

Sebastiano Panichella - Publications (or Research output list)

Sebastiano Panichella was born (19/12/1986) in Isernia (Italy), he received (cum laude) the Laurea in Computer Science from the University of Salerno (Italy) in December 2010 defending a thesis on IR-based Traceability Recovery. He received the PhD in Computer Science from the University of Sannio (Department of Engineering) in **July 18th 2014** defending the thesis entitled “*Supporting Newcomers in Open Source Software Development Projects*”. During the PhD his work was supervised by **Prof. Massimiliano Di Penta** and **Prof. Gerardo Canfora**. His research interests are in the domain of Software Engineering (SE). In particular, during his bachelor, master and doctoral studies, he had the opportunity to explore a wide range of research topics in SE such as Mining Software Repositories (MSR), Software maintenance and evolution and Empirical Software Engineering.

Major scientific achievements

Currently he is a Senior Research Associate at University of Zurich (*since November 2014*) working in the *Software Evolution and Architecture (SEAL) Lab* of **Prof. Harald Gall**. He is a **member of IEEE**. During this experience he investigated further SE research fields such as Mobile Computing, Continuous Delivery and Continuous integration, and the new line of research related to the use of Summarization Techniques for Code, Changes and Testing. Currently His research interests include Mobile Computing, Code Review, IR-based Traceability Recovery, Textual Analysis, Machine Learning and Genetic Algorithms applied to SE problems, Continuous Delivery (with special attention to Continuous Integration Problems), Software maintenance and evolution and Empirical Software Engineering. Another topic that is also of his interest is Code Review, indeed, he is currently working and advising students on research ideas aimed at automating the process of code inspection. His research is funded by a Swiss National Science Foundations project. He is author of **39** papers appeared in International Conferences and Journals (**22** of them published during the experience at the SEAL lab). In summary he published in high-ranked, peer-reviewed (according to the <http://www.core.edu.au/conference-portal>), and international venues (where he also received best and distinguished paper awards¹). Specifically, he published 6 (between full and demos) papers at ICSE (RANK: A*), 3 (between full and demos) at FSE (RANK: A*), 6 at ICSME (RANK: A), 2 at ASE (RANK: A), 1 at GECCO (RANK: A), 5 at SANER, 1 at WCRE (RANK: B), 6 at ICPC (RANK: C) and other workshop papers (e.g., WAMA 2017 and MaLTesQuE 2018). He also published in top journals such as EMSE (2), IST (1), STVR (1) and JSEP (1).

These research work involved relevant industrial companies (e.g., ING NEDERLAND, Sony Mobile Communication) and their extensions will involve further industrial organizations (e.g., Allianz, Facebook, Google, Oracle Corporation, etc.) and open source projects. He serves and has served as program committee member of various international conference (e.g., ICSE, SBST, ASE, ICPC, ICSME, SANER, MSR, SEAA) and as reviewer for various international journals (e.g., TSE, TOSEM, EMSE, JSS, IST, JSEP) in the fields of software engineering and evolutionary computation. He is currently Editorial Board Member of *Journal of Software: evolution and process* (JSEP).

List of 5 selected Publications:

The list of the 5 selected papers is based on the following criteria: (i) most novel and cited papers; (ii) most related papers to the project proposal. Note that in papers marked with (*) the authors are listed in alphabetic order.

- [1] C. Vassallo, G. Schermann, F. Zampetti, D. Romano, P. Leitner, A. Zaidman, M. di Penta, S. Panichella. **A Tale of CI Build Failures: an Open Source and**

¹ <http://www.ifi.uzh.ch/en/seal/people/panichella/Awards-Best-Paper-Nominations.html>

a Financial Organization Perspective.. *Proceedings of the 33rd International Conference on Software Maintenance and Evolution (ICSME 2017).* Core RANK: A.

Link to the paper: <https://doi.org/10.1109/ICSME.2017.67>

Paper contribution: Sebastiano elaborated with Carmine Vassallo (PhD student hired in his recently accepted SNF project) the idea behind the work and designed and performed the experiments, analyzed the data, contributed to the materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper. It is important to mention that this work involved the relevant software development context of the ING Netherland company and other open source projects. Moreover, even if the goal of this work is different to the one proposed in the proposal, this paper presents important initial insights for achieving the goal of RT1 of the proposal (e.g., R1.3). Sebastiano and Carmine worked together on a parallel extension of this work, observing further software development dynamics related to the usage of static analysis tools in the CD/CI and Code review contexts [26][8].

