How to Write a Paper for SIGGRAPH

James F. Blinn

It's that time of year again. Snow is beginning to fall (I hear by rumor). Gold lamé pine trees adorn the shopping malls. Little fat men run around in red suits. Jack Frost nipping at your toes. That's right folks...it's SIGGRAPH paper deadline time. I thought that this month I would give my observations about the SIGGRAPH publishing process and what seems to get papers accepted and rejected. This comes from my experiences in writing papers as well as reviewing papers on the Technical Program Committee. I hasten to point out that what appears here is only my own viewpoint and not the official policy of SIGGRAPH.

History

In the early days of computer graphics the field was so new that it was not really considered a valid academic discipline. People wrote programs and solved problems but often didn't consider these solutions something you would really publish. After computer graphics became more respectable, people went around finally documenting and publishing things they had been doing for years. Many of the earlier papers were written after the ideas had had time to incubate and mature. In my own personal experience, on several occasions I did something, waited a year or two (OK, I'm lazy), found a better way to do it, and then published. For this reason, the first paper on a subject usually presented a fairly refined solution.

Now days computer graphics is positively fashionable. There are university professors whose tenure depends on publication in this field. People are so eager to publish and so worried about being scooped that as soon as they get the germ of an idea, they write it up and trot it out for publication. Then, the following year, when they have had time to rethink the problem, they come up with the "correct" solution and submit a revised paper. This time it's rejected because the SIGGRAPH committee says "We've seen this before." The result: The half-baked idea gets printed, and the better idea doesn't. I don't know how to solve this problem.

There is another practice from the Middle Ages that I am happy to see disappearing. When SIGGRAPH had not yet established its reputation as the place to publish, the better papers accepted by SIGGRAPH were forwarded to Communications of the ACM for publication there. Since CACM doesn't want to be a reprint service, these papers were
not allowed to be in the SIGGRAPH conference proceedings.

This has led to some curious incidents. For example, in 1978 I wrote a paper on a scan-line algorithm for rendering patches which was accepted by SIGGRAPH. Since they especially liked it, they forwarded it to CACM (yeah!) ... and CACM rejected it! (Ouch!) And they weren't kind about it. (I remember reviewers' comments like "How dare you send such rubbish to CACM?") Whenever I tried to revise the paper according to the reviewers' comments I got so depressed that I put it right back on the shelf again. Meanwhile, IEEE was publishing a volume of reprints of interesting papers, edited by John Beatty and Kelly Booth, and asked to include mine, thereby reprinting the as yet unpublished paper. Meanwhile, Jeff Lane, Turner Whitted, and Loren Carpenter had come up with other algorithms for solving this same problem. Ultimately the four of us were going to put together a joint paper for CACM, but I was so discouraged that I withdrew my part. The other three were kind enough to include a brief description of my technique but didn't go into any detail. Finally, when IEEE published the second edition of its reprint volume, it replaced my paper with the more up-to-date Lane et al. paper. As a result my algorithm now doesn't appear anywhere.

This is not an isolated incident. Similar things have happened to several other authors. I am happy to see that now days papers accepted by SIGGRAPH are published by SIGGRAPH.

The canonical paper
Let us now look at the structure of a typical paper. A paper for SIGGRAPH generally consists of three parts: the beginning, the middle, and the end.

The beginning is where the author states some problem and offers a solution. Typically the solution will be a generalization of some current technique, a specialization of a current technique to make it faster, or a faster way to generate the same results. Then come some historical references about how people have either approached the problem in the past or totally ignored it.

The middle is where you give the problem solution. This should contain enough detail for the reader to be able to reproduce the results. In particular, you should endeavor to make the information useful to someone who does not have your exact system. Emphasize details that are exportable to other situations.

The end is where you point out obvious extensions and generalizations of the technique. This is where you can stake your intellectual claim to any and all generalizations of the technique.

The review process
The review panel gets about 140 papers, of which it must pick about 35, i.e., one out of four. The papers are first divided up among the 15 or so senior reviewers. These people then find two or three other people to review the papers, usually those who have done similar work in the past. Each paper is given a net score by the senior reviewer based on the reviews. The senior reviewer sends the scores to the Technical Program chair. The scores for all papers are then sorted in preparation for the meeting of the program committee, where the final decisions are made. Usually the top scorers are accepted without much discussion. Likewise, the bottom scorers are rejected unless one of the senior reviewers thinks a paper has special merit that was missed by the reviewers.

