Shadow Program Committee Initiative: Process and Reflection

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1. INTRODUCTION

The Shadow Program Committee (PC) is an initiative/program that provides an opportunity to Early-Career Researchers (ECRs), i.e., PhD students, postdocs, new faculty members, and industry practitioners, who have not been in a PC, to learn first-hand about the peer-review process of the technical track at Software Engineering (SE) conferences. This program aims to train the next generation of PC members as well as to allow ECRs to be recognized and embedded in the research community. By participating in this program, ECRs will have a great chance i) to gain experience about the reviewing process including the restrictions and ethical standards of the academic peer-review process; ii) to be mentored by senior researchers on how to write a good review; and iii) to create a network with other ECRs and senior researchers (i.e., Shadow PC advisors).

The Shadow PC program was first introduced to the SE research community at the Mining Software Repositories (MSR) conference in 2021. The program was led by Patanamon Thongtanunam and Ayushi Rastogi (Shadow PC Co-chairs) with support from Shadow PC Advisor Co-Chairs (Foutse Khomh and Serge Demeyer), PC Co-Chairs of the technical track (Meiyappan Nagappan and Kelly Blincoe), and the General Chair of the conference, Gregorio Robles. To promote and facilitate the Shadow PC program at SE conferences in the future, this report provides details about the process and a reflection on the Shadow PC program during MSR2021. The presentation slides and video are also available online at `https://youtu.be/ReUXwmtIEk8`.

2. SHADOW PC PROCESS

The Shadow PC review process functioned like an independent version of the review process of the technical track at the conference. The Shadow PC members provided reviews on a subset of submissions to the technical track of the conference (the authors opted-in for their paper to be reviewed by the Shadow PC). However, the Shadow PC members did not have access to the reviews and the names of actual reviewers of the technical track. In addition, they had to abide by the same rules and restrictions applicable to regular PC members. This includes, but is not limited to, declaring conflict of interests, performing double-blind reviews, and following rules against discussing the papers outside of the PC context or using in any way results from reviewed papers before such papers have been published. Delegated reviews (i.e., external reviews) were not allowed for the Shadow PC. Shadow reviews for papers that were reviewed by the Shadow PC were sent out after the actual review process.

2.1 Shadow PC Members

Recruitment. The Shadow PC program was open to PhD students, post-docs, new faculty members and industry practitioners working in SE research who have not yet served as a PC member of the technical research track (or the main track) of premier SE conferences. ECRs who were interested in participating in our Shadow PC program were asked to nominate themselves through a Google form, which collects general demographics (e.g., country of residence, gender), public research profile, motivation for joining the Shadow PC, and SE topics of expertise. To ensure that this Shadow PC opportunity was widely spread to many ECRs, we publicized the Shadow PC program and the self-nomination via various social platforms (e.g., Twitter, Facebook), SE mailing lists (e.g., SEWorld), SE communities (e.g., SEWIRE: Women in SE, SENF: New Faculty and Postdoc). Through our personal contacts, we also reached out to SE researchers in under-represented regions who are less likely to be informed about this opportunity (e.g., ECRs in South-East Asia, Africa, South America). The self-nomination was open during November 1st to December 10th, 2020.

Selection. We received a total of 162 applicants from a wide range of backgrounds from 36 countries. The selection was mainly based on the research experience (i.e., the number of years before or after PhD graduation and the number of publications) and their stated motivation for participating in the Shadow PC program, while ensuring the diversity in terms of gender, country, and occupation. After reviewing the applications, we invited 106 applicants from 32 countries to participate in the program as Shadow PC members. Figure 1 shows that our Shadow PC members are in a fairly reasonable distribution based on gender and occupations.

The applicants who were not selected were given other opportunities to serve the community based on their qualifications. Indeed, we found that thirteen of the applicants were overqualified to be in the Shadow PC as they had prolific research profiles with experience reviewing journal and workshop papers. Hence, these thirteen applicants were instead invited to be a regular PC member of the technical track at MSR2021. The applications of the Post-PhD applicants (e.g., post-docs, faculty members) were also shared with PC chairs of various tracks at the premier SE confer-
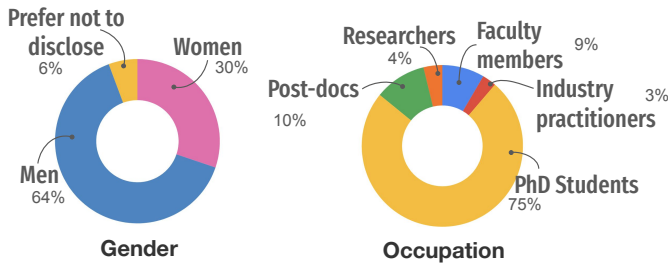
Figure 1: The distributions of the 106 Shadow PC members at MSR2021 based on gender and occupations.

ences. The remaining applicants who were not selected, mainly early PhD students, were encouraged to apply in future editions of the conference.