- [2] A. Di Sorbo, S. Panichella, C. V. Alexandru, J. Shimagaki, C. A. Visaggio, G. Canfora, H. Gall. **What Would Users Change in My App? Summarizing App Reviews for Recommending Software Changes.** In: *24th ACM SIGSOFT International Symposium on the Foundations of Software Engineering (FSE 2016)* will be held in Seattle, WA, USA.

Link to the paper: <https://dl.acm.org/citation.cfm?doid=2950290.2950299>

Paper contribution: Sebastiano performed the experiments advising Andrea Di Sorbo during the analysis of the data, contributed to the reagents/materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper. Sebastiano Panichella conceived the idea behind this work and designed the experiments. As matter of fact, this paper represents the natural continuation of a work (indicated also in the list of all papers published during his career) where Sebastiano was the first author [24]. Such previous work [24] was published during the postdoc experience at the SEAL group and is nowadays, one of the most cited papers of ICSME 2015 with over 70 citations in around 2 years (as reported in the Google Scholar Ref:

<https://scholar.google.it/citations?user=HiNuBFgAAAAJ&hl=en&oi=ao>).

On top of the idea proposed in such a work Sebastiano also submitted and got accepted an SNF project proposal called SURF-MobileAppsData (SNF Project No. 200021-166275). Sebastiano Panichella is working actively on such topic with his PhD students **Carol V. Alexandru** and **Adelina Ciurumelea** (see papers in the conference publications list[12][13][15]) and **Giovanni Grano** (see papers in the conference publications list[7] [9]). Moreover, even if the research goals of a Giovanni Grano are different to the one proposed in the proposal, his recent accepted paper [7] (supervised by Sebastiano) presents important initial insights for achieving the goal of another RT of the proposal (e.g., RT3). Such results attracted also the attention of researchers working at Facebook, and thus, they are willing to collaborate in the project proposal.

- [3] S. Panichella, A. Panichella, M. Bella, A. Zaidman, H. Gall. **The impact of test case summaries on bug fixing performance: An empirical investigation.** In: *Proceedings of the 38th International Conference on Software Engineering (ICSE 2016)*, Austin, TX.

Link to the paper: <https://dl.acm.org/citation.cfm?doid=2884781.2884847>

Paper contribution: Sebastiano Panichella conceived the idea behind the work and designed and performed the experiments, analyzed the data, contributed to the reagents/materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper. This work together to other works [18], represents the potential application of “Summarization approaches” in SE research field. More sophisticated techniques based on the concept

of Summarization, will be explored to achieve the goals of all the research tracks of the proposal, i.e., RT1-3. Sebastiano Panichella is currently working with **Carmine Vassallo**, one of his PhD student at the University of Zurich, on the scalable implementation a tool, called TestDescriber, which implements the approach described in the research paper published at ICSE. In collaboration with several developers of companies (with already established contacts) in Germany, Switzerland (e.g. the stat-up BLINQ ²), Austria, Italy (e.g. Independent News & Media ³) and Japan (Sony Mobile Communications ⁴) they are going to test the usefulness of the tool in their working context. They are also investigating several future research directions for the extension of such work.

- [4] A. Di Sorbo, S. Panichella, C. Visaggio, M. Di Penta, G. Canfora, H. Gall. **Development Emails Content Analyzer: Intention Mining in Developer Discussions**. In: *30th international conference on Automated Software Engineering (ASE 2015)*. Lincoln, Nebraska. Link to the paper: <https://doi.org/10.1109/ASE.2015.12>

Paper contribution: Sebastiano Panichella conceived the idea behind the work and designed and performed the experiments, analyzed the data, contributed to the reagents/materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper. As matter of fact, this paper represents the natural continuation of a work (indicated also in the list of all papers published during his career) where Sebastiano was the first author [36]. Such previous work [36] was published during the postdoc experience at the University of Sannio. This work had several citations and involved further publications also involving students advised by Sebastiano ([29], [35], [33], [27], [32], etc.). This line of research results to be a precious starting point for RT1 and RT3 of the proposal.

