ICSE 2018 PC Chairs Report

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Note: Marsha and Mark take full responsibility for the ICSE'18 process.

1. Introduction

The submission rate, author, programme committee, and program board surveys all point to a successful conference overall. In this report, we will focus on those aspects of the process for which we have data to investigate the behavior of authors and reviewers, and the overall performance characteristics of the processes adopted.

We will also use this report to highlight those aspects of process which, for this year, differed in nontrivial ways from previous iterations of the conference, in order to document these the future reference. We will not consume extra space with discussion of aspects of the conference which remain relatively invariant from year-to-year, apart from reporting quantitative summary statistics to capture conference-specific information, in order to facilitate comparison with previous and future years.

Our process used a PB / PC model, with PC members doing the reviewing and PB members eliciting questions for the rebuttal, facilitating the discussion, helping to converge the decisions to accept or reject, writing meta-reviews and then meeting in person to discuss all papers for which the PC was unable to reach consensus. We also used a "heavy" double-blind review model where names of authors were not revealed until the final decisions (for accepted papers) or never (for rejected papers). We experimented with an idea of an informal local social cluster (LSC), to facilitate an additional layer of communication with the PC, in order to help understand the process, improve reviews, or any other reason where PC members needed to get their voice "heard".

When the authors submitted their papers, we collected various bibliometric information, such as their participation in earlier ICSEs and whether some of the authors were students. When PC members submitted reviews, we also asked them to rank papers using structured criteria: soundness, significance, reproducibility, novelty, presentation, etc. We then did a survey of authors (relatively late in the game, in March) w.r.t. their satisfaction with the reviews and their views on the double-blind process. We also did a survey of PC and PB members w.r.t. their views on the process. In what follows, we present details about our process, submission and acceptance statistics, details about the expertise and the PB meeting. We finish the report with our comments on the overall ICSE Technical track paper review process.

2. Some historical data

Year	Submitted	Accepted	%
2009	405	50	12
2010	380	52	14
2011	441	62	14
2012	408	87	21
2013	461	85	18
2014	495	99	20
2015	452	82	18
2016	530	101	19
2017	415	67	16
2018	502	105	21

As can be seen from the table, the trend in the number of submissions for ICSE appears to have stabilized. While the drop in the number of submissions for ICSE 2017 might have been explained by the 3-paper maximum submission policy, ICSE 2018 did not have such restrictions; yet, the number of submissions was lower than in 2016. The quality of the papers seems to be roughly stable.

3. Basic Process data

In this section, we describe the process flow of the papers entering the reviewing process until they exit, either as rejected or as accepted. The process followed the following schedule with online discussion primarily focused on the time when the rebuttals were in and continuing until either the PC was able to reach an Accept or a Reject decision or until the PB meeting.

Timeline:

- Submission deadline: August 25, 2017
- Bidding on papers + COI (PB): August 27-August 31, 2017
- Bidding on papers + COI (PC): August 27–September 1, 2017
- Assignments for PB out: September 2, 2017
- Checking papers for scope/formatting/anonymity violations (PB): September 3-6, 2017
- Assignments for PC out: September 8, 2017
- First half of reviews due (done by the PC): October 6, 2017
- Review improvement (PB + PC): October 6-20, 2017
- Second half of reviews due (PC): November 3, 2017
- Review improvement (PB + PC): November 4-10, 2017
- Author responses: November 12-15, 2017
- On-line discussion (PB + PC): November 16-December 1, 2017
- Program board meeting: December 6-7, 2017, London UK
- Author notification: December 15, 2017

As stated, 502 papers have been submitted through Easychair. Of them, 106 included an optional zip file with data, code or any other additional information. In fact, several papers originally had optional zip files but we had to delete them when double-blind violations in the data were discovered.

Conflicts. We began by asking members of the PC and the PB to declare their conflicts with a list of authors. The list consisted of all authors of ICSE'18 submitted papers plus a few extra. The authors, when they submitted their papers, also declared conflict with PC and PB.

Double-blind violations and desk rejection. After the bidding, we have allocated papers for each PB member (about 14-16 each), asking them to check the paper for being out of scope and for double-blind violations. Another significant task given to the PB was to check additional data that ICSE authors were allowed to submit (with code, data, etc). for double-blind violations. We used a multi-stage process to detect double-blind violations. First of all, we were indebted to Robert Felt, who provided us with an automated checking process, which consisted of scripts, executed on the PDF files, searching for tell-tale signs such as email addresses, use of pronouns such as "my" or "we". Not only did Robert run the script for us, he also looked at the reported violations and helped identify which ones were "true" violations. We also asked the programme board members to check the pile of papers initially assigned to them for obvious violations. One of the PC chairs also spent two days going to every paper looking for such violations. Handling violations required to make a distinction between those we deemed to be flagrant disregard of DBR (as if authors had not even read the submission guide), and those which could, with the most charitable interpretation, be regarded as inadvertent slips. We felt it was important to the algorithmic in the distinction, and also that it was important to err on the side of caution, this being the first year in which double-blind reviewing was applied to ICSE. Therefore, we took the approach that we would desk reject only flagrant violations, where *flagrant* was defined as including the author names with the title (as in the traditional non-blinded style of papers). For all other situations, where the violation was discovered at some point during the process, authors were given 48-hours to correct this. In all such cases the authors did respond within 48 hours. There were a handful of such cases.

At the end of this process, 13 papers have been desk-rejected (either due to double-blind violation, or due to violation of formatting requirements, such as paper being over long or formatted in a single column), and all others entered the review process.

PC Reviewing. On September 8, we sent review assignments to PC members. Each received between 14 and 16 papers to review. We followed the strict ½ review deadline, followed by the full review deadline. After each review deadline, the reviews were looked over by PB members, with the goal of improving them, clarifying points, summarizing questions for the authors that they can address in the rebuttal, etc. Overall, 1487 reviews were collected. In cases when the PC member was late with his/her reviews, or when the PB member monitoring the paper felt that the quality of the reviewers was low, we solicited an additional review from a special group of RRRR (Rapid Response Reliable Reviews) – group of 11 PC members who received a lower initial review load, but were asked "to stand by" to do additional reviews if needed.

Some of the double-blind violations escaped the original script and looking over by PB members, including, interestingly, author names in headers of even papers (!!!) and related work written in a way that makes is very clear who the authors are. Whenever this occurred, we asked any members of the committee who would become aware of the author names to recuse themselves, reallocating referee assignments, wherever possible, if the problem was spotted sufficiently early in the process. Irrespective of the timing in the process, we gave authors 48 hours to correct the problem. Fortunately, no violations were encountered for the first time within 48 hours of the program board meeting, which would have otherwise challenged the consistency of the process for handling violations ☺.

