

Maurer/Stier 2011 Annual Letter

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Steve writes: It's 10:30 New Year's Eve and I'm finally starting to write this. Though that sounds late, it's earlier than the last few years. It has to be, since I leave for 3 months in Germany on January 4.

At dinner tonight, Fran and I both noted that 2011 had been pretty good for us. For Leon it has been frustrating. If Aaron deigns to send in a section from his perch in San Francisco, you will probably conclude that it's been a good year for him.

I finished being Math/Stat chair on June 20. As predicted a year ago, the spring was even busier than the fall. I accomplished a lot as chair (strong program, good hires) and was much appreciated, but by the end I was sick of it.

I am on leave now for the full academic year. The leave started out with a very successful MathPath 2011. I was then able to get MathPath 2012 planning off to a good start instead of always rushing to catch up. We will be in the east for the first time in 4 years, at Mount Holyoke.

The two most interesting things this year so far are Fran and my August vacation in the UK and my two-week trip in November to Kyrgyzstan.

Fran has written at length about the UK on her blog. I will just add a few comments about my favorite spots.

The Lake District is excellent to hike in because there is little forest, so you get great views even from low down – so long as it isn't raining, which happened less than expected. See the photo on the website for this letter, and photos for other things I mention.

The Cotswolds were gentler, but still pretty with wide views. The extensive land belonging to our B&B (the [Westward](#)) includes a ruin of a roman villa which is not on maps! The owner told us about it. It was so nifty to walk through the woods and suddenly come upon it. I was there by myself, as if I had discovered it. Sure, other roman villas are better preserved, but being there had a magic feel. Mostly all you see is the foundations of the walls. But in the one place where more is standing, a roof has been put over a floor area

covered with tarp. If you lift up the tarp, there is a large, pretty roman mosaic.

We spent the last few days in London mostly in museums. I highly recommend the *London Transportation Museum*, which puts the NYC subway museum to shame (and we won't even mention the small Philly museum).

Kyrgyzstan. I went there to help the American University of Central Asia (AUCA) get a broader view of what math at a liberal arts institution could mean. The Math Dept were extremely friendly and generous hosts, but the institution was quite unlike others I know. Right now, there is no math major, and the many mathematicians mostly teach service courses at a low level for other departments. The Kyrgyz Ministry of Education doesn't help, as it has long lists of required courses, including math courses, for each major. Every AUCA student has to take 6 courses a semester, so how can you expect the courses to have any depth? At least AUCA has banished the bribery endemic to academic institutions in many former Soviet republics. I asked the AUCA president (formerly graduate school dean at Northwestern) how salaries at AUCA compared with other Kyrgyz universities. I have good news and bad news, he said. The good news: our salaries are double the salaries at the national university. The bad news: when you count the bribes that faculty there routinely receive (for passing students), our compensation is only 2/3 of theirs. (I may misremember the exact ratios, but the order is correct.)

AUCA is housed in what had been the headquarters of the Kyrgyz Communist Party. It was quite a trip to give one of my classes in a grand auditorium under the watchful eyes of Marx, Lenin and Engels. When you see the photo, it may occur to you that the portraits are asymmetric. There should be a fourth. I asked, and sure enough there had been a 4th. Who?

Kyrgyzstan is a fascinating country of contrasts. It's beautiful (except for the trash lying around). The capital Bishkek is sort of like Denver in that nearby high mountains are the backdrop. But in fact, the Tian Shan are higher and sharper than the Front Range of the Rockies – they are the 2nd highest range in the

world. The country is quite a mixture of 1st and 3rd world. Everyone has a cell phone, and it's cheap to phone the US with excellent reception. But my apartment complex, one block from the beautiful modern White House (Parliament Building) was run down, with a mud courtyard. When I asked for a laundromat for washing my clothes (Bishkek has a million people), I was told they don't exist – I should wash my clothes in my bathtub; indeed, there were already clotheslines above the tub, and the detergent that had been left for me in the apartment gave instructions for how to wash in a basin. I later went to a grocery store and found boxes of Tide – same instructions. But hey, it's one of the few places left in the world where the exchange rate is favorable for dollars. Dinner for 2 in an upscale restaurant was \$15.

Growing old. Although it beats the alternative, it's discouraging watching my powers decline. In the last year I've come to see myself a new way, so perhaps it is time to talk about it.