- [5] G. Canfora, A. De Lucia, M. Di Penta, R. Oliveto, A. Panichella, S. Panichella. ***Multi-Objective Cross-Project Defect Prediction**. In: *Proceedings of the 7th International Conference on Software Testing, Verification and Validation (ICST 2013)*. Luxembourg. Core RANK: A. Link to the paper: <https://doi.org/10.1109/ICST.2013.38>

Paper contribution: Sebastiano Panichella conceived with Annibale Panichella the idea behind the work and designed and performed the experiments, analyzed the data, contributed to the reagents/materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper. The work was nominated as one of the best papers of ICST conference in 2013 and got invited for extension to the STVR journal [1]. This work was also recently extended in collaboration with Carol Alexandru, PhD student at the University of Zurich [19] and published to the *25th International Conference on Genetic Algorithms (ICGA) and the 21st Annual Genetic Programming Conference (GP) (GECCO 2016)*. the gained knowledge on Genetic Algorithms by Sebastiano [19], [1], [34] will be crucial for achieving the goals of RT2 of the proposal.

²www.joinblinq.com

³<http://www.inm.ie/>

⁴<http://www.sonymobile.co.jp/>

List of all publications:

PUBLICATIONS IN
PEER-REVIEWED
SCIENTIFIC JOURNALS

In papers marked with (*) the authors are listed in alphabetic order.

Journal Publications during the postdoctoral experience:

- [1] G. Canfora, A. De Lucia, M. Di Penta, R. Oliveto, A. Panichella, S. Panichella. ***Defect Prediction as a Multi-Objective Optimization Problem**. *Software Testing, Verification and Reliability (STVR)* 2015. doi:10.1002/stvr.1570

Paper contribution: Sebastiano Panichella conceived with Annibale Panichella the idea behind the work and designed and performed the experiments, analyzed the data, contributed to the reagents/materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper.

Journal Publications during the PhD study:

- [2] G. Bavota, G. Canfora, M. Di Penta, R. Oliveto, S. Panichella. ***How the Apache Community Upgrades Dependencies**. *Empirical Software Engineering (EMSE)* 2014.

doi:10.1007/s10664-014-9325-9

Paper contribution: Sebastiano Panichella conceived with Gabriele Bavota the idea behind the work and designed and performed the experiments, analyzed the data, contributed to the reagents/materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper.

- [3] A. De Lucia, M. Di Penta, R. Oliveto, A. Panichella, S. Panichella. ***Applying a Smoothing Filter to Improve IR-based Traceability Recovery Processes: An Empirical Investigation**. *Information and Software Technology (INFISOFT)* 2012.

doi:10.1016/j.infsof.2012.08.002

Paper contribution: Sebastiano Panichella conceived in his master thesis the idea behind this work. Thus, he designed and performed the experiments, analyzed the data, contributed to the reagents/materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper.

- [4] A. De Lucia, M. Di Penta, R. Oliveto, A. Panichella, S. Panichella. ***Labeling Source Code with Information Retrieval Methods: An Empirical Study**. *Empirical Software Engineering (EMSE)* 2013. doi:doi:10.1007/s10664-013-9285-5

Paper contribution: Sebastiano Panichella conceived the idea behind the work and designed and performed the experiments, analyzed the data, contributed to the reagents/materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper.

Journal Publications during the master study:

- [5] G. Capobianco, A. De Lucia, R. Oliveto, A. Panichella, S. Panichella. ***Improving IR-based traceability recovery via noun-based indexing of software artifacts**. *Journal of Software: Evolution and Process (JSE)* 2012.

doi:10.1002/smr.1564

Paper contribution: Sebastiano Panichella conceived with Annibale Panichella the idea behind the work and designed and performed the experiments, analyzed the data, contributed to the reagents/materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper.

PEER-REVIEWED
CONFERENCE
PROCEEDINGS

In papers marked with (*) the authors are listed in alphabetic order.