2.2 Reviewing and Mentoring Process

Respecting the double-blind policy, the Shadow PC members did not have access to the names of the actual reviewers at the technical track and the author names. Hence, the Shadow PC reviews were conducted in a separate instance of the HotCRP review management system from the technical track. This also ensured that the reviews of the PC members at the technical track did not influence the review decisions of the Shadow PC members, and vice versa. The Shadow PC reviews were also double-blinded.

Paper Submissions. The Shadow PC program used a subset of the papers that were actually submitted at the technical track of MSR2021. During the submission of the technical track, the authors could select an option to participate in the Shadow PC program. We selected 40 papers from the 59 papers that opted for the Shadow PC program. The selection was based on the paper categories (i.e., a full-length research paper) and the diversity of the topics. Then, the PC co-chairs of the technical track of MSR21 shared the meta-data and the submission files of the selected papers to the Shadow PC co-chairs privately to populate into the HotCRP Shadow PC review instance.

Reviewing Timeline & Process. The Shadow PC program used a similar process and timeline to the technical track at MSR2021. The Shadow PC members had to declare conflicts of interests, topics of interest, and provide review preferences. Since the reviewing timeline of the Shadow PC program was shorter than the technical track and many Shadow PC members did not have prior reviewing experience, each PC member was assigned only two papers based on their topics of interests and review preferences. Hence, each paper received five to six Shadow PC reviews. Again, to avoid potential influence of the outcomes from the technical track, Shadow PC members had to submit reviews and reach consensus before the author notification date of the technical track. After the review submission deadline, Shadow PC advisors provided feedback on the reviews written by the Shadow PC members. After all the reviews were checked by the Shadow PC advisors, we sent the decisions and reviews of the Shadow PC members with the authors.

Mentoring & Support. The mentorship was mainly from Shadow PC advisors through individual feedback for each Shadow PC review. We invited 26 senior SE researchers who had extensive experience in community service and reviewing to serve as Shadow PC advisors. Each Shadow PC advisor was assigned to monitor one or two papers and provide feedback for 5-10 Shadow PC reviews. In addition to mentorship by the Shadow PC advisors, the Shadow PC members were also provided with materials about

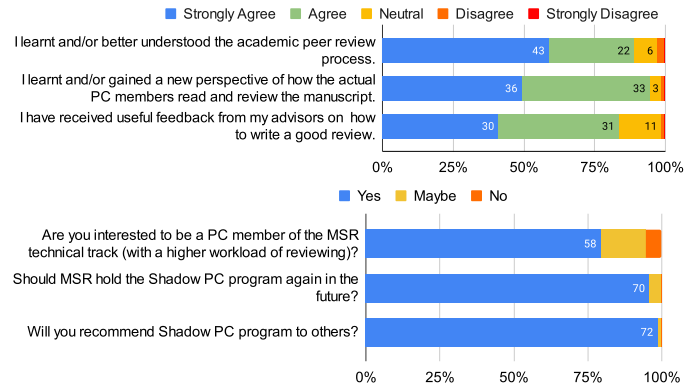|		By MSR PC	
		#Accepted	#Rejected
By Shadow PC	#Accepted	**12**	7
	#Rejected	2	**19**

Figure 2: Survey responses from Shadow PC members

reviewing guidelines and tips. We also set up a private communication channel via Discord for questions and answers between Shadow PC members and the Shadow PC co-chairs.

2.3 Review Outcome and Analysis

We received a total of 203 reviews from 102 Shadow PC members. There were 680 messages exchanged in the review discussions of which 408 messages were from Shadow PC members, showing that Shadow PC members were active. The acceptance rate by Shadow PC members was 47.5% (19 out of 40 papers). Based on the same set of the papers, we found that the acceptance rate by the regular PC members was similar, i.e., 35% (13 out of 40 papers). Table 1 shows that the review outcomes from the Shadow PC members and the PC members of the technical track are fairly consistent, i.e., 12 papers were consistently accepted and 19 papers were consistently rejected. Only 9 out of 40 papers that received inconsistent review outcomes.

3. REFLECTION

To gauge the success of the Shadow PC program, we sent out a survey to each of the Shadow PC members and the authors who participated in the program. The surveys were anonymized and voluntary. For the Shadow PC members, the survey aimed to collect feedback on their experiences and perceptions of the program. For the authors who received reviews from the Shadow PC, the survey aimed to better understand their motivation for opting into the Shadow PC review process and to collect feedback about the Shadow PC reviews. In this section, we present the survey responses and discuss the areas for improvement for the program in the future.