Rebuttals. All papers have received at least 3 reviews (20 papers received 4), and all were sent for rebuttal on November 11, with rebuttals due on November 15. All papers had an opportunity to rebut the reviews in order to improve our confidence in the relevance of the reviews and to reduce the chance that important aspects were missed or incorrectly reviewed. In order to maximize the value of the rebuttal phase to authors, we ensured that all reviews on the paper were presented to the authors before the rebuttal phase commenced, and that no additional reviews were solicited on any paper after the conclusion of the rebuttal phase. Overall, authors of 402 papers submitted their rebuttals. During this phase, 17 papers were withdrawn.

Online discussion and the first round of decision making. One of our goals was to "empower the PC", i.e., to make sure that if PC members reach consensus about a paper, their decisions are not being overruled by the PB. The very lively on-line discussion of papers, reviews and rebuttals, (over 5000 comments/emails had been exchanged) over a two-week period, led to the PC accepting 71 papers and rejecting 327. The PB members overseeing the discussions also wrote a summary of decisions (a meta-review). The remaining 74 papers were those where the PC members were unable to reach consensus. They were moved up for discussion at the in-person PB meeting which took place in London on December 6-7, 2017.

PB meeting. The two-day in-person meeting yielded 34 additional acceptances. For each paper discussed at the PB meeting, the PB member handling the paper was asked to present the paper and points for and against. In addition, we assigned another PB member, ahead of time, to play a "challenger" role, to help elicit points for and against the paper and help weigh them. All papers discussed at the PB meeting received a meta-review summarizing not only the online discussion but also the discussion that took place at the PB meeting.

We note that the PB accepted a bit under half of the papers it discussed.

Poster invitations. Following the practice which started at ICSE'17, we invited the authors of submissions that did not make the final selection for their track, but received positive reviews, to present their work in the form of a poster during the conference. We invited the authors of 297 Technical track submissions to present posters about their work. Overall, authors of 105 submissions took this opportunity. All of their posters got accepted, and all but 10 chose to have the 2-page poster abstract published as part of the Proceedings.

3.1 Scoring

The table below summarizes the range of the scores for the N papers and compares with ICSE 2017. For example, the second row [-1; 2] represents the category of submissions that received an overall recommendation of least a -1 (weak reject) and a 2 (strong accept); of the 33 submissions in this category, 23 were accepted and 10 were rejected.

In both years, 47.2% of submissions received only negative scores ([-2; -1]). The percentages of papers with only positive scores ([1; 2] and [1; 1]) is slightly higher in 2018 with 13.3% than it was in 2017 with 6.9%. In 2018, there were fewer conflicts between strong reject and strong accept ([-2; 2]) than in 2017, 3.4% vs. 8.5%.

	ICSE 2018 (489 submissions)					**ICSE 2017** (388 submissions)			
Range	Count		Accept	Reject	Withdrawn	Count		Accept	Reject
[1; 2]	50	(9.9%)	49	1	0	25	(6.4%)	25	0
[-1; 2]	33	(6.5%)	23	10	0	29	(7.5%)	15	14
[-2; 2]	17	(3.4%)	8	9	0	33	(8.5%)	13	20
[1; 1]	17	(3.4%)	16	1	0	2	(0.5%)	2	0
[-1; 1]	83	(17.0%)	22	61	3	61	(15.7%)	12	49
[-2; 1]	60	(12.6%)	3	57	4	55	(14.2%)	1	54
[-2;-1]	229	(47.2%)	0	229	10	183	(47.2%)	0	183

3.2 Confidence / Expertise

Previous ICSEs asked reviewers to report their *expertise* (X: I am an expert in the subject area of this paper; Y: I am knowledgeable in the area, though not an expert; Z: I am not an expert. My evaluation is that of an informed outsider). In 2018, reviewers instead were asked to report their *confidence* in the review (3 high; 2 medium; 1 low). The table below compares the confidence values reported in 2018 with the expertise levels reported in previous years. For the comparison, confidence of 3 (high) was mapped to expertise X (expert), 2 (medium) to Y (knowledgeable), and 1 (low) to Z (outsider).

Overall, the numbers are comparable to previous years (2015, 2016): 87.3% of papers had at least one high confidence review; 98.0% of papers had a minimum of two reviews with medium or high confidence by the reviewer.

	2013	**2014**	**2015**	**2016**	**2018**
At least 1 high/expert	72.0%	77.0%	84.0%	83.0%	87.3%
Minimum of 2 reviews with medium/knowledgeable (or higher confidence/expertise)	95.5%	96.0%	97.7%	99.2%	98.0%
Papers with at least 1 low/outsider review	23.0%	18.0%	7.2%	20.6%	17.0%

For ICSE 2017, no data was reported for confidence/expertise in the "Report on the Technical Track of ICSE 2017".

3.3 Topics

We begin by listing the number of papers submitted and accepted for each category. The last column also includes the number of PC and PB members who declared this area as their expertise.