Conference Publications during the postdoctoral experience:

- [6] G. Grano, T. V. Titov, S. Panichella, F. Palomba, H. Gall. **How High Will It Be? Using Machine Learning Models to Predict Branch Coverage in Automated Testing.** *MaLTeSQuE 2018 workshop* (collocated with SANER 2018) - To Appear (PDF available at <http://www.ifi.uzh.ch/en/seal/people/panichella/publications.html>).
Paper contribution: Sebastiano Panichella conceived the idea behind the work (as matter of fact, this work represent the natural extension of previous work published by Sebastiano at ICSE 2016 [20]) and advised on this topic the master thesis of Timofey V. Titov (UZH). Thus, with Timofey he designed and performed the experiments, analyzed the data, contributed to the reagents/materials/analysis tools. With Giovanni Grano (PhD at the UZH) and Timofey he decided to submit the outcome of this thesis to the MaLTeSQuE workshop of SANER 2018. Giovanni, Timofey, Sebastiano and Harald Gall wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper.
- [7] G. Grano, A. Ciurumelea, S. Panichella, F. Palomba, H. Gall. **Exploring the Integration of User Feedback in Automated Testing of Android Applications..** *Proceedings of the IEEE 25th International Conference on Software Analysis, Evolution and Reengineering* (SANER 2018) To Appear (PDF available at <http://www.ifi.uzh.ch/en/seal/people/panichella/publications.html>).
Paper contribution: Sebastiano Panichella conceived the idea behind the work and designed and performed the experiments, analyzed the data, contributed to the reagents/materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper. As matter of fact, this work represent the natural extension of previous work published by Sebastiano and some of the supervised students, i.e., [18], [15] and [20].
- [8] C. Vassallo, S. Panichella, F. Palomba, S. Proksch, A. Zaidman and H. Gall. **Context is King: The Developer Perspective on the Usage of Static Analysis Tools..** *Proceedings of the IEEE 25th International Conference on Software Analysis, Evolution and Reengineering* (SANER 2018) - To Appear (PDF available at <http://www.ifi.uzh.ch/seal/people/vassallo/VassalloSANER18.pdf> or <http://www.ifi.uzh.ch/en/seal/people/panichella/publications.html>).
Paper contribution: Sebastiano Panichella conceived the idea behind the work and helped Carmine Vassallo in designing and performing the experiments, analyzing the data, contributing to the reagents/materials/analysis tools, writing the paper. As matter of fact, this work represent the natural extension of previous work published by Sebastiano [26].
- [9] G. Grano, A. Di Sorbo, F. Mercaldo, C. Visaggio, G. Canfora, S. Panichella. **Android Apps and User Feedback: a Dataset for Software Evolution and Quality Improvement..** *Proceedings of the International Workshop on App Market Analytics* (WAMA 2017). <http://doi.acm.org/10.1145/3121264.3121266>
Paper contribution: Sebastiano Panichella conceived the idea behind the work and helped Giovanni Grano in designing and performing the experiments, analyzing the data, contributing to the reagents/materials/analysis tools, writing the paper. As matter of fact, this work represent the natural extension of previous work published by Sebastiano [26].
- [10] C. Vassallo, G. Schermann, F. Zampetti, D. Romano, P. Leitner, A. Zaidman, M. di Penta, S. Panichella. **A Tale of CI Build Failures: an Open Source and a Financial Organization Perspective..** *Proceedings of the 33rd International Conference on Software Maintenance and Evolution* (ICSME 2017). *Core RANK: A*.
<https://doi.org/10.1109/ICSME.2017.67>
Paper contribution: Sebastiano elaborated with Carmine Vassallo (PhD student hired in his recently accepted SNF project) the idea behind the work and designed and performed the experiments, analyzed the data, contributed to the materials/analysis

tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper.

