A Bibliometric Assessment of Software Engineering Scholars and Institutions (2010-2017)

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Abstract

This paper presents the findings of a bibliometric study, targeting an eight-year period (2010-2017), with the aim of identifying: (a) emerging research directions, (b) the top-20 institutions, and (c) top-20 early stage, consolidated, and experienced scholars in the field of software engineering. To perform this goal, we performed a bibliometric study, by applying the mapping study technique on top-quality software engineering venues, and developed a dataset of 14,456 primary studies. As the ranking metric for institutions, we used the count of papers in which authors affiliated with this institute have been identified in the obtained dataset, whereas regarding scholars we computed the corresponding rankings based on the number of published papers and the average number of citations. Finally, we identified the top-20 rising scholars in the SE research community, based on their recent publication record (between 2015 and 2017) and their research age.

Keywords*: top institutions, top scholars, software engineering, publications*

Research Highlights

- Identification of most active research topics in software engineering
- Identification of top scholar and institutions in software engineering
- Results on top-scholars is not sensitive to venue selection
- Differences identified in terms of impact and activity
- Seniority is an important factor for research activity

1. Introduction

Software engineering is a continuously growing research field derived from computer science since the 1960s. Correspondently, the importance of software engineering has been widely recognized by more and more scholars all over the world in the past five decades. In order to gain a better understanding about the state-of-the-art in software engineering from past to present and into the future, analyzing papers published in leading conferences and journals within the field

has been considered as a feasible and reasonable approach. This assessment provides the journal's audience with different research/technical background an important reference to help them smoothly get involved in the SE research community. Such an assessment has long been applied to software engineering since Glass's first report in 1994 (Glass, 1994). While trying to answer the two famous questions: (1) Who are the most published scholars in the field of systems and software engineering, and (2) Which are the most published institutions; it is vital to keep the venue and publication screening processes unbiased and to evaluate the academic performance of each author/impact of each paper in an objective way (Parnas 2007).

Bearing these in mind, our main target is to systematically identify, rank, characterize, and classify scholars and institutions in the area of SE that have the most influence in terms of research output and impact. To the best of our knowledge, this is the latest annual survey of publications on top institutions and scholars in software engineering since Wong's report in 2011 (Wong et al., 2011), despite those on the subdivisions of software engineering (such as agile software development (Chuang et al., 2014), search-based software engineering (Freitas et al., 2011) or specific regions (Garousi et al., 2010). In summary, the contributions of our study are the following:

- An assessment of top software engineering scholars and institutions (2010-2017) based on a large sample of 14,456 research papers published in 28 leading conferences and journals during this period;
- Two evaluation schemes: research output and impact of the research are proposed to conduct a comprehensive analysis on individual scholars;
- With respect to different periods of research activity of scholars, a classification mechanism is proposed to group them into early stage ones, consolidators, and experienced (more details on this classification is provided in Section 3). Such a classification updates the evaluation process in order to be more precise manner;
- The distribution of articles of each researcher to the studied venues is also explored to investigate if an author is targeting a specific community or in a wide variety of venues.

The remainder of this paper is organized as follows: Section 2 presents an overview of related work. Next, in Section 3, we pre-sent the study methodology and research questions, whereas the results are presented in Section 4. Finally, we discuss threats to validity in Section 5, and in Section 6 we conclude the paper and discuss the main findings.

2. Related Work

The series of bibliometric reports on software engineering (SE) conducted by Glass et al.—starting from 1994 (Glass, 1994) —was an ongoing, annual event that identified the top-20 SE scholars and institutions between 1994 and 1999. In these studies, the authors explored only six journals (*Information and Software Technology, Journal of Systems and Software, Software Practice and Experience, IEEE Transactions on Software Engineering, ACM Transactions on Software Engineering and Methodology, and IEEE Software*), based on their relevance to software engineering and their reputation in the field as reflected by

bibliometric indices such as the journal impact factor. To calculate the score of each scholar, a single author of a published paper received a score of one, while each author of a multiple-authored paper initially received a score equal to their fractional representation on the paper. For author totals, the initial scores for multiple authors are updated with a specific transformation (i.e., 0.5 becomes 0.7, 0.33 becomes 0.5, and those values that are less than or equal to 0.25 become 0.3). An author's raw score (without the transformation) was attributed to the institution he/she belonged to on a paper. From 1996 to 2011—last paper of the series that has been published by Wong et al. (Wong et al., 2011), the same assessment had been repeated annually for a sliding five-year period in Systems and Software Engineering. Keywords started to be considered in these studies and e-mails were sent to each of the top-20 scholars asking them to provide a set of keywords, which can best describe their research focus within the study period. The geographic distribution of the top-20 scholars was also investigated. In addition, the same set of journals and ranking formula was used until the period of 2002–2006, when an additional journal, (i.e., *Empirical Software Engineering*) was also included to emphasize the importance of applied software engineering research with a strong empirical component.

From 1999 to 2002, four reports were conducted by Wohlin to analyze the most cited papers in SE journals (Wohlin, 2009). The focus of Wohlin's work was to identify the most cited papers and to invite the authors of the most cited papers to contribute to a special section of the *Information and Software Technology* journal. Garousi and Fernandes (Garousi and Fernandes, 2016) reported that more than 70,000 papers have been published in the area of Software Engineering since its inception in 1968. Citations are crucial in any research area to position the work and to build on the work of others. Identification and characterization of highly cited papers are common and are regularly reported in various disciplines. Haghighatkhah et al. (2017) conducted a systematic mapping study that aimed to classify and analyze the literature related to automotive software engineering in order to identify well-established topics and potential research gaps. The review included 679 articles published between 1990 and 2015. Three areas, namely system/software architecture and design, qualification testing, and reuse were the most frequently addressed topics in the literature. Overall, research activity on automotive software engineering seems to have high industrial relevance but is relatively lower in its scientific rigor. Garousi and Mäntylä (2016) utilized automated citation and topic analysis to characterize the software engineering research literature over the years. They found that the number of papers published per year has grown tremendously and currently 6,000–7,000 papers are published every year. At the same time, nearly half of the papers are not cited at all. In addition, only a small share of large countries produces the majority of the papers in SE while small European countries (in proportion to their population) are the most active in the area of SE, based on the number of papers. According to Fernandez (2014) and Garousi and Fernandez (2017), until 2014 the research corpus of software engineering (in DBLP) included 70,000 articles. The authors researched mostly bibliometrics (e.g., number of authors per paper) and they suggested that the number of authors of articles in software engineering is increasing on average around 0.40 authors/decade. The results also indicate that until 1980, the majority of the articles have a sole author, while nowadays articles with 3 or 4 authors

represent almost half of the total. As a parallel finding, they report on the most active scholars in the software engineering domain.

3. Study design

To assess the research output and impact of scholars and institutions in the software engineering domain, we have used the systematic mapping study methodology, so as to systematize the design and the reporting of this study. However, we note that this study is not a systematic mapping study, but a bibliometrics study. In this section, we present the protocol of the study, which we designed according to the guidelines of Petersen et al. (2008).

3.1 Objectives and Research Questions

The goal of this study is to ***analyze*** existing literature on software engineering ***for the purpose*** of characterization of topics, scholars and institutions ***with respect to*** their research output and impact, *from the perspective of* software engineering researchers. Based on this goal, we set the following research questions:

RQ1: Which are the most active institutions in software engineering research, in terms of number of publications?

RQ2: What is the ranking of individuals with respect to their research in the software engineering domain?

- **RQ2.1:** Who are the most active early stage, consolidated, or experienced researchers in the software engineering domain?
- **RQ2.2:** Who are the most active early stage, consolidated, or experienced researchers in the software engineering domain, during the last three years?
- **RQ2.3:** Who are the most active early stage, consolidated, or experienced researchers in the software engineering domain, by considering only journal publications?
- **RQ2.4:** Who are the most impactful early stage, consolidated, or experienced researchers in the software engineering domain?

RQ1 relates to research institutions, whereas RQ2 to individual scholars. On the one hand, regarding institutions, we consider only the number of publications, whereas regarding individual scholars we performed three distinct kinds of analysis: (a) with respect to the number of published research items, (b) regarding the citations of these items, and (c) regarding the research topics that they work on. In particular, for individual scholars we examine:

- R***esearch Output.*** We examined three different views of research output, as follows:
  - ***Total amount of papers in high quality venues***. This is an indicator of the overall work of the researcher between 2010 and 2017.
  - ***Number of papers published in the last three years***. This view indicates the research activity between 2015-2017, aiming and identifying potential "*rising stars*" in the SE community that have only recently started to produce a substantial amount of research outcomes.

- *Amount of papers published only in journals*. The motivation for this choice is the need to compare the results of this study to the previous ones, in which only journals where considered. For this reason, we considered only the venues analyzed by Wong et al. (2011).

- ***Impact of their research***. As impact of an article, we use the average number of monthly citations per article. The decision to normalize citations per month, per article is to avoid any bias from article age and the total number of articles published by the scholars. This indicator expresses how frequently other scholars use the results presented in an article.

Moreover, we use an additional classification that classifies researchers to early stage ones (up to 7 years of research by the end of 2013[1]—therefore first peer-reviewed publication between 2007 and 2017), consolidators (8-12 years of research by the end of 2013—therefore first peer-reviewed publication between 2002 and 2006), and experienced (more than 12 years of research by the end of 2013—therefore before 2001). We performed the classification of researchers, based on the EU classification of researchers in European Research Council (ERC) Grants[2]. The rationale for this splitting is that we expect different research intensity from scholars that: (a) have only recently begun their academic career (e.g., PhD students, Post-Docs, and early-Lecturers), (b) are active in research groups for some years (e.g., people that have supervised at least some PhD students), and (c) are group leaders with large experience in research (e.g., full Professors). Finally, we explored the distribution of articles of each researcher to the studied venues, to investigate if each author is targeting a specific community, or if he/she publishes in a wide variety of venues.

