The Secret Lives of Scientists: Sam Behar
Nadia Cohen (Immunology G5)

It all started with a visit to his PCP’s office. Dr. Samuel Behar, a physician-scientist working on tuberculosis, hadn’t had a checkup in years and was finally forced to sign up with a doctor. After all the usual questions had been covered, the PCP asked his new patient something he hadn’t been expecting: “What do you do for fun?” he inquired, “you know, when you aren’t spending time with your kids or your wife, when you aren’t working, what do you do for fun?” Behar was puzzled. “I sat there and completely drew a blank. That’s not a fair question,” he thought to himself, “you know what I do for a living. If I have free time, I work!” Behar went home unsettled that day. Where was the inquisitive, creative child he had once been? “It really had a huge impact on me, that one comment, so I changed my life, actually.”

One of Behar’s favorite hobbies as a child growing up in San Diego was rock collecting. He and his best friend loved to spend their free time exploring the canyons in the area for unusual stones and fossils. In high school, the pair attended a junior lapidary class every Saturday morning at the “Gem and Mineral Society” in Balboa Park — also home to the famous San Diego Zoo. “At that point most of the guys working there were these old fossilized-looking men,” Behar fondly recalled, “They would give us pointers and we would learn to take rocks and cut them, shape them and polish them.”

The rudiments of hardstone cutting, a very ancient art dating back to civilizations that lived over 5000 years ago, are fairly simple. To produce a basic cabochon (from the old French word cabochon meaning “head,” a cabochon is an oval-shaped, convex and polished dome with a flat back), a rock is first sliced like a bread loaf into “slabs” of up to a quarter of an inch thick. This requires a special saw with a blade coated in industrial diamonds, the only material hard enough to slice trough stone. Once a flat slab is obtained, a second type of saw called a 

How to Write Your Dissertation (Really)!
Dr. Jenny Sims (BBS 2009)

You should take plenty of time, draw a firm line of when you’re going to stop experiments, clear your mind, and schedule plenty of meetings to glean nuggets of wisdom from your advisor, who will be eager to share deep thoughts about the context of your work in the field. Right. If you’re like the rest of us, you’ll be sneaking in last minute experiments, your boss will be out of town right when you’re in the mood for feedback, and crunch time won’t even start in earnest until long after your mom and everyone you know is asking, “So, aren’t you just writing now?” Here’s some real advice from real people who have done this in the real world, and not only survived, but have our nifty three-letter suffix to boot!

#1: Know your own writing habits.
I hate writing. (Yes, I was a Lit/Writing major, but trust me, when it comes to science, the blank page and blinking cursor are my arch enemies). But I LOVE editing and revising. So, a long time ago I realized that in order to write things I don’t enjoy writing, I have to do it in two completely separate phases. First, I vomit my thoughts onto the page. The organization usually sucks, but I try to imagine how I would explain whatever it is in a conversation. Naturally, it fails whenever you hit a roadblock, something really technical, or you lose your train of thought, and then the process becomes akin to sticking your mental finger down your mental throat. But as long as words appear on la maldita página, I can move on to step two, where I completely dissociate myself from the product — thinking, “Geez, whoever wrote this was a
The overall goal of reform is to ensure that all Americans can obtain affordable coverage and to reduce wasteful health care spending. The principles set forth by President Barack Obama in February 2009 (http://www.HealthReform.gov) have guided reform efforts:

- Reduce long-term growth of health care costs for businesses and government.
- Protect families from bankruptcy or debt because of health care costs.
- Guarantee choice of doctors and health plans.

- Invest in prevention and wellness.
- Improve patient safety and quality care.
- Assure affordable, quality health coverage for all Americans.
- Maintain coverage when you change or lose your job.
- End barriers to coverage for people with pre-existing medical conditions.