- [11] C. V. Alexandru, S. Panichella, Harald Gall. **Replicating Parser Behavior using Neural Machine Translation**. *Proceedings of the 25th International Conference on Program Comprehension (ICPC 2017)*.
Core RANK: C. <https://doi.org/10.1109/ICPC.2017.11>
Paper contribution: Carol Alexandru conceived the idea behind the work. Carol, under the main supervision of Sebastiano Panichella, designed and performed the experiments, analyzed the data, contributed to the reagents/materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper.
- [12] A. Di Sorbo, S. Panichella, C. V. Alexandru, C. A. Visaggio, G. Canfora. **SURF: Summarizer of User Reviews Feedback**. Demonstrations Track of the *39th International Conference on Software Engineering (ICSE 2017)*. Core RANK: A*. <https://doi.org/10.1109/ICSE-C.2017.5>
Paper contribution: Sebastiano Panichella conceived the idea behind the (original research) work and implemented with Andrea Di Sorbo and Carol Alexandru the SURF tool.
- [13] F. Palomba, P. Salza, A. Ciurumelea, S. Panichella, H. Gall, F. Ferrucci, A. De Lucia. **Recommending and Localizing Change Requests for Mobile Apps based on User Reviews**. In: *39th International Conference on Software Engineering (ICSE 2017)*.
Core RANK: A*. <https://doi.org/10.1109/ICSE.2017.18>
Paper contribution: Sebastiano Panichella conceived the idea behind the work (which consisted in a joint work between University of Salerno and University of Zurich) and advised Fabio Palomba, Pasquale Salsa and Adelina Ciurumelea in designing and performing the experiments, analyzing the data. He also contributed to the reagents/materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper.
- [14] Y. Zhou, R. Gu, T. Chen, Z. Huang, S. Panichella, H. Gall. **Analyzing APIs Documentation and Code to Detect Directive Defects**. In: *39th International Conference on Software Engineering (ICSE 2017)*.
Core RANK: A*. <https://doi.org/10.1109/ICSE.2017.11>
Paper contribution: Sebastiano Panichella conceived with Yu Zhou (guest researcher at the UZH during the year 2016) the idea behind the work and designed and performed the experiments, analyzed the data, contributed to the reagents/materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper.
- [15] A. Ciurumelea, A. Schaufelbuhl, S. Panichella, Harald Gall. **Analyzing Reviews and Code of Mobile Apps for better Release Planning**. In: *Proceedings of the 24th IEEE International Conference on Software Analysis, Evolution, and Reengineering (SANER) 2017*. Klagenfurt, Austria.
<https://doi.org/10.1109/SANER.2017.7884612>
Paper contribution: Sebastiano Panichella conceived the idea behind the work and advised the work of Adelina Ciurumelea (his PhD student) and Andreas Schaufelbuhl (master student at the UZH). Thus, he advised them in designing and performing the experiments, analyzing the data. He also contributed to the reagents/materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper.
- [16] C. Alexandru, S. Panichella, Harald Gall. **Reducing Redundancies in Multi-Revision Code Analysis**. In: *24th IEEE International Conference on Software Analysis, Evolution, and Reengineering (SANER) 2017*. Klagenfurt, Austria.
<https://doi.org/10.1109/SANER.2017.7884617>

Paper contribution: Sebastiano Panichella conceived with Carol Alexandru (PhD student at the UZH) the idea behind the work and designed and performed the experiments, analyzed the data, contributed to the reagents/materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper.