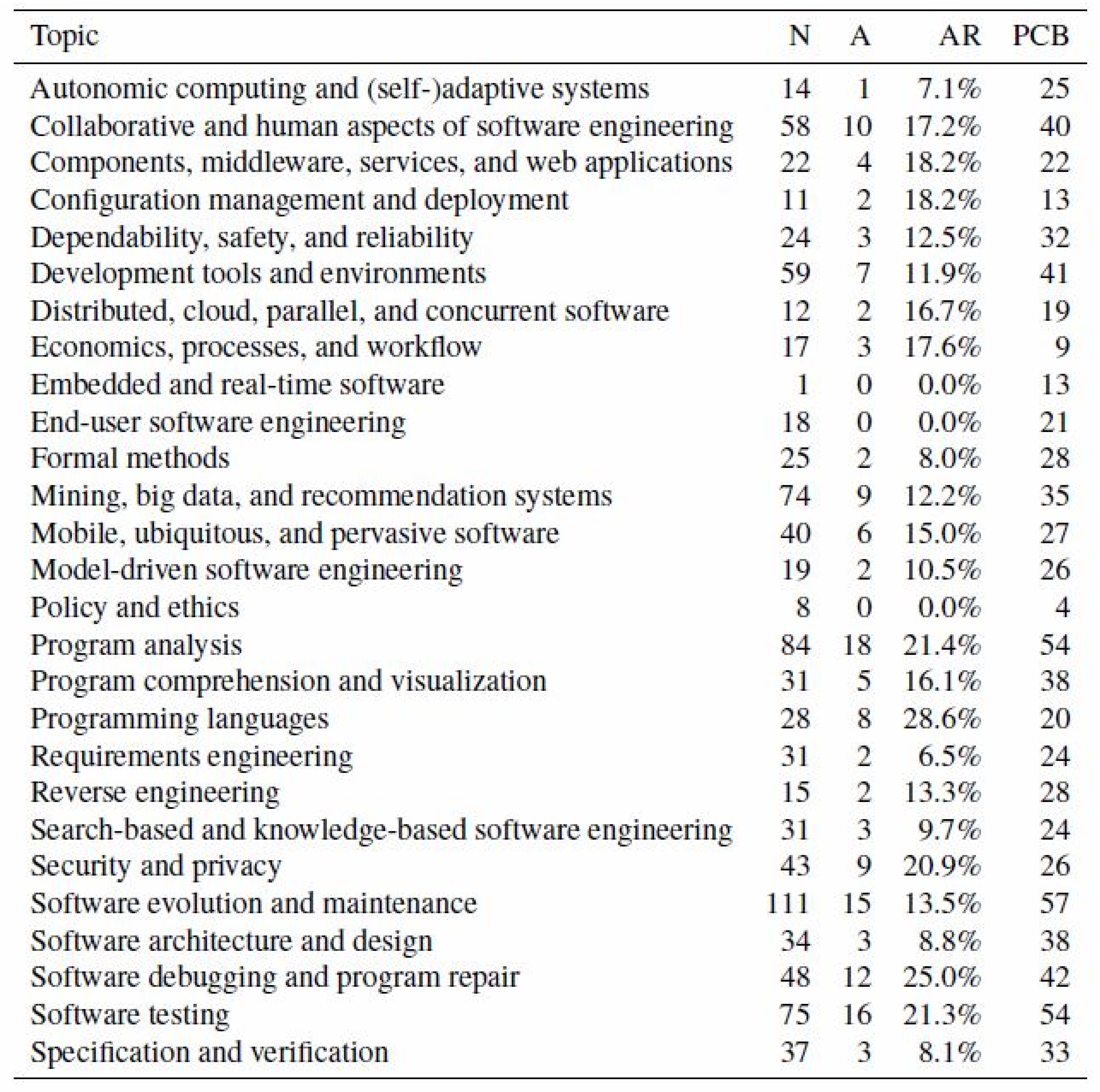
Topic	**submissions**	**accepted**	**acceptance rate**	**PC members**
Ubiquitous/pervasive software systems	2	0	0	9
Embedded software	3	0	0	10
Software services	5	0	0	16
Green and sustainable technologies	5	0	0	11
Crowd sourced software engineering	6	2	0.33	21
Software visualization	6	1	0.17	16
Traceability	6	1	0.17	24
End-user software engineering	7	1	0.14	18

Cyber physical systems	8	1	0.12	25
Component-based software engineering	9	1	0.11	30
Cloud computing	10	0	0	14
Configuration management and deployment	11	2	0.18	13
Software economics and metrics	11	0	0	16
Autonomic and (self-)adaptive systems	11	1	0.09	29
Parallel, distributed, and concurrent systems	13	3	0.23	10
Program synthesis	15	6	0.4	16
Reverse engineering	15	2	0.13	24
Human-computer interaction	16	2	0.12	17
Software product lines	18	4	0.22	26
Middleware, frameworks, and APIs	18	4	0.22	12
Distributed and collaborative software engineering	18	4	0.22	28
Performance	18	2	0.11	7
Specification and modeling languages	19	2	0.11	31
Agile software development	20	1	0.05	21
Model-driven engineering	20	1	0.05	36
Software architecture	21	2	0.1	28
Software process	22	3	0.14	17
Programming languages	22	4	0.18	15
Refactoring	22	3	0.14	19
Dependability, safety, and reliability	23	3	0.13	29
Requirements engineering	23	4	0.17	32
Recommendation systems	24	3	0.12	30
Software reuse	26	5	0.19	19
Software modeling and design	28	4	0.14	36
Search-based software engineering	30	8	0.27	34
Software performance	30	5	0.17	10
Formal methods	32	7	0.22	25
Apps and app store analysis	33	8	0.24	26
Program comprehension	42	8	0.19	31
Mobile applications	47	11	0.23	25
Human and social aspects of software engineering	48	10	0.21	33
Validation and verification	55	12	0.22	39
Security, privacy and trust	58	6	0.1	25
Tools and environments	59	13	0.22	30
Debugging, fault localization, and repair	74	13	0.18	41
Mining software engineering repositories	82	16	0.2	41
Software evolution and maintenance	91	16	0.18	46
Program analysis	97	21	0.22	32
Software testing	102	29	0.28	50
Empirical software engineering	146	29	0.2	56

We note that overall, we had expertise that covered all topics for submitted papers. Assuming that each PC member reviews 15 papers and each paper gets 3 reviews, areas where number of papers submitted X 3 < number of experts X 15, would be those where we were low on expertise.

The data clearly shows that some topics were strongly favored for acceptance, e.g., 40% of papers on program synthesis go accepted. Papers on crowd-sourcing techniques were accepted in 33% of the cases. Yet no papers covering some areas, such as ubiquitous and embedded computing, software services, green and sustainable computing, cloud computing and software economics, got accepted. Furthermore, modeling and agile each got 20 papers submitted and only one accepted. Papers on security also had a somewhat lower acceptance rate (10%), as were on the topics of software architecture, performance, specification and modeling languages.

Let's compare this date with 2017 categories (the following table is from the 2017 ICSE PC chair's report), where N is the number of submitted papers, A is the number of accepted papers, PCB is coverage by program committee and board members (PCB) and AR is acceptance rate. Many of the topics are somewhat different from the ones used in 2018, making direct comparison complex. Specifically, there was no explicit program synthesis category which was so strongly favored in 2018 nor was there a crowd-sourcing category. Yet a significantly larger number of papers on economics, processes and workflows got submitted and accepted.