The three most refined pieces of legislation from the House of Representatives and Senate are compared in the table below. With the passage of the Affordable Health Care for America Act by the House on November 7, 2009, the burden is now on the Senate to prevent health care reform momentum from fading. The late Senator Ted Kennedy (D-Massachusetts) was largely involved in developing the Senate HELP Committee Affordable Health Choices Act and he worked together with Senate Finance Committee Chairman Max Baucus (D-Montana) with the goal of pushing through similar legislation. Among the proposals from the House and Senate, some broad similarities include taxes on individuals who do not have insurance, exemptions for individuals with pre-existing medical conditions, and automatic enrollment of employees to lowest cost plan unless opted out.

### Table: Comparison of Health Care Legislation

<table>
<thead>
<tr>
<th>Date Originally Proposed</th>
<th>Official Name</th>
<th>Overall Approach</th>
<th>Employer Requirements</th>
<th>Creation of Insurance Pooling Mechanisms</th>
<th>Tax changes related to health insurance and to financing health reform</th>
<th>Congressional Budget Office Cost Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>October 29, 2009 (passed by House on November 7, 2009)</td>
<td>Affordable Health Care for America Act (H.R. 3962, now H. Res. 903)</td>
<td>Require individuals to have affordable health insurance.</td>
<td>Employers with over 25 employees must contribute at least 60% of the premium cost or pay $750 for each uninsured full-time employee and $375 for each uninsured part-time employee who is not offered coverage. The first 25 workers are exempt.</td>
<td>Require guarantee issue and renewability</td>
<td>Tax on individuals without coverage ($750 per year)</td>
<td>$894 billion over 10 years</td>
</tr>
<tr>
<td>June 9, 2009 (passed by Committee July, 15, 2009)</td>
<td>Affordable Health Choices Act (S. 1679)</td>
<td>Create a Health Insurance Exchange through which individuals and smaller employers can purchase health coverage.</td>
<td>Require most U.S. citizens and legal residents to have affordable health insurance.</td>
<td>Create a new health insurance “public option” to be offered through the Health Insurance Exchange</td>
<td>Require guarantee issue and renewability</td>
<td>Tax on insurers with expensive plans</td>
</tr>
<tr>
<td>September 16, 2009 (as amended during mark-up)</td>
<td>America’s Healthy Future Act of 2009</td>
<td>Expand Medicaid to 150% of the FPL (Federal Poverty Level)</td>
<td>Create state-based American Health Benefit Gateways through which individuals and small businesses can purchase health coverage.</td>
<td>Create state-based health insurance exchanges through which individuals can purchase coverage.</td>
<td>Increase funding to states depending on percentage of individuals in these programs</td>
<td>Imposes new fees for sectors including pharmaceutical manufacturing, medical device manufacturing, and health insurance</td>
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Note: Italics identify major differences between proposals.

‘Health Reform’ continued on page 3
“trim saw” is used to shape the slab into an oval. Using wax as an adhesive, the coarsely shaped stone is then mounted onto a wooden dowel (the “dop stick”) with which it can be held against a series of grinding wheels that serve to polish the stone.

“I still love rocks, going to museums and looking, picking up things I find,” thought Behar after his doctor’s visit, “why don’t I get my own equipment?” So he did. Now, Behar’s garage is filled with grinding wheels, varieties of saws and stones at various stages of processing. At first, he made only simple cabochons. “But then I ended up with a bunch of polished rocks and I didn’t know what to do with them,” he explained. So Behar started reading books about silver work and took a few jewelry classes to learn how to make settings for his stones. “I’m still learning; there are so many different techniques [...] but now I’m taking the cabochons and making them into necklaces, rings, pins, or things like that,” he said. “As I’ve become more skilled with what I’m doing, I’m able to play around with it [...] and I try to be a little more creative.” Behar now regularly participates in crafts fairs where he sells his pieces, or donates them to charity auctions. He also makes jewelry for family and friends, and jokes that “this is a hobby my wife can really get behind!”

