The purpose of this is to summarize career advice that works for me and I have found to be generally true. Most of this wisdom is high-level and derived from conversations with former mentors, previous wisdom I have encountered that resonated, as well as my own experiences. If you're looking for other tips on a career in theoretical and computational molecular science, I would suggest Prof. Subotnik's website at Princeton. If you're looking for other tips on a career in research, I would suggest Richard Hamming's Lecture and Schwartz's the importance of stupidity in scientific research. With that said, and in no particular order:

- **Science is done by people.**

Scientists are, by definition, people. Consequently, scientists are not 100% rational actors 100% of the time. Did somebody give you a weird, agitated response to a question? Maybe it's because they have an upset stomach. Did my advice in our one-on-one meeting yesterday make no sense? Maybe it's because I'm sleep deprived from my young children. "Science is just as corruptible a human activity as any other." (Crichton) Jealousy, anxiety, self-esteem issues, and personal priorities all still apply in scientific interactions.

- **Genius is a stupid word.**

Society tends to call people who can do fairly narrow tasks (e.g. classical music, chess, tennis, algebra) extremely well at young ages "geniuses." In my experience, these skills rarely translate to creative scientific impacts, and true creative genius is rare. Most people are fairly equivalent in terms of research potential, and hard work and dedication generally are the difference makers. "Luck favors the prepared mind" (Pasteur). Academic communities also tend to exalt those with the most mathematical skill – while mathematical fluency is essential to scientific progress, don't mistake hard math for physical insights or scientific impact. Terse and impossible to understand does not mean genius. Remember that rejection is the default in this business. Most of your applications (jobs, papers, awards, grants) will be rejected, and try to not let it get to you (it will though).

- **Tolerate ambiguity.**

The average person wants to know that something is true or not true, black or white. Nobody wants to be told that something is "sort of right, but not really the complete story." If you believe in a theory too much, you'll never notice the flaws, and if you doubt an idea too much you won't get started. Tolerating ambiguity is at the core of doing science, but it is at odds with default human behavior. See all politics, ever.

- **Creativity is a long-time, experiential process.**

Most creativity is the result of making connections between accumulated experiences derived from what is close to randomly sampling your environment. As such, be as open as you can to a breadth of experiences in your discipline. Leave your office door open whenever you can. Periodically go to talks about things you know nothing about. Read the big papers from important people in your field and neighboring fields just to know what is out there. There is also evidence that sleep is essential for helping your brain make connections. Do these things and years down the road you may find yourself to be very creative.

- **Sometimes, you need to work very hard. Sometimes, you need to not.**

Creativity is a complex thing. However, taking an idea to its conclusion is typically not. It requires an intense dedication that some people do not possess. You need to be ready to close your office door, scratch your other obligations, and think deeply to carry the idea to its conclusion. I find this is often a defining feature of "good" researchers – many do not have the dedication to do this because it often requires sacrificing other elements of their work/lives. Not every week should be a >60-hour work week, but good scientists are capable of this. With that said, sometimes you need to take a break. You can't work hard all the time, and you can't do quality work if you are too tired and stressed. Breaks are important too.

- **Be kind to, and supportive of, your assistants.**

Your administrative assistants and other staff can make your life heaven or hell. I take this seriously enough that if I hear that a group member of mine was disrespectful to an assistant, their time in my group will be short lived. While it is "the right thing to do," trust me that in the long-run being nice to your assistants will enhance your productivity.

- **Humans are terrible at parallel processing.**

You can do one thing extremely well, two things pretty well, three things ok, and any more than that poorly. Society is built to push you into parallel processing, especially as you are promoted. Some things are better suited to parallel processing, such as mindless administrative tasks. However, deep thinking and science are incredibly poorly suited to parallel processing. Close all your browser windows, scratch your meetings for the day, carve out a multi-hour block, and focus on what you want to do a good job on scientifically.

- **Having bad ideas is the first step to having good ideas.**

You must have bad ideas before you have good ideas, which is a corollary of Pauling's "the best way to have a good idea is to have many ideas." You must have the courage to think deeply about, and attempt to execute, your bad ideas. If you don't have your own ideas, you will never be an independent scientist. As such, you need to give yourself the grace to fail and learn from your failures. Similarly, if you're always afraid of failing, you are sure to never do anything interesting.

- **Overplanning is dangerous.**

Young students often make the mistake of overplanning in a project. However, when you lack the experience required to anticipate realistic contingencies, overplanning can be a dangerous time sink. You are better off making many short, dirty, attempts at a solution and rapidly learning from your failures (fail fast). On longer timescales of project planning, overplanning is also ineffective. If you are working on something truly interesting, the idea that you can effectively plan the course of the project more than a month in advance is wishful thinking.

- **Find people you can talk deeply about science with.**

Most effective scientific collaborations are based on the matching of personalities, and not the matching of scientific expertise. Just like there is no expectation you will be friends with everyone you talk to, there is no expectation that you will have great scientific discussions with everyone you talk to. However, you should keep trying to find people that you can discuss ideas with freely, honestly, and without judgement. If you do, it will change your career and probably your life.

- **Effectively communicating your science takes effort.**

You will overestimate the comprehension ability of your audience; people probably don't understand what you are talking about. Don't discuss more than two big ideas you want to convey to an audience. Don't overwhelm the audience with technical details unless you are in a room full of technical experts in your field. Tailor your talk to your audience's comprehension level. Err on the side of broad views and big pictures of your research – people who want to know the finer details will read your papers or contact you directly to discuss in greater depth. Be respectful of your time slot. Practice your talk out loud. Number your slides out of the total number of slides in your deck (e.g. 4/26) – this helps regulate questions and time management in your talk. Make your slide titles statements of the takeaways from your slide, not vague statements like "results at 300K" or "simulated spectra". If your slides and presentation are sloppy it begs the question what other aspects of your research are sloppy. Your slide has too much text on it, and your axes are unreadable. Don't put something on your slide you can't explain (theory, experiment, physical quantity, equation, etc) – this seems obvious but young scientists make this mistake all the time.

- **Follow basic professional etiquette**.

This is not rocket science, but a lot of people fail to do it. All of this advice is drawn from my own experiences. If you don't know the person you are emailing, always start an email with "Dear Prof." or "Dear Dr.", not "Hi Nick" or "Hey Professor," and sign your name "Sincerely". Don't slouch in your chair. Make eye contact. Don't swear. Never look at, or answer, your phone in a meeting. Don't show up to a meeting with nothing to say – come prepared with questions/slides. Always say please and thank you. If you disagree, don't roll your eyes or react emotionally. Don't write emails when you are emotional – wait 48 hours. Be reliable – if you say you will get something done by a certain time, follow through. If you don't follow through, then what good is your word? When you meet someone shake their hand and make eye contact. Not everyone can be perfect all the time, but these things accumulate and become part of your reputation.

- **Reproducibility is kindness to your future self.**

Future-you is a different person with worse memory and less time. Use version control (GitHub) from day one. Capture environments (environment.yml/requirements.txt) and random seeds. Comment your code (or use LLM's to comment it). Write small unit tests for calculations. Prepare for yourself to forget how everything worked in your code within a matter of months.