3.2 Search Process

We defined our search strategy considering the goal and research questions of the study. Specifically, we have selected not to perform a search of the complete content of digital libraries, but to take into account only a limited number of selected venues. Consequently, we focus our search on premium software engineering venues. As described by Kitchenham et al., targeted searches at carefully selected venues are justified to omit low quality papers (Kitchenham et al., 2009). The proposed search approach, i.e., selecting specific publication venues has been applied in other systematic secondary studies (i.e., mapping studies and literature reviews) in the field of SE, such as (Cai and Card, 2008; Kitchenham et al., 2010; Galster et al., 2014). This approach is used either for ensuring the quality of the retrieved studies, or to reduce the load of

[1] We selected the end of 2013 since it is the timestamp that splits the examined period [2010 – 2017] in the middle: [2010, 2013] and [2014, 2017]. The use of any other year landmark (e.g., 2010 or 2017) would lead to the following problems: the use of 2010 would lead to the issue that a researcher being an early stage one at 2010, would probably become a consolidator with in the period of the study (thus its classification would be ambiguous). The use of 2017 would mean that this is characterization is a future state of the researcher, although the study examines his/her previous state.

[2] https://erc.europa.eu/

data-points to be handled for very broad topics. In the case of our study, both reasons apply. In addition to that, historically this series of papers is based on specific high quality venues and not on the complete software engineering research corpus. This discussion has been used to elaborate on this decision in the manuscript.

Selection of Publication Venues: Our search method is based on Cai and Card (Cai and Card, 2008), where the authors selected seven journals and seven conferences as the search space for their bibliometric study. Driven by the goal to exploit only high-quality venues, we have developed a venue-selection process, based on the following criteria:

cr.1. We selected venues that are classified as "Computer Software" by the Australian Research Council, with an evaluation higher than or equal to level "B" for both journals and conferences. We included venues with "B" be-cause rankings of scientific venues are usually not conclusive and vary between ranking systems. We considered venues classified under "Computer Software", because this category includes the publication venues related to software engineering (among other computer science disciplines that are included in "Computer Software"). We preferred to use this strategy instead of searching for the "Software Engineering" term in the venue name, since many top venues (e.g., Journal of Systems and Software and Information and Software Technology) do not include the term, but obviously publish works on Software Engineering. An alternative to this decision would be to use the term "software" only. However, our approach returned a broader set of venues that were manually evaluated, with respect to their relevance to software engineering.

cr.2. We selected venues that are strictly relevant to the software engineering domain. The category "Computer Software" also contains venues that do not focus on software engineering. From the search space, we excluded venues of very high quality (e.g., Communications of the ACM) that target a diverse audience and therefore typically do not present in-depth research studies on specific topics. Therefore, we explore venues that include the term "software engineering", or a development phase (e.g., requirements and architecture) in their title.

cr.3. For all venues that have been retained after inclusion criterion cr.1 and cr.2, we count the average number of citations per article, in 2015-2017, and retain for analysis the venues, whose articles attract on average more than one citation per month. The reason for limiting the period for this pilot phase is the effort required to gather data for all venues (approx. 70) for all their papers, published between 2010 and 2017. Nevertheless, we used the complete period for data extraction, but only for the limited number of selected venues, after applying cr.4.

cr.4. To avoid bias from specific communities, we restricted the selected list of venues to all journals, all generic-SE conferences, plus the top-one or top-two conferences per phase, if applicable (e.g., requirements and architecture). In case of one phase having a dedicated journal (e.g., testing), only one conference has been selected, whereas if a journal is not selected (e.g., maintenance), two conferences have been selected.

The list and the scoring of each venue with respect to the abovementioned criteria is presented in Appendix A, organized by criteria (cr.1 to cr.4). To obtain the number of citations per article, per venue, we used the Publish or Perish tool[3] that extracts this information from Google Scholar (GS). In the table, with green fonts we denote venues that pass each criterion, whereas with red the ones that fail. The results of Appendix A, in terms of journals include those of Wong et al. (2011), who used a subset (seven) of the selected journals for assessing top software engineering scholars and institutions.

3.3 Article Filtering Phases

From the aforementioned list of venues, we considered all papers published between 2010 and 2017 (including first and final year) as candidates for final inclusion in our pool of primary studies. Another important element of the systematic mapping planning is to define the Inclusion Criteria (IC) and Exclusion Criteria (EC), that we have used as guidelines for including primary studies that are relevant to answer the research questions and exclude studies that do not help answer them. The only inclusion criterion for this work is the relevance of the paper to software engineering (safeguarded by the selected venues). Similarly, we assume all other typical exclusion criteria (e.g. paper language is not English) as covered due to the systematic selection of venues. The only other exclusion criterion established is that the primary study should not be an editorial, position paper, keynote, opinion, tutorial, poster or panel. Every article selection activity has been handled by two members of the team and possible conflicts have been resolved by a senior researcher (Team-1: Misirlis and Li, Team-2: Karantasiou and Arvanitou). For each selected publication venue, we documented the number of returned and selected papers (see Section 4).

3.4 Keywording of Abstracts (Classification Scheme)

Petersen et al. (2008), propose keywording of abstracts as a way to develop a classification scheme for primary studies and to answer the research questions, if existing schemes do not fit, and to ensure that the scheme takes into account the identified primary studies. However, the goal of this study is not to develop a classification scheme, so we omitted this step.

3.5 Data Collection & Analysis

During the data collection phase, we collected a set of variables that describe each primary study. Two members of the team performed the data collection process (namely, Misirlis and Karanatsiou). No conflicts can occur at this stage since no subjective judgement is involved. For every study, we extracted and assigned values to the following variables:

[V1] Author: Records the *list of authors* of the paper.
[V2] Institution: Records the list of *institutions* of the paper
[V3] Title: Records the *title* of the paper.

[3] https://harzing.com/resources/publish-or-perish

[V4] Month / Year: Records the *publication date* of the paper (available online).
[V5] Publication Venue: Records the *name* of the corresponding journal or conference.
[V6] Number of Citations in Google Scholar.

Given the scores of these variables, we calculated some general indices for each paper:
[V7] Age of the paper in months: CURRENT_DATE – [V4].
[V8] Paper Impact [V6] / [V7]: Average annual number of Citations.

Thus, for each individual scholar, we record four variables: (a) count of papers in which the author is involved, (b) average impact of papers (i.e., average [V8] for the papers in which the author is involved), (c) seniority level (i.e., early stage, consolidator, or experienced) based on the year of the first paper published in google scholar, and (d) homogeneity of publications in different venues. We perform the assessment of homogeneity of publications in venues to identify if top scholars prefer to publish in journals, conferences, or to venues of specific communities (e.g., the maintenance community is represented in our dataset by SANER and ICMSE and architecture by WICSA and QoSA). This can potentially lead to interesting conclusions and guide younger researchers in their venue selection, based on the choices of more experienced ones. To perform such an observation, we use the standard deviation analysis and Gaussian distribution. Based on the above, we obtain two different thresholds for every author (a low threshold and a high threshold); outside these boundaries, a preference to this venue can be suggested. Strong preference is suggested by cases when the high threshold is surpassed and weak preference when only the lower threshold is surpassed. The low threshold refers to (mean + standard deviation), whereas the high threshold refers to cases when (mean + double standard deviation).

As part of validation, all top scholars (the top-20 and 10 runner-ups) have been contacted by email to validate their personal/academic data. The scholars have been provided with a list of the numbers of papers that we have identified them to have authored, in each venue, their email address that one could use as a contact point, and their affiliation (to validate if it is the current one). The process was performed along two time periods, with a distance of 2 months. In the second phase, only scholars that have not reacted to the first invitation have been contacted. In addition to that, to validate the research age of the top scholars, two of the authors have visited their profiles in Google Scholar, identified the 1st peer-reviewed publication (i.e., excluded thesis, technical reports, etc.), and compared the results. In case of disagreement a discussion was initiated. The outcome of the validation process is discussed in Section 5. The complete dataset as extracted by the digital libraries is available online[4]. Apart from verification and repeatability purposes, the provision of the dataset

[4] http://se.uom.gr/wp-content/uploads/top_scholars_dataset.zip

can facilitate the execution of other secondary studies that aim at the same venues, in the sense that it is provided in an easily accessible and parseable format, which can be reused instead of re-collecting data from digital libraries.

4. Results

4.1 Top Institutions in Software Engineering Research

In Table 1, we present the top-20 institutions, based on the number of papers that involve authors affiliating the specific organizations. We note that for cases in which researchers with multiple affiliations have authored a paper, a fraction of this paper is attributes to each organization. For example, if a paper is written from 3 authors of organization A and 1 from organization B, organization A gets 0.75 papers and B gets 0.25 papers. This table we are not reporting on individual department or faculty level, but on organization/institution level.