Behar often wonders what it is about lapidary work that he so enjoys. “There’s a monotonous part of it, but it’s kind of relaxing. When I get home, I’ll go right down to the basement and do this for a half hour, and it’s a nice transition between work and home. I’m in my own world and being left alone I can re-surface,” Behar explained. Also, like in science, stonework requires intense focus, and creates a feeling of anticipation, sensations that Behar deeply enjoys, and which he finds soothing, especially when directed towards something other than work. Every rock is a little mystery, like an experiment, Behar explained, “you’re imagining what it will look in the end and hoping that it will turn out” but the stakes are much lower than in science and the result usually comes fast. “It either works or it doesn’t work, and then you just move on.”

Kaiser Family Foundation’s “Side-by-Side Comparison of Major Health Care Reform Proposals” tool (http://www.kff.org/).

For the record, it is important to note that NONE of these plans involve so-called “death panels” or other curious products of misinformation campaigns against health care reform. In fact, a major reason why efforts at comprehensive health care reform have historically failed in the United States is the ease with which elaborate proposals can be shot down by negative advertising.

So far, however, progress is still being made, so the next important development to watch for is the release of Senate Majority Leader Harry Reid (D-Nevada)’s proposal, which he pledged would include a public option. Although many polls show that a majority of Americans support a government-run coverage option as a means of promoting competition within the monopolistic health insurance industry, the inclusion of a public option has been very controversial in Congress. As always, we remind you to make time to contact your Congressional representatives! Letters, emails, and calls can make a difference (and at least until now, already have).


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**Recent DMS Student Publications:**

The answer to the question “what’s up?” is, regardless of your psychological state, “not much.” This is most usually a phrase of greeting rather than an inquiry into what you are doing or how you are feeling. Life would have been much easier for me if I came to the U.S. had someone told me about this generic answer.

• If you are hailing from Europe, you will most probably think there is an excessive use of “sorry” and “thank you” in this country. If you are coming from East Asia, you might be shocked that students do not behave respectfully enough when they’re interacting with their mentors. Middle Eastern students will probably never fully adapt to the idea of impeccable political correctness in the U.S. Rules of social interaction and acceptable behavior vary greatly between cultures, and the golden rule is to be open-minded if you do not want to be offended, or offend anyone. Accept the fact that people around the world grow up with different notions of what is ‘socially appropriate’ and that Muntadar al-Zeidi would never come up with the genius idea of throwing his shoe at the former President had he not grown up in the Middle East.

• Along the same lines, you do not have to inform the instructor during class (or the PI during group meetings) when you need to go to the bathroom. It is not disrespectful to eat during class/group meetings. I came to find out that the call of nature is well-respected here.

• Plagiarism is the 8th deadly sin in the U.S. Not giving credit when it is due is the academic equivalent of throwing a shoe (and much worse).

• Watching episodes of Friends, Seinfeld, Scrubs or any other American TV show (ok, maybe not LOST) will give you a pretty good idea of interactions and conversation flow in the U.S., including norms of dating, hanging out, and simple conversation. (Not to mention that these shows actually do represent a significant percentage of current pop culture in the U.S.)

• Achieve inner peace by accepting the fact that, yes, vegetables, fruits and food in general are more expensive in this part of the world. However, you will find out that clothing and access to technology is probably cheaper than most other places in the world. Therefore, buy laptops for your family and friends back home when you visit for winter break, and enjoy as many papayas and mangoes as you can while you’re there.

• As an international student, you will be subject to more stringent payment plans. Do not forget that your cell phone plan may require a deposit, or that your mortgage rate will probably be much higher (including its down-payment). Try to avoid future difficulties by building a good credit score, which starts with open- ing a credit card account (and not skipping any monthly payments).

• Gaining a social security number will immensely help accelerate many bureaucratic processes. How to get one? International students from other Harvard schools may have to wait up to one year, but we are lucky to be part of the HMS community, as

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**HUMMUS:**

The International Student’s Unofficial Guidebook to Life and Science in the U.S.

