DO'S AND DON'TS
IN
OBTAINING FUNDING
FOR
GEOTECHNICAL ENGINEERING RESEARCH

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Objective

This document is meant to be a collection of observations on the do's and don'ts in obtaining funding for geotechnical engineering research as seen by experienced researchers, as well as a collection of contact information on the geotechnical research programs in the country. The goal is to help younger geotechnical engineering researchers to optimize their chances of success when competing for funded geotechnical engineering research.

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DO'S

1. One of the main reasons for seeking research funding is to advance the state of knowledge and to teach and disseminate the newly discovered knowledge. Do maintain the beautiful and delicate balance between teaching, research, and service.
2. Do optimize your chances of success by knowing (asking) the probability of success for each research program. NSF may operate at a probability of success of about 15% overall but success varies widely across programs. Some State DOTs operate at 33% or even 50% success rates.
3. Do consider the prestige associated with obtaining projects from various programs. In that respect, NSF and, to a somewhat lesser extent, other nationally competitive research sponsors carry a lot of weight on your resume and for tenure and promotion.
4. Do optimize your budget considerations by studying the typical yearly budget for a given program. For example, the budget for an NSF proposal is typically about $70,000/year, for an NCHRP proposal from about $100,000/year to $200,000/year (fixed by the RFP), for the Texas DOT about $110,000/year.
5. Do optimize your overhead considerations. The overhead rate associated with each proposal within your university system can vary quite a bit: at one university this rate is 45% for most proposals but is only 10% for State DOT proposals. Find out where the overhead goes at your University. How much comes back to your Department? Your laboratory? Your personal overhead account? Do you have to budget directly for office expenses, or is that covered by the overhead charges?
6. Do try to work in research areas where the competition is not too stiff. Some research areas are saturated with researchers, some areas are not. One could conceivably do a search to identify the research interests listed by professors on their university web sites and get a feel for saturated and unsaturated fields of geotechnical research. If you are working in a "crowded" area, consider inviting someone more strongly established in the field to collaborate, serve as a paid advisor, or review your proposal.
7. Do identify local (your city, your state) geotechnical problems that need attention. In Texas, for example, foundation problems for residences on expansive clays are significant, yet relatively few researchers work on improving the situation.
8. Do get involved in consulting early in your career by approaching the local geotechnical firms and government organizations and expressing interest in helping. Many positive things will come from it. First you will make more money, second you will learn the trade, third you will have better stories to tell in the classroom, fourth you will learn what tough problems need to be solved in research. However, be clear about your Department's attitude toward consulting (what they do, as well as what they say), and be sure that you use the consulting to benefit your research; consulting at the expense of research activity and production can lead to denial of tenure and promotion.

9. Do join local chapters of professional organizations and attend meetings. Get to know your local professional community. Invite professionals to give seminars or guest lectures.
10. Do seek opportunities for collaboration with your colleagues at your home institution. This helps them get to know you, and you may be surprised at the opportunities for interdisciplinary growth that appear.
11. Do seek to integrate teaching and outreach with your research. Consider ways to enhance learning within your University, but also to teach practicing professionals, grade-school and high-school kids, and the general public when appropriate.
12. Do walk the fine line between being protective of your ideas in the early stages of development and exchanging information with your colleagues for the benefit of everyone. This is a tough one. You may share something with somebody who will use it without reference to you. Most of the time it is not intentional, they simply forgot where they heard it, but they will remember that you are a pretty sharp person.
13. Do consider soliciting a mentor. Choose someone whose work you appreciate and respect, someone who is not too much farther along than you are, and whom you can trust, and ask that person for feedback.
14. Do volunteer to review proposals, particularly at NSF. This is a great way to quickly get an understanding of what proposals look like, and what sorts of proposals are funded.
15. Do try to support your proposal concept or idea with either your own preliminary data or data from the literature that you have analyzed. Reviewers typically are more inclined to accept a novel idea if the investigator has done a good job at convincing the reviewer that the research will be successful in meeting the stated objectives. “Pie in the sky” ideas generally won’t be funded if not supported by supporting data. Providing such data may take more time initially, but will be well worth the effort in the long term.
16. Do proof-read your proposal carefully, or have someone else do the proofreading. Spelling and grammar do count, especially in professional life-research proposals, professional reports, response to RFP's, bids, etc. Too many typos can give the impression you do sloppy work. Reviewers may not catch all your technical errors, but they will notice all the typos.
17. When you receive comments from reviewers on one of your proposals, you may be frustrated: 1. stay cool, ; 2. let the proposal sit for one week, ; 3. accept the fact that while the peer review system is the best system we have, it is not a perfect system, ; 4. accept the fact that reviewers may well know less than you do about the topic and might even make fundamental mistakes in their comments, ; 5. do not abandon the proposal if you are convinced that it is a good one and if you really believe in it, ; and 6. concentrate on improving the proposal (many proposals are funded after multiple submissions, others end up being funded by an agency which was not the first one you approached.