Table 1 – Most Active Institutions in Software Engineering Research

#	Name	Country	#papers
1	University of California	USA	162.25
2	Microsoft Research	USA	146.00
3	Carnegie Mellon University	USA	107.75
4	Chinese Academy of Sciences	China	98.67
5	University of Waterloo	Canada	95.00
6	Nanjing University	China	87.50
7	Queen's University	Canada	85.16
8	Simula Research Laboratory	Norway	79.50
9	Blekinge Institute of Technology	Sweden	78.75
10	Swinburne University of Technology	Australia	76.33
11	University of Victoria	Canada	73.67
12	North Carolina State University	USA	71.50
13	University College London	UK	64.25
-	University of Limerick	Ireland	64.25
15	Delft University of Technology	Netherlands	62.67
-	University of Sannio	Italy	62.67

In Table 2, we present the results regarding organizations using only the publication venues used in previous versions of this series (i.e., EMSE, IST, JSS, SPE, SW, TOSEM, and TSE), so as to obtain comparable results. The comparison of results is performed in Section 6, in which we cumulatively discuss all the findings of this study.

Table 2 – Most Active Institutions in Software Engineering Research (only top-quality journals)

#	Name	Country	# papers
1	University of California	USA	83.67
2	Carnegie Mellon University	USA	80.44
3	Microsoft Research	USA	54.36
4	University of Waterloo	Canada	49.33
5	Chinese Academy of Sciences	China	48.28
6	Blekinge Institute of Technology	Sweden	43.33
7	Queen's University	Canada	41.22
8	Simula Research Laboratory	Norway	38.00
9	Nanjing University	China	37.11
10	Swinburne University of Technology	Australia	35.67
11	University of Oslo	Norway	34.17
12	University of Luxembourg	Luxemburg	32.50
13	University of Lugano	Italy	28.67
-	University of Limerick	Ireland	28.10
15	Delft University of Technology	Netherlands	27.17

4.2 Top Scholars in Software Engineering Research

In this section, we present the results regarding the top individual scholars in software engineering. In Tables 3-5, we present the top-20 experienced, consolidated, and early stage researchers, ranked by the total number of publications in the selected venues. Bold fonts represent cases in which authors show strong preference into some venue, and italics suggest weak preference. To enhance the readability of the tables, we removed venues with zero published articles.

Table 3 – Most Active Experienced Researchers

#	Name	# papers	ASE	CBSE	EASE	EMSE	ESEM	ESOP	FASE	FSE	ICSE	ICSME	ISSTA	IST	JSEP	JSS	POPL	QoSA	SANER	SPE	STTT	STVR	SW	TOPLAS	TOSEM	TSE	WICSA	XP
1	Hassan Ahmed E.	95	1			24	2			5	10	14		1	2	5			12	1			9			9		
2	Di Penta Massimiliano	81	4			11				7	12	16		2	4	2			11	1		1	1			9		
3	Harman Mark	78	7			3	3		1	7	11		8	3		9			2	1	1	4	1	1	5	11		
4	Briand Lionel C.	75	9				4			8	5	1	7	10		3			2			4	3		9	10		
5	Avgeriou Paris	54			2	1	2				1			11	2	15		3		1			6		1	3	6	
6	Xie Tao	50	14						4	10	8		5			1							4		1	3		
7	Cleland-Huang Jane	49	6			3				6	10	3											19			2		
-	Antoniol Giuliano	49	1			8					3	9		2	5	1			15	1			1			3		
9	Yann-Gaël Guéhéneuc	47	1			9	1				3	6		3	6	2			11							5		
10	Shull Forrest	43			2	2	2				2			1	1								31			2		
11	Ernst Michael D.	41	4							7	13		10											2	1	4		
12	Bosch Jan	39	1	1		1	1			1		1		2	3	8	1			2			7				5	5
13	Grundy John	38	13		1	1	1			2	7			3		3		1					1			2	3	
14	Marinov Darko	37	8						2	9	7		8									2			1			
15	Zhang Lu	36	7					1		4	10	3	3			1	1								2	4		
16	Khurshid Sarfraz	35	9							5	8	3	5	1	1				1						1	1		
-	Zimmermann Thomas	35	1			2	3			9	11				1								3			5		
18	Juristo Natalia	34	4			6	7				1			11		2										3		
-	Zhang Hongyu	34	5		1		2			6	5	5	1		1	2	1		2							1	1	1
20	Mei Hong	33	9	1						5	3	2			1	4	1	1					1		2	3		
-	Menzies Tim	33	6			5	2				5			2		1				1			3			8		

Table 4 – Most Active Consolidated Researchers

#	Name	# papers	ASE	EASE	EMSE	ESEM	FASE	FSE	ICSE	ICSME	ISSTA	IST	JSEP	JSS	JSW	SANER	SPE	STTT	STVR	SW	TOSEM	TSE	WICSA	XP
1	Lo David	104	21	5	6	3		4	6	23	3	2	3	1		25						2		
2	Oliveto Rocco	78	6		6			5	16	15	2	2	4	4		5	1		1		3	8		

#	Name	# papers	ASE	EASE	EMSE	ESEM	FASE	FSE	ICSE	ICSME	ISSTA	IST	JSEP	JSS	JSW	SANER	SPE	STTT	STVR	SW	TOSEM	TSE	WICSA	XP
3	Poshyvanyk Denys	66	8		6	1		4	16	14	2		4	1		2					3	5		
4	Adams Bram	57	1		11	2		2	6	7		1	2	3		9	2		2	8		2		
5	Nguyen Tien N.	50	12				1	10	20	4											1	2		
6	Xing Zhenchang	44	11		2	1		1	6	8			2	1		12								
7	Babar Muhammad Ali	43	1	7	4	3			2			8	2	6			2			4	1		3	
8	Liu Yang	41	8					6	7	1	6			1	1	2	1	2			1	5		
9	Zhang Xiangyu	40	5					7	10		8	1		1		4				1	1	2		
-	Petersen Kai	40		3	3	6			1	1		9	5	6			2							4
-	Fraser Gordon	40	5		4		1	4	4		8	1					1		4		2	5		
12	Bird Christian	39	1		4	4	1	9	10	3	1									3		3		
13	Sun Jun	37	12				1	5	5	2	4					1		1			2	4		
14	Kim Miryung	34	4		1		1	9	10	4			1						1			3		
-	Kim Sunghun	34	5		1			10	5	2	2									2		7		
16	Apel Sven	33	7		3	1	2	5	11			1									2	1		
-	Prikladnicki Rafael	33		2	5	3			1			6	2							14				
18	Gorschek Tony	32			3				1			5	7	5						6	1	4		
-	Garousi Vahid	32		7		2		1		1		8	2	6					1	3		1		
20	Mesbah Ali	31	7			3		3	7	2	1	1				1			1	1	1	3		
-	Brun Yuriy	31	5				1	9	5		1			2								6	2	

Table 5 – Most Active Early Stage Researchers

#	Name	# papers	ASE	CGO	EASE	EMSE	ESEM	ESOP	FASE	FSE	ICSE	ICSME	ISSTA	IST	JSEP	JSS	POPL	QoSA	SANER	SPE	STVR	SW	TOSEM	TSE
1	Bavota Gabriele	69	6			6				5	15	16		1	3	4			4			1	3	5
2	Khomh Foutse	50	2			7	4					13			2	3			18			1		
3	Nguyen Tung Thanh	36	14						1	4	11	5												1
4	Arcuri Andrea	35	5			5			1	3	2		6			1						4	3	5	
5	Nguyen Hoan Anh	29	9						1	4	11	2											1	1

#	Name	# papers	ASE	CGO	EASE	EMSE	ESEM	ESOP	FASE	FSE	ICSE	ICSME	ISSTA	IST	JSEP	JSS	POPL	QoSA	SANER	SPE	STVR	SW	TOSEM	TSE
6	Shihab Emad	28				5	2			4	1	3		2					6	1		2		2
7	McMillan Collin	25	2			2	2				7	5			3								1	3
-	McIntosh Shane	25	1			6	1			1	5	2							5					4
9	Zhang Lingming	23	3					1		4	3		7		1	1	1						1	1
10	Treude Christoph	22				1				3	8	6				1			1					2
-	Kessentini Marouane	22	3			3			2			2		1	3	3							3	2
-	Pradel Michael	22	3							1	9	1	7											1
-	Gethers Malcom	22	2	1		2					4	6			3				1				2	1
-	Panichella Sebastiano	22	2			2				3	3			1	1				3		1			
15	Shang Weiyi	20	1			4				1	2	3			1	2			3			1		2
-	Jia Yue	20	3				1			2	3		4	2		2						1		2
-	Thung Ferdian	20	5		1	2				2		5			1				4					
-	Palomba Fabio	20	2								5	6	1		1	1			2					2
19	Ampatzoglou Apostolos	19			1		2							6	1	5		2						2
20	Sun Chengnian	18	4			1				3	3	3	3						1					
-	Milos Gligoric	18	4						2	4	2		4								1		1	

In Table 6, we present the top-20 scholars in the years between 2015 and 2017. The structure of this table does not include the publication in specific venues, since we have already presented the details for the majority of the scholars in Table 5. We note that since the goal of this research question is to identify possible rising stars in the SE research community, we do not present the results of Experienced and Consolidated researchers.

Table 6 – Rising SE Research Stars

#	Name	# papers	Publish Since

#	Name	# papers	Publish Since
1	Bavota Gabriele	33	2010
2	McIntosh Shane	21	2010
3	Palomba Fabio	16	2012
4	Treude Christoph	14	2007
-	Arcuri Andrea	14	2007
6	McMillan Collin	13	2009
-	Panichella Sebastiano	13	2009
-	Jia Yue	13	2008
9	Pradel Michael	12	2008
-	Shang Weiyi	12	2009
-	Shihab Emad	12	2007
-	Ampatzoglou Apostolos	12	2007
-	Kessentini Marouane	12	2008
-	Zhang Lingming	12	2009
15	Li Li	11	2012
-	Khomh Foutse	11	2008
-	Borg Markus	11	2007
18	Panichella Annibale	10	2009
-	Mocci Andrea	10	2007
-	Papadakis Mike	10	2009
-	Sarro Federica	10	2009

In Tables 7-9, we present an updated version of Tables 3-5, by considering only the publication venues used in previous versions of this series (i.e., EMSE, IST, JSS, SPE, SW, TOSEM, and TSE). We note that similarly to Table 6, we omit the details about the top scholars.