Aysu Uygur (BBS G2)

As the Division of Medical Sciences at Harvard, we definitely take pride in the fact that we could potentially organize our very own parade of nations, considering the diverse student body on campus. For the sake of some statistical support, 25% of students are international in BBS, which happens to be the most crowded program within DMS.

For the incoming international student, this is promising and comforting. However, it is always useful to have an unofficial (yet polished) introduction to life on and off campus as a foreign student in Boston. Here in this column, I will attempt to ease life for my fellow incoming group of international students. Below are some of the most important aspects to settling into Boston and undergoing the transition process.

• The answer to the question “what’s up?” is, regardless of your psychological state, “not much.” This is most usually a phrase of greeting rather than an inquiry into what you are doing or how you are feeling.

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see ‘Hummus’ on page 5
It started as another harmless habit, along with Sudoku and filling in those ridiculous message board posts on MySpace. Pretty soon, I couldn’t eat my lunch without putting down at least two hands. I worked my way up to four suits. When one stalled, and hitting “M” revealed no more moves, it was F2 (New Game) for me. In my passive-aggressive campaign for 2008, I began to leave the multicolored fireworks of victory up on the screen when I was done (after clicking “no,” I don’t want to play again), just to irritate one of my labmates who begrudged me my solitaire respite.

After a minor intervention by the undergraduates, with whom I was sharing the computer room, I admitted I had a problem. But why, of all my procrastinatory indulgences, was this one actually eating into my focus? At 10:00pm, while waiting for a real-time PCR (plus dissociation curves!, sigh) to finish its business, I won one game and lost the next six. At that point I knew I had a problem.

And yet, I felt great. I’d just wasted almost two hours, and for what? Extraordinary peace of mind, it seemed. I’d lost that hand, but perhaps it was unwinnable, and at that very moment I was making a conscious decision not to care enough to want to replay. But was I referring to the solitaire game itself, or the two hours of idleness during which, at the very least, I should have been clearing the old bacteria-laden plates off my bench?

I play four-suit. For the uninitiated, that means the probability that a hand will actually be unwinnable is ridiculously high. Because with each deal the cards are distributed across the stacks and there’s a finite number of deals, it’s pretty clear by the third one whether you have a reasonable chance of success or not. Even if the answer’s yes, all the deftness in the world can’t rectify a categorical lack of 9’s, or an inability to access that 7-card straight-flush you spent paying estimated taxes (by sending a check to the IRS and state treasury four times a year), you will be filing your taxes only once a year (before the dreaded deadline of April 15th). Since your tax is withheld from your monthly paycheck, the government owes you, which means you have to file those forms. CINTAX is useful software for international tax preparation, and you can get free access with the password provided through the Harvard International Office. After you have been in the U.S. for more than 5 years, you gain a tax resident status. This tax residency status has none of the privileges provided by permanent residency, except the down-side of having to file estimated taxes four times a year (like American students in the program).

In our next issue, we will go through gastronomy as a part of your life in Boston, and a guide to where you can find that rare ingredient or that cozy restaurant. Until we meet again, enjoy science in America! §

Advice to Grad Students: “Keep an open mind and do what you find interesting.” Since you will be putting many years into your PhD, “it seems logical to keep on doing what you are doing, but also be open to changing fields and your changing interests. Embrace serendipity, and trust your gut feelings.” §

* Kobayashi Maru is the name of a spaceship in a Starfleed Academy training exercise in which that ship is the precipitating element in a simulated no-win scenario. (Adapted from Wikipedia)
‘Dissertation’ from page 1

moron; obviously this part needs to go at the beginning of the chapter!” — enables me to critically reorganize and edit the hell out of the thing. That’s just how I roll.

That meant that every chapter needed a couple days of forcible hot-poker negative reinforcement word extrusion, a day of not looking at it, and a couple days for improving it. Taking other people’s criticism into account can be scheduled around that. If you’re the kind of person who functions well into the wee hours, hold yourself to firm deadlines about what you’re going to get done before you go to sleep each night; if your brain turns into a pumpkin at 6pm, then schedule a margin every couple days to catch your spill-over. (If you’re living in a two-body system, don’t forget to discuss whatever your strategy is with body #2).

