Recommendations for Authors

We asked our participants about features that can get security papers accepted at top-tier security conferences. We also asked questions specific to their expectations from different sections of the paper. This section provides a comprehensive list of suggestions that authors could leverage to write high-quality security papers.

An informative title. The title is usually read first by any reader and, therefore, the most important element of the paper that defines the research project. Our participants mentioned that their decision to accept or reject a paper would certainly not depend on the title. Although five of the participants mentioned that the paper title is beneficial when bidding for the papers they would like to review. P19 added that if the selection of papers for review is based on the title, they will hope that it actually has relevance to the area they thought it would have when they get that paper to review. And if the title is not what the paper is about, then the paper could be assigned to someone who does not have the expertise to review and may even hurt the chance of getting accepted.

Our participants also shared their expectations from a paper title and P16 reported that:

> *Coming up with a good title is definitely a nice art form.*

Here, we will discuss the recommendations from our participants to formulate a suitable research paper title:

- Subtitles are frequently used in security research papers with a little descriptive phrase and then some information about the methodology or the technique used to solve the research problem.
- A good paper title captures the paper's main results in some kind of nuanced way.
- A "joke-y" paper title remains in memory and helps with the recognition of the work, but it does not mean that authors use such titles to obfuscate the importance of their papers.
- A good title should reflect the novelty of the paper.
- A title should be relevant and not completely wrong or misleading about the paper's contributions.

A well articulated problem statement. A well-written introduction of the paper is vital as readers form an opinion and have certain expectations after reading it. The introduction should have three main components: summarization of prior works to help the reader understand the research problem and the motivation behind attempting to solve the problem, clear explanation on how your work will fill the gap, and the impacts and the contributions that your work will have on the community. The introduction should provide enough information to the reader about the motivation, the argument, the writing style, the research being conducted, and the findings and conclusions. Hence, a well-written introduction is essential, and a vague, wrong, or disorganized one can leave negative impressions on readers.

Almost all of our participants considered that the problem statement should be adequately articulated in a security paper. However, when asked about the satisfactory level of the articulation of the problem statement, P07, P11, P12, P13, P14, and P16 mentioned that unfortunately, some authors are not competent in having good and formal information of the problem statement. According to P07, the proper articulation of the problem statement is below average, and they said:

> *I think it is hard to do that in a compelling way. I see people screw that up more often than they screw up writing method or result sections, but it is not horrible.*

P11 also reported that most papers do not clearly explain their problem, but some people can write amazing papers and really know what they are talking about. They said:

> *I think this is a skill, it is also a talent. Many people get it, but it is also a skill you can work on. And overall, I would not say that as a community, we have developed this skill at a satisfactory level yet.*

Whereas, P10 believed that a good majority of papers submitted to top venues clearly communicate their problem statement because these people know what is expected at a top security conference and said:

> *Papers that are submitted to the top four will at least tick boxes of a clear problem statement, clear contributions, clear context, and so on, and there are rare cases where this does not happen.*

P16 believed that some researchers are better than others at articulating the problem statement and said:

> *The best researchers are also the clearest communicators, and so they end up being able to communicate the main results very clearly.*

They added that some stories are much easier to tell than others; for example, it is a straightforward kind of contribution from the point of view of explaining that this paper improves the performance of a well-known countermeasure. Other papers can be complicated because the researchers are working on something that is not following very closely in lockstep with prior work, and it is trying to open up a new direction. It is always hard to tell a story if not many papers have told that story before. P16 also mentioned that a big piece of "successful" academic research is figuring out what the right story is about the work and, of course, discovering new stories.

Here, we will discuss the reviewers' expectations and the importance of writing a clear and compelling problem statement:

- A properly articulated problem statement makes reading and understanding of papers exceptionally easy.
- An introduction helps to understand what the paper is about, and a motivation section with a motivating example illustrates the problem the authors are trying to solve. If there is a good motivation, then it is a good introduction.
- A properly articulated problem statement helps reviewers write a short overview of the paper. It is a red flag if it is hard to write that overview correctly because the paper needs refinement.

- A properly articulated problem statement mentions the research questions that the paper is addressing. It helps the reviewers to evaluate if the research questions are answered or not. It also helps to assess the correctness of the paper.
- A weak reject is possible if the problem is not properly articulated and the contributions are unclear.
- A properly articulated problem statement makes reviewing easier and helps properly apply the evaluation metrics.

A good literature review. A good literature review typically provides an overview of previous works from a field to explain how the current work fits within the larger space of research and identify where gaps exist in how research has been conducted in that field.