Table 7 – Most Active Experienced SE Researchers in Top-Quality Journal

#	Name	# papers	Venues
1	Hassan Ahmed E.	49	All but TOSEM
2	Avgeriou Paris	38	All

#	Name	# papers	Venues
3	Shull Forrest	36	All but JSS, SPE, TOSEM
4	Briand Lionel C.	35	All but EMSE, SPE
5	Harman Mark	33	All
6	Ebert Christof	31	All but EMSE, SPE, TOSEM, TSE
7	Di Penta Massimiliano	26	All but TOSEM
8	Cleland-Huang Jane	24	All but IST, JSS, SPE, TOSEM
-	Feldt Robert	24	All but SPE
10	Juristo Natalia	22	All but SPE, SW, TOSEM
11	Bosch Jan	20	All but TOSEM, TSE
-	Menzies Tim	20	All but TOSEM
-	Holzmann Gerard J.	20	All but EMSE, IST, JSS, SPE, TOSEM
-	Wohlin Claes	20	All but TOSEM, TSE
-	Piattini Mario	20	All but EMSE, TOSEM, TSE
16	Yann-Gaël Guéhéneuc	19	All but SPE, SW, TOSEM
-	Angelis Lefteris	19	All but SPE, TOSEM
-	Chan Wing Kwong	19	All but EMSE, SW
19	Magne Jørgensen	16	All but SPE, TOSEM
-	Guliano Antoniol	16	All but TOSEM

Table 8 – Most Active Consolidated SE Researchers in Top-Quality Journal

#	Name	# papers	Venues
1	Adams Bram	26	All but TOSEM
2	Prikladnicki Rafael	25	All but JSS, SPE, TOSEM, TSE
-	Babar Muhammad Ali	25	All but TSE
4	Gorschek Tony	24	All but SW
-	Oliveto Rocco	24	All but SW
6	de Almeida Eduardo Santana	22	All but EMSE, TOSEM, TSE
7	Petersen Kai	20	All but SW, TOSEM, TSE
8	Garousi Vahid	18	All but EMSE, SPE, TOSEM
9	Torkar Richard	16	All but SPE, SW, TOSEM

#	Name	# papers	Venues
-	Nagappan Nachiappan	16	All but SPE, TOSEM
11	Poshyvanyk Denys	15	All but IST, SPE, SW
12	Fraser Gordon	14	All but SW
-	Grunske Lars	14	All but EMSE, SW, TOSEM
-	Mendling Jan	14	All but EMSE, SPE, TOSEM
15	Itkonen Juha	12	All but SPE, TOSEM
-	Tang Antony	12	All but EMSE, SPE, TOSEM
-	Malek Sam	12	All but EMSE, SPE
-	Xu Chang	12	All but EMSE, SPE
19	Monperrus Martin	11	All
-	Lo David	11	All but SPE, SW, TOSEM
-	Cabot Jordi	11	All but SPE, TOSEM, TSE

Table 9 – Most Active Early Stage SE Researchers in Top-Quality Journal

#	Name	# papers	Venues
1	Bavota Gabriele	20	All but SPE
2	Arcuri Andrea	14	All but IST, SPE, SW
3	Ampatzoglou Apostolos	13	All but EMSE, SPE, SW, TOSEM
4	Shihab Emad	12	All but JSS, TOSEM
-	Kessentini Marouane	12	All but SPE, SW
-	Turhan Burak	12	All but JSS, SPE, TOSEM
7	Khomh Foutse	11	All but IST, SPE, TOSEM, TSE
-	Yue Tao	11	All but JSS, SW, TSE
9	McIntosh Shane	10	All but IST, JSS, SPE, SW, TOSEM
10	Shang Weiyi	9	All but IST, SPE, TOSEM
11	Stol Klaas-Jan	8	All but EMSE, SPE, TSE
-	Borg Markus	8	All but JSS, SPE, TOSEM
-	Wnuk Krzysztof	8	All but JSS, SPE, SW, TOSEM
14	Yamashita Aiko	7	All but IST, SPE, TOSEM
-	Keivanloo Iman	7	All but IST, SPE, SW, TOSE, TSE

#	Name	# papers	Venues
-	Ouni Ali	7	All but SPE, SW
-	Jia Yue	7	All but EMSE, SPE, TOSEM
18	McMillan Collin	6	All but IST, JSS, SPE, SW
-	Sarro Federica	6	All but EMSE, SPE, SW, TOSEM
-	Mirakhorli Mehdi	6	All but IST, SPE, TOSEM

Additionally, in Tables 10-12, we present the most impactful software engineering researchers in terms of number of citations per article, per month.

Table 10 – Most Impactful Experienced SE Researcher

Name	$AVG_{citations}$
Rinard Martin	1.865
Barr Earl T.	1.554
Gulwani Sumit	1.311
Kruchten Philippe	1.264
Budgen David	1.255
Birkedal Lars	1.238
Hall Tracy	1.238
Wohlin Claes	1.208
Devanbu Premkumar	1.207
Wasowski Andrzej	1.207
Harman Mark	1.198
Kitchenham Barbara	1.150
Le Traon Yves	1.144
Heymans Patrick	1.144
Whittle Jon	1.116

Table 11 – Most Impactful Consolidated SE Researcher

Name	$AVG_{citations}$
Klein Jacques	1.603
Mendling Jan	1.489

Name	$AVG_{citations}$
Halfond William G. J.	1.388
Fraser Gordon	1.181
Monperrus Martin	1.126
Legay Axel	1.125
Holmes Reid	1.092
Berger Thorsten	1.051
Kim Sunghun	1.008
Apel Sven	0.978
Abreu Rui	0.944
Poshyvanyk Denys	0.931
McMinn Phil	0.929
Bodden Eric	0.903
Torkar Richard	0.844

Table 12 – Most Impactful Early Stage SE Researcher

Name	$AVG_{citations}$
Jia Yue	1.896
Ding Li	1.731
Li Li	1.678
Yoo Shin	1.574
Papadakis Mike	1.460
Unterkalmsteiner Michael	1.380
Arcuri Andrea	1.305
Bowes David	1.247
Sarro Federica	1.244
Dit Bogdan	1.231
Gethers Malcom	1.018
Tamburrelli Giordano	0.961
Stol Klaas-Jan	0.895
Shihab Emad	0.881

McIntosh Shane	0.837

Finally, in Table 13, we present the most frequent research topics, in which all of the aforementioned researchers work on. The data have been extracted by the titles of their paper, and have been validated by the authors themselves. A detailed list of all top-scholars (presented in an alphabetical order) along with the year of their first research peer-reviewed publication, their category, their current affiliation, contact details and research interest are provided in Appendix B. To extract the research topics the following analysis has been performed: (a) the title of each publication has been split in strings of one, two, or three words, (b) a frequency for all strings of all sizes in all publications has been calculated, and (c) a synthesis process of synonyms or closely related terms has been performed. For example, the terms source code, code, and implementation have been merged in one category named source code (i.e., the most frequent term).

Table 13 – Emerging Topics

Research Topics	# papers	Top-Scholars
Source Code	344	Bavota, Di Penta, Hassan, McMillan, Nguyen, Oliveto, Palomba, Poshyvanyk, Yamashita
Empirical Research	256	Adams, Angelis, Di Penta, Harman, Hassan, Kim, Xu, Wohlin
Software Testing	246	Briand, Chan, Fraser, Garousi, Harman, Petersen, Xie
Systems Development	139	Adams, Apel, Avgeriou, Bosch, Briand, Legay, Liu, Sun
Automated Software Engineering	115	Arcuri, Ernst, Grundy, Harman, Lo
Secondary Studies	113	Ampatzoglou, Avgeriou, Feldt, Garousi, Gorschek, Petersen
Bug / Fault / Defect Detection	105	Chan, Gethers, Lo, McIntosh, Menzies, Nguyen, Thung, Xu, Yoo, Zimmermann
Quality Assessment / Prediction	102	Ampatzoglou, Bavota, Hassan, Khomh, Shihab
Data Analytics	95	Briand, Harman, Menzies
Web Development	86	Halfond, Nguyen, Xie
Mobile (Android) Development	81	Adams, Berger, Halfond, Hassan
Refactorings	75	Bavota, Kessentini, Kim
Requirements Engineering	73	Borg, Feldt, Gorschek, Grundy, Wnuk
Change Impact Analysis	71	Adams, Antoniol, Di Penta, Gethers, Khomh, Poshyvanyk
Search-based Software Engineering	68	Fraser, Harman, McMinn, Ouni

