

# The Five (or Four) Paragraphs of a Successful Introduction

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The basic components of a good introduction for a research paper.

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*By Niklas Elmqvist, University of Maryland, College Park*

We're in full deadline rush for [IEEE VIS 2018](#), so I can't believe I am taking time out of my writing schedule to write this blog post! Tenure does do terrible things to a person. On the other hand, this year I am working with several new students who for the first time are writing for VIS (or, indeed, a research paper altogether), and I have found myself having to repeat the same basic guidelines about introductions several times. I figured that I might as well write this once and be done, henceforth referring my students to this post instead of repeating myself.

First, some disclaimers. As always, my blog represents my opinion, and there are surely many opinions on the right way to compose an introduction. Feedback is welcome, but I am likely not going to change my opinion. Second, I am a huge believer in introductions, and I am plotting to at some point write a big blog post on the "art of introductions". This is not that article. This is just a short and sweet list of the paragraphs that go into my ideal introduction. And third, I may very well be outing myself in any double-blind review scenario, because now you may be able to recognize my way of writing intros. On the other hand, this is hardly rocket science, and a lot of people write intros with this basic structure, so I'm probably safe.

With that out of the way, let me tell you how I always (with a few exceptions) structure my introductions into five, or sometimes four, paragraphs:

- **Paragraph #1: Problem Statement** – Explain the problem that your paper is addressing. Know your audience, so please don't start at too basic of a level. You want to get to the problem as soon as possible. You can probably afford a sentence or two giving background, but you should be zeroing in on the problem statement pretty quickly. Be specific and add citations if you can, but at the same, don't turn your introduction into a

miniature related work section. Also, try to offer at least one concrete example of this problem (examples are always good).

- **Paragraph #2: Proposed Solution** – With this gaping hole in the literature and a big, bad problem to solve, the second paragraph is where you get to describe your brilliant solution. Remember to be specific and to actually describe your technical approach (likely at a high level, but still). It is not enough to say that your solution will solve the problem, you have to give enough detail that a reader can understand the gist. In other words, don't talk around the contribution ("it's the best!"), talk about the contribution.
- **Paragraph #3: Validation and Applications** – This is science, so it's not enough to have a neat idea, you also have to validate it. Validation takes many shapes and forms, but the third paragraph is where I generally explain which specific validation mechanisms we used for this paper and what the results were. Don't forget the last part, the results! This is not a mystery novel. The reader deserves to know the results upfront, they are not supposed to have to wait until they reach the end of the paper to find out who the killer (technique) is. You should absolutely **spill the beans** here! Also, sometimes I add information about applications for the work in this paragraph, as this is often a form of validation in itself. These applications also serve as concrete examples.
- **Paragraph #4: Contribution** – Lest the reader forgets, or lest it is not clear from the prior paragraphs, I tend to use the fourth paragraph to explicitly enumerate the contributions contained in the paper. While this may seem obvious and redundant to you, remember that you are not a reliable source on your own work: things that are obvious to you are likely not obvious to the reader. Don't force the reader to hunt for your contributions. Instead, just write them out, one at a time. I often end up writing this paragraph something like this: "The contributions of this work are the following: (1) a basket weaving technique that [...]; (2) an implementation of the basket weaving technique that [...]; (3) results from a user study on the basket weaving technique that [...]; and (4) applications of the basket weaving technique to three example datasets, [...]"
- **Paragraph #5: Roadmap** (optional) – A roadmap paragraph explains the structure of the paper following the introduction. It often reads like this: "The remainder of this paper is structured as follows: Section 2 gives the related work on weaving, wicker and rattan containers, and general basket weaving. Section 3 proposes our new basket weaving technique. Section 4 [...]" Opinions are split on whether you need a roadmap paragraph; for example, some people **hate** them and think that no one reads them, and thus should be cut. I tend to think they can be useful if your paper is somehow different from the norm.

Having said that, the roadmap paragraph is often the first thing I cut if I run out of space. You be the judge.

And that's it. There's plenty of material to discuss with regards to introduction, including the elusive concept of story, the role of the introduction in shaping the research (even before the research is finished!), and methods to write compelling and engaging introductions. I'll try to get to those topics some other time.

## **Niklas**

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