Our participants shared their thoughts on the importance of a good literature review and some recommendations for improvements:

- Related work helps support the claims of novelty made in the paper. According to P08, a paper would leave positive impressions on reviewers if a paper has an introduction that argues about the impact and the interestingness level, along with a technical part that convinces the reviewer that it is technically correct, and an evaluation section shows the improvements made and a correctly argued related work.
- Suppose the paper does not have a thorough literature review. In that case, the reviewers can get the impression that if the authors have not compared their work with the state-of-the-art, how can the reviewers believe that the authors are aware of the state-of-the-art, and how can they argue that their solution or approach is sound.
- It is crucial to credit the related work, reflect on all the commonalities, and make a fair comparison with prior work.

A clear methodology. The methods section of a paper typically describes the steps taken by the researchers to investigate a research problem. It precisely explains the procedures or techniques used to solve the problem and allows the reviewers to evaluate the validity and reliability of the study.

Even though we did not have a question specific to methodology in the interview, our participants mentioned the importance of a good methodology section, and here, we discuss them:

- The implementation section can be short with details on what was involved in putting together a prototype or conducting a measurement.
- Not mentioning the attack model is considered a significant red flag.

Comprehensive experiments. Our participants shared mixed thoughts on the efforts made by the authors on experiments. P19 mentioned that no one is ever complete or sound and everyone is going to miss things and said:

> *Some authors like to sweep the problems under the rug, they get away with it, and I read their published papers later and kind of get irritated. If I am reviewing one of those papers, then I am going to be super critical of that.*

P01 emphasized the correctness of the experiments and said that if a paper is in their area of research, they will know when someone is trying to fool or "sell snake oil". P04 reported that authors were trying to do their best in performing thorough experiments and said:

> *I guess it is always tricky for the authors because there is only always a limited amount of space to discuss experiments. So, they have to just do their best job, but sometimes it is not perfect, and that is understandable.*

P20 mentioned that no one could completely convince the reviewers purely based on experiments and their descriptions. The authors have to convince the reviewers that they did this experiment, had this data, and got these results. They added that there is no magic bar where anybody could prove that they did something. It is instead of how relatively convinced the reviewers are on the validity of the contributions.

Performing experiments requires enough expertise, and only highly competitive papers meet the expectations of the reviewers. Here, we will discuss some expectations of our participants from the experiments section of a security paper:

- Experiments should be comprehensive but not necessarily complete.
- Experiments should be correct and understandable.
- Best practices in the area should be followed for better experimentation.
- A paper submission is a snapshot of research, and if required, students can do more experiments for their thesis.

P06 believed that it is tough to decide how many experiments must be included in the paper to prove that a system works. Hence, a discussion among reviewers is necessary to decide what are enough experiments, how this paper can be improved, and whether it is necessary to ask for more experiments.

Clear, concise, and factual results. The results section is where the researchers present the findings of their work based on the application of techniques and approaches mentioned in the methodology section.

Our participants shared their views and expectations from the results section of a security paper:

- Results should match the claims made and show that they did not overclaim or make incorrect claims.
- Authors should also explore the trade-offs between different results in the paper and look at the sensitivity of the results by varying certain parameters.
- Authors should report their results with facts and sufficient analysis. There should be a discussion around the dataset, biases, and limitations. The results should clearly show what the authors wanted to show and explain why those results are important.
- In cryptography, papers have a theorem that explains what is being done and the construction of the protocol.

Reviewers expect the authors to have a clear construction of whatever is being built or, if it is an attack, what the attack looks like, and then a proper analysis with all details.

- Authors should point out the facts and perform sufficient analysis of the results and not let reviewers dig into the results to find their merits.
- Reviewers expect that they should get similar results if they download the authors' code and try it.
- Results section should clearly describe the datasets and assumptions and clarify the use of different parameters.

A self-contained evaluation. A rigorous and comprehensive evaluation section starts with the questions that the authors are trying to answer. It details the goals of the evaluation and the things that authors are trying to evaluate. To do so, authors may formulate a set of research questions and answer each of those questions in a separate sub-section. P10 mentioned that best practices papers are incredibly crucial as they put the community in sync. They added that some areas struggle with best practices such as fuzzing, whereas there are best practices papers to do performance benchmarking and malware analysis. It is also vital to sync the community on evaluation metrics. If a paper is not adequately evaluated and concludes too strongly, then follow-on work will struggle to improve on that baseline. One paper with overly optimistic claims and results can jeopardize future research in the area.

Here, we will discuss some of the best practices for writing the evaluation section in a security paper:

- Comprehensive and valuable dataset play a big role in helping the reviewers to evaluate the evaluation section.
- An evaluation section must evaluate the work against other related works and perform a fair comparison against competing solutions.
- A reviewer should understand the performance impact of the work from their evaluation section.
- Reviewers do not expect a rigorous evaluation for a novel problem because no one has ever done this before, and there is no ground truth to compare against.