Topic	N	A	AR	PCB
Autonomic computing and (self-)adaptive systems	14	1	7.1%	25
Collaborative and human aspects of software engineering	58	10	17.2%	40
Components, middleware, services, and web applications	22	4	18.2%	22
Configuration management and deployment	11	2	18.2%	13
Dependability, safety, and reliability	24	3	12.5%	32
Development tools and environments	59	7	11.9%	41
Distributed, cloud, parallel, and concurrent software	12	2	16.7%	19
Economics, processes, and workflow	17	3	17.6%	9
Embedded and real-time software	1	0	0.0%	13
End-user software engineering	18	0	0.0%	21
Formal methods	25	2	8.0%	28
Mining, big data, and recommendation systems	74	9	12.2%	35
Mobile, ubiquitous, and pervasive software	40	6	15.0%	27
Model-driven software engineering	19	2	10.5%	26
Policy and ethics	8	0	0.0%	4
Program analysis	84	18	21.4%	54
Program comprehension and visualization	31	5	16.1%	38
Programming languages	28	8	28.6%	20
Requirements engineering	31	2	6.5%	24
Reverse engineering	15	2	13.3%	28
Search-based and knowledge-based software engineering	31	3	9.7%	24
Security and privacy	43	9	20.9%	26
Software evolution and maintenance	111	15	13.5%	57
Software architecture and design	34	3	8.8%	38
Software debugging and program repair	48	12	25.0%	42
Software testing	75	16	21.3%	54
Specification and verification	37	3	8.1%	33

3.4 Analyzing other information in structured reviews

The structured reviews asked the reviewers to score the *significance, soundness, novelty, replicability*, and *presentation quality* (1: very poor, 2: poor, 3: fair, 4: good, 5: excellent) and to identify candidates for the best paper awards. The structured scores were not used during the discussion phase and decision making and thus allows us to model the relationship between the individual quality aspects and the total score.

The table below shows the distribution of the scores for the 1487 reviews. For example, for significance, 4.7% of the scores were very poor, 18.9% poor, and so on. On average the scores for presentation and novelty were higher than the scores for soundness and replicability.

	very poor (1)	**poor (2)**	**fair (3)**	**good (4)**	**excellent (5)**	**average**
Significance	4.7%	18.9%	35.1%	35.2%	6.1%	3.19
Soundness	5.2%	23.7%	35.4%	30.2%	5.4%	3.07
Novelty	3.7%	17.0%	34.6%	37.9%	6.7%	3.27
Replicability	8.2%	21.2%	33.5%	30.4%	6.7%	3.06
Presentation	4.7%	13.9%	30.5%	40.2%	10.7%	3.38

Of the 1487 reviews, 42 nominated a paper for best paper.

The table below compares the average scores for rejected papers, accepted papers, and papers with a best paper nomination:

	rejected	**accepted**	**nominated for best paper**
Significance	3.025	3.797	4.548
Soundness	2.891	3.719	4.381
Novelty	3.137	3.753	4.357
Replicability	2.926	3.559	4.095
Presentation	3.234	3.925	4.452

Explaining Total Score with Significance, Soundness, Novelty, Replicability, Presentation

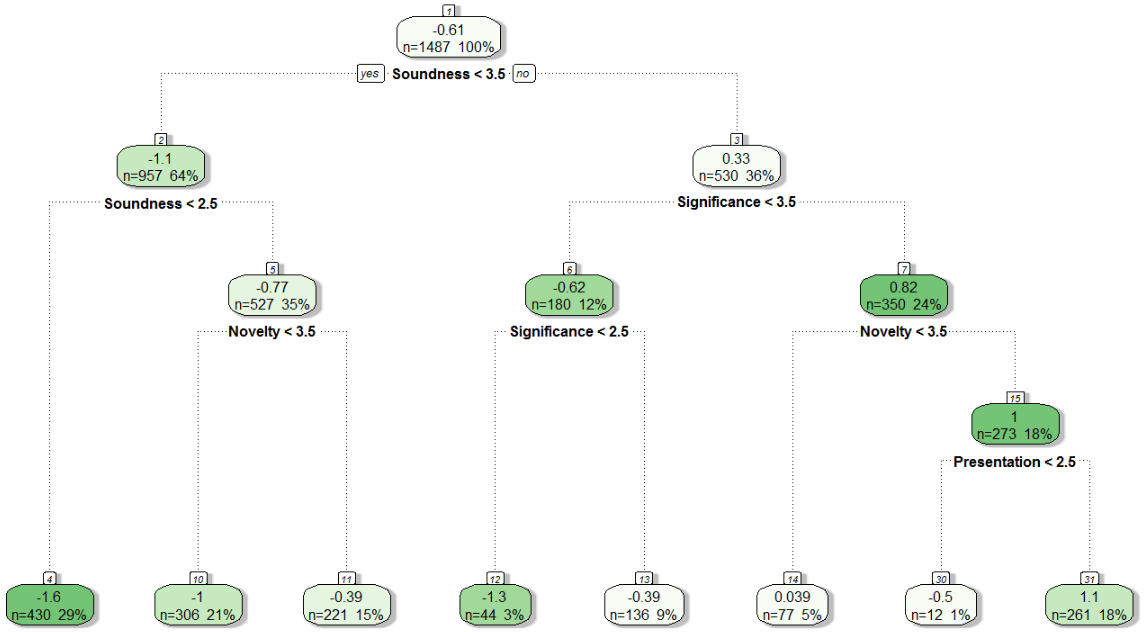
To analyze the relation between the scores for significance, soundness, novelty, replicability, presentation quality, reviewer confidence (as independent variable) and **the total score** (as dependent variable) we built a linear regression model (see below; Multiple R-squared: 0.5412, Adjusted R-squared: 0.5394). All factors were statistically significant. The coefficients for Soundness (0.414) and Significance (0.376) are the highest. Replicability only has a small influence on the total score. The reviewer's confidence (on a scale of 1 to 3) also influences the total score, the more confident the more critical a reviewer is; however, the effect is very small (-0.102).

	Coefficients	Significance
(Intercept)	-4.208	***
Reviewer's Confidence	-0.102	**
Significance	0.376	***
Soundness	0.414	***
Novelty	0.217	***
Replicability	0.061	*
Presentation	0.143	***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1		

We also computed a decision tree (see below) to model the **total score** with significance, soundness, novelty, replicability, presentation quality, reviewer confidence as independent variables. The top node

(#1) summarizes the 1487 reviews with an average of -0.61. The first split of the decision tree is along the criteria Soundness < 3.5: the 957 reviews with Soundness < 3.5 are summarized in the left node (#2) and have an average total score of -1.1; the 530 reviews with Significance >= 3.5 are summarized in the right node (#3) and have an average total score of 0.33. The highest average total score is for papers with Soundness 4 or higher, Significance 4 or higher Novelty 4 or higher, and Presentation 3 or higher (node #31, 261 reviews, average total score of 1.1).