5. Threats to Validity

In this section, we discuss the threats to the validity of this paper. First, the results of the paper are threatened by the selection of publication venues to be considered, since a different set of venues could possibly lead to different results. However, we believe that the selected set of publication venues is as inclusive as possible, whereas the criteria for selecting them is straightforward, and without bias towards a specific community of researchers. Furthermore, we acknowledge that the selection of metrics for impact and activity are influencing the results, and that the use of different metrics (e.g., weighting based on authors' order) would have differentiated them. However, we note that especially regarding research impact the results should be treated with caution, since the reflection of research impact is an extremely difficult task that is connected to the subfield of research. For example, if a researcher opens up a completely new line of research, he/she may not receive a lot of citations initially, but might get many over time. Also, the way of citing a paper can be different, ranging from a simple reference to the actual use of the proposed method or tool. Although the latter is obviously more important, such a distinction cannot be performed in this bibliometric study. Additionally, the process is completely replicable, since all data are available, the tools that have been used for the analysis are open-source, and the steps of the methodology are clearly explained[5]. Moreover, we need to note that no researcher bias has been introduced, since no interpretation or synthesis of results has been performed. All performed analysis is purely quantitative with simple counts and mean as aggregation functions. Additionally, a threat to validity of the results regarding organizations is related with counting systems of universities, e.g., University of California, that hold many campuses as one organization. Such a decision might be unfair for single campus universities; however, the automated analysis performed in this study was unable to comprehensively handle such cases. Regarding RQ_3, we note that a possible threat arises from the combination of the publication date (i.e., journal publications are favored over conferences, in the sense that they are available online prior to official publication) and the number of citations (i.e., citations gathered later would benefit the corresponding scholars). Concerning the 1st issue, for journal publications we have used the official publication month (in-print). Due to the nature of the study and the quantity of the data that needed to be handled, we have opted to use the date that was fetched by the employed tools. Regarding the 2nd issue, GS citations have been recorded per venue and not per author, so that all authors get an as fair treatment as possible. In any case, the period for recording citations was as limited as possible (about 2 weeks), and was performed simultaneously by the authors using automated tools. The period could unfortunately not be further shrunk, since GS poses a limit to how may queries it can get per day from the same IP address.

The final threat to validity is related to possible errors that might have occurred during data collection. To mitigate this threat, as much as possible, a systematic validation process has been conducted (as described in Section 3). During this process we have contacted all authors that appear in our dataset (top-20 scholars and 10 runner-ups), and we received

[4] Our dataset is available online at: http://se.uom.gr/wp-content/uploads/top_scholars_dataset.zip. An alternative use of this extracted dataset is its reuse in secondary studies targeting the same venues, so as to avoid difficulties in using search engines, since the .bib formatting of our dataset enables easy import and management to dedicated tools, such as JabRef.

feedback from 62 of them (~59%). Out of them, 9% identified problems in their contact details or affiliations and 19% have sent us updated list of publications to be checked. By manually checking the suggested publications, we realized that the majority of them was intentionally excluded from the dataset, since they referred to editorials, invited talks, keynotes, etc. Based on these checks, 22 changes have been applied: (a) 64% of the changes corresponded in the number of papers of one scholar, without altering his/her ranking, (b) 31% of the changes corresponded in the ranking of one researcher by one position, and (c) 4% (1 in absolute number) of the changes led to the inclusion of scholars that were runner-ups in the main tables.

6. Conclusions

This study is a follow-up of the famous series on top scholars and institutions in software engineering research that has been performed for more than two decades. The study has been designed based on the footsteps of the previous studies, with the following methodological differences: (a) the set of publication venues has been expanded, since nowadays the bibliometric study processes are tool-assisted; (b) the weighting of scholars is the same regardless of the number or the positioning in the authors' list, due to the cultural differences that exist in different countries; and (c) additional metrics and analysis are performed. Nevertheless, we need to note that especially regarding (a) an analysis with the same publication venues (i.e., the top-7 generic-scope journal in the field) has been performed. The main findings of this study can be summarized as follows:

- ***Sensitivity of results to venues***. The ranking of researchers is quite similar regardless of the number and type of publication venues being considered. In particular, 32 (out of 48) researchers that are ranked as top in their categories, based on all selected publication venues, exist in the listing of top scholars by considering the top-7 journals. A possible reason for researchers to prefer journal over conference publications is that in some countries journal publications (or a subset of them) are valued as a part of the academia evaluation system, whereas conference publications are not considered in the evaluation. Thus, some authors might be biased towards publishing in journals (for strategic reasons).
- ***Importance of seniority level***. The difference in produced research output between *Experienced* and *Consolidated* researchers is not considered significant. However, regarding *Early Stage* researchers the difference (from more senior ones) is more substantial, since only one scholar (namely Gabriele Bavota), would appear in the list of top-researchers without discriminating researchers based on their research age. Thus, we consider this discrimination as useful and fair for younger researchers. This difference becomes less crucial when considering journal publications only.
- ***Sub-fields of Software Engineering***. Some communities seem to be well-represented in this list compared to others. For example, the maintenance community (SANER, CSMR) is substantially more represented than architec-

ture (QoSA, WICSA), or testing (ISSTA, STVR). This observation is probably due to the loyalty of community members to publish in domain-specific venues, rather than generic ones. For example, there are cases for which approximately 40% of the total research output of some researchers is published in the two maintenance conferences.

- ***Impact (citations) vs. Research output***. An interesting finding of this work is that the list of highly impactful researchers and highly active researchers only have a limited overlap. In particular, only 19 (out of 45) researchers that are ranked as top in their categories in terms of activity are ranked as highly cited ones. This observation suggests that in some cases researchers with many publications have a number of publications that are not attracting high number of citations, or that the same author is active in multiple subfields of software engineering with different rates of attracting citations. The sub-field in which the number of citations is high (considering the researchers focusing on testing), compared to the number of publications is testing. This fact can be explained by the fact that smaller communities (i.e., those with fewer published articles) are getting more citations per manuscript compared to broader ones (e.g., maintenance).
- ***Comparison against past studies***. By comparing the number of researchers that were present in the last two lists of top-scholars to ours we can observe that a significant percentage of the list has remained unchanged. In particular 9 out of 29 that were reported as being part of "Top-scholar ranking for four consecutive survey periods (2001-2008)" are present in this list. These researchers (namely Jørgensen, Angelis, Kitchenham, Harman, Runeson, Wohlin, Briand, Bosch, and Piattini) have shown top researching performance that spans across the last two decades. Regarding research organizations only 3 out of 15 that existed in the 2004-2008, are presented in the top institutes of this year, suggesting that ranking of institutes is more fluid, compared to this of scholars which was more stable. However, three more universities that existed in the list of 2004-2008 (namely University of Maryland, Iowa State University, and University of Alberta) were runner-ups in our list.

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Appendix A: Publication Venues

Name	Cr.1	Cr.2	Cr.3	Cr.4	Included	Type
Journal of Systems and Software (JSS)	A	yes	6,856	Generic	x	Journal
IEEE Software (SW)	B	yes	5,680	Generic	x	Journal
ACM-SIGACT Symposium on Principles of Programming Languages (POPL)	A	yes	4,833	Languages	x	Conference
IEEE Transactions on Software Engineering (TSE)	A	yes	4,006	Generic	x	Journal
ACM Transactions on Programming Languages and Systems (TOPLAS)	A	yes	3,667	Languages	x	Journal
International Journal on Software Tools for Technology Transfer (JSTT)	B	yes	3,595	Tools	x	Journal
International Symposium on Software Testing and Analysis (ISTTA)	A	yes	3,180	Testing	x	Conference
International Conference on Software Engineering (ICSE)	A	yes	3,086	Generic	x	Conference
Empirical Software Engineering (EMSE)	A	yes	3,027	Generic	x	Journal
ACM Transactions on Software Engineering and Methodology (TOSEM)	A	yes	2,963	Generic	x	Journal
Information and Software Technology (IST)	B	yes	2,855	Generic	x	Journal
International Symposium on Code Generation and Optimization (CGO)	A	yes	2,489	Programming	x	Conference
European Symposium on Programming (ESOP)	A	yes	2,344	Programming	x	Conference
Software: Practice and Experience (SPE)	A	yes	2,343	Generic	x	Journal
Software Testing, Verification and Reliability (STVR)	B	yes	2,311	Testing	x	Journal
IEEE Working Conference on Reverse Engineering (SANER)—Formerly European Conference on Software Maintenance and Reengineering (CSMR) jointed with Working Conference on Reverse Engineering (WCRE)	B	yes	1,939	Maintenance	x	Conference
Conference on the Quality of Software Architectures (QoSA)	A	yes	1,848	Architecture	x	Conference
Automated Software Engineering Conference (ASE)	A	yes	1,829	Tools	x	Conference
IEEE/IFIP Working Conference on Software Architecture (WICSA)	A	yes	1,821	Architecture	x	Conference
International Conference on Evaluation and Assessment in Software Engineering (EASE)	A	yes	1,570	Generic	x	Conference
Journal of Software (JSW)	B	yes	1,566	Generic	x	Journal
IEEE International Conference on Software Maintenance and Evolution (ICSME)	A	yes	1,493	Maintenance	x	Conference
International Symposium on the Foundations of Software Engineering (FSE)	A	yes	1,338	Generic	x	Conference
Journal of Software: Evolution and Process (JSEP)—Formerly Journal of Software Maintenance and Evolution (JSME)	B	yes	1,272	Generic	x	Journal
International Symposium Component-Based Software Engineering (CBSE)	A	yes	1,249	Generic	x	Conference
International Conference on extreme Programming (XP)—Formerly Conference on Agile Software Development (AGILE)	B	yes	1,137	Processes	x	Conference
International Symposium on Empirical Software Engineering and Measurement (ESEM)	B	yes	1,096	Generic	x	Conference
Fundamental Approaches to Software Engineering (FASE)	B	yes	1,104	Generic	x	Conference
Software & System Modelling	B	yes	3,333	Languages		

