

2011 The Redbook

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S T A N F O R D C S 2 0 1 1

Computer Science Graduate Students
2011

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Dedicated to...

...the incoming class of 2011. Best of luck!

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0.1 WHAT IS THIS?

The Redbook is the attempt of a few PhD students to pass on bits of wisdom and frank advice to newer students in the hope that the next generation avoids their missteps. It lives online at <http://theredbook.pbwiki.com>.

THE BASICS

1.1 THREE THINGS TO KNOW

1. Academia is a business, and graduate student is a job title. From Azuma: “Academia is not the Real World and does not work in the same way that the ordinary corporate world does. However, it is a business nonetheless and as a graduate student, you must treat it that way. Graduate school made a lot more sense and became much easier for me after I realized this. If you think of graduate school as an ‘Ivory Tower’ free of politics, money problems, and real-world concerns, you will be severely disappointed.”
2. Remember you’re here to get a PhD. Especially if you come straight from college, the apparent lack of requirements may cause you to not take school seriously. Have fun, just don’t have *too much fun*. Have a plan for completing your degree in a timely fashion.
3. Acquire good advice by chatting with senior graduate students behind closed doors; they will be more open and honest.

1.2 YOUR FIRST QUARTER

What should I be doing in my first few months at Stanford?

In your first quarter, *don’t drift*. Starting from 2010, the CS department has a rotation system, which is a great opportunity to experience multiple advising styles and re-

search group dynamics. Set up your winter (and spring) rotations as soon as you can in the fall quarter. Attend the CS300 seminars to hear about current research projects. Here are some tips from last year's class on how to make the rotation a valuable experience and find the right advisor/group to align with permanently.

- Meet with your rotation advisor (and graduate student mentor, if you have one) in advance of the rotation to work out the details of your project. One quarter is not much time; you want to hit the ground running, rather than spend a few weeks defining what it is you will actually be doing.
- Work on a concrete project that is already running, rather than having an “exploratory rotation”. It is better if both you and the advisor clearly understand the timeline and deliverables. Establishing realistic goals is also important, particularly in minimizing the amount of “bleed over” of rotation projects into subsequent quarters.
- Try to work with a more senior student during the rotation. You will get more direction, mentorship, and an additional conduit for learning about what it is really like to work for a particular faculty member. Having two or more rotation students work together on a project can also be effective.
- It can be valuable to do one rotation with a faculty member in an area that is a little out of your comfort zone, but still relevant to your interests. Working with someone outside of CS is possible, but meet with someone in the CS student services office to figure out how you will get funded.

- If you are thinking about aligning early, chat with Prof. Mitchell or a staff member in the CS student services office first about the decision.

Make yourself aware of the PHD requirements:

<http://www-cs-students.stanford.edu/phd/>

These include completing your Breadth Requirements by the end of your second year. Many students get credit for classes they have already taken as undergrads. On the other hand, taking classes in the Breadth Requirements can be a good opportunity for learning new topics.

1.3 ADVISORS

1.3.1 *Choosing an Advisor*

The choice of advisor is by far the most important decision you'll make, by any order of magnitude.

It will completely control your grad school experience and will affect your post-grad-school career, especially if you want to continue in academia.

OTHER STUDENTS' EXPERIENCES. The best way to learn about an advisor is to chat with current members of that professor's group behind closed doors. They'll give you the real information about a professor, from inspiring tales to horror stories. Both exist. Ask them about the topics below.

FUNDING. When choosing an advisor, you need to understand their funding situation. Don't be afraid to discuss this candidly—it's the only way to avoid misunder-

standings. Without funding, you will be supported by the department, which means you have to be a course assistant (CA). You don't want this to happen because CASHips take a considerable amount of time away from research. A 50% CASHip covers your tuition and stipend, but generally requires ≈ 20 hours per week of work from you. Although 25% CASHips exist, the common wisdom is that you will be working almost as much as the 50% CA for less money. Another source of funding is industrial fellowships (Microsoft, IBM, NVIDIA, ATI). The department usually controls who gets to apply for these fellowships or it is limited to one applicant per professor.

Keep in mind the following questions: Are there active grants that can support your specific research project as a 50% RA? How many quarters of support are these grants? Are they renewable? What is the criteria under which they can be renewed? Are your professors actively writing more grants for the future? If not, will they help you write a grant (it's good practice, in any case)?