The point is that after 20 years of schooling, you should have some feel for how you process your verbal output. Maybe you’re completely neurotic, but this is no time for self-improvement. Schedule accordingly.

#2: Find a good spot.

This is critical. Maybe it’s sunny out, and there’s a table open on the quad. Maybe you have a terrible caffeine addiction, and sitting in the Starbucks seems like it might just be a good decision — after all, you wouldn’t want to waste time since you’ll have to go get coffee anyway. Some of you have magically imperturbable attention spans (bully for you), but the rest of you, like me …SQUIRREL!! The quad itself is full of hazards, such as the helicopter landings at Children’s, well-meaning classmates who are eager to catch up now that your life is kind of interesting, and a perpetual latent curiosity about what the special is at Courtyard. Meanwhile, the Starbucks (the one proximal to Longwood one, at least) will at some point fill up with everyone from your floor, who will want to know how that writing is going. Even coffee shops far from the LMA community have hazards — such as the bimbo who spilled her glass of water into my friend’s laptop while she was eating breakfast at Petsi Pies, with three cr@p, it’s due when???” point, put together a select team of people (labmates, friends, significant other if you’re lucky enough to have one who’s scientifically with-it) who are willing to look over a chapter or two with a critical eye. You don’t need to hear that it’s pretty good, or that they still love you, or that you’re really smart (you knew that already). You need someone you trust to really give your product the beat down to the full extent that they feel is necessary to make it better — people who can handle your defensive snarking or a self-esteem meltdown — and then will still love you and think you’re really smart anyway. Line them up ahead of time, tell them what day to expect drafts, and they will help keep you honest with your schedule.

Conversely, don’t bring the people who want to cheer you up and distract you. You will be stressed, and that is fine — don’t hang out with people who will make you feel bad about it or encourage you to escape it, because you will find yourself needing to fight them too in order to get it done. They mean well, but none of us signed up for this expecting a rose garden on the home stretch. This is difficult stuff — even your best non-scientific folks know that, in an abstract way. If you’re golfing a Master, you need your best caddies.

#4: Start with the Acknowledgements & Dedication.

It’s short, it’s non-technical, and it will make you feel all warm and fuzzy. The positive energy and motivation will carry you through the first chunk of longer, technical, less-enjoyable stuff, on the other side of which waits a small sense of accomplishment. Plus, once you’ve written it, you can always get your warm fuzzies back by taking a few minutes to “edit” it some more.

see ‘Dissertation’ on page 7
#5: Outlines are your friends

So maybe your DAC let you slide on having a detailed outline at your box-checking. Maybe you got some sparkly new data, and it’s restructuring a whole chapter. In a document this long, you need structure, structure, structure, or else you will get lost in it. I find it really easy to start with just section titles and figures, to put everything in the right order. Then for each of those sections, you can usually write a bullet-point list of declarative statements on the scale of single-experiment results, à la “Knockdown of Gene A is insufficient to prevent infection.” You can order and re-order these big declarative points into a persuasive arc later — in the meantime, just fill them in….one at a time.

Outline every day. Moments of clarity are rare, and despite our improved red wine consumption, none of us are getting any younger. Especially if you’re writing on a compressed timeline, you can’t afford to let an instantaneously organized mind go to waste. Maybe you’re so tired you’re falling off the chair, maybe you have to go to the bathroom and can’t leave your laptop in a public place — write down a list before you get up! Always! You will accumulate a bunch of little lists of arguments, orders-of-

#6: Take your PI’s criticism seriously; take your own more seriously.