Name	Cr.1	Cr.2	Cr.3	Cr.4	Included	Type
European Conference on Object-Oriented Programming	A	yes	1,917	Programming		
ACM-SIGPLAN Conference on Programming Language Design and Implementation	A	yes	1,796	Languages		
Architectural Support for Programming Languages and Operating Systems	A	yes	1,723	Languages		
Science of Computer Programming	A	yes	1,667	Programming		
International Conference on Software Language Engineering	B	yes	1,633	Languages		
ACM Conference on Object Oriented Programming Systems Languages and Applications	A	yes	1,552	Languages		
International Conference on Functional Programming	A	yes	1,544	Programming		
Aspect-Oriented Software Development	A	yes	1,234	Programming		
Journal of Object Technology	B	yes	1,131	Programming		
International Conference on Generative Programming and Component Engineering	B	yes	1,127	Programming		
International Journal of Agent Oriented Software Engineering	B	yes	1,081	Programming		
International Conference on Software Reuse	A	yes	0,864			
International Conference on Availability, Reliability and Security	B	yes	0,813			
International Conference on Quality Software	B	yes	0,765			
ASIAN Symposium on Programming Languages and Systems	B	yes	0,733			
Workshop on Programming Languages and Operating Systems	B	yes	0,720			
International Conference on Software Development	B	yes	0,653			
International Symposium on Software Reliability Engineering	A	yes	0,637			
Pattern Languages of Programs	B	yes	0,607			
Ada-Europe International Conference on Reliable Software Technologies	B	yes	0,570			
International Conference on Reliable Software Technologies	A	yes	0,570			
International Workshop on Requirements Engineering: Foundation for Software Quality	B	yes	0,567			
International Conference on Formal Engineering Methods	B	yes	0,542			
European Conference on Pattern Languages of Programs	B	yes	0,539			
Product Focused Software Process Improvement	B	yes	0,531			
International Conference on Evaluation of Novel Approaches to Software Engineering (found as Evaluation of Novel Approaches to Software Engineering)	B	yes	0,525			
International Conference on Software Process	A	yes	0,521			
Australian Software Engineering Conference (found data for Australasian Software engineering conference ASWEC)	B	yes	0,502			
International Conference on Software Engineering and Formal Methods	B	yes	0,434			
International Conference on Computer Safety, Reliability and Security	B	yes	0,410			
International Conference on Software and Data Technologies (found as ICSOFT)	B	yes	0,298			

Name	Cr.1	Cr.2	Cr.3	Cr.4	Included	Type
ACM SIGSOFT Workshop on Program Analysis for Software Tools and Engineering	B	yes	0,291			
Australasian Computer Systems Architecture Conference (now Asia-Pacific Computer Systems Architecture Conference)	B	yes	0,239			
European Software Engineering Conference	B	yes	0,133			
European Software Engineering Conference and the ACM SIGSOFT	A	yes	0,133			
International Computer Software and Applications Conference	B	yes	0,098			
Australian Workshop on Requirements Engineering	B	yes	0,000			
International Conference on Software Composition	B	yes	0,000			
International Workshop on Computer-Aided Software Engineering	B	yes	0,000			
Journal of Functional and Logic Programming (closed 2008)	B	yes	0,000			
Software Technology and Engineering Practice Conference	B	yes	0,000			
Technology of Object-Oriented Languages and Systems Europe	B	yes	0,000			
ACM Computing Surveys	A	no				
ACM Conference on Applications, Technologies, Architectures, and Protocols for Computer Communication	A	no				
ACM Conference on Computer and Communications Security	A	no				
ACM International Symposium on Computer Architecture	A	no				
ACM Multimedia	A	no				
ACM SIGOPS Symposium on Operating Systems Principles	A	no				
ACM SIGPLAN Workshop on Partial Evaluation and Program Manipulation	B	no				
ACM Symposium on Information, Computer and Communications Security	B	no				
ACM Transactions on Architecture and Code Optimization	A	no				
ACM Transactions on Computer Systems	A	no				
ACM Transactions on Design Automation of Electronic Systems	A	no				
ACM Transactions on Embedded Computing Systems	A	no				
ACM Transactions on Information and System Security	A	no				
ACM Transactions on Multimedia Computing Communications and Applications	B	no				
ACM Workshop on Scalable Trusted Computing	B	no				
ACM/IEEE International Conference on Distributed Smart Cameras	B	no				
ACM/IFIP/USENIX International Middleware Conference	A	no				
Acta Informatica	A	no				
Annual Computer Security Applications Conference	A	no				
Asia-Pacific Bioinformatics Conference	B	no				

Name	Cr.1	Cr.2	Cr.3	Cr.4	Included	Type
Complexity and information-theoretic approaches to biology	B	no				
Computational Intelligence in Security for Information Systems	B	no				
Computer Standards and Interfaces	B	no				
Computers and Electrical Engineering	B	no				
Computers and Security	B	no				
Computers in Industry	B	no				
Conference on Security and Cryptography for Networks	B	no				
Dynamic Languages Symposium	B	no				
European Conference on Computational Biology	B	no				
European PKI Workshop: Theory and Practice	B	no				
European Symposium On Research In Computer Security	A	no				
Eurosys Conference	A	no				
IBM Journal of Research and Development	A	no				
IBM Systems Journal	A	no				
IEEE Computational Systems Bioinformatics Conference	A	no				
IEEE Computer Security Foundations Symposium	A	no				
IEEE International Requirements Engineering Conference	A	no				
IEEE International Symposium on High Assurance Systems Engineering	B	no				
IEEE Transactions on Computers	A	no				
IEEE Transactions on Dependable and Secure Computing	A	no				
IEEE Transactions on Multimedia	A	no				
IEEE Transactions on Reliability	A	no				
IEEE/IFIP International Conference on Dependable Systems	A	no				
IEEE/IFIP International Symposium on Trusted Computing and Communications	A	no				
IET Computers and Digital Techniques	B	no				
IFIP Joint International Conference on Formal Description Techniques and Protocol Specification, Testing, And Verification	A	no				
IFIP/ACM Working Conference on Component Deployment	B	no				
IMA International Conference on Cryptography and Coding	B	no				
Industrial Management + Data Systems	B	no				
Information Security Practice and Experience Conference	B	no				
Innovations in Teaching and Learning in Information and Computer Sciences	B	no				

Name	Cr.1	Cr.2	Cr.3	Cr.4	Included	Type
Intelligent Systems in Molecular Biology	A	no				
International Conference on Applied Cryptography and Network Security	B	no				
International Conference on Compiler Construction	A	no				
International Conference on Coordination Models and Languages	A	no				
International Conference on Cryptology and Network Security	B	no				
International Conference on Information and Communications Security	B	no				
International Conference on Information Systems Security	B	no				
International Conference on Model Transformation	B	no				
International Conference on network and System Security	B	no				
International Conference on Principles and Practice of Constraint Programming	A	no				
International Conference on Principles and Practice of Declarative Programming	B	no				
International Conference on Provable Security	B	no				
International Conference on Security and Privacy for Communication Networks	A	no				
International Conference on Software Methods and Tools	B	no				
International Conference on Tests and Proofs	B	no				
International Conference on Trust, Privacy and Security in Digital Business	B	no				
International Conference on Virtual Execution Environments	A	no				
International Conference/Workshop on Practice and Theory in Public Key Cryptography	B	no				
International Symposium on Automated Technology for Verification and Analysis	A	no				
International Symposium on High Performance Computer Architecture	A	no				
International Symposium on Memory Management	A	no				
International Symposiums on Wikis	B	no				
International Workshop of Privacy Enhancing Technologies	B	no				
International Workshop on Security	B	no				
International Workshop on Software Process Simulation and Modelling (now ICSP)	B	no				
Joint Modular Languages Conference	B	no				
Journal of Systems Architecture	B	no				
Journal of Computer Security	B	no				
Journal of Visual Languages and Computing	A	no				
Language Descriptions, Tools and Applications	B	no				
Multimedia Systems	B	no				

Name	Cr.1	Cr.2	Cr.3	Cr.4	Included	Type
Multimedia Tools and Applications	B	no				
Practical Aspects of Declarative Languages	B	no				
Requirements Engineering	B	no				
Text Technology: the journal of computer text processing	B	no				
Theory and Practice of Logic Programming	A	no				
Tools and Algorithms for Construction and Analysis of Systems	A	no				
Unified Modelling Language	B	no				
Usenix Network and Distributed System Security Symposium	A	no				
Usenix Security Symposium	A	no				
Usenix Symposium on Operating Systems Design and Implementation	A	no				
USENIX Workshop on Hot Topics in Operating Systems	A	no				
Verification, Model Checking and Abstract Interpretation	B	no				
Workshop on Power Aware Computing and Systems	B	no				

Appendix B: Top Scholars & Research Topics (as identified in Google Scholar)