- [17] S. Panichella, A. Di Sorbo, E. Guzman, C. Visaggio, G. Canfora, H. Gall. **ARdoc: App Reviews Development Oriented Classifier**. In: *24th ACM SIGSOFT International Symposium on the Foundations of Software Engineering* will be held in Seattle, WA, USA. Core RANK: A*. <http://doi.acm.org/10.1145/2950290.2983938>
Paper contribution: Sebastiano Panichella conceived the idea behind the (original research) work and implemented with Andrea Di Sorbo and Emitza Guzman the ARdoc tool.
- [18] A. Di Sorbo, S. Panichella, C. V. Alexandru, J. Shimagaki, C. A. Visaggio, G. Canfora, H. Gall. **What Would Users Change in My App? Summarizing App Reviews for Recommending Software Changes**. In: *24th ACM SIGSOFT International Symposium on the Foundations of Software Engineering (FSE 2016)* will be held in Seattle, WA, USA. Core RANK: A*. <http://doi.acm.org/10.1145/2950290.2950299>
Paper contribution: Sebastiano Panichella conceived the idea behind the work and advised Andrea Di Sorbo and Carol Alexandru (PhD student at the UZH). Thus, he advised them in designing and performing the experiments, analyzing the data. He also contributed to the reagents/materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper.
- [19] A. Panichella, C. Alexandru, S. Panichella, A. Bacchelli, H. Gall. **A Search-based Training Algorithm for Cost-aware Defect Prediction**. *25th International Conference on Genetic Algorithms (ICGA) and the 21st Annual Genetic Programming Conference (GP) (GECCO 2016)*. Denver, Colorado, USA. Core RANK: A. <http://doi.acm.org/10.1145/2908812.2908938>
Paper contribution: Sebastiano Panichella conceived with Carol Alexandru (PhD student at the UZH) and Annibale Panichella the idea behind the work and designed and performed the experiments, analyzed the data, contributed to the reagents/materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper.
- [20] S. Panichella, A. Panichella, M. Bella, A. Zaidman, H. Gall. **The impact of test case summaries on bug fixing performance: An empirical investigation**. In: *Proceedings of the 38th International Conference on Software Engineering (ICSE 2016)*, Austin, TX. Core RANK: A*. <http://doi.acm.org/10.1145/2884781.2884847>
Paper contribution: Sebastiano Panichella conceived with the idea behind the work and designed and performed the experiments, analyzed the data, contributed to the reagents/materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper.
- [21] A. Di Sorbo, S. Panichella, C. Visaggio, M. Di Penta, G. Canfora, H. Gall. . **DECA: Development Emails Content Analyzer**. In: *Proceedings of the 38th International Conference on Software Engineering (ICSE 2016)*, Austin, TX. Core RANK: A*. <http://doi.acm.org/10.1145/2889160.2889170>
Paper contribution: Sebastiano Panichella conceived with Andrea Di Sorbo the idea behind the (original research) work and implemented with him the DECA tool.
- [22] S. Panichella. **Supporting Newcomers in Software Development Projects**. In: *Proceedings of the 31st International Conference on Software Maintenance and Evolution (ICSME 2015)*. Bremen, Germany. Core RANK: A. <https://doi.org/10.1109/ICSM.2015.7332519>
- [23] A. Di Sorbo, S. Panichella, C. Visaggio, M. Di Penta, G. Canfora, H. Gall. **Development Emails Content Analyzer: Intention Mining in Developer Discussions**. In: *30th international conference on Automated Software Engineering (ASE*

2015). Lincoln, Nebraska. *Core RANK: A*.
<https://doi.org/10.1109/ASE.2015.12>

Paper contribution: Sebastiano Panichella conceived with Andrea Di Sorbo the idea behind the work and designed and performed the experiments, analyzed the data, contributed to the reagents/materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper.

- [24] S. Panichella, A. Di Sorbo, E. Guzman, C. Visaggio, G. Canfora, H. Gall. **How Can I Improve My App? Classifying User Reviews for Software Maintenance and Evolution**. In: *Proceedings of the 31st International Conference on Software Maintenance and Evolution (ICSME 2015)*. Bremen, Germany. *Core RANK: A*.
<https://doi.org/10.1109/ICSM.2015.7332474>

Paper contribution: Sebastiano Panichella conceived the idea behind the work and designed and performed the experiments, analyzed the data, contributed to the reagents/materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper.

- [25] G. Schermann, M. Brandtner, S. Panichella, P. Leitner, H. Gall. **Discovering Loners and Phantoms in Commit and Issue Data**. In: *Proceedings of the 37th International Conference on Program Comprehension (ICPC 2015)*. Firenze, Italy. *Core RANK: C*.
<https://doi.org/10.1109/ICPC.2015.10>

Paper contribution: Gerald Schermann and Martin Brandtner conceived the idea behind the work. Gerald and Martin, under the main supervision of Sebastiano Panichella and Philipp Leitner, designed and performed the experiments, analyzed the data, contributed to the reagents/materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper.

- [26] S. Panichella, V. Arnaoudova, M. Di Penta, G. Antoniol. **Would Static Analysis Tools Help Developers with Code Reviews?**. In: *Proceedings of the 22nd International Conference on Software Analysis, Evolution and Reengineering (SANER 2015)*. Montreal, Canada.
<https://doi.org/10.1109/SANER.2015.7081826>

Paper contribution: Sebastiano Panichella conceived the idea behind the work and designed and performed the experiments, analyzed the data, contributed to the reagents/materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper.