The results are similar to the linear regression model: Soundness and Significance have the largest influence on the total score, followed by Novelty and Presentation. Note that the absence of Reviewer's Confidence and Replicability in the decision tree does not mean that they have no influence on total score.



3.5 Authors

ICSE 2018 received submissions from 1,493 authors and 52 countries. Here is the distribution of papers based on the country of origin:

country	authors	submitted	accepted	acceptance rate	PC members
Algeria	1	0.25	0	0	0
Argentina	15	4	1	0.25	1
Armenia	0	0.2	0.2	1	0
Australia	17	5.56	2.88	0.52	1
Austria	8	3.67	1	0.27	0
Belgium	7	2.42	0	0	0

Brazil	62	15.92	3.45	0.22	3
Canada	77	27.58	6.89	0.25	15
Chile	14	4.53	0.67	0.15	1
China	285	75.74	10.04	0.13	5
Colombia	6	2.08	0.17	0.08	0
Czech Republic	1	0.25	0	0	1
Denmark	8	2.38	0.33	0.14	1
Ecuador	3	0.83	0.5	0.6	0
Egypt	3	1	0	0	0
Finland	5	1.75	0.75	0.43	0
France	37	9.23	0.83	0.09	1
Germany	145	51.31	6.43	0.13	7
Greece	4	1.58	0.25	0.16	0
Hong Kong	9	3.45	1.67	0.48	1
Hungary	7	1.67	0.67	0.4	2
India	20	6.13	0.33	0.05	2
Ireland	0	0	0	0	1
Israel	12	3.9	1.5	0.38	1
Italy	28	9.68	2.33	0.24	11
Japan	20	4.98	0.64	0.13	1
Jordan	1	0.17	0	0	0
Korea, Democratic People's Republic of	3	0.75	0.75	1	0
Latvia	1	0.2	0	0	0
Lebanon	0	0	0	0	1
Luxembourg	26	10.22	2.47	0.24	4
Malaysia	1	0.5	0	0	0
Mexico	4	2	0	0	0
Netherlands	26	9.74	4.49	0.46	5
New Zealand	4	1.95	0	0	0
Norway	8	3.92	0	0	1
Oman	1	0.5	0	0	0
Pakistan	11	3.5	0	0	0
Poland	1	1	0	0	0
Portugal	19	6.6	0.6	0.09	1
Russia	7	2	0	0	0
Saudi Arabia	1	0.33	0	0	0
Singapore	32	10.87	3.67	0.34	1
South Africa	1	0.33	0	0	2
South Korea	15	5.67	2.67	0.47	1
Spain	19	4	0.67	0.17	3
Sri Lanka	1	0.5	0	0	0
Sweden	24	8.27	0	0	4
Switzerland	17	6.18	1.33	0.22	1
Taiwan	4	1.25	0	0	0
Tunisia	3	1	0	0	0
United Kingdom	48	17.84	3.17	0.18	17
United States	479	161.45	42.49	0.26	40

United States Minor Outlying Islands	2	1	0	0	0
Viet Nam	1	0.17	0.17	1	0

3.6 Additional information about the authors and submissions

At the time of the submission, we were collecting additional data about the composition of the authors with respect to students, gender, industrialists, and previous submission. Authors could provide this data voluntarily. The responses were not visible to PC/PB members and the responses did not affect the decision making. We received responses for 388 to 399 submissions, depending on the question.

- **Gender.** Of the 395 submissions that provided gender information, 207 had no female co-authors (acceptance rate: 24.8%), 188 papers had at least one female co-author (acceptance rate 21.0%). No data was available for 107 submissions.
- **Industry.** Of the 388 submissions that provided industry author information, 301 had no co-author from industry (acceptance rate: 23.2%), 87 papers had at least one co-author from industry (acceptance rate 16.9%). No data was available for 117 submissions.
- **Students.** Of the 399 submissions that provided student author information, only 78 had no student author (acceptance rate: 16.0%), 317 papers had at least one student co-author (acceptance rate 24.4%). No data was available for 103 submissions.
- **Previous ICSE submissions.** For 53 submissions no author had previously submitted to ICSE (acceptance rate 6.8%), for 331 submissions at least one author submitted to ICSE before (acceptance rate 24.4%), for 118 submissions. no data was available.

The submission form included two questions about **double-blind review**. (Note that these questions were answered by the person who made the initial paper submission, which might be a biased sample of the ICSE population, e.g., junior co-authors are more likely to submit than the senior co-authors.)

1. For the question “What are your thoughts about double-blind refereeing for ICSE'18?”, the responses were positive. Of the 396 submissions, which responded to this question, 58.3% selected “Very positive”, 25.5% “Somewhat positive”, and 12.4% “Neutral”. Only a small number of responses felt negatively: 3.0% selected “Somewhat negative” and 0.8% selected “Very negative”

2. We also asked “Do you feel that double-blind reviewing will produce a more fair assessment of your work, when compared to regular reviewing?”. Of the 395 submissions, which responded to this question, 39.0% selected “Definitely”, 42.8% “Probably”, 12.4% were “Unsure”, 5.3% selected “Probably not” and 0.5% “Definitely not”

4. Programme committee selection

We put a great deal of effort into drawing from the widest possible pool of candidate reviewers. In order to do this, we first drew up a detailed spreadsheet, extracting candidate reviewer names from Google scholar and DBLP. For each entry, we recorded total number of citations and H index. We rounded the total number of citations to the nearest 1000, to cater for different sample times. We manually collected demographic information such as the sector in which the candidate reviewer worked, gender, country of affiliation and so on. Finally, we recorded approximately 50 different categories of expertise, manually determining candidate reviewer expertise based on recent and highly-cited publications, as listed on DBLP and Google scholar. The whole process occupied about 10-12 person days' effort in terms of manual extract, cross-validation, and annotation. In order to choose the column headings for topics of expertise as our categories, we harvested the "topics include but are not limited to" bullet point lists from previous iterations of the conference.

Although laborious to construct, this spreadsheet allowed us to construct subsets of candidate reviewers, and immediately measure the coverage of topics, geography, sector and other demographics. At the same time, recording bibliometric data kept us relatively "honest" in terms of assessing the suitability of candidates; it made it immediately visible if we were trying to promote a "favourite candidate" who lacked scientific impact, compared to the approximate overall distribution of other candidates.