Name	Publish Since	Type	Current Affiliation	email	Research Interests
Abreu Rui	2006	Consolidator	University of Lisbon and INESC-ID	rui.maranhao@tecnico.ulisboa.pt	Software Engineering, Debugging and Testing, Machine Learning, Green Computing, Security
Adams Bram	2005	Consolidated	École Polytechnique de Montréal	lab.mcis@gmail.com	Software Release Engineering, Software Integration, Software Build Systems, Software Modularity, Software Maintenance
Ali Mesbah	2002	Consolidated	University of British Columbia	amesbah@ece.ubc.ca	Software Engineering, Software Testing, Software Evolution, Web Engineering
Ampatzoglou Apostolos	2007	Early	University of Groningen	apostolos.ampatzoglou@gmail.com	Technical Debt, Maintainability, Design Patterns, Software Quality, Computer Games
Angelis Lefteris	1991	Experienced	Aristotle University of Thessaloniki	lef@csd.auth.gr	Statistics, Software Engineering, Information Systems
Antoniol Giuliano	1991	Experienced	École Polytechnique de Montréal	giuliano.antoniol@polymtl.ca	Software Engineering, Software Evolution, Software Maintenance, Software Testing, SBSE
Apel Sven	2003	Consolidator	University of Passau	apel@uni-passau.de	Software Engineering, Programming Languages, Software Product Lines, Empirical Software Engineering, SBSE
Arcuri Andrea	2007	Early	Westerdals Oslo School of Arts, Communication and Technology	arcand@westerdals.no	Software Testing, SBSE, Empirical Software Engineering
Avgeriou Paris	2001	Experienced	University of Groningen	paris@cs.rug.nl	Software Engineering
Babar Muhammad Ali	2003	Consolidator	The University of Adelaide	ali.babar@adelaide.edu.au	Software Engineering, Software Architecture, Software Services, Cloud Computing, Secure Software
Barr Earl T.	2000	Experienced	University College London	e.barr@ucl.ac.uk	Software Engineering, Computer Security, Programming Languages
Bavota Gabriele	2008	Early	University of Lugano	gabriele.bavota@usi.ch	Software Maintenance, Mining Software Repositories, Empirical Software Engineering
Berger Thorsten	2006	Consolidator	Chalmers University of Technology in Gothenburg	thorsten.berger@chalmers.se	Software Product Lines, Variability Modeling, Static Analysis, Software Ecosystems, Model-Driven Engineering
Bird Christian	2006	Consolidator	Microsoft Research	cbird@microsoft.com	Software Engineering
Birkedal Lars	1994	Experienced	Aarhus University	birkedal@cs.au.dk	Computer Science, Programming Logic Semantics
Bodden Eric	2003	Consolidator	Paderborn University	eric.bodden@uni-paderborn.de	Secure, Software Engineering, Software Security, Program Analysis, Programming Languages, Compilers
Borg Markus	2007	Early	Lund University	markus.borg@ri.se	Software engineering
Bosch Jan	1992	Experienced	Chalmers University of Technology in Gothenburg	jan.bosch@chalmers.se	Software engineering
Bowes David	2008	Early	University of Hertfordshire	d.h.bowes@herts.ac.uk	Defect prediction
Briand Lionel C.	1992	Experienced	Université du Luxembourg	lionel.briand@uni.lu	Computer Science, Software Engineering, Software Testing Model-Driven, Software Engineering, SBSE
Brun Yuriy	2004	Consolidator	University of Massachusetts	brun@cs.umass.edu	Software Engineering, Fairness Testing, Self-Adaptive Systems, Theory, Biologically-Inspired Computing
Budgen David	1985	Experienced	Durham University	david.budgen@durham.ac.uk	Software Engineering, Evidence-Based Software Engineering, Empirical SE, Software Design
Cabot Jordi	2003	Consolidator	ICREA Research Professor at Internet Interdisciplinary Institute (UOC)	jordi.cabot@icrea.cat	Model Driven Engineering, Software Engineering, Formal Methods, Open Source, Open Data
Chan Wing Kwong	1993	Experienced	City University of Hong Kong	wkchan@cityu.edu.hk	Software Engineering
Cleland-Huang Jane	2001	Experienced	University of Notredame	janeclelandhuang@nd.edu	Software Traceability, Requirements Engineering, Software Architecture
Darko Marinov	1998	Experienced	University of Illinois at Urbana-Champaign	marinov@illinois.edu	Software Engineering, Software Testing

Devanbu Premkumar	1988	Experienced	University of California	devanbu@cs.ucdavis.edu	Empirical Software Engineering, "Naturalness" of Software Exoscatolgy, Software Engineering
Di Penta Massimiliano	1994	Experienced	University of Sannio	dipenta@unisannio.it	Software Engineering, Mining Software Repositories, Software Evolution, SBSE
Ding Li	2012	Early	NEC Labs America	dinglipersonal@outlook.com	Software Engineering, Security
Dit Bogdan	2008	Early	Boise State University	bogdandit@boisestate.edu	Software Engineering, Software Maintenance and Evolution
Ebert Christof	1992	Experienced	Vector Consulting Services	christof.ebert@vector.com	Software Engineering
Ernst Michael D.	1994	Experienced	University of Washington	mernst@cs.washington.edu	Software Engineering, Programming Languages
Feldt Robert	1998	Experienced	Chalmers University of Technology in Gothenburg	robert.feldt@chalmers.se	Software Engineering, Empirical Software Engineering, SBSE, Behavioral Software Engineering, Artificial Intelligence
Forrest Shull	1996	Experienced	Carnegie Mellon University	fshull@computer.org	Empirical Software Engineering
Fraser Gordon	2003	Consolidator	University of Passau	Gordon.fraser@uni-passau.de	Software Engineering, Search-based Software Engineering, Software Testing, Specification Mining, SBSE
Garousi Vahid	2003	Consolidator	Wageningen University	vahid.garousi@wur.nl	Software Engineering, Software Testing, Empirical Studies, Action-Research Engineering, Scientific Software
Gethers Malcom	2010	Early	University of Maryland	mgethers@umbc.edu	Software Engineering
Gorschek Tony	2003	Consolidator	Blekinge Institute of Technology	tony.gorschek@bth.se	Software Engineering Technology, Product Management, Requirements Engineering, Value Based Agile / Lean
Grundy John	1991	Experienced	Monash University	john.grundy@monash.edu	Software Engineering, Software Tools, Model-driven Development, Automated Software Engineering, Visual Languages
Grunske Lars	2003	Consolidator	Humboldt University Berlin	grunske@informatik.hu-berlin.de	Automated Software Engineering, Safety Engineering, Reliability, Engineering Formal Methods, Software Engineering
Gulwani Sumit	2001	Experienced	Microsoft Research	sumitg@microsoft.com	Program Synthesis, Artificial Intelligence, Program Verification, End User Programming, Computer-aided Education
Halfond William G. J.	2005	Consolidator	University of Southern California	halfond@usc.edu	Software Engineering, Program Analysis and Software Testing, Software Security, Software Energy Consumption, Mobile and Web apps
Hall Tracy	1994	Experienced	Brunel University London	tracy.hall@brunel.ac.uk	Software Engineering
Harman Mark	1993	Experienced	University College London	mark.harman@ucl.ac.uk	SBSE, Software Testing, Evolutionary Computation, Program Analysis, Software Engineering
Hassan Ahmed E.	2000	Experienced	Queen's University	ahmed@cs.queensu.ca	Software Engineering, Mining Software Repositories, Empirical Software Engineering, Software Analytics, Software Maintenance
Heymans Patrick	1997	Experienced	University of Namur	patrick.heymans@unamur.be	Software Engineering, Requirements Engineering, Software Product Lines, Formal Methods, Artificial Intelligence
Holmes Reid	2003	Consolidator	University of British Columbia	rtholmes@cs.ubc.ca	Software Engineering
Holzmann Gerard J.	1982	Experienced	California Institute of Technology	gholzmann@acm.org	Software Verification, Logic Model Checking
Itkonen Juha	2003	Consolidator	Aalto University	Juha.itkonen@aalto.fi	Software Engineering, Software Testing, Exploratory Testing, Agile Development, Human Aspects
Jia Yue	2008	Early	University College London	jia.yue@ucl.ac.uk	Mutation Testing, Software Testing, Software Engineering, SBSE
Jørgensen Magne	1995	Experienced	Simula Metropolitan	magnej@simula.no	Software Engineering, Empirical Software Engineering, Project Management
Juristo Natalia	1992	Experienced	Universidad Politécnica de Madrid	natalia@fi.upm.es	Empirical Software Engineering, Requirements Engineering, Testing, Usability
Keivanloo Iman	2008	Early	Queen's University	iman.keivanloo@queensu.ca	Source Code Search, Clone Detection, Clone Search, Code Clone Search, Code Search

