZ 2015)**
Free University of Bolzano, Bolzano, Italy

2013/03 **ERASMUS IP HUMAN-MACHINE INTERACTION**
Reims, France

2011/10 – 2014/09 **MASTER'S DEGREE (M.SC.) IN COMPUTER SCIENCE**
University of Salerno, Italy
110/110 cum laude

2007/10 – 2011/05 **BACHELOR'S DEGREE (B.SC.) IN COMPUTER SCIENCE**
University of Molise, Italy
110/110 cum laude

WORK EXPERIENCE

01/2018 – ACTUAL **RESEARCH FELLOW**
Vrije Universiteit Brussel, Belgium
Projects:

- INTelligent Modernisation Assistance for Legacy Software project.
  Principal Investigator: Prof. Coen De Roover
- SECO-ASSIST
  Principal Investigator: Prof. Coen De Roover

2014/12 – 2018/03 **PH.D. STUDENT IN MANAGEMENT & INFORMATION TECHNOLOGY**
University of Salerno, Italy
Fully funded by University of Salerno. Advisor: Prof. Andrea De Lucia

04/2014 – 09/2014 **SOFTWARE DEVELOPER**
Gnome and GraphHopper
Google Summer of Code 2014 working on Gnome Maps and GraphHopper

09/2011 – 01/2012 **SOFTWARE DEVELOPER**
CercAziende.it, Venafro, Italy
Development of a search engine for indexing and searching data on MySQL databases

11/2005 – 12/2005 **CUSTOMER SERVICE REPRESENTATIVE / TECHNICAL SUPPORT**
eliquidMEDIA International Inc., Windsor, ON, Canada
Web development and customer relationship handling

RESEARCH INTERESTS

My research activities are focused on maintenance and testing of software systems. In details my research interests are:

- **SEARCH BASED SOFTWARE TESTING.** Software testing is an essential yet expensive activity in software development, therefore much research effort has been put to automate it as much as possible. Search-based software testing consists of using meta-heuristic optimizing search technique, such as genetic algorithms, to address problems in the software testing and verification and validation domain, such as regression testing optimization and automatic test data generation. The main goal of an optimization process is to guide the search toward good solutions from a potentially infinite search space, within a practical time limit.

- **ENERGY OPTIMIZATION OF MOBILE APPS.** Energy efficiency is a vital characteristic of any mobile app, and indeed is becoming an important factor for user satisfaction. However, optimizing the energy consumption of a mobile app is non-trivial due to the highly volatile nature of mobile execution environments and the lack of knowledge of software developers. The goal of this topic is on the one hand to build new tools able to measure the energy profile of mobile apps, and on the other hand to propose new methods and tools able to assist software developers.

- **MINING SOFTWARE REPOSITORIES.** Software repositories such as source code control systems, communications stored between project staff and monitoring systems of the defects are used to improve the management of the progress of software projects. The purpose of this branch of research is to find out how to obtain information in order to help understand the development and evolution software processes, support forecasts on software development, and plan future developments.

- **EMPIRICAL SOFTWARE ENGINEERING.** Empirical software engineering is a subdomain of software related to experiments on systems software (software products, processes and resources). This branch includes the design of experiments on software, the collection of the results, and the consequent development of laws and theories.

TEACHING

LECTURER

2018/19 **CAPITA SELECTA OF SOFTWARE ENGINEERING**
Master's Degree in Computer Science, Vrije Universiteit Brussel, Belgium
in collaboration with Prof. Coen De Roover

TEACHING ASSISTANT

2016/17 **SOFTWARE ENGINEERING, MANAGEMENT AND EVOLUTION**
Master's Degree in Computer Science, University of Salerno, Italy

PROGRAMMING I
Bachelor's Degree in Computer Science, University of Salerno, Italy

SOFTWARE ENGINEERING
Bachelor's Degree in Computer Science, University of Salerno, Italy

WEB DEVELOPMENT
Bachelor's Degree in Computer Science, University of Salerno, Italy

2015/16 **SOFTWARE ENGINEERING, MANAGEMENT AND EVOLUTION**
Master's Degree in Computer Science, University of Salerno, Italy

SOFTWARE ENGINEERING: MAINTENANCE AND TESTING
Master's Degree in Computer Science, University of Salerno, Italy

PROGRAMMING I
Bachelor's Degree in Computer Science, University of Salerno, Italy

SOFTWARE ENGINEERING
Bachelor's Degree in Computer Science, University of Salerno, Italy