Having constructed the spreadsheet, we used simple, by-hand, constraint satisfaction to solve the various constraints of ensuring geographic and topic spread, availability of reviewing expertise, and balance in the composition of the programme committee and program board.

In choosing the programme committee, we were prepared to take risks with relatively new and junior members in order to maintain the lifeblood of the review pool and development of the wider community. This calculated risk was amply balanced by the admirable willingness of many senior members of the community to serve on the programme committee. This is to be welcomed, since many perceive the programme board role is somehow be more prestigious. We believe this (potentially incorrect) perception is something that needs to be addressed if possible; both roles are simply different and equally important. However, we do tend to favour more senior people on the programme board, which tends to create a "correlation expectation".

We have confidence in the process by which we arrived at the composition of the programme committee and program board and feel that a suitably balanced composition and topic coverage contribute greatly to the quality of discussion and reviewing.

5. Survey analysis

We ran two surveys to learn about the satisfaction with the ICSE 2018 review process:

1. Among the **authors**. Of the 1,493 authors[1], 343 (23.0%) people participated in the survey. For the analysis we split the responses in (a) authors with all papers rejected, (b) some but not all papers accepted, and (c) all papers accepted.

[1] In this report, we use author for a person who is co-author of an ICSE *submission*, regardless of whether the paper was accepted or not.

2. Among the **PC/PB members**. Of the 101 PC members, 44 (43.6%) participated and of the 33 PB members, 17 (51.5%) participated in the survey

When possible, we compare the results to previous ICSE conferences. However, it is important to note that the data collection varied over each year, and only subsets of authors participated in the author feedback. In 2014 and 2015, the author surveys were post-notification (2014: 185 responses, assuming one response per paper, 37%; 2015: 182 responses, assuming one response per paper, 42%); in 2016 the author ratings were collected during the rebuttal (359 out of 513 responses, 70%); in 2017, the survey was post-notification and allowed each author of a paper to rate each reviews of each paper they submitted. For the survey in 2018, we simplified the process and asked authors for feedback on the reviews for all their submissions.

Satisfaction (Authors, PC/PB members). The satisfaction and dissatisfaction with the review process and the review quality is shown in the table below. Of all authors, 70% were satisfied with the review process and 64% were satisfied with the review quality (the numbers are higher for authorswith all papers accepted. 93% satisfied with the process and 84% satisfied with the review quality). Among the PC/PB, 71% were satisfied with the review process and 79% were satisfied with the review quality.

	Review Process		Review Quality	
	Satisfied	Dissatisfied	Satisfied	Dissatisfied
Authors (all)	70%	16%	64%	22%
Authors: no accept	50%	30%	45%	38%
Authors: some accept/reject	71%	13%	68%	18%
Authors: all accept	93%	0%	84%	5%
PC/PB	71%	21%	79%	11%
PC	73%	18%	80%	14%
PB	65%	29%	77%	6%

Review quality (Authors, PC/PB members). We asked authors and PC/PB members for their agreement with statements about specific aspects of the review quality (usefulness, fairness, accuracy, constructiveness, thoroughness). The table below summarizes the agreements.

	Authors						
	all rejected	some accepted/ rejected	all accepted	All	PC/PB	PC	PB
The reviews were *accurate*.	41%	57%	76%	57%	72%	72%	71%
The reviews were *constructive*.	50%	64%	82%	64%	77%	75%	82%
The reviews were *fair*.	51%	57%	85%	64%	87%	84%	94%
The reviews were *thorough*.	47%	60%	73%	59%	68%	65%	77%
The reviews were *useful*.	62%	70%	91%	74%	88%	88%	88%

We now summarize the results of the 2018 survey and compare to the results from the submitter surveys of previous years.

- *Accuracy.* Of the ICSE authors, 57% agreed that the reviews were accurate (authors with all submissions accepted: 76%, all submissions rejected: 41%). Among the PC/PB, 72% agree that the reviews were accurate. Compared to previous years, in 2017, when each review was rated by the authors, 59% of the reviews were rated as accurate. Before 2017, ICSE surveys did not ask explicitly about accuracy. Instead they asked whether the reviews reflected sufficient knowledge of the reviewers: 58% of authors agreed in 2014 that the reviewers had sufficient expertise to evaluate their submission, 67% agreed in 2015, and 58% agreed in 2016.

- *Constructiveness.* Among the authors, 64% agreed that the reviews were constructive (all submissions accepted: 82%, all submissions rejected: 50%). Among the PC/PB, 77% agreed with the statement that the reviews were constructive. Compared to previous years, 61% of the reviews were rated as constructive by authors in 2017, 64% of authors agreed in 2014 that the reviews were constructive, 64% agreed in 2015, and 57% agreed in 2016.

- *Fairness.* Among the authors, 64% agreed that the reviews were fair (all submissions accepted: 85%, all submissions rejected: 51%). Among the PC/PB, 87% agreed with the statement that the reviews were fair. Compared to previous years, in 2017 authors rated 62% of the reviews as fair. Before 2017, ICSE surveys did not ask about the fairness of reviews.

- *Thoroughness.* Among the authors, 59% agreed that the reviews were thorough (authors with all submissions accepted: 73%, all submissions rejected: 62%). Among the PC/PB, 68% agreed with the statement that the reviews were thorough. Compared to previous years, 55% of the reviews were rated as thorough by the authors in 2017, 66% of authors agreed in 2014 that the reviews were constructive, 69% agreed in 2015, and 66% agreed in 2016.

- *Usefulness.* Among the authors, 74% agreed that the reviews were thorough (authors with all submissions accepted: 91%, all submissions rejected: 47%). Among the PC/PB, 88% agreed with the statement that the reviews were thorough. Compared to previous years, 64% of the reviews were rated as useful by the authors in 2017, 66% agreed in 2016 that the reviews were useful, no data is available for 2014 and 2015.

Resubmissions (Authors). Of the authors with research papers rejected, 84% have or are planning to resubmit the papers to a different venue.

We also asked authors about which venue(s) they have or are planning to resubmit. For the question, we allowed multiple responses (since authors might have multiple rejected papers) and write-ins. In total we received 340 responses by 175 participants. The most frequent targets for resubmission are in the table below.