Kessentini Marouane	2008	Early	University of Michigan	marouane@umich.edu	Search-based Software Engineering, SBSE, Refactoring, Software Quality, Code-Smells
Khomh Foutse	2008	Early	École Polytechnique de Montréal	foutse.khomh@polymtl.ca	Experimental Software Engineering, Mining Software Repositories, Reverse Engineering, Source Code Analysis, Software maintenance
Kim Miryung	2004	Consolidator	University of California	miryung@cs.ucla.edu	Software Engineering
Kim Sunghun	2004	Consolidator	The Hong Kong University of Science and Technology	hunkim@cse.ust.hk	Software Engineering, Mining, Software Repositories, Software Testing
Kitchenham Barbara	1985	Experienced	Keele University	b.a.kitchenham@keele.ac.uk	Empirical Software Engineering, Software Engineering, Empirical Methods, Statistical methods, Meta-analysis
Klein Jacques	2005	Consolidator	University of Luxembourg	jacques.klein@uni.lu	Computer Science, Software Engineering, Android Security, Software Security, Model-Driven Engineering
Kruchten Philippe	1978	Experienced	University of British Columbia	pbkatece.ubc.ca	Software Engineering, Software Architecture, Software Development Process, Rational Agile Method
Legay Axel	2003	Consolidator	Universitaire de Beaulieu	axel.legay@inria.fr	Formal Design
Le Traon Yves	1995	Experienced	University of Luxembourg	yves.letraon@uni.lu	Computer Science, Software Engineering, Software Testing, Software Security, Model-Driven Engineering
Li Li	2012	Early	University of Luxembourg	li.li@uni.lu	Software Engineering
Liu Yang	2006	Consolidator	Nanyang Technological University	yangliu@ntu.edu.sg	Formal Methods, Model Checking, Security, Software Engineering
Lo David	2004	Consolidator	Singapore Management University	davidlo@smu.edu.sg	Software Analytics, Software Maintenance, Software Testing, Software Engineering, Data Mining
Malek Sam	2003	Consolidator	University of California Irvine	malek@uci dot edu	Software Engineering, Software Architecture, Autonomic Computing, Software Dependability and Security, Testing and Analysis
McIntosh Shane	2010	Early	McGill University	Shane.McIntosh@mcgill.ca	Build Systems, Empirical Software Engineering, Mining Software Repositories, Software Quality
McMillan Collin	2009	Early	University of Notre Dame	cmc@nd.edu	Software Engineering
Mehdi Mirakhorli	2007	Early	Rochester Institute of Technology	mehdi@se.rit.edu	Software Architecture - Software Traceability - Requirements Engineering
Mei Hong	1997	Experienced	Peking University	meih@pku.edu.cn	Software Engineering
Mendling Jan	2002	Consolidator	Vienna University of Economics and Business	jan.mendling@wu.ac.at	Business Process, Management, Digital Transformation Process, Mining Information Systems, Software engineering
Menzies Tim	1998	Experienced	NS State University	tim@menzies.us	SBSE, Software Analytics, Software Product Lines, Mining Software Repositories, Data Mining and Machine Learning
Milos Gligoric	2008	Early	University of Texas	gligoric@ece.utexas.edu	Software Engineering
Mocci Andrea	2007	Early	Università della Svizzera Italiana	andrea.mocci@gmail.com	Software Engineering
Monperrus Martin	2004	Consolidator	KTH Royal Institute of Technology	Martin.monperrus@univ-lille1.fr	Software Engineering
Nagappan Nachiappan	2003	Consolidator	Microsoft Research	nachin@microsoft.com	Empirical Software Engineering
Nguyen Hoan Anh	2008	Early	Iowa State University	anhnt@iastate.edu	Software Engineering
Nguyen Tien N.	2002	Consolidator	Univeristy of Texas	tien.n.nguyen@utdallas.edu	Software Engineering
Nguyen Tung Thanh	2008	Early	Auburn University	tung@auburn.edutung@auburn.edu	Software Emgineering
Oliveto Rocco	2004	Consolidator	University of Molise	rocco.oliveto@unimol.it	Software Maintenance and Evolution
Ouni Ali	2011	Early	Université de Montréal	ali@iro.umontreal.ca	SBSE, Refactoring, Code smells, Software Engineering, Software Maintenance and Evolution
Palomba Fabio	2008	Early	University of Zurich	palomba@ifi.uzh.ch	Software Maintenance and Evolution, Software Verification, Mining Software Repositories, Empirical Software Engineering

Panichella Annibale	2009	Early	Delft University of Technology	a.panichella@tudelft.nl	Software Testing, Security, Testing, Empirical Software Engineering, SBSE
Panichella Sebastiano	2009	Early	University of Zurich	spanichella@gmail.com	Mining Software Repositories, Code Review, Textual Analysis, Software maintenance and evolution and Empirical SE
Papadakis Mike	2009	Early	University of Luxembourg	michail.papadakis@uni.lu	Software Engineering, Mutation Testing, Software Testing, Software Product Lines, SBSE
Petersen Kai	2006	Consolidator	University of Applied Science Flensburg	kai.petersen@bth.se	Software Engineering, Software Processes, Software Metrics, Software Security, Software Process Improvement
Piattini Mario	1995	Experienced	University of Castilla-La Mancha	Mario.Piattini@uclm.es	Ingeniería de Software, Software Engineering, Sistemas de Información, Information Systems, Security
Poshyvanyk Denys	2005	Consolidator	The College of William and Mary	denys@cs.wm.edu	Software Engineering, Software Evolution and Maintenance, Program comprehension
Pradel Michael	2008	Early	TU Darmstadt	michael@binaervarianz.de	Software Engineering, Programming Languages
Prikladnicki Rafael	2002	Consolidator	PUCRS University	rafael.prikladnicki@pucrs.br	Software Engineering, Global Software Engineering, Empirical Software Engineering, Software Process, Software Quality
Rinard Martin	1984	Experienced	MIT Computer Science and Artificial Intelligence Laboratory	rinard@lcs.mit.edu	Software Engineering
de Almeida Eduardo Santana	2002	Consolidator	Federal University of Bahia	esa@dcc.ufba.br	Engenharia de Software, Software Engineering, Software Reuse, Software Product Lines, Empirical Software Engineering
Sarfraz Khurshid	1999	Experienced	University of Texas	khurshid@ece.utexas.edu	Software Testing and Verification, Debugging, Error Recovery, Specification Languages
Sarro Federica	2009	Early	University College London	f.sarro@ucl.ac.uk	Empirical Software Engineering, SBSE, Effort Estimation, Defect Prediction, Software Analytics, Software Metrics
Shang Weiyi	2008	Early	Concordia University	shang@encs.concordia.ca	Software Logs, Mining Software Repositories, Performance Engineering, Cloud Computing
Shihab Emad	2007	Early	Concordia University	eshihab@cse.concordia.ca	Software Engineering, Mining Software Repositories, Empirical Software Engineering
Stol Klaas-Jan	2009	Early	University College Cork	k.stol@cs.ucc.ie	Open Source, Inner Source, Crowd Sourcing, Software Engineering, Research Methodology
Sun Chengnian	2009	Early	University of California	cnsun@ucdavis.edu	Software Engineering, Programming Languages
Sun Jun	2002	Consolidator	Singapore University	sunjun@sutd.edu.sg	Cyber-Security, Software Engineering, Formal Methods, Model Checking
Tamburrelli Giordano	2008	Early	Vrije Universiteit Amsterdam	g.tamburrelli@cs.vu.nl	Software Engineering
Tang Antony	2004	Consolidator	Swinburne University of Technology	atang@swin.edu.au	Software Engineering, Software Architecture, Indoor Positioning
Thung Ferdian	2011	Early	Singapore Management University	ferdiant.2013@smu.edu.sg	Software Engineering, Data Mining
Torkar Richard	2003	Consolidator	Chalmers and the University of Gothenburg	richard.torkar@chalmers.se	Empirical Software Engineering, Software Testing, Software Verification and Validation, Statistics
Treude Christoph	2007	Early	University of Adelaide	christoph.treude@adelaide.edu.au	Software Engineering, Collaboration, Social Media, Natural Language Processing
Turhan Burak	2007	Early	University of Oulu	burak.turhan@brunel.ac.uk	Software Engineering, Computer Science, Data Science, Machine Learning
Unterkalmsteiner Michael	2010	Early	Blekinge Institute of Technology	michael.unterkalmsteiner@bth.se	Software Engineering, Empirical Software Engineering, Mining Software Repositories
Wasowski Andrzej	2001	Experienced	University of Copenhagen	wasowski@itu.dk	Engineering of Critical Software, Legacy Re-Engineering and Modernization, Code Scanning, Model-Driven Engineering, Privacy
Whittle Jon	1996	Experienced	Monash university	Jon.Whittle@monash.edu	Software Engineering, Digital Social Innovation, Digital Health, HCI

Wnuk Krzysztof	2008	Early	Blekinge Institute of Technology	krzysztof.wnuk@bth.se	Software Engineering, Software Business, Open Innovation, Product Management, Requirements Engineering
Wohlin Claes	1987	Experienced	Blekinge Institute of Technology	Claes.Wohlin@bth.se	Empirical Software Engineering, Software Engineering, Software Quality, Global Software Engineering, Software Process
Xie Tao	1998	Experienced	University of Illinois at Urbana-Champaign	taoxie@illinois.edu	Software Engineering, Software Testing, Program Analysis, Mining Software Repositories
Xu Chang	2003	Consolidator	Nanjing University	changxu@nju.edu.cn	Big Data Software Engineering, Intelligent Software Testing and Analysis, Adaptive and Autonomous Software Systems
Yamashita Aiko	2007	Early	Oslo Metropolitan University (OsloMet)	aiko.yamashita@oslomet.no	Software Evolution, Source Code Analysis, Program Comprehension, Empirical Software Engineering
Yann-Gaël Guéhéneuc	2001	Experienced	Concordia University and Polytechnique Montréal	yann-gael.gueheneuc@concordia.ca	Software quality, Patterns, Re-engineering, IoT
Yoo Shin	2007	Early	Korea Advanced Institute of Science and Technology	shin.yoo@kaist.ac.kr	Software Testing, Software Engineering, Evolutionary Computation, SBSE
Yue Tao	2009	Early	University of Oslo	tao@simula.no	Model-based Engineering, Uncertainty Modeling, Search-based Software Engineering, Model-based Testing, Product Line Engineering
Zhang Hongyu	2001	Experienced	Univeristy of Newcastle	hongyu.zhang@newcastle.edu.au	Software Engineering, Mining Software Repositories, Software Analytics, Software Testing
Zhang Lingming	2009	Early	The University of Texas	lingming.zhang@utdallas.edu	Mutation Testing, Regression Testing, Programming Languages, Software Analysis, Software Evolution
Zhang Lu	2001	Experienced	Peking University	zhanglu@sei.pku.edu.cn	Software Engineering, Software Testing, Software Analysis
Zhang Xiangyu	2003	Consolidator	Purdue University	xyzhang@cs.purdue.edu	Program Analysis, Security
Zhenchang Xing	2003	Consolidator	Australian National University	Zhenchang.Xing@anu.edu.au	Software Engineering, Human-Computer-Interaction, Data Mining
Zimmermann Thomas	2001	Experienced	Microsoft Research	tzimmer@microsoft.com	Software Engineering, Empirical Software Engineering, Mining Software Repositories, Recommender Systems, Computer Games