I make very strange typing mistakes. “we” comes out “me” (though w and m are not close on the typewriter), “what” comes out “how”, “have” becomes “am”, syllables or whole words are skipped, and so on. These errors are not new; me for we was a typo published on line 10 of the Preface of the 1991 first edition of my discrete math text, to my embarrassment. But these errors have gotten more and more frequent. At least I know to look for them now and find most after a few reads.

Remembering people's names is getting worse. This is the first memory to go, but it's gotten to the point where if I don't use a name in a month or two, I won't be able to call it up. I can usually call up the rhythm and number of syllables, but not the name. Fortunately, I can still call up most vocabulary words in real time.

Even remembering street configurations is getting tricky. Fran used to be amazed that I could remember the lay of intersections I had been through once in my life 25 years ago. That's changed. Even for local routes I can't always instantaneously decide anymore the best way to get from A to B, if I haven't done it for a month.

I am not very good at puzzles, as I have come to learn at MathPath watching the kids and some of the grownups. My colleague Al likes to give some letter sequence and asks for an English word containing that sequence. Some kids can do it very fast but I can't do it at all. (Example: name a word ending in eny.) Spatial visualization is increasingly hard for me too. I can visualize linear stuff easily still, even in multiple dimensions (teaching linear algebra helps) but not

curvy stuff beyond 2 dimensions that topologists and knot theorists would do. (Fortunately, only part of math needs this geometric insight; much can be done algebraically)

My physical abilities have been going down too. I'll give one or two examples.

For some years I have had trouble understanding people when there is a noisy background (e.g., in restaurants or at parties) and it has gotten worse. The ability to understand what people say in movies has also gone down, even when I back up the DVD and play the phrase again. My ability to understand someone speaking German is far worse. They understand me fine, but sometimes I can't understand them at all. I used to attribute this to just needing more practice, but it didn't get much better when I was in Germany 4 years ago. Of course, foreign languages are always harder, but now I think my difficulty is related to my trouble understanding English. Even at the quiet dinner table, Fran has to repeat things for me sometimes.

I have had my hearing checked. There was a little loss 4 years ago, mostly in one ear at midrange frequencies. A year ago the loss was more. The audiologist thought it was borderline whether a hearing aid would make a difference, but I do intend to try one. It seems more like a processing problem to me. Since it seems I can't anticipate what people might be saying (just like I can't just naturally think about puzzles the right way), I have trouble figuring out what people mean just from the sounds.

I read once about a strange brain disorder where one day you wake up and you can no longer comprehend spoken language. I sometimes imagine that happening to me. I guess so long as I could still comprehend the written word I could manage. (The reverse happened to my mother when she was coming out of an epileptic seizure from the brain tumor that eventually killed her. She would talk, but it was all garbled sounds. Later she would say she understood us and thought she was making perfect sense in reply.)

The shaking on the left side of my body is getting worse. I first noticed this a few years ago, when I could not always hold a camera steady with my left hand. But now I can't hold anything steady with my left hand. If I hold a saucer and spoon, they clatter. I have of course reported this to my doctor. He said it was not uncommon with aging. When I pointed out the asymmetry he got more interested and ordered a brain MRI. The report: only normal aging. I shake some on the right side, but far less. Good thing. If I had that much shaking on the right I wouldn't be able to write on the board or sign my name, and then I

would be sunk. As it is, my handwriting has gotten hard for even me to read.

Years ago, when we took both our sons (at different times) to a specialist for students who had trouble writing (both physically and writer's block) he asked me: Do you notice how they grit their teeth when they write. This is a sign of motor difficulty.

I grit my teeth when I write.

Switching gears slightly, do you know the scene towards the end of Forrest Gump where Gump/Hanks is cheerfully riding a lawn mower? He has returned to his home town and has been given a job mowing the lawn for the town hall. He voices over with something like "they let me mow the lawn all I want and even offered to pay me." He was happy as a little clam. I sometimes think: If I could just ride trains and mail packages all day, I too would be happy as a little clam. I have a mild fixation on trains and the post office. I study train routes and schedules wherever I go, I study postal rates and zip codes, and I love tracking packages. A few years ago, I wrote about how much I enjoyed *The Curious Incident of the Dog in the Nighttime*. If I didn't write about it in our annual, you can see my essay about it on my Swarthmore web page. Anyway, I really liked the main character Christopher, who had Asperger's and studied train schedules.

