“What do I do after graduating as a physics major?” (and what to be thinking about long before you graduate!)

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A few physics majors at CSU-EB have been asking me this question lately as they are rolling into their last year of undergrad. I was in this situation, a bit over a decade ago, and I still remember it feeling stressful – I didn’t have much guidance, and frankly, no one really seemed to care about *my* path. I had lots of people telling me that this area was hot or that this was a good, secure way to go… But I didn’t really have a mentor who was encouraging me to pay attention to my heart and what I really love. I want to encourage you to think about the things that you really love. Something to the tune of Alan Watt’s “If money were no object… what would you do?” (youtube this phrase). There are moments for engaging in this bigger-picture thought, and in other moments we need more exploration of practicals. So in this writing I offer some more practical thoughts for how to go about exploring career opportunities and paths.

First, a career is not the same as a job. A job is something that you do that helps pay your rent and pay off your debt, is a community you are a part of, and can be an aspect of your career. Your career is the thread of coherence that ties your experiences together, an expression of *you*. You may have many different jobs in your life, but as you spend time getting to know yourself, you will see and be able to articulate your career. You create this meaning. “I help clarify information to the world…” “I work to promote social justice by…” “I organize teams to accomplish…” Just some ideas for the narrative that people can have with regards to their career. In your exploration of careers, I encourage you to talk with people (in all fields!) often and ask them about their careers – what is satisfying, why they’re motivated, etc.

I remember feeling intimidated by the “what are you going to do when you grow up?” question. It’s the wrong question. What about – “What do you want to do right now to promote a life that is consistent with your values and desires?” That might be a better question. That being said, it’s a tricky problem. It’s like solving a transcendental equation – it would be easier to solve the problem if you already knew the solution. It’s going to be necessarily messy.

So, you’re graduating. You’re trying to look around to see what’s interesting. Have you made a list of what things you find most interesting? Making things? Electronics projects? Comics? Playing sports? Try to list everything. List the values behind these things – curiosity, tinkering, learning about ___, being a part of a type of community… you might see some threads in there that are expressions of who you are and what you are passionate about.

It’s important to continue getting tuned in to what’s happening in the world. What’s happening in Physics Today? Wired magazine’s recommended science blogs, or How stuff works. One of my favorite youtube channels, Veritasium, lights up new ideas. Or How it’s made. I love to check out and watch things like these. It gives me fuel and inspiration. Maybe you’ll find yourself jazzed to get involved in manufacturing fiber optics, or you’ll want to learn more about AI robotics and how people in this field need someone who knows physics… There isn’t any limit to what’s out there. What gets you pumped? Solar technology, the internet, communications technologies, energy storage in batteries, 3d printing?

The amazing thing about a physics major is that you can do so many things. This 'tabla rosa' (blank slate) can feel somewhat paralyzing because of too many options, so let's explore just a few thoughts… Many people who are physics majors think that going to physics graduate school is the only clear option. If you are set on graduate school, why not consider programs in engineering, materials science, computer science, or renewable energy policy? If we are fishing, it's good to use a big net. Another option is to get out and work a few years in the industry to help give you some perspective. The Bay Area is crawling with companies in every technical area of the private sector. They value organization, initiative, gumption, clarity in communication. If you like optics, you could also check out the Thorlabs or Newport website. Look at what jobs are offered – and especially check what qualifications are needed. If you see something that looks interesting, and a certain graduate degree is required or preferred, this might give you motivation for your next steps. There are many companies in California that deal with semiconductor chip manufacturing – KLA Tencor in Milpitas is an interesting one, also AOSense. One of our majors, Scott Pallesen, started working for Tesla Motors right out of college and enjoys testing and tinkering with high-performance electric motors for their latest model of cars. Medical imaging physics is a hot topic these days, and a master's degree in a program such as Duke University or UC Davis will open some cool opportunities for design and engineering medical imaging equipment such as CT scanners at General Electric. There are several companies including google, VW, Cruise (acquired by GM) that are testing self-driving cars, and you better believe they need people trained in physics! Having a graduate degree will almost always mean higher pay in the beginning of a job compared with a Bachelor's, but with more years of experience at a company, it's possible to be making more than your professors do fairly quickly. ☺

