

Key Questions for a Researcher

James Friend 30 May 2013

Significance

Ninety percent of everything is crap. — Theodore Sturgeon

1. What are the key novel findings of your research, placed in the context of others' work?
2. What is their impact on your field and on society?
3. By what means did you communicate your findings, and, in particular, what evidence can you provide of their significance (i.e., publication in highly cited journals)?
4. What is the amount of new research work that can be pursued as a consequence of using your findings?

Understanding

If you can't explain it simply, you don't understand it well enough. — Albert Einstein

1. Can you explain the physical significance of both your results and the methods used to find them?
2. With your method(s), can you explain the physical meaning of the details, i.e., of the equations' terms, the boundary conditions, and so on?
3. What assumptions are made in expressing and using each method, and what are the physical implications of these assumptions?
4. What are the sources of error in each of your methods?
5. Are these reduced to an acceptable (statistically) level, i.e., by repetition, and have you provided evidence of this?
6. Why are you convinced of the results of your method?
7. Do you base your discussion and conclusions on sound statistical interpretation of your results?
8. Does your data support your conclusions or are you *conjecturing*?

Effort

Be master of your petty annoyances and conserve your energies for the big, worthwhile things. It isn't the mountain ahead that wears you out. It's the grain of sand in your shoe. — Robert Service

1. Did you present your results in the most cogent, succinct fashion possible?
2. Is there any more you could do here — as in nondimensionalisation, scaling, data collapse a'la von Karman, and so forth?
3. If so, why hasn't it been done, and does the omission jeopardize your work?
4. Did you choose the brute force route when it would have been better to pursue a simpler path because the answers you seek are not reliant on the details?
5. Is the amount of work put forth competitive internationally? How do you know? How did you make the comparison? Papers? Code? Experiments?

Coherence

Everyone hears only what he understands. — Johann Wolfgang von Goethe

1. Does your work, taken altogether, clearly address a specific aim?
2. How do your findings address the problem posed as an aim of your thesis?
3. Have you spent the time needed to **think** about your work in the context of your aims and role?