I said I have come to see my growing old a new way. Well, I've come to see myself as a cripple. A high functioning cripple to be sure - I know how to compensate. But a cripple nonetheless. I'm not depressed about it, just discouraged. It's even sort of interesting to observe myself. So I am just reporting, not asking for sympathy or help or even expecting to convince you. I can live with growing old, at least until it gets a whole lot worse. I guess that depends on how long I live. I turned 65 in August, and am a card-carrying member of Medicare A.

Anyway, for the time being things are good. My barber gives me a senior discount. Though I can't balance on one leg, I can still drive without accident all day on the left on those narrow British secondary roads. Finally, MathPath causes me to mail lots of packages, and Germany will let me ride lots of trains.

Finally, Fran and I have been getting along well. We enjoy each other's company and negotiations between us are mostly successful and short. Maybe it's really true that you get more alike if you grow old together. At least, we agree to disagree without even discussing it much. Our 30th anniversary is next October.

To readers who are old people (what Leon calls Fran and me - he also thinks we have become wusses about arguing with each other), I hope you are managing as least as well as we. To everyone, I wish you a Happy New Year.

Fran's part: Hoping this finds you well. It's New Year's Eve - Leon, Steve & I sat around eating rack of lamb & drinking wine & talking about the past year.

Leon: Leon continues studying physics at UW Madison. He got a garden plot from the university, and also came home in July while Steve was away at MathPath & took care of Steve's garden:

He harvested turnips from the garden & left them spread out on the kitchen table, greens, garden dirt & all. I said, (after asking him to trim them & clean off the dirt) I hope you get a girlfriend who civilizes you & he said, maybe he'll get a girlfriend who LIKES dirty turnips on the kitchen table. Just like S, who, whenever I object to something he does, announces his next wife won't object.

Garden updates featured heavily in weekly phone calls.

L and S are having a heart to heart talk about the home backup system and how it handles S's VPN, bicycle pumps (one of ours has a seal that seems to have dried out), zucchinis (L's didn't have squash borers after all), chard, beans, L had 19 cukes to pickle, and will soon have another bunch, and a ton of butternut squash coming. He has some okra coming - S warning him against letting the pods toughen. S giving an entomological update on his garden, and earnestly questioning L on what bugs he's seen in his Wisc garden.

He continued studying condensed matter, fabricating tiny devices,

The [wafer-stepper](#) has been giving him trouble all week again. First he followed David's suggestions, which didn't work. Then he followed the tech support company's suggs, which also didn't work (ancient as the wafer stepper is, there's tech support because there's a whole industry to support these huge old things). ...L's getting fed up with the stepper not working - he said he'd rather flip burgers - at least

they smell good & and can be made successfully.

Aaron: Aaron didn't get into math grad schools, but found a job in San Francisco at [Acumen](#), doing statistical analysis on Medicare claim data.

At spring break, he and many friends galavanted through the Mississippi valley to New Orleans.

I of course keep trying to elicit signs of life, so texted him "u alive" w/o a question mark. He replied he was alive but might die of shame if I didn't learn to punctuate my texts, so I did find the question mark for the next "u ok".

He didn't come home for Seder – he had comprehensive projects to finish in math and history and wanted to savor his last months in Northfield.

I emailed: I feel so bad thinking of you alone & not at a seder on Mon night.

He replied: Mom, just because I won't be at a Seder does not mean I will be alone. If it will make you feel any better, Monday is wine night at one of the local bars, and I swear I will drink at least 4 cups of wine.

We all trooped out for his graduation, of course (details on [my blog](#)).

After graduation, he cleared out his house, spent 6 weeks helping take care of a friend's horse farm. He headed to SF in August, staying with friends in Missoula MT – was very impressed with the SD Badlands and battlefield at Little Big Horn —Seattle (good Chinese food & wind-surfing) and Portland.

He stayed with a Carleton friend's family in SF for some weeks, before finding a (very affordable) house to share with two teachers. He still goes to the friend's house for Sunday dinner every week. His office is full of 20-somethings (mostly Stanford grads); they come to work in shorts, bringing their dogs, and go out drinking together over the weekend. His nook in the business world is a lot like college.

He runs SAS and STATA on huge datasets (the whole database is measured in [petabytes](#) – the biggest data unit I knew of previously was a terabyte) to answer questions like whether high-dose flu vaccine for Medicare beneficiaries is cost-effective. He's proud to have his own health insurance & 401(k). Our last fledgeling has fledged.