Have a candid talk with your advisor to avoid being forced to CA quarter after quarter while struggling to produce research. If this does happen to you and you still graduate, however, turn those lemons into lemonade by earning a Distinction in Teaching.

ADVISOR AGE. A young (pre-tenure) advisor will be hungry for results and will be closely involved with your work. They are likely to closely monitor the relevant conferences and will be well aware of related work. This may appeal to you. The downside is that they may fail to make tenure, which could screw up your grad school career.

An old advisor will have fame, experience, and contacts. They are a safer bet than a pre-tenure professor since they

aren't going anywhere, and many have reliable funding. On the other hand, older, successful professors sometimes aren't hungry for success anymore, and may be only superficially engaged in the research of their students, leaving them feeling adrift.

RECENT PUBLISHING RECORD. If you want to pursue an academic career at a top-tier school, you'll need several high-quality first-author papers. Look at how many papers the professor's current students have published in the past few years, and at what conferences. This is an indicator of where the professor stands with respect to the earlier point: are they still hungry to achieve success, or are they resting on their laurels?

Aside from this question of hunger, professors also differ from each other with respect to how they approach conferences; some publish papers three times more often than others. Of course, paper quality matters more than quantity, so use CiteSeer, ACM Digital Library, or Google Scholar to see how often the professor's recent papers are cited, as an indicator of how well their work is received by their research community.

ADVISING STYLE. Many will suggest you ask if a professor is "hands-on" or "hands-off." Unless you lean strongly toward one or the other, stick to other metrics when picking an advisor. Be wary of professors at either extreme (talk to senior grad students).

GROUP COMPOSITION. Find an advisor with several current students, since their body of knowledge and experience will be of great benefit. Many groups work like an apprenticeship: young students join existing projects to learn from the older students, and, as they get more experience, they will strike out in their own directions.

If all the current students are near graduation and there are no younger current students in the pipeline, this could be a problem.

Be wary of advisors with large groups (15+ students), because you'll get much less face-time than with only 5–10 students.

INDUSTRY CONTACTS. Industry contacts are key in systems-related fields. It is often hard to do compelling research in a systems area without collaboration with industry partners. Do the professor's students work for companies that excite you? Do the advisor's current students often do consulting or summer internships in industry?

1.3.2 Switching Advisors

We do not recommend switching advisors after your second year, but it has been done. If you want to switch, simply have a candid conversation with your advisor; be honest and try to leave on peaceful terms. Notify the PhD Program Office if you switch advisors.

1.3.3 Talking with your Advisor

The role of your advisor is to provide 'advice'. If you disagree, talk about it. Disagreements may arise regarding research direction, summer plans, or even funding.

Talk to your advisor often, at least once a week. There are several topics you may need to discuss during your PhD:

- *Be explicit about expectations.* How often does your advisor expect you to publish? Specifically, what about the upcoming FOO-BAR conference? If you

know your advisor's expectations, you are less likely to disappoint.

- *Make meetings count.* Come to meetings prepared with a plan of what to talk about, questions, etc., and leave with a clear idea of what you'll do before the next meeting.
- *Paper author order.* Credit for a research paper is determined by author order; some groups encounter strife because there is no clear ordering policy. Discuss it with your advisor ahead of time, rather than waiting until the paper is complete. Likewise, beware of working on projects with students on the same graduation schedule as you, as you may both want first authorship on the same paper. When you are a senior student, work with junior students to avoid these problems.
- *Theses from large projects.* Large, multi-year projects can involve an unknown number of graduate students, but usually produce a finite number of theses. If you get involved in one of these projects, discuss what part of the project can be used for your thesis. If that can't be determined within the first few quarters, you may want to find a new project.

1.4 FUNDING

Funding is vital. Have candid talks with your advisor about it so you can ensure support through your entire graduate career with minimal distraction from your research. Your happiness and progress are correlated with funding. Grad students with funding tend to be pretty happy, but, without funding, grad life can be pretty miserable. Most

students find their thesis topic by working in an area or project that provides them funding.

Every quarter you need 50% of support. Funding comes in percent units, usually 50% or 25%. Ideally, you are a 50% Research Assistant (RA), funded under a grant from a government agency (DOE, DOD, NSF) or a private organization, and working on an interesting topic.