At least once a day, you will likely say to someone, “It’s not like anyone’s going to read it anyway.” And we all know that’s kind of true. But somewhere deep down, we all also know that none of us got here by not doing things right whenever possible and being meticulous about things that would bore average humans to death. No matter how much your PI cares about you, and no matter when in the process his/her panic attack occurs*, there is no way anyone but you has the RAM to put T.L.C. into ~200 pages of what you have to say. That doesn’t mean it isn’t worth saying, and it doesn’t mean that your PI won’t have some very different ideas than you about what, where, how, and how much.

So once you’re done appeasing The Man, you’re done, right? Nah. There’s no crying in baseball, and there’s no arrogant dumbness in your dissertation. The occasional typos will appear (I assure you with the certainty of someone who has just started noticing hers). But we all learned at some point in college that if you shoot for a B+, you might end up with a B-. People will ask you what you’ve done with your life all this time, and if they happen to be in arm’s reach of a copy, you DON’T want their passing curiosity to fall on a repeated paragraph (copy/paste fail!) or a spellcheck-mangled figure caption. You have the power to make sure your actual flights of dumbness are far above the comprehension of the average consumer — why give them a freebie? Don’t compromise your ability to focus on the big stuff by stressing over tiny edits, but don’t be reluctant to be careful either, since it will be yours (and mostly only yours) forever.

#7: Be nice to Elisabeth!

If you’ve been around for 5+ years, you know full well that when it comes to hardcore bureaucracy (i.e. the FAS Registrar’s Office), it’s all fun and games until somebody takes an “i” out…of their title. Elisabeth Taylor’s services are one of the many luxuries of the DMS office — she will not let you forget when your Summary is due, seriously, so make the most of the opportunity to have her advice. §

* the PI Panic is a common phenomenon. (I’ve collected several datapoints on this.) You can head-shrink it all you want — maybe they’re projecting a bad case of Imposter Syndrome onto the thought of you in your closed-door defense, maybe they’re suddenly afraid of all those loose ends in your project once you leave, maybe they’re peeved because you’re defending a little too early or a little too late. Either way, sometime between the T minus 10-week and 4-week mark, you may face a personality other than the one you’re used to dealing with, and it may throw you a curveball (e.g. “There’s no way you should defend unless you have X!!” where X is an experiment he/she thought of yesterday, and your written draft is due tomorrow). We don’t have a cream for that. Just know you’re not alone.

Some happy G1 faces at the Provincetown Inn for the 2009 BBS Retreat. Photo by Chenning Lu.
Research Interests: Developing computational methods for analyzing human DNA sequence data to determine the genetic basis underlying complex traits and common diseases.

Research In Brief: Dr. Paul de Bakker focuses on developing computational and statistical methods to interpret complex data sets from genome-wide association studies (GWAS) in order to identify genes associated with disease susceptibility. A key aspect of the lab is collaborative data analysis, as large data sets are essential in discovering statistically significant gene associations. As de Bakker states, “Individual studies may find nothing, but once you merge the studies, we may find the associated genes.” This is especially important when trying to relate common diseases and discovering genes that are responsible for similar traits in multiple pathologies, such as certain autoimmune diseases. As de Bakker exclaims, “GWAS works! We can find genes, reproducibly, that are associated with different diseases. There has been a marathon of discovery. Now we need to understand: what does it all mean?”

While de Bakker is not focused on any one disease, immune-related disorders such as HIV/AIDS and autoimmune disease are of special interest. Currently, the lab is doing a GWAS comparing HIV controllers to chronic progressors. HIV controllers are patients who are HIV-positive, yet are able to control the virus even without antiretroviral therapy for considerable time. Figuring out which genes are associated with this phenomenon could bode well for future vaccine design. The lab also studies cardiovascular and cerebrovascular diseases. Currently, the de Bakker lab is analyzing data related to electrocardiographic QT interval (shortened or prolonged QT interval is associated with sudden cardiac death), RR interval (resting heart rate), and QRS complex.

Background:
• In 2003, he earned his Ph.D. from the University of Cambridge, UK, after doing research in protein structure and modeling in the lab of Sir Tom Blundell.