Steve finished his second 3 year term as chair, planted his garden (late, this year) and set off for

MathPath, which went well, except for falling off his bike (picture on [my blog](#); his helmet saved him) and then returned to a year of leave.

S arrived home Tues night. He spent time decompressing and pottering around and comparison shopping for a USB cable (he'd packed his printer cable in boxes that wouldn't be delivered till tomorrow, but didn't want to spend too much money, so checked out Walmart & Target & Best Buy and heaven knows where else) and stretchy green socks that were easy to put on (30 years of marriage almost & I never noticed he liked his socks to match his pants).

Being on leave has meant he can read the paper at length every morning and take naps in the afternoon when he's been up late working the night before.

We vacationed in the UK: Lake District, the Cotswolds, and London (Steve did almost all the driving and 99.9% of the navigating, more details [on blog](#))

Fran's work: It's been a long year. You may remember ALICO was purchased by Met Life in Nov of 2010. We found out in March whether our jobs would continue – the actuaries mostly got to stay but the accounting jobs are being moved to Tampa, where MetLife has a big office. By now, several floors of our building stand empty.

At the start of 2011, I was working temporarily in the Japan financial reporting section, helping set up purchase GAAP. Afterwards, I was to go back to Experience Studies. However, an AVP (Assistant Vice President) in the Japan financial reporting section left in February– a job a notch above what I was doing in experience studies—and I started filling in for him in March. The paperwork for my transfer to Japan financial reporting went through in September, and a promotion goes through as of the start of 2012.

The "operating model" (what gets done where and who reports to whom) for "legacy ALICO" actuarial work is in flux. In spring, calculating reserves was going to move from Wilmington to overseas, but modeling work would stay in Wilmington, so there was a stampede among the actuarial students to find jobs in modeling, and a colleague in financial reporting left (I filled in for him, too). In summer, the decision to send reserve calculation to the field was reversed, and (thank heavens), the colleague returned. Now, MetLife's new CEO is reorganizing the whole company along regional lines; no one knows how that will play out.

MetLife is a Systemically Important Financial Institution (SIFI) and, starting this year, had to submit projections to the Federal Reserve showing what its balance sheet would look like under stress conditions. Our group had to put together projections for Japan (since it's a large chunk of ALICO), and I designed worksheets that would pull together the reports that come out of our projection system. Fed stress tests ate up a lot of evenings and weekends.

Very tiring week grinding out projections for the Fed - 4 scenarios with two different starting dates, each of which (for my little group) is made up of 14 pieces. Since Japan is 12 hours ahead of us, much ado about keeping them supplied with the raw materials to make final income statements of. Tues night, phone call w/ Japan, they wanted total income statements of my stuff, so, like a fool, I said brightly, I'll go back into the office and do them, it's no trouble. What with road construction, it took maybe 40 min to get to the office, and 40 min to get home, and an hour or so there. I got home around midnight.

Then, the next day, I went in maybe 9 AM and stayed till 8 PM or so. By Friday, I was really, really tired, and Japan had a bunch of questions about cash flows. X had said, we're still going to do ½ days before a holiday (ALICO custom, not in conformity w/ MetLife). I decided to just answer Japan's questions & not make my 2 remaining munchkins labor on grinding out the final 2 scenarios, which my boss was ok with but Y the MetLife accountant, wasn't. Y scheduled a 9 PM phone call to "touch base", and Japan had another set of questions that arrived this morning (meaning they worked their Sunday), so I had to come up with some reasonable response.

There's one product with a name that means "Yen outside, dollar inside", that has a particularly complicated set of currency conversions. I was standing at the ladies' room sink with my eyes closed trying to think about what was making a funny bump in an income statement, and AC came up in some concern and asked, was I ok. Trying to think about it makes me feel dizzy.

Some things are definitely going better—a very able guy came over to work for me from experience studies. The department has contract accountants who help us with our vouchers, and have automated (and taken responsibility for) some of the most onerous manual reconciliations. They created nifty Cognos reports that let us "drill down" to the voucher entries that comprise our P&L statements.

In spite of the turmoil and lost weekends, I like financial reporting – it's a challenge to review the numbers my group's submitting and hopefully spot the errors before they happen, and then spot irregularities in the profit-and-loss (P&L) statement and come up with an explanation, or a fix if there's been a mistake.