THESES COORDINATION SUPPORT

2017 **DESIGN AND DEVELOPMENT OF METHODS FOR TEST CASE MINIMIZATION**
Student: Francesco De Feo – B.Sc. in Computer Science – Advisor: Prof. Andrea De Lucia

DESIGN AND DEVELOPMENT OF METHODS FOR TEST CASE PRIORITIZATION
Student: Giuseppe Sessa – B.Sc. in Computer Science – Advisor: Prof. Andrea De Lucia

DESIGN AND DEVELOPMENT OF A PLUGIN FOR OPTIMIZING REGRESSION TESTING
Student: Gerardo Della Monica – B.Sc. in Computer Science – Advisor: Prof. Andrea De Lucia

DESIGN AND DEVELOPMENT OF A PLUGIN FOR THE DETECTION OF ENERGY DEFECTS OF MOBILE APPLICATIONS
Student: Sara Zaino – B.Sc. in Computer Science – Advisor: Prof. Andrea De Lucia

DESIGN AND DEVELOPMENT OF A DEFECT PREDICTION TOOL
Student: Giuseppina Tufano – B.Sc. in Computer Science – Advisor: Prof. Andrea De Lucia

DEVELOPMENT OF A SOFTWARE ENERGY ESTIMATION METHODOLOGY IN AN INTEGRATED DEVELOPMENT ENVIRONMENT
Student: Roberto Contaldo – B.Sc. in Computer Science – Advisor: Prof. Andrea De Lucia

DESIGN AND DEVELOPMENT OF A DEFECT PREDICTION TOOL BY USING CROSS-PROJECT TECHNIQUES
Student: Pasquale Martiniello – B.Sc. in Computer Science – Advisor: Prof. Andrea De Lucia

2016 **TRIO: A TOOL FOR REGRESSION TESTING OPTIMIZATION**
Student: Antonio Luca D'Avanzo – B.Sc. in Computer Science – Advisor: Prof. Andrea De Lucia

CHECKAPP: A TOOL FOR MONITORING JAVA APPLICATION PERFORMANCE
Student: Elisa D'Eugenio – M.Sc. in Computer Science – Advisor: Prof. Andrea De Lucia

DESIGN AND DEVELOPMENT OF A DEFECT PREDICTION TOOL
Student: Fabiano Pecorelli – B.Sc. in Computer Science – Advisor: Prof. Andrea De Lucia

PETRA: A POWER ESTIMATION TOOL FOR ANDROID APPLICATIONS
Student: Antonio Prota – M.Sc. in Computer Science – Advisor: Prof. Andrea De Lucia

2015 **DEVELOPMENT AND COMPARISON OF NOVEL TECHNIQUES FOR SEARCH BASED TEST DATA GENERATION**
Student: Giovanni Grano – M.Sc. in Computer Science – Advisor: Prof. Andrea De Lucia

DESIGN AND DEVELOPMENT OF A TOOL FOR THE AUTOMATIC GENERATION OF TEST CASES
Student: Simone Scalabrino – M.Sc. in Computer Science – Advisor: Prof. Andrea De Lucia

A COMBINED MODEL FOR THE PREDICTION OF DEFECTS
Student: Giuseppe De Rosa – M.Sc. in Computer Science – Advisor: Prof. Andrea De Lucia

PROFESSIONAL ACTIVITIES

ORGANIZATION COMMITTEE PARTICIPATION

2017 **SCIENTIFIC SECRETARIAT**
13th International Summer School on Software Engineering, University of Salerno, Italy

2016 **SCIENTIFIC SECRETARIAT**
12th International Summer School on Software Engineering, University of Salerno, Italy

PROGRAM COMMITTEE MEMBER

2019 6th IEEE/ACM International Conference on Mobile Software Engineering and Systems (MOBILESoft) – Student Research Competition

5th International Conference on Advances and Trends in Software Engineering (SOFTENG)

2018 1st International Workshop on Cloud-Native Applications Design and Experience (CNAX)

34th IEEE International Conference on Software Maintenance and Evolution (ICSME) - Tool Demo Track

5th IEEE/ACM International Conference on Mobile Software Engineering and Systems (MOBILESoft) – Student Research Competition

10th International Conference on Advances in System Testing and Validation Lifecycle (VALID)

2nd Workshop on Machine Learning Techniques for Software Quality Evaluation (MaLTeSQuE)

2017 9th International Conference on Advances in System Testing and Validation Lifecycle (VALID)