Venue	Count	Percent	Venue	Count	Percent
ESEC/FSE	58	33%	ISSRE	10	6%
ASE	51	29%	TOSEM (journal)	9	5%
TSE (journal)	39	22%	RE	8	5%
ISSTA	36	20%	ICST	6	3%
ICSME	19	11%	SANER	6	3%
EMSE (journal)	17	10%	ICPE	5	3%

MSR	11	6%	ICSA	5	3%
ESEM	10	6%	OOPSLA	5	3%

Review process (PC/PB members). We asked PC and PB members about their agreement with several statements on the ICSE 2018 review process, specifically about workload, rebuttals, review quality, discussions, interaction between PC/PB, and the local social clusters. The results are summarized in the table below. Interestingly, 94% of the PB responses agreed with the statement that the workload was manageable but only 59% of the PC responses.

Program Committee	Agreement	Disagreement
My workload for ICSE was manageable.	59%	18%
The rebuttals helped make decisions more informed and more fair.	55%	18%
I was able to provide expert reviews on most of the papers assigned to me.	93%	2%
PB members helped improve my reviews.	51%	21%
PB members were effective in seeding and facilitating discussion among reviewers.	60%	16%
It was fair to recuse myself for discussions where I became aware of some author identities.	36%	20%
PB members and PC Chairs did not overrule my decisions about the papers I reviewed.	73%	9%
The Local Social Cluster is a useful mechanism to facilitate mentoring and resolve problems.	12%	33%
I took advantage of the Local Social Cluster system.	11%	55%

Program Board	Agreement	Disagreement
My workload for ICSE was manageable.	94%	0%
The rebuttals helped make decisions more informed and more fair.	65%	18%
The PC reviews were of poor quality.	6%	82%
Online discussions resulted in good decisions.	71%	12%
I would have preferred to review papers myself instead of presiding over the PC online discussion.	35%	41%
I had all the data I needed to make decisions about papers discussed at the PB meeting.	71%	24%
The PC chairs used their influence to inappropriately change decisions for papers discussed at the PB meeting.	6%	82%
The discussion at the PB meeting discussions led to good decisions.	71%	29%
Local Social Cluster is a useful mechanism to improve mentoring of PC members and resolve other problems.	6%	53%
I used my Local Social Cluster.	6%	88%

Opinion questions (Authors, PC/PB members). We asked authors and PC/PB members about their agreement with several statements about review processes *in general*.

	Authors		**PC/PB members**	
	Agree	Disagree	Agree	Disagree
Authors should be able to respond to all reviews.	72%	8%	48%	17%
No additional reviews should be assigned after rebuttal, even when the review expertise was low.	15%	61%	17%	65%

Meta-reviews written by program board members are useful.	61%	13%	63%	20%

Double-blind (Authors, PC/PB members). Overall, the double-blind review process was perceived positively by the PC, PB, and the authors.

Among PC/PB members, 57.4% agreed (13.1% disagreed) with the statement "Before ICSE 2018, your attitude towards double-blind reviewing was positive/ supportive". 68.9% of the PC/PB members agreed (14.7% disagreed) agreed with "You would like to see double-blind reviewing being used for future ICSE conferences." The difference between 57.4% and 68.9% suggests that by participating in the ICSE 2018 review process several PC/PB members became more positive towards double blind review.

In the submitter survey, 75.6% agreed (6.8% disagreed) with "Before ICSE 2018, your attitude towards double-blind reviewing was positive/ supportive." 77.4% agreed (8.5% disagreed) with "You would like to see double-blind reviewing being used for future ICSE conferences". The small difference between 75.6% and 77.4% suggests that the ICSE 2018 review process did not have much impact on the (already positive) attitude towards double-blind-review. This can have several reasons: many authors might have already previously submitted to double-blind venues; it is harder to observe any changes for authors because they don't have as much insight into the internals of the review process as PC/PB members, etc.

It is noteworthy that there are demographic differences in whether authors want to see double-blind review again:

- Gender: among authors who identified as females 72.1% agreed, while among authors who identified as male 78.9% agreed;
- Location: Europe 68.4%, South America 76.9%, North America 80.8%, and Asia/Pacific 89.4% agreed (not enough responses for the other regions);
- First-time authors: 80.9%, Repeat authors: 73.5% agreed
- Seniority: Graduate/Master 82.4%, Post-doc 80%, Assistant Professor 78.4%, Associate Professor 72%, Full Professor 57.5% agreed that they would like to see double-blind reviewing being used for future ICSE conferences

The tables below list the agreement with additional statements about double-blind in the ICSE 2018 review process from the point of view of the PC/PB members.

Program Committee	Agreement	Disagreement
Double-blind reviewing helped make decisions which are more fair.	64%	14%
Double-blind reviewing gave me all data that I needed to make a decision.	77%	9%

Program Board	Agreement	Disagreement
Double-blind reviewing made decisions which are more fair.	65%	6%
Double-blind reviewing provided sufficient data to make a decision.	82%	6%

The table below lists the agreement with general statements about double-blind review from the point of view of the authors and PC/PB members. Among authors and the PC/PB members, there is a preference for never revealing the identity of the author names for rejected papers.

	Authors		PC/PB members	
	Agree	Disagree	Agree	Disagree
Making submissions double-blind is a lot of work.	33%	42%	37%	42%
Submitting supplemental materials such as data, case studies, code is difficult for double-blind review.	55%	21%	63%	20%
Double-blind reviewing decreases the quality of reviews because it is harder to solicit external opinions.	16%	51%	18%	60%
Reviewers should recuse themselves from the discussion if they discover the authors' identity.	48%	21%	37%	44%
The authors names of rejected submissions should never be revealed.	67%	6%	57%	22%
Submissions that accidentally reveal the authors identity should be rejected.	29%	43%	15%	63%

PB meeting. We asked the PC/PB members to rate the agreement with the statement "A physical PC/PB meeting is not necessary. An electronic meeting would suffice.". 60.7% agreed with this statement, 21.3% disagreed. Among the PC 63.7% agreed, among the PB 52.9% agreed. The agreement was higher for PC/PB members who attended at least one meeting vs those who never attended a PC meeting: 64.5% vs 56.3%. Among PC/PB members who identified as female 64.3% agreed (10.7% disagreed) and among members who identified as male 55.5% agreed (33.3% disagreed).

6. Chairs' Comments:

Review Process. We invited several members of the PC to serve as Rapid Response Reviewers, that is, at the exchange of getting a smaller initial review load, we asked them to be prepared to step in with their reviews when needed. This was a very good move and we recommend next year's chairs to do the same. We "deployed RRRs" whenever initial reviewers were late or when the quality or depth of the review we did receive was deemed inadequate by the PB member handling the paper.