Coop, Social Action: [Chester's Coop](#) opened in a permanent location, 6 days a week, in March (Leon updated the website). I continue as treasurer (it's a lot more work, with the store open full time), with the help of a bookkeeper. We found a local accounting firm willing to prepare our Federal & State income tax forms. Our membership has grown, but not yet to a sustainable basis.

I continue [on Social Action](#) at Ohev Shalom: reading with kids at nearby shelters, taking dinners to a nearby soup kitchen, food drives, Martin Luther King Day. So many families have made a tradition of volunteering – events come together easily.

Genealogy: My family tree is still up on Ancestry.com, leading to some interesting encounters. In May, I got a message over Ancestry from alumnae relations at [Hockaday](#), the school my grandmother attended in Dallas. Nanny was its first graduate, in 1913, and did I have a picture? She had looked Nanny's family up in the Dallas Morning News Historical archive, and sent several pieces like the following.

May 27, 1909: Dallas Morning News: Mr. and Mrs. Rudolph Liebman were at home yesterday, both evening and afternoon, so that their friends might greet their daughter, Alma, on her confirmation. The class flowers, daisies, sweet peas and ferns were used to make the rooms pretty, where Mesdames Morris Liebman, Hablo, Sterrs, L Lorch, Hagenback, A Harris, Misses Marguerite Repp, Hortense and Marguerite Dreyfus, Julia Repp, Marcell Harris, Marguerite Kahn, Mildred and Ruth Liebman assisted in receiving. In the evening, also, a number of guests called to offer gifts and best wishes.

In October, a 2nd cousin once removed (her grandfather was the brother of my mother's father's mother) got in touch through Ancestry; she knew several Greenman cousins; they and my Mom got together for lunch (I had to cancel at the last minute; Fed stress tests....).

Steve's brothers are much more diligent genealogists than I – I'm not making much progress tracing family back into Europe, but I can't bring myself to take down the tree, either. I never knew my father's mother—she died at age 45, before I

was born (I'm named for her)—but her naturalization papers and her name on the 1930 census give me some sense of connection.

End of Fran's part: Leon heads back to WI on Tuesday, Steve leaves for 3 months in Germany on Wednesday, I set out for 2 weeks in Japan for work on Saturday. I haven't traveled overseas for work since 2008 (when I used to go to Brazil); I'm excited. Wishing you peace, health and wide horizons in the New Year.

Leon writes: In many ways, 2011 was the least eventful year I can remember – even less eventful than last year. I'm now a fourth year graduate student in physics, and I spent a lot of time doing research – research which didn't work. However, there are changes coming up, and hopefully last year was instructive.

In the first half of the year, I worked on the project I described last year and the year before that. As of last year, it had failed about a dozen times, and I was certain the problem was the devices we were measuring (from a research group we collaborated with) – not with the measurement equipment. The professor from the collaborating group wasn't convinced. It turns out I was right.

I should have handled things differently. I hate the 'o' word, but the devices were obviously at fault. I tried several times to demonstrate this, but when the professor remained unconvinced, I deferred to his judgment rather than pushing my case. I should have been tipped off because he kept asking the same questions meeting after meeting, and kept accepting the same answers. He wasn't convinced because he didn't fully remember what was going on.

The weight of evidence finally sunk in around August, and he decided to redesign his devices. We soon parted ways. I'm not sure what happened behind the scenes; I like to think my adviser suggested I be taken off the project. The other group took up measurement of their devices (which made more sense) using the apparatus I built, and that was that. The project was supposed to be quick, but I spent ~1.75 years on it and it's still not done.

I started on another project in June. I'm not working on it anymore, so I'll just say it was a device that allowed several photons (quanta of light) to do a random walk. In principle, it could be used for numerous experiments. It was based on designs we had already tested, so my adviser thought it would be quick to get working. I was excited since it would be my first complete experiment; I'd do all three parts of the research

cycle: design/simulation, fabrication, and measurement.

We should have seen a problem coming. Although this design was similar to our previous ones, it was more than twice as complicated, and the simpler devices already had a low yield.

This had little effect on design/simulation where complexity was as simple as copying and pasting or adding a few lines of code. This step – especially simulation – was a lot of fun. At the end, I had laid out the device with a computer and predicted the experiments' results with my simulation.