A career option that is often overlooked is teaching, from elementary to high school levels. Also, places like the Alameda County Office of Education (in Hayward) hires people who develop educational programs and curricula for California's K-12 programs. You would find yourself in a position to inspire and challenge young people in a way that can be very rewarding. If you are considering a career as a teacher, the Robert Noyce scholarship may help support some of your education through college! There are also opportunities for pursuing more deeply how to we communicate science in a program such as University of Colorado's Physics Education Research group.

Another alternative that might be worthy of your consideration – if you are a U.S. Citizen, you can join the Peace Corps. I have several friends and one family member who chose this after college and none have regretted it. Many tell me that this was the single most transformative experience in their lives. Spend a couple years in a foreign country, learn their language, and do work ranging from science education to managing water quality to develop technology infrastructures… you *will* be challenged by such a venture, and grow, and fuel an even stronger passion for the things that you want to be doing in the world.

People also do things that appear far outside the 'science' realm but actually involve using many of the same skills that we develop in our physics program – Computational strategy for quantitative finance; designing and animating computer graphics (CG) for video games and animated films (especially including all of the realistic physics, yes including Newton's laws, that make modern CG so realistic); going to a medical school program; data science – an extremely high demand skill these days is knowing how to work with and interpret large sets of data; working with a consulting firm such as McKinsey & Co. or Boston Consulting Group; software engineering for a tech company in the Bay Area (there are many incredible programming boot camp programs such as Hack Bright (for women) and Hack Reactor

that will place graduates from their ~10-20 week program to a well-paying job in the Bay Area…); many others (see links below)..

So, you don't have to have it all figured out, despite what some people may tell you. They probably didn't. As you spend time intentionally exploring who you are and how you enjoy spending your time, you'll make more and more decisions that are consistent with your values. Have fun, be bold, and don't worry about making mistakes!

Links about alternative careers for physics majors:

http://cognitomentoring.org/blog/career-prospects-for-physics-majors/

https://www.physicsforums.com/insights/alternative-careers-for-a-physics-graduate/

http://www.its.caltech.edu/~pgsi/alternate.html

http://www.topuniversities.com/student-info/careers-advice/what-can-you-do-physics-degree

Graduate School Information

GradSchoolShopper.com

A new electronic venture of the American Institute of Physics (AIP). Our goal is to become the most comprehensive online source for researching graduate programs in the physical sciences, engineering and related fields. The site provides both a graduate recruitment forum for graduate schools and a one-stop graduate-school shopping place for graduate-school-bound students.

Planning for Graduate Studies in Physics and Related Fields

This brochure is written for students considering graduate work in physics or related fields such as astronomy, biophysics, and applied physics. It also provides some information for physics undergraduates who plan on pursuing postbaccalaureate studies in the fields of engineering, medicine, law, and other professions that attract significant numbers of physics B.A./B.S. graduates. It will help each student decide whether to pursue a graduate degree and, if so, how to prepare for this path while still an undergraduate. It addresses the mechanics of the application process, the types of financial aid, and the final selection of a graduate school. It concludes with a discussion about what a student might expect during the first few weeks of graduate school, and an example of a personal timetable.

Steps Towards Graduate School

A website created by Sonoma State University which gives advice on planning and choosing a graduate school.

Some interesting physics majors who have had unusual careers…

David X. Cohen

The longtime "Simpsons" writer and creator of "Futurama" graduated from Harvard University with a degree in physics. He then went on to U.C. Berkeley, where he was enrolled in a Ph.D. program in computer science. He got his Master's degree before leaving the program to write comedy. (Photo Via Gage Skidmore)

Mike Judge

The man behind "King of the Hill," "Office Space" and "Beavis And Butthead" graduated from UC San Diego with a degree in physics and worked in engineering before shifting his focus to comedy.