You may be lucky and have a fellowship from Stanford, NSF, NDSEG, Hertz, or some other group that covers you for three to five years. If you're really lucky, you have two fellowships, one deferrable, like NSF and NDSEG: defer NSF for two years, and get five years of coverage. If it's your first year and you don't have a fellowship, you should apply for NSF, which is still open to graduate students in their first and second year. There are also one year fellowships from companies like Microsoft, Intel, ATI, NVIDIA, and Yahoo. Other fellowships are offered by IBM, the Ford Foundation, NPSC, NASA, LLNL, and AAUW.

If you're not on a grant or fellowship, then you're a Course Assistant (CA). Being a CA requires ≈ 20 hours a week of work. Do not be a long-term CA. You will be unable to do enough research to keep your advisor happy, and so you continue on as a CA in a negatively reinforcing cycle. If you have to CA, ask the senior grad students which courses require less than 20 hours of work. A rule of thumb might be to avoid intensive programming project courses like Operating Systems.

One requirement of the PHD program at Stanford is to complete at least 4 units as a course assistant (CA) or teaching fellow (TF) for courses in Computer Science that are numbered 100 or above. For more information, see the PHD requirements.

1.4.1 Grants

Grants are given to your advisor and your advisor employs you as an RA. It is rare, but not unheard of, for a professor to cut a student's funding. (I believe they are required to give a one quarter notice so that you have time to scramble to find other funding.) This is something that should not happen if you are having candid talks with your advisor about your progress.

You should know what grant you are on, if it is renewable, and what the criteria are for renewal. You should also know if your advisor is applying for other grants from the NSF, DOD, DOE, or whomever. Try to help write the grant. If you want to be faculty in the future you should know how to write a grant. If your advisor is not writing a grant, you should be concerned. In this case, ask your advisor if they will help you write a grant. You can go to the NSF website and look at the calls.

1.4.2 50% vs. 25% CA

Avoid a 25% CA (Course Assistantship). You usually do nearly the same amount of work as a 50% CA, which fully funds you for the quarter. As a 25% CA, you'll need to find another source of 25% funding (possibly a 25% RA with a professor who is not your advisor).

1.4.3 50% vs. 25% RA

Most RAships are 50% (except in the summer, when they are 90%, which is $1.8\times$ your normal salary). You are usually an RA under your advisor. Sometimes, people take an RA position with someone else to have support. If this

happens to you, minimize the impact on your research by finding an RA position that is somewhat related to your research (e.g., kickstart a collaboration between your advisor and another professor). Sometimes, an RA under another professor may have you writing code for some group in the university that needs it. Students in the EE department tend to know a little more about doing RAShips not for your advisor, so try asking one of them.

1.4.4 Fellowships

A fellowship can be a double-edged sword. It's great to have long-term funding with few or no strings attached, but the lack of quarter-to-quarter accountability for funding can often lead to drift, especially in the case of a hands-off advisor. Celebrate, but beware! A fellowship can enable you to work with the advisor you want to work with, because advisors tend to welcome a student who comes with funding.

1.4.5 Consulting

Officially, you may consult for other companies for one day a week. It's a nice way to make money and may not require too much time on your part.

1.4.6 Summer Internships

Internships are a great source of extra spending money, a valuable way to hook into industry research, and a way to get ideas for a thesis. Spend at least one summer at an industry research lab early in your graduate career. Students have taken their summer internship at an industry research lab (e.g., Microsoft Research) and turned it into

a thesis. Your advisor may have contacts and be able to recommend internships. Some good places are Microsoft Research, Microsoft Research Asia, Yahoo Research, Intel Research, HP Labs, PARC, or your advisor's company.

1.4.7 Unrestricted Funds

Grants are reserved for particular purposes and projects. So, you (usually) can't get money from the FOO pot unless you work on the FOO project. If you are lucky, however, your advisor may have some unrestricted funds to cover you. Unrestricted funds are often coveted, so don't rely on this.

1.4.8 TGR

If you're in your last year, you can make your fellowship money stretch further by going TGR, which reduces the amount of tuition. You can technically only stay on TGR for a year, but this rule has not yet been enforced by the university.

1.4.9 Graduation Quarter

If you need just one more quarter, the University Registrar's Office allows you to register for a graduation quarter which costs very little (\$100 plus fees). If you've saved up some money and really are on your last quarter, you can take this option. If it proves not to be your last quarter, you can apply (or reapply) for TGR status.