REVIEWER

INTERNATIONAL JOURNALS	Advances in Software Engineering - Elsevier Arabian Journal for Science and Engineering – Springer Computational Intelligence - Wiley Empirical Software Engineering - Springer IEEE Access – IEEE IET Software - Institution of Engineering and Technology Information Processing Letters - Elsevier Journal of King Saud University, Computer and Information Sciences - Elsevier Journal of Software: Evolution and Process – Wiley Journal of Systems and Software – Elsevier Scientific Programming - Hidawi Software Quality Journal – Springer Transactions on Knowledge and Data Engineering - IEEE
INTERNATIONAL CONFERENCES	IEEE International Conference on Software Analysis, Evolution, and Reengineering: 2017, 2018 IEEE International Conference on Program Comprehension: 2016 IEEE International Conference on Software Maintenance and Evolution: 2016 (ERA Track), 2018 International Conference on Business Information Systems: 2015, 2016 International Conference on Distributed Multimedia Systems: 2015, 2016 International Conference on Enterprise Information Systems: 2015, 2016, 2017

INVITED TALKS

2019

MINING SOURCE CODE^3: MINING IDIOMS, USAGES AND EDITS
FOSDEM, Brussels, Belgium, February 3^{3d} 2019

2018

DEFECT PREDICTION: USING MACHINE LEARNING FOR FOCUSING THE TESTING EFFORT
Jheronimus Academy of Data Science, 's-Hertogenbosch, The Netherlands, March 9th 2018

2017

DEFECT PREDICTION: USING MACHINE LEARNING FOR FOCUSING THE TESTING EFFORT
Jheronimus Academy of Data Science, 's-Hertogenbosch, The Netherlands, December 5th 2017

DIAGNOSE AND DETECT ENERGY FLAWS OF ANDROID APPS
Vrije Universiteit Brussel, Brussels, Belgium. March 23rd 2017

PARTICIPATIONS AT CONFERENCES

2018

34TH IEEE INTERNATIONAL CONFERENCE ON SOFTWARE MAINTENANCE AND EVOLUTION (ICSME)
Madrid, Spain

40TH ACM/IEEE INTERNATIONAL CONFERENCE ON SOFTWARE ENGINEERING (ICSE)
Gothenburg, Sweden

15TH IEEE/ACM WORKING CONFERENCE ON MINING SOFTWARE REPOSITORIES (MSR)
Gothenburg, Sweden

25TH IEEE INTERNATIONAL CONFERENCE ON SOFTWARE ANALYSIS, EVOLUTION, AND REENGINEERING (SANER)
Campobasso, Italy

2017

CODEMOTION
Amsterdam, The Netherlands

24TH IEEE INTERNATIONAL CONFERENCE ON SOFTWARE ANALYSIS, EVOLUTION, AND REENGINEERING (SANER)
Klagenfurt, Austria

2016	**SYMPOSIUM ON SEARCH-BASED SOFTWARE ENGINEERING (SSBSE)** Raleigh, NC, United States
2015	**SYMPOSIUM ON SEARCH-BASED SOFTWARE ENGINEERING (SSBSE)** Bergamo, Italy
	37TH ACM/IEEE INTERNATIONAL CONFERENCE ON SOFTWARE ENGINEERING (ICSE) Florence, Italy
	12TH IEEE/ACM WORKING CONFERENCE ON MINING SOFTWARE REPOSITORIES (MSR) Florence, Italy
2014	**THE GNOME CONFERENCE (GUADEC)** Strasbourg, France

AWARDS AND RECOGNITIONS

2017	**NSF TRAVEL SUPPORT** Symposium on Search-Based Software Engineering (SSBSE), Raleigh, NC, United States
2015	**ACM SIGSOFT STUDENT TRAVEL GRANT** 37th ACM/IEEE International Conference on Software Engineering (ICSE), Florence, Italy

PUBLICATIONS

JOURNAL ARTICLES

[J4] D. Di Nucci, A. Panichella, A. Zaidman, A. De Lucia
A Test Case Prioritization Genetic Algorithm guided by the Hypervolume Indicator
IEEE Transactions on Software Engineering (TSE), 2017, to appear

[J3] F. Palomba, D. Di Nucci, A. Panichella, A. Zaidman, A. De Lucia
On the Impact of Code Smells on the Energy Consumption of Mobile Applications
Elsevier Information and Software Technology (INFSOFT), 2019, Volume 105, 13 pages, 43-55.

[J2] D. Di Nucci, F. Palomba, R. Oliveto, A. De Lucia
Dynamic Selection of Classifiers in Bug Prediction: an Adaptive Method
IEEE Transactions on Emerging Topics in Computational Intelligence (TETCI), 2017, Volume 1 Issue 3, 11 pages, 202-212.

