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How to write a research paper

Here are some notes on how to write a research paper that will be accepted.

- Work on a good problem.
  - Try to find a problem that will still be a problem in a few years (to prevent you from being scooped). Find a problem that others would be interested in the solution.
  - Try all of the existing solutions. Know whether they work and why. Don't just try to be different for the sake of being different.
  - Design a hypothesis about what would make demonstrable progress. Make it clear. Design an experiment to critically test the hypothesis. If the experiment is well designed, you should not have a stake in the success or the failure. If you can do something better, that is good. If not, then it is even better, as you may be able to generalize why.
- Start writing the paper early:
  - You should have all of your results ready, and be able to give a "poster overview" of you paper two months before the submission deadline.
  - You should have a complete first draft one month before the submission deadline.

  ...yes, it takes that long to write a clear paper.
- Make sure there is a reason for them to accept it.
  - There should be demonstrable results that show that it is an improvement over existing proposals or can do something that others can't. Be very clear about what the result is. After the reviewer reads it, they should be able to explain what the result is and why it is important to publish.
  - It should be clear what the evidence for your results is.
- Write clearly.
  - Tell a story; a paper should have a beginning, a middle and an end. It should motivate why someone else should be interested in this work, build the foundations needed to explain the contribution, and evaluate the contribution.
  - Motivate top-down; build bottom-up. Motivate from your top-level goals. How does this work help towards solving the main goal? Build on solid foundations. Make sure that everything needed to understand your contribution is well defined. Motivate before you explain. (Therefore the motivation needs to be in plain language, and not use technical words).
  - Introduce only enough formalism that is needed to understand the result. Only

introduce formalism if it makes the explanation clearer.
- Make the result reproducible. Someone should be able to reproduce what you do, based on your writing.
- Stand on the shoulders of giants. Newton said: "If I have seen further it is because I have stood on the shoulders of giants." Build on other's work, and give them credit for what they have done. Assume the people who have worked on this before are your reviewers. Don't denigrate their work. Give credit where credit is due.
- Don't assume readers will understand your notation. Explain it.

...of course I can't guarantee that it will get the paper accepted.

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