The big decisions are about the medium scorers. The committee members are very conscientious about being fair and not rejecting a paper for trivial reasons. But they
are also sticklers for quality. To get in, you have to be better than you think you have to be. The committee is supposed to accept or reject papers on the basis of what it has actually received, not what it imagines the author could fix it up to be. There are always discussions about whether to accept a poorly written paper with great ideas instead of a well-written paper that gives a good, accessible view of existing ideas.

Advice

I have seen many papers go through this mill. Gone are the days when most anything with color pictures or a lot of equations would probably get in. Here are some of the things that are most likely to get papers rejected, sort of in order of frequency.

• Not new or different enough:
Obviously, SIGGRAPH is not in business to republish existing results. Sometimes someone will innocently rediscover and submit an idea that had been thought of 10 or 20 years earlier. It's not plagiarism; the submitter just never heard of the earlier discovery. If it was an early enough result, it might never have been published but just passed around by word of mouth. You gotta know the territory. The most common phrase heard at technical committee meetings is “didn't so-and-so do this 10 years ago?” Now if you have referenced so-and-so's paper (or at least shown knowledge of the technique) and explicitly told why your idea is different, you may head off such objections. Which leads us to...

• Improper references: Here is where you have to have done your homework. While making sure that someone else has not already solved your problem, you must also make appropriate reference to those ideas that are precursors to your idea. I have actually reviewed papers where the author only references his or her own previous work. This tends to evoke a very negative emotional response in the reviewers. And furthermore, when you refer to Obscurowich's algorithm but don't describe it in your paper, you must give a (findable) reference for those of us who have never heard of Obscurowich.

• Too little detail:
Some papers will show a lot of pretty pictures and make a lot of claims about the applicability of an algorithm, but a reader simply cannot figure out how the author did it. The common test applied by the committee is “could a reasonably intelligent graduate student replicate these results just from the description in the paper?” Remember, SIGGRAPH is not an advertising agency. You can't just write a lot of hype and say the details are proprietary. I have seen papers rejected because they were about some mathematical simulation of lighting but did not contain a single equation.

• Unsupported outrageous claims:
Many papers will claim great speed advantages for their algorithms. The trouble is, the authors have never actually compared their algorithms with anything else, or only compared them in a trivial way. Someone will lovingly craft an implementation of an algorithm over a period of months or years. Then the would-be author feels it must be compared with something, so a weekend is spent tossing together a crude implementation of some older algorithm. Lo and behold, the proposed algorithm is faster! This simply won't do. Speed claims are an emotional topic. I have seen (verbal) fights break out in conferences over this. When you say your algorithm is faster, it makes people want to challenge you. A speed claim must be supported by some more controlled experiments and theoretical justifications showing why it's faster.

• Bad English:
Kids today don't know how to write good. If English is not your native language, have someone who does speak it check over your grammar and usage. The committee has also received (and almost rejected) some startlingly bad English from native speakers. This might seem like nit-picking, but it is surprisingly difficult to read such stuff. Your eye is continually being snagged by these bloopers, and after a while you give up. Remember, the panel is looking for reasons to reject your paper (they have to get rid of three-quarters of them). Don't give them one.

Trends

Multidisciplinary papers are starting to become common. An example would be “Applications of Dynamics Simulations to Computer Animation.” This situation raises its own set of questions, since importation of ideas from another field usually starts with the simpler ideas. Should a paper be published if it brings in trivial results from some other field but is new to computer graphics? It's good for CG people to know about other fields, but is SIGGRAPH the place for tutorials?

There is always a cry for good applications papers (Editor's Note: Especially from this magazine). These basically take the form of “How I used CG to solve this real-world problem.” If you have done such work, SIGGRAPH is interested in hearing from you.

In the early days, when all the easy problems hadn't been solved, the research was devoted to algorithmic tricks for finding a cheap, approximate solution for complex problems (an example of this would be bump mapping). Now days it seems we have passed the era of approximations. If you want to simulate second-order diffuse reflections from extended light sources in variable-density fog, there seems to be no alternative to following millions of light rays around the scene. Rendering research consists of finding more and more subtle lighting effects to simulate by using more and more brute force.

In fact, it seems that the hardest problem in computer graphics is finding something that hasn't been done already. That is your challenge.