[J1] D. Di Nucci, F. Palomba, G. De Rosa, G. Bavota, R. Oliveto, A. De Lucia
A Developer Centered Bug Prediction Model
IEEE Transactions on Software Engineering (TSE), 2017, Volume 44 Issue 1, 21 pages, 5-24.

CONFERENCE PAPERS, MAIN TRACK

[C8] Y. Pacheco, J. De Bleser, T. Molderez, D. Di Nucci, W. De Meuter, C. De Roover
Mining Scala Framework Extensions for Recommendation Patterns
In Proceedings of the 26th IEEE International Conference on Software Analysis, Evolution, and Reengineering (SANER 2018) – Hangzhou, China, 2019, 10 pages, to appear.

[C7] P. Salza, F. Palomba, D. Di Nucci, C. D'Uva, A. De Lucia, F. Ferrucci
Do Developers Update Third-Party Libraries in Mobile Apps?
In Proceedings of the IEEE/ACM 26th International Conference on Program Comprehension (ICPC 2018), Gothenburg, Sweden, 2018, 11 pages, 255 - 265.

[C6] L. Pascarella, F. Geiger, F. Palomba, D. Di Nucci, I. Malavolta, A. Bacchelli
Self-Reported Activities of Android Developers
In Proceedings of the 5th IEEE/ACM International Conference on Mobile Software Engineering and Systems (MOBILESoft 2018), Gothenburg, Sweden, 2018, 12 pages, 144 - 155.

[C5] D. Di Nucci, F. Palomba, D. A. Tamburri, A. Serebrenik, A. De Lucia
Detecting Code Smells using Machine Learning Techniques: Are We There Yet?
In Proceedings of the 25th IEEE International Conference on Software Analysis, Evolution, and Reengineering (SANER 2018) – Campobasso, Italy, 2018, 10 pages, 612 - 621.

[C4] D. Di Nucci, F. Palomba, A. Prota, A. Panichella, A. Zaidman, A. De Lucia
Software-Based Energy Profiling of Android Apps: Simple, Efficient and Reliable?
In Proceedings of the 24th IEEE International Conference on Software Analysis, Evolution, and Reengineering (SANER 2017) - Klagenfurt, Austria, 2017, 12 pages, 103-114

[C3] S. Scalabrino, G. Grano, D. Di Nucci, R. Oliveto, A. De Lucia
Search-based Testing of Procedural Programs: Iterative Single-Target or Multi-Target Approach?
In Proceedings of the Symposium on Search-Based Software Engineering (SSBSE 2016) - Raleigh, NC, United States, 2016, 15 pages, 64 - 79

[C2] D. Di Nucci, F. Palomba, S. Siravo, G. Bavota, R. Oliveto, A. De Lucia
On the Role of Developer's Scattered Changes in Bug Prediction.
In Proceedings of the 31st International Conference on Software Maintenance and Evolution (ICSME 2015) - Bremen, Germany, 2015, 10 pages, 241-250

[C1] D. Di Nucci, A. Panichella, A. Zaidman, A. De Lucia
Hypervolume-based Search for Test Case Prioritization.
In Proceedings of the Symposium on Search-Based Software Engineering (SSBSE 2015) - Bergamo, Italy, 2015, 15 pages, 157-172

CONFERENCE PAPERS, TOOL DEMONSTRATIONS TRACK

[D5] S. Scalabrino, G. Grano, D. Di Nucci, M. Guerra, A. De Lucia, H. Gall, R. Oliveto
OCELOT: a Search-Based Test-Data Generation Tool for C
In Proceeding of the 33rd IEEE/ACM International Conference on Automated Software Engineering (ASE 2018) - Tool Demonstrations Track, Montpellier, France, 2018, 4 pages, to appear.

[D4] F. Geiger, I. Malavolta, L. Pascarella, F. Palomba, D. Di Nucci, A. Bacchelli
A Graph-based Dataset of Commit History of Real-World Android apps
In Proceedings of the IEEE/ACM 15th International Conference on Mining Software Repositories (MSR 2018), Gothenburg, Sweden, 2018, 5 pages, 30 - 33.

[D3] D. Di Nucci, F. Palomba, A. Prota, A. Panichella, A. Zaidman, A. De Lucia
PETrA: a Software-Based Tool for Estimating the Energy Profile of Android Applications
In Proceedings of the 39th International Conference on Software Engineering (ICSE 2017) - Demonstrations Track, Buenos Aires, Argentina, 2017, 4 pages, 3-6.