3.1 Participant Feedback

Below, we summarize the survey responses from Shadow PC members and the paper authors.

Shadow PC Feedback. We received 73 responses from Shadow PC members. Figure 2 shows that the responses were generally positive about the learning and experience gained after participating in the Shadow PC program. The majority of the respondents
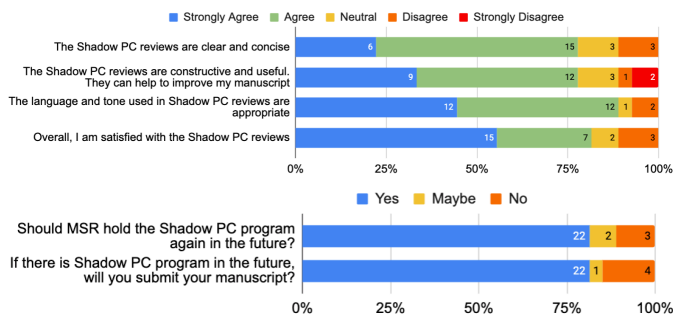
Figure 3: Survey responses from authors of participating papers

agreed that they learned and/or better understood the academic peer review process and gained a new perspective of how the actual PC members read and reviewed the manuscripts. Many respondents noted that this program provided a great opportunity to learn how the actual review process functions. For example, Shadow PC members noted: *"It was my first time seeing the work behind the scenes that goes into discussing the papers and finalizing the decision"*; *"there is not often an opportunity to learn this (except if you are lucky and have a good supervisor/colleagues during your PhD studies)."* Several respondent also noted that they have also learnt from other Shadow PC reviews: *"Great to read feedback on not only my reviews but also on other shadow PC members' review."* In addition, most of the respondents also indicated that the Shadow PC program should be held again in the future and that they would recommend this program to others.

Author Feedback. We received 23 responses from the paper authors. Several respondents indicated that they opted in the Shadow PC review to receive additional feedback, while contributing to the community to train the next generation of PC members: *"Receiving additional feedback and allowing new community members to become acquainted with the inner workings of a conference."* Figure 3 also shows that the authors were generally satisfied with the quality of Shadow PC reviews. Many respondents agreed that the Shadow PC reviews were clear, constructive and used appropriate tone and language. Several respondents also noted that several comments were useful: *"I used some reviews in the camera-ready."*; *"The shadow PC reviews are mostly well-expressed and comparable in clarity to the normal PC reviews."* Similar to the response from Shadow PC members, most of the respondents suggested that the Shadow PC program should be held in the future and that they would submit manuscripts to participate in the program.

3.2 Areas for Improvement
Based on the survey responses and our discussion with the Shadow PC advisors, we also identified several points that can be further improved in the future.

Training Workshop & Social Event: Several respondents from the survey of Shadow PC members noted that it would be good to see an example of reviews and receive guidelines about what they should and shouldn't do when reviewing before starting the review process. Hence, we suggest that organizing a training workshop to ensure that all Shadow PC members have a clear understanding about what they should read, critique, and write in a review. In addition, organizing a social event may also increase the interaction and participation between the Shadow PC members.

Timeline: There were a couple of delays in the timeline. This is partly because each paper received reviews from five to six Shadow PC members and it took a longer time to reach consensus than usual. Hence, the authors received the Shadow PC reviews relatively late (i.e., one week prior to the camera-ready deadline). We suggest that reducing the number of Shadow reviews per paper and be more strict on the timeline to ensure a timely notification sent to the authors.

Author Response: One interesting suggestion from the paper authors is that they were happy to provide feedback to their Shadow PC members. We agreed that organizing an author response period would be beneficial to both Shadow PC members and the paper authors. This opportunity allows the authors to clarify or correct misunderstandings. The Shadow PC members will also receive additional feedback about their reviews.

Recognition: To recognize the effort of Shadow PC members, future programs should also consider to select distinguished reviewers and/or invite some of the more deserving participants to be a PC member of the main research track. Since the majority of Shadow PC members were PhD students, they considered that the participation to the Shadow PC program could be useful for their profile. Hence, a certificate of participation should also be provided.

4. CONCLUSION
Shadow PC has provided numerous benefits to the SE community. ECRs had an opportunity to learn to review and understand the academic peer review process. Paper authors received additional feedback. Moreover, the community will have a larger pool of diverse reviewers. Responses to this initiative from both Shadow PC members and the paper authors were also very positive and encouraging. Several Shadow PC members have acknowledged that they have gained experience in reviewing and some paper authors noted that they received useful feedback from the Shadow PC members. Hence, we encourage the SE research community to continue on the Shadow PC program in the future.