Conference Publications during the PhD experience:

- [27] S. Panichella, G. Bavota, M. Di Penta, G. Canfora, G. Antoniol. **How Developers' Collaborations Identified from Different Sources Tell us About Code Changes**. In: *Proceedings of the 30th International Conference on Software Maintenance and Evolution (ICSME 2014)*. Victoria, Canada. *Core RANK: A*.
<https://doi.org/10.1109/ICSME.2014.47>

Paper contribution: Sebastiano Panichella conceived the idea behind the work and designed and performed the experiments, analyzed the data, contributed to the reagents/materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper.

- [28] G. Bavota, S. Panichella, N. Tsantalis, M. Di Penta, R. Oliveto, G. Canfora. **Recommending Refactorings based on Team Co-Maintenance Patterns..** In: *29th international conference on Automated Software Engineering (ASE 2014)*. Vasteras, Sweden. *Core RANK: A*. <http://doi.acm.org/10.1145/2642937.2642948>

Paper contribution: Sebastiano Panichella with Gabriele Bavota conceived the idea behind the work and designed and performed the experiments, analyzed the data, contributed to the reagents/materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper.

- [29] C. Vassallo, S. Panichella, G. Canfora, M. Di Penta. **CODES: mining sourCe cOde Descriptions from developErs diScussions**. In: *Proceedings of the 36th International Conference on Program Comprehension (ICPC 2014)*. Hyderabad, India. Core RANK: C. <http://doi.acm.org/10.1145/2597008.2597799>
Paper contribution: Sebastiano Panichella conceived the idea behind the (original research) work and implemented with Carmine Vassallo (Master student at the University of Sannio) the CODES tool.
- [30] S. Panichella, G. Canfora, M. Di Penta, R. Oliveto. **How the Evolution of Emerging Collaborations Relates to Code Changes: an Empirical Study**. In: *Proceedings of the 36th International Conference on Program Comprehension (ICPC 2014)*. Hyderabad, India. Core RANK: C. <http://doi.acm.org/10.1145/2597008.2597145>
Paper contribution: Sebastiano Panichella conceived the idea behind the work and designed and performed the experiments, analyzed the data, contributed to the reagents/materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper.
- [31] G. Bavota, G. Canfora, M. Di Penta, R. Oliveto, S. Panichella. ***The Evolution of Project Inter-Dependencies in a Software Ecosystem: the Case of Apache**. In: *Proceedings of the 29th International Conference on Software Maintenance (ICSM 2013)*. Eindhoven, Netherlands. Core RANK: A. <https://doi.org/10.1109/ICSM.2013.39>
Paper contribution: Sebastiano Panichella conceived with Gabriele Bavota the idea behind the work and designed and performed the experiments, analyzed the data, contributed to the reagents/materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper.
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Paper contribution: Sebastiano Panichella conceived with Annibale Panichella the idea behind the work and designed and performed the experiments, analyzed the data, contributed to the reagents/materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper.
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Conference Publications during the bachelor and master studies:

- [39] G. Capobianco, A. De Lucia, R. Oliveto, A. Panichella, S. Panichella. ***On the role of the nouns in IR-based traceability recovery**. In: *Proceedings of the 19th IEEE International Conference on Program Comprehension (ICPC)* 2009. Vancouver, British Columbia, Canada. Core RANK: C.
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Paper contribution: Sebastiano Panichella conceived with Annibale Panichella the idea behind the work and designed and performed the experiments, analyzed the data, contributed to the reagents/materials/analysis tools, wrote the paper, prepared figures and/or tables, performed the computation work, reviewed drafts of the paper.

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TALKS GIVEN

International Summer School on Software Engineering 2011

How identify Mentors in software projects? July 2011.

FSE 2012

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Mining source code descriptions from developer communications, *June 2012*.

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YODA: Young and newcOmer Developer Assistant, *May 2013*.

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Empirical Investigation on Documentation Usage Patterns in Maintenance Tasks, *September*.

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Supporting Developers, Mining of Software Repositories, *June*.

ICPC 2014

How the Evolution of Emerging Collaborations Relates to Code Changes: an Empirical Study, *June*.