[D2] F. Palomba, D. Di Nucci, A. Panichella, A. Zaidman, A. De Lucia
Lightweight Detection of Android-specific Code Smells: the aDoctor Project.
In Proceedings of the 24th IEEE International Conference on Software Analysis, Evolution, and Reengineering (SANER 2017) - Tool Track, Klagenfurt, Austria, 2017, 5 pages, 487-491

[D1] F. Palomba, D. Di Nucci, M. Tufano, G. Bavota, R. Oliveto, D. Poshyvanyk, A. De Lucia
Landfill: an Open Dataset of Code Smells with Public Evaluation.
In Proceedings of the IEEE/ACM 12th Working Conference on Mining Software Repositories (MSR 2015) - Florence, Italy, 2015, 4 pages, 482-485

CONFERENCE PAPERS, MISCELLANEOUS TRACK

[M1] D. Di Nucci
Methods and Tools for Focusing and Prioritizing the Testing Effort
In Proceeding of the 34th IEEE International Conference on Software Maintenance and Evolution (ICSME 2018) - Doctoral Symposium Track, Madrid, Spain, 2018, 5 pages, to appear.

PUBLISHED WORKSHOP PAPERS

[W4] D. Tamburri, F. Palomba, D. Di Nucci, L. Di Giacomo
Omniscient DevOps Analytics
In Software Engineering Aspects of Continuous Development and New Paradigms of Software Production and Deployment: First International Workshop (DEVOPS 2018), Chateau de Villebrumier, France, 2018, 48 - 59

[W3] D. Di Nucci, F. Palomba, A. De Lucia
Evaluating the Adaptive Selection of Classifiers for Cross-Project Bug Prediction
In Proceedings of the 6th International Workshop on Realizing Artificial Intelligence Synergies in Software Engineering (RAISE 2018), Gothenburg, Sweden, 2018, 7 pages, 48 - 54.

[W2] D. Di Nucci, A. De Lucia
The Role of Meta-Learners in the Adaptive Selection of Classifiers
In Proceeding of 2nd Workshop on Machine Learning Techniques for Software Quality Evaluation (MaLTeSQuE 2018), Campobasso, Italy, 2018, 6 pages, 7 - 12.

[W1] F. Palomba, D. Di Nucci, A. Panichella, R. Oliveto, A. De Lucia
On the Diffusion of Test Smells in Automatically Generated Test Code: An Empirical Study.
In Proceedings of the 9th International Workshop on Search-Based Software Testing (SBST 2016) - Austin, TX, United States, 2016, 10 pages, 5-14

PROJECTS

2019 - ONGOING **SECO-ASSIST 2018-2021**
https://secoassist.github.io/
Software ecosystems are the most promising avenue for organising the software needs of the digital era. Jointly funded by F.R.S.-FNRS and FWO-Vlaanderen, the four-year Excellence of Science Project SECO-ASSIST aims to realise a scientific breakthrough to nurture the ecosystems of the future, by providing novel software recommendation techniques that address the resilience, evolvability, heterogeneity, and social interaction. To achieve this the project partners will combine their expertise in social networks (UMONS), software testing (UAntwerpen), software reuse (VUB) and database evolution (UNamur).

2018 - ONGOING **INTIMALS**
http://soft.vub.ac.be/intimals/
This project's goal is to research and deploy novel pattern mining algorithms in an industrial prototype of an intelligent modernisation assistant for legacy software systems. The assistant pro-actively recommends software engineers source code modernisation actions by comparing their current development efforts with insights gained by treating source code repositories as data. The assistant draws its intelligence from continuously mining for previously unknown patterns in the current state and structure of the system's source code (programming idioms, coding conventions, library usage protocols) and in changes made to this code (systematic edits, repetitive changes).

SOFTWARE PROJECTS

2017 - ONGOING **ADOCTOR**
https://github.com/fpalomba/aDoctor
ADOCTOR is a tool able to identify 15 Android-specific code smells from the catalogue by Reimann et al.

2017 - ONGOING **PETRA**
http://tinyurl.com/je2nxkd
PETrA is a software able to estimate the energy consumption of method calls in Android apps. It is based on some Android tools that are Monkey, Batterystats, Systrace, and dmtracedump.

2015 - ONGOING **LANDFILL**
http://soft.vub.ac.be/landfill/
Landfill is a Web-based platform for sharing code smell datasets. It also provides a set of APIs for programmatically accessing its data. Anyone can contribute by: improving existing datasets or sharing and posting new datasets.

12th February 2019