Next came fabrication, which was a mess. It took 11 steps. If one went wrong, that usually meant starting over. I started and restarted for most of September, October, and November. Most of the fabrication was done in the cleanroom, not a place I wanted to be; as I told my Mom, I'd rather be flipping burgers. Fabrication centered around a nearly 20 year old, hand-me-down photolithography system from Intel. It had been flaky for years, but it mostly worked when only one or two people were using it. However, I tried to use it along with four or five other people. The machine couldn't handle it. It'd work poorly or break down and not work at all. Finally, towards the end of November, I made some devices that weren't pretty but looked like they might work.

After all that, I was tired, but I wanted to try measurement in case it – along with design/simulation – could counterbalance fabrication. I'd done dinky measurements mixed in with fabrication, but this would be the real deal: a tall rack of microwave generators, sequences, mixers, filters, and the likes all connected to a dilution refrigerator (cooling my device nearly to absolute zero), all at my command, and all to measure my device.

However, I had to wait while higher priority devices were measured, so I only started measuring on 12/21. By this point, the person familiar with the equipment had left (thankfully, he had a cell phone), so I struggled for days to do the measurements. I eventually succeeded. My devices were barely working. Even adjusting for the circumstances, I decided measurement wasn't enjoyable enough to offset fabrication. In short, this research cycle wasn't for me (especially since it wasn't working).

During September, I started searching for a backup plan. Since I enjoyed writing simulations and was sick of fabrication, I looked for simulation oriented research. That meant giving up experiment completely and moving to theory. I had taken (and done well in) two simulation heavy classes on semiconductors from a professor in

electrical engineering, so I talked with her, and she offered me a spot in her group. I think it's a good match; she's affiliated with the physics department so she can be my adviser without bureaucratic hurdles, her research is mostly simulations of tiny semiconductor devices (concrete applications), and the two classes gave me some foundation for the research.

Still, I was hesitant to switch for three main reasons: the things I learned from research wouldn't be applicable, I still liked my current research in principle, and my current research meant spending time in the machine shop and designing electronics – which I greatly enjoy. While considering my options, my research kept not working, and I finally tried measurement and found I didn't like it enough. I decided the first reason was a sunk cost (plus, the knowledge might be useful later), the second didn't hold up in practice, and the third might be me confusing what I wanted to do for work and what I wanted to do for play. Also, another opportunity to play in a machine shop and with electronics opened up; more on that later.

I finally decided to make the switch at 11pm on 12/22 – when I was leaving the lab. I discussed the possibility with my adviser in October, so it wasn't without warning. Many of the lessons are clear and unsurprising: research doesn't always work, professors aren't always right, etc. One thing is less clear: did I stick with this research too long? Was I too patient? Demotivational posters have long been an internet staple, and [my favorite](#) was always a picture of a tennis player on his knees on a court, racket discarded at his side, hands on his head. The title is "Stupidity", and the caption reads "Quitters never win, and winners never quit, but those who never win and never quit are idiots." Being too patient certainly backfired recently with my idiot roommate recently, but I won't elaborate on that. I consider myself a pretty patient person, but maybe I should experiment with being less so. In any case, it was strange to throw in the towel. It's the first time I quit a job, and I think it's the first significant project I've abandoned as an adult.

I did little besides research last year partly because I was already late in doing my preliminary examination, a milestone on the way to a PhD that needs preliminary results. So I doubled down on research. Needless to say, I still haven't done my prelim (I'm the only person in my class who hasn't), but I've been granted extensions.

For fun, I've been up to my usual activities (cycling, cooking, etc.) and two new ones. The first is vegetable gardening, which was a great success. Like Swarthmore College, UW-Madison has plots available, and I worked mine from mid March through mid December (when – due to unusually

warm weather – I picked my last parsnips). I planted many crops that were old favorites from my Dad's garden (tomatoes, zucchini, etc.), but some of my favorites ended up being new ones (butternut squash, parsnips, etc.) I'm looking forward to experimenting more next year.

The second is that I've joined a local hackerspace, a shop with machining, electronics, and computer facilities available to members for use in their projects. I've long had access to similar facilities in the physics department, but this hackerspace has some tools I didn't have access to (3D printers, computer controlled mills, etc.) and a population of other people with similar interests. I won't write about my projects because they're incomplete; hopefully I'll have something to share next year.

If you want to follow me during the year (or learn more about last year), see [my google plus page](#). Many of my posts aren't public – you must join to see them – but some are (including a few on [fabrication](#), [gardening](#), and [cooking](#)).

Enjoy the new year.