We also felt that it was important that the authors have an opportunity to rebut every review. That meant that we made a choice not to solicit additional reviews in case the existing reviewers disagreed or when some of the expertise was lower than we would have liked. We believed that the reasons for our decision outweighed those again but it is a point that the next chairs may want to decide for themselves (see the data provided).

Journal-first and Posters. We received 67 submissions for the Journal-First track (25 from TSE, 5 from TOSEM and 37 from TSE). Of these, 18 were deemed ineligible because they were either published outside the eligibility window or had an associated conference paper. Furthermore, the author of one paper was unable to attend ICSE. The resulting 48 JFP were presented at ICSE'18 (20 from TSE, 2 from TOSEM and 26 from JESE. That number was still significant as it added, effectively, 50% to the size of the ICSE Technical Track program. In several occasions, the JFP papers nicely complemented the ones from ICSE but there were several sessions consisting of primarily (or even solely) JFP papers. But JFP clearly increased attendance: 77 registrants indicated that they had a JFP paper at ICSE, and 33 of them indicated ONLY a JFP (for 30 unique papers). We feel that the JFP process should be reviewed at the SC meeting.

In addition, we invited a significant number of authors of rejected papers to submit posters to present at ICSE, and many authors took us up on this offer. This may be one of the many factors that led to the high attendance at this ICSE. Specifically, 168 registrations indicated that they had a poster at ICSE'18, and 108 had only a poster (for 96 unique posters). Moreover, of these 108, 51 were students (and of these, 40 were attending ICSE for the first time). Thus, as one would expect, posters are an excellent way to increase ICSE student attendance.

Use of easychair. While relatively late, EasyChair did provide a workable plugin for managing double-blind conflicts. That enabled authors to specify conflicts with PC/PB members and enabled PC/PB members to see these conflicts and declare theirs. We also used EasyChair to allow authors to submit optional (and anonymized) data supplementing their papers. A significant number of authors took advantage of that option. Overall, the use of EasyChair went relatively smoothly. We did significant amount of double-blind conflict testing ahead of time, over the summer of 2017, and the bugs did get fixed before the submission started. Since we did not switch roles of individuals (as was done in 2017), by asking PB members to do reviews, support provided by EasyChair was adequate.

Double-blind violations. Probably the most significant problem with experienced was in identifying double-blind violations. Some were blatant but some were subtle. Yet others involved attached supplementary information. Identifying double-blind violations rapidly and enabling authors to fix them quickly, all the while without "polluting" the reviewer pool was a challenge for us and will probably remain a challenge for next chairs. We did ask the program board members to help us in this process during the first week after the paper submission and before the papers were sent out to PC members for review. We discuss others below.

Why not Triple blind: Both program chairs felt very strongly that we should opt for double-blind but not triple blind. That is, the identities of reviewers *should* be known to each other. We discussed this at length with the programme committee and program board. There appeared to be strong and valid opinions on both sides of this argument.

In favour of hiding review identities from each other, more junior members of the community may sometimes seemed to feel that they might be unduly silenced by more senior members of the community if identities were known. Similarly, other reviewers were concerned that more junior members may simply choose to remain silent, once they realized they were discussing a paper with someone who had more seniority. The first of these concerns we were able to ameliorate by seeking out and tackling any such cases as they arose. Mercifully, we didn't see any cases where this happened.

The second issue was a more silent (undetectable) concern; we weren't able to tell whether junior members were simply reticent. Having said that, we did observe that review of reticence was a per-reviewer property, rather than a reviewer-group phenomenon; reviewers who are reticent to comment tended to be reticent on all of the papers to which they were assigned, rather than only with regard to a particular perceived more authoritative reviewer.

Set against these concerns over revealing of reviewer identities, we have to take account of the social nature of the reviewing process. We felt that it was important for junior reviewers to be recognized for the quality of their reviews. We could have achieved this by revealing review identities at the end of the process, of course. However, could we really be sure that lasting impressions of reviewer quality would remain in the minds of those who have influence in the selection and ongoing development of more junior colleagues? Furthermore, we felt that it was appropriate to take into account the expertise, and also possible *leanings* (and dare we say *biases*), of reviewers in weighing the different contributions to make to the discussion.

Managing Conflicts of Interest. One of the big challenges lies in balancing the tension between the handling of conflict-of-interest and the aim to provide a double-blind review process. The former is concerned with explicit bias that arises through conflict-of-interest, while the latter is concerned with implicit bias, about which the reviewer may be entirely unaware. Since we are dealing with professionals, we tended to regard the balance of risk in terms of favouring the reduction of implicit bias, and relying on professionalism to reduce explicit bias.

That is, we hope that by removing author identity from the process, the only way in which explicit bias could occur through conflict-of-interest would be through unprofessional behavior, which we hope will be minimal if not non-existent. On the other hand, motivated by many scientific publications on the topic of implicit bias to favour double-blind, we favoured reducing potential sources of implicit bias, since no amount of professionalism could ever hope to ameliorate their affects.

We thought that there would be a tension here, when we send people out of the room for conflict-of-interest, because this may reveal author identity. However, fortunately, we were not aware of this happening during the programme board meeting. We did try to obscure the conflicts and attempted to focus the meeting away from the consideration of author identities.

We were pleased to find that there wasn't a single occasion where any of the members of the programme board claimed to discover identity during the meeting itself, and furthermore, we got the strong impression that members of the programme board had fully absorbed the philosophy of double-blind reviewing: they were not even thinking about possible author identity during the process. This is an impression, rather than something for which we can provide quantitated data.

Use of Paper History vs "Blind" Reviewing. One of the biggest tensions we encountered was between two things, both of which we wanted to have in the process but which appeared contradictory. It arose because of the incompatibility of making use of historical data on previous submissions, with the need to remove author entities from the decision-making process. If a previous conference had not had a fully double-blind process then, by definition, we would not be able to take account of any historical information available, and anyone among the reviewers/board who knew of such information would automatically be compromised and therefore unable to take part in the discussion. This is clearly very unfortunate, since it may be useful to have this historical information, and any so-recused reviewer would, by definition, be one who has suitable expertise to comment. We had no way to balance these competing concerns, and were therefore forced, in a couple of cases, to recuse referees and deny our committee historical information from previous conferences that were not fully double-blind.

It seems that the only way the community could resolve these two conflicting objectives would be at the community level, by agreeing to move to full (heavy) double-blind, throughout the review process. If we don’t do this, as a community, then one conference will effectively pollute the double-blind intentions of another. Maybe this is a conversation for the ACM SIGSOFT/IEEE TCSE Townhall meeting.