1.5 HOW TO DO RESEARCH

An undergraduate degree is about doing well in classes: someone tells you what to do and how to do it. In graduate school, you are solely responsible for setting your daily schedule, finding the right project to work on, and figuring out how to accomplish it. This uncertainty may contribute to a stressful existence while you adjust. There may be long stretches of time when you doubt whether your work will be fruitful.

What follows are tips on how to avoid this uncertainty.

1.5.1 *Read Papers*

It is critical to read *lots* of papers in your area, and specifically on your research topic. What if you don't like to read papers? Then, at the very least, *skim* lots of papers.

1.5.2 *Talk With People*

Conversations make you smarter. They help you look at problems from different perspectives, hone your arguments, refine your terminology, explore alternative solutions, and uncover existing approaches. Chat with professors, other graduate students (even outside your area), and anyone else who will give you the time of day. Not only will this improve your research, but more people will know you and what you are doing. Make sure you are listening at least as much as you are talking.

Bounce your ideas off other colleagues. If they like your work, great. If not, ask them why and improve your work based on their feedback.

1.5.3 Be Goal Oriented

When deciding on research projects, be goal-oriented. Do not waste your time working on projects that lead nowhere. Ask yourself, “Will this project lead to a paper? Which conference will I submit it to? Is it a chapter in my thesis?” Do not work on a project simply because it’s cool.

1.5.4 Set Deliverables and Discuss with your Advisor

A project will span weeks, if not months or years. It is easy to become distracted or discouraged. Set weekly goals. Turn these goals into deliverables that you can share with your advisor and colleagues. If you’re going the wrong direction, the early feedback will help you get back on track.

1.5.5 Time Management and Procrastination

Some (read: many) of us find it challenging to manage our schedules. If you really need to get work done, consider techniques to avoid wasting time. If you close your office door or wear headphones, fewer folks will bother you. If your office is too loud, consider switching offices or working in the campus libraries.

1.6 QUALS

Quals is the milestone exam that tests the “depth” of your knowledge in your area. Some folks take it their second year, some take it their third. Ideally, you should pass quals on your first attempt. Officially, it’s 100% OK to fail your first time and then pass your second. It’s possible but rare to take quals three times, but your advisor better

be loving your research, and you will go through a petition process. In the past ten years, no one has taken quals more than three times, and roughly two students have taken quals exactly three times. Students have left with a Masters after failing twice; other students have passed on the third try, generally based on whether their advisor likes what they are doing.

In general, orals are “better” than written exams; the questioner can tease out the answers, whereas on a written exam there is no back-and-forth. Form study groups and try your best to pass on the first try.

1.7 THE THESIS

Theses vary between disciplines and even advisors. Your thesis should be modeled after others in your area; grab some examples and discuss the structure with your advisor. One rule of thumb (in Graphics or HCI) is to have about 3 papers on a single topic, which then become the 3 main chapters of your thesis. One strategy for pushing ahead on your thesis is to present your advisor with a proposed outline. This allows the both of you to discuss what, if anything, may be missing from your research and can allow you to target your work so that you can graduate in a timely manner.

1.7.1 *Committee*

You will need a thesis committee. Make sure your reading committee will have time to read and sign your thesis. Pick committee members who will provide timely feedback and meet with them somewhat regularly to update them on your progress. You don't want them to be sur-

prised at your defense about the direction you are taking for your thesis! It is better to hear objections 12 months before your defense than the day of.

1.7.2 Defense

Your advisor shouldn't let you schedule a defense until you are ready. Most people defend after having written some (but not all) of their thesis. Schedule your orals two to three months in advance. Don't forget to bring food. Catering means one less thing to worry about.

1.7.3 Writing

Thesis lengths vary from under a hundred pages to as long as several hundred pages. Some advisors are comfortable with a "stapled thesis," which is merely the papers you've written with transition paragraphs between them. Other advisors want the thesis to stand on its own as a treatise on a subject; this requires rewriting.

HEALTH AND HAPPINESS

2.1 YOU ARE AN ASSET

A graduate student costs more than \$100K/YR to fund, including tuition, stipend, office space, computing equipment, and travel expenses. You are an enormous investment. A graduate student who is unable to do research (due to RSI, depression, or other physical or mental health issues) is a waste of that money. Your advisor is likely to accommodate your needs where your well-being is at stake. Recognize your value, and put your health above all else.