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ICSE 2017

SURF: Summarizer of User Reviews Feedback., *May*.

ICSE 2017

Analyzing APIs Documentation and Code to Detect Directive Defects, *May*.

VSS 2017

Summarization Techniques for Code, Change, Testing and User Feedback *December*.

YODA:

Yoda (Young and newcOmer Developer Assistant) is an Eclipse plugin (available in <http://www.ifi.uzh.ch/seal/people/panichella/tools/YODA-tool.html>) that identifies and recommends mentors for newcomers joining a software project. Yoda mines developers' communication (e.g., mailing lists) and project versioning systems to identify mentors using an approach inspired to what ArnetMiner does when mining advisor/student relations. Then, it recommends appropriate mentors based on the specific expertise required by the newcomer.

CODES:

CODES (mining sourCe cOde Descriptions from developErs diScussions) is an Eclipse plugin (available in <http://www.ifi.uzh.ch/seal/people/panichella/tools/CODES-tool.html>) to automatically extract method descriptions of Java Systems from discussions in StackOverflow. Actually, CODES implements an approach defined in our previous work [2], that automatically extracts method descriptions from developers' communication. CODES considers as good descriptions paragraphs describing methods that obtained the higher score and allows developers to put the chosen description into the code as a Javadoc comment also becoming de facto an API description.

DECA:

DECA (Development Emails Content Analyzer) is a java tool (available in <http://www.ifi.uzh.ch/seal/people/panichella/tools/DECA.html>) to automatically recognize natural language fragments in emails that are relevant in the software engineering domain. Actually, DECA implements an approach which allows to recognize most informative sentences for development purposes by exploiting a set of recurrent natural language patterns that developers often use in such communication channel. DECA purpose is to capture the intent of each informative sentence (requesting a new feature, description of a problem, or proposing a solution) and consequently to allow developers to better manage the information contained in emails.

ARdoc:

ARdoc (App Reviews Development Oriented Classifier) is a Java tool that automatically recognizes natural language fragments in user reviews that are relevant for developers to evolve their applications. Specifically, natural language fragments are extracted according to a taxonomy of app reviews categories that are relevant to software maintenance and evolution. The categories were defined in our previous paper entitled "*How Can I Improve My App? Classifying User Reviews for Software Maintenance and Evolution*" and are: (i) Information Giving, (ii) Information Seeking, (iii) Feature Request and (iv) Problem Discovery. ARdoc implements an approach that merges three techniques: (1) Natural Language Processing, (2) Text Analysis and (3) Sentiment Analysis to automatically classify app reviews into the proposed categories. The purpose of ARdoc is to capture informative user reviews (requesting a new feature, description of a problem, or proposing a solution) and consequently to allow developers to better manage the information contained in user reviews.

SURF:

Continuous Delivery (CD) enables mobile developers to release small, high quality chunks of working software in a rapid manner. However, faster delivery and a higher software quality do neither guarantee user satisfaction nor positive business outcomes. Previous work demonstrates that app reviews may contain crucial information that can guide developer's

software maintenance efforts to obtain higher customer satisfaction. However, previous work also proves the difficulties encountered by developers in manually analyzing this rich source of data, namely (i) the huge amount of reviews an app may receive on a daily basis and (ii) the unstructured nature of their content. In this paper, we introduce **SURF** (Summarizer of User Reviews Feedback) a tool able to (i) analyze and classify the information contained in app reviews and (ii) distill actionable change tasks for improving mobile applications. Specifically, SURF performs a systematic summarization of thousands of user reviews through the generation of an interactive, structured and condensed agenda of recommended software changes. An end-to-end evaluation of SURF, involving 2622 reviews related to 12 different mobile applications, demonstrates the high accuracy of SURF in summarizing user reviews content. In evaluating our approach we also involve the original developers of some analyzed apps, who confirm the practical usefulness of the software changes recommended by SURF.

A more comprehensive and updated list of implemented tools and shared datasets to the research community by Sebastiano is available at
<http://www.ifi.uzh.ch/en/seal/people/panichella/tools.html> and
<http://www.ifi.uzh.ch/en/seal/people/panichella/SNF-Projects.html>