DON'TS

1. Don't start writing an unsolicited proposal until you have discussed your idea and the size of the budget with the director of the research program that you intend to approach. This discussion will help you evaluate your chances of success and orient the research in a direction that is optimized for the intended research program.
2. Don't forget the research that comes from consulting work. Some of the most successful geotechnical professors in the world are people that combined university work and consulting work (e.g.: Peck, Kerisel, Jamiolkowski, Poulos).
3. Don't forget, if appropriate, to involve industry in your proposal. In that respect, industry is much more likely to participate through in-kind contributions than by giving you cash. With a little bit of imagination this can be very helpful and enhance your proposal. For example ADSC is much more likely to participate by installing some drilled shafts at a site than to give you $10,000 cash.
4. Don't limit yourself to traditional geotechnical research topics. Keep a sharp eye on neighboring fields such as structural, construction, hydraulic, environmental, pavement, offshore. A lot of important geotechnical engineering research work needs to be done at the boundaries with other fields. For example scour is a field where a lot of important geotechnical work needs to be done to enhance the work accomplished by hydraulic researchers.
5. Don't limit yourself to traditional geotechnical research techniques. Look at the most successful departments in your university and go visit some of the faculty. You might discover a technique routinely used in, say, agricultural engineering, but unknown to geotechnical engineers and yet with great potential.
6. Don't worry too much about copycats. The best way to defend against them is to keep innovating faster than they can copy. The most dangerous copycats are those who get into your field and do a much better job at conducting the research than you did. Although sometimes unpleasant, that is healthy competition that one should learn from.
7. Don't do research in a field simply because there is money in it. Sooner or later, this leads to frustration both on your part and on the sponsor's part. Try to work in fields that you really love and are excited about.
8. Don't put all your eggs into one basket; keep some diversification in your research program.
9. Don't overextend yourself. Pick the areas in which you want to work, and pursue them.
10. Don't shun "entitlements" and "earmarks" that your state or local politicians might throw your way. But the temptation may exist to let such funding make you lazy; take it upon yourself to build quality control and accountability into the work plan.
11. Don't submit a mediocre proposal in order to meet a deadline. This is especially important when submitting unsolicited proposals that are reviewed by a panel (e.g., NSF). A poor proposal can affect a reviewer's opinion of the overall quality

of your work and may bias that review with respect to future submissions. Plan ahead, and repeatedly review your proposal before submission.

12. Don’t give up on a proposal idea if it is not accepted on the first submission. Consider the reviewer’s comments and try to be objective with respect to the perspective of the reviewer. Such objectiveness is often more difficult for younger researchers who typically aren’t familiar with the system and who might become defensive with respect to criticism of their work. The best approach may be to read the reviewer comments, let them sit for a week or more, and then come back to the proposal with the mindset of trying to revise the proposal to make it stronger from the perspective of the reviewer.

SOME WEB SITES FOR GEOTECHNICAL ENGINERING RESEARCH FUNDING

National Science Foundation
http://www.nsf.gov/od/lpa/news/publicat/nsf013/eng/cms.htm#ghs

Federal Highway Administration
http://www.fhwa.dot.gov/bridge/geo.htm

USAE Waterways Experiment Station
http://www.wes.army.mil/SL/gsl.html

ADSC, The Intern. Assoc. of Foundation Drilling
http://www.adsc-iafd.com/schol-page.html

The Geosynthetic Materials Association
http://www.gmanow.com/

Army Research Office
http://www.arl.army.mil/aro/research/index.htm

Office of Naval Research
http://www.onr.navy.mil/education/default.htm

Air Force Office of Scientific Research
http://afosr.sciencewise.com/f00026.htm

Environmental Protection Agency
http://www.epa.gov/ebtpages/research.html

National Cooperative Highway Research Program
http://www4.trb.org/trb/crp.nsf

Department of Energy
http://www1.pr.doe.gov/gdtoc.html

Department of Defense
http://www.defenselink.mil/faq/pis/21.html

Electric Power Research Institute
http://www.epri.com/

State Departments of Transportation
See individual web sites for research opportunities