2.2 MENTAL HEALTH

A PHD can be a high-stress, low-social-interaction environment that can lead to a variety of mental issues, including anxiety and depression.

Keep in mind that if you're stressed or feeling worried about the uncertainty of grad school, other students are as well. You're not alone. Talk to other students about it, it will make you feel better. Counseling and Psychological Services (CAPS), an arm of Vaden Health Center, can provide additional help with mental health.

2.3 PHYSICAL HEALTH

Although we aren't medical doctors, we think that regular exercise is great for reducing stress (and much more!). Take advantage of the Stanford athletic facilities; apart

from the gym, there are classes in tennis, swimming, climbing, yoga, golf, volleyball. You also happen to be in the Bay Area: there is skiing a few hours away, surfing in Santa Cruz, hiking and climbing in Yosemite, and good weather year round.

Eat well. The free food around Gates is not the healthiest.

Speaking of free food, you should certainly subscribe to the `gates-food@lists` email list. Whenever free food is lying around Gates, someone emails this list with a description. Remember to bring your own plate.

2.3.1 RSI

You probably do a lot of typing, and you may develop RSI. Educate yourself about ergonomics. Consider getting an ergonomic keyboard (Kinesis Maxim or Goldtouch). Some students use Workrave which monitors typing and mousing behavior and reminds you to take breaks every once in a while. Students report that this has significantly improved their RSI. The default settings are appropriate if you're already experiencing pain (obey the limits set by the program). If you just want to be preventative, set it to be less strict.

2.4 ACTIVITIES AND SOCIAL LIFE

Join activities to meet people, gain life experiences, add structure to your life, and maintain good physical and mental health. At Stanford, there are student-run organizations for just about every interest (e.g., swing dancing, juggling, hiking). Top-notch instructors teach classes like golf, languages, social dance, music, photography,

and art. Some students play intramural sports, join larger clubs like Taekwondo or Wushu, join Stanford Outdoors clubs, or do various kinds of dance, including Viennese Ball or the SBDT.

If you live on campus, your residence has Community Associates (CAs) whose main job is to provide social activities for you. Rains has the most events, Lyman has many, and Escondido Village has some.

Stanford is located near a huge variety of off-campus destinations including San Francisco, Yosemite, and Napa Valley. The Graduate Life Office (<http://glo.stanford.edu>) can help you find information on specific activities.

Get to know people in your research lab and department. You will spend a lot of time with them. When your code is broken right before your thesis is due, these people will both want to help you and know how to help you.

Start meeting people early: you will only grow busier.

DEPARTMENT

3.1 PAPERWORK AND PITFALLS

There are several types of paperwork that matter. They generally deal with getting paid and completing your PhD milestones.

When you pass your Breadth Requirements, file your candidacy form so you get a pay increase. If you have some strange advising situation (e.g., your advisor is not natively CS or has a joint appointment with another department), make sure it goes through.

Before each quarter, secure funding. If you are RAing, sign a form with your advisor's admin.

When you near the end of your PhD, fill out a form for your Reading Committee, and one to schedule your Oral Examination.

During the last year, you can go TGR to save your lab money.

Many of the forms are at the address below:

<http://studentaffairs.stanford.edu/registrar/forms/grad>

3.2 LOUNGE

The lounge committee members are an elected position worth noting. *You*, the student body, are in charge of the lounge. Make sure there are ping-pong balls and foosballs (money is available from the department) and that the lounge stays tidy.

LIFE AFTER GRAD SCHOOL

4.1 DOING SOMETHING ELSE

About 10% of PHD students drop out to pursue other interests, although we don't know the official statistics. Some leave with a Master's degree, others without. There are legitimate reasons for each decision. If you want to be faculty, or if you want to do research in the future, you need a PHD. However, you may be unable to work with your advisor, unable to find an advisor to work with, or disillusioned with the research process. There is an opportunity cost to staying in graduate school: we can make very good salaries working in industry. (If you estimate a salary as \$100k and a graduate student stipend as \$30k, \$70k is what you're "giving up" annually to be here.) There is also a cost to leaving graduate school. Be clear with yourself about why you are still in the program or why you want to leave. If you do leave, try not to burn any bridges.

4.2 WORKING IN INDUSTRY

The Computer Forum (forum.stanford.edu) is a great in-house resource for finding a job in industry. The Forum is a group of businesses interested in supporting the CS department, probably because they get primo access to hires from Stanford. Every year, they host career fairs, hold informative lunches with local and global companies, and sponsor career-building events.

4.3 BECOMING FACULTY

At most 40–50% of Stanford PhD graduates go on to faculty careers. This is a lower percentage than at other schools because of Stanford's strong industry ties. As with much of grad school, successfully preparing for and landing a faculty position won't just happen: you must take the initiative.

4.3.1 *Kinds of Faculty Positions*

Only about 5% of Stanford PhDs (one or two students in your entering class) will end up in a job that resembles their advisor's tenure track position at a top-5 CS department. Others will end up lower on the ranking totem-pole or in other kinds of academic jobs. If you are interested in academia, you should think about the basis for your interest. Is it doing research? Freedom to follow your interests? Advising students? Teaching? Working with smart people? Or just the university environment?

There is a pecking-order of prestige in academia:

1. tenure-track faculty at a top research school
2. tenure-track faculty at other research universities
3. teaching-centered academic jobs
 - teaching faculty at a research school (non-tenure)
 - tenure-track faculty at a liberal arts college
4. non-faculty research staff
5. adjunct faculty

Higher up in this pecking order, the jobs are more demanding, harder to get, and pay better. You also get bet-

ter students and have an easier time getting funding. Different positions also emphasize different aspects of the job. Consider how hard you want to work and what kind of work you want to do. If you are unsure what you want, aim high. It is generally easy to switch from a research-centered career to a teaching-centered career, and to slide down the totem pole within either domain, but it is extremely hard to move the other way once your career has begun. Most academia-bound Stanford PhDs end up at number 2, with a few stars hitting number 1 and a few deciding to focus on teaching. Avoid an adjunct career.

4.3.2 Preparing

Whatever sort of academic career you're heading for, think of your time in grad school as an apprenticeship. Seek out chances to do what faculty do. There are many such opportunities:

- Help your advisor write grants. Learn how funding works.
- Recruit junior grad students or undergrads for your project and act as a mentor for them. Participate in CURIS, which pairs undergrads with graduate students during the summer. If you get a good undergrad and you have a well-defined project, they can be extremely helpful.
- Submit papers, attend conferences, and give lots of talks.
- Network with other researchers at conferences and when they come to give talks at Stanford.
- Choose TAs where you can help write tests or assignments and give lectures.

- Be a teaching fellow and teach a whole class.
- Earn the department's Distinction in Teaching.

There are several specific resources available at Stanford:

- The Future Faculty Seminar (CTL 231), offered each fall, is a set of talks on all aspects of an engineering academic career, mostly given by Stanford faculty.
- The Career Development Center offers a series of talks on academic careers.
- The Center for Teaching and Learning has lots of talks and resources for becoming a better teacher.

4.3.3 Readings

Tomorrow's Professor, by Rick Reis. A very good book on what to do while you're in grad school in order to land a faculty job.

The Elements of Style, by William Strunk, Jr., and E. B. White. A concise and prescriptive manual for English composition and grammar ¹. Buy a copy and consult it frequently.

¹This is the best-known American style guide, used in colleges and cited frequently. It teaches a direct and concise, no-nonsense style of expression and is still immensely popular. You may want to get a copy of it for these reasons. While undoubtedly useful, know that linguists have argued that some of its notions and rules are outdated or too restrictive.

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<http://www.cs.cmu.edu/~jasonh/advice.html>

ABOUT THIS DOCUMENT

Every 5–6 years, a panel of visiting faculty conducts an evaluation of the Stanford CS department. In Spring of 2007, one such visitor mentioned that Purdue students distribute a manual of learned wisdom and advice, called the Blue Book, to incoming students. Not to be outdone, we created the Redbook.

6.1 PHILOSOPHY AND STYLE

The Redbook should be concise to encourage complete reading and facilitate future updates. It should offer advice instead of listing facts about the program, because those facts are available elsewhere.

6.2 MAINTENANCE

Please maintain the Redbook: add to it, edit it, correct it, and distribute it to first-year students in the Fall. The 2007-2011 printings were supported by the Computer Forum, although the content was created independently.

Please append a dedication and add to the acknowledgments page.

The Redbook has an email. Use it to communicate with publishers and advertisers.

`stanfordredbook@gmail.com` / ask a student

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