

ADVICE TO MID-CAREER RESEARCHERS

We are starting a new series to provide advice to mid-career researchers. There are a number of programs that SIGMOD organizes for researchers at the beginning of their careers (PhD Symposium and the like) and senior people do not (or should not) need much help. There are considerable challenges for those who are about to transition from an early researcher to a more senior role. In academia, these are people who are about to get tenured that comes with starting to think of moving from shorter-term research objectives to longer-term ones. In industrial research, this corresponds to the transition from participating in projects to initiating and leading them. As a community we don't seem to talk about these challenges much. That is the gap this series attempts to fill. We will get the views of senior researchers from diverse backgrounds and diverse geographies. We will continue as long as we find original advice and the views are not repetitions.

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Congratulations! You Have Become a Senior Researcher. Now What?

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It probably seems like yesterday that you were starting at your first post-PhD position, but with this latest promotion, whether it is tenure or promotion to a senior level at your company, you can no longer call yourself “junior”. You are now stepping into the shoes of a senior researcher. Congratulations! This is a tremendous accomplishment, and you should celebrate. The road was long and often uphill. You finally made it.

Promotion to a senior role is a really great time to pause and reflect on where we are and where we would like to go next. We all know that seniority brings the opportunity to take even greater risks and have an even greater impact than the early years. That's in my opinion one of the greatest benefits of getting older (there has to be a positive side of getting wrinkles and having to attend more faculty meetings). It's important to take that opportunity and to continue working extra hard to do great things because, before long, the next promotion will loom on the horizon.

First and foremost, transitioning to a senior role is a great opportunity to grow as a *researcher*. To pause and ask: “What is the most important problem that I should be working on?” A senior researcher has already proven that they are very good at research. Now they get to define and assess excellence. They can define new research directions and even new research areas. They can explore unusual directions. In my case, as an assistant professor, I worried about making sure I had a

steady stream of papers at top conferences (while also going through two pregnancies and raising little children), so I took the safe approach of building on existing open-source systems, such as Hadoop, for my projects. After promotion to associate professor, I embarked (with my colleagues) on an exciting project where we built our own big data system and cloud service, called Myria. I also started to explore unusual directions with my collaborators, such as how to price data or how to price cloud services, and more recently how to manage video data including 360-degree virtual reality videos. The ability to take greater risks let me take on more ambitious and more interesting projects than before and, in all cases, I was glad that I had chosen that path.

Seniority, however, opens much more than opportunities to grow as a researcher. It also opens more opportunities to expand the types of impacts one can have. Many senior researchers have start-ups based on their research. More junior researchers can also do that, but it's much easier as a senior researcher to get through the disruption to research caused by a new company. Some researchers decide to write a textbook, which requires great persistence and effort, but can have a major impact on how an entire subject area is taught. Other researchers, yet, apply for center grants or lead other large-scale initiatives or large-scale projects. In general, seniority implies the expectation of *leadership*

and much larger-scale impact. When one is recently promoted to a senior role, taking on tasks such as start-ups, books, or center leadership may still be a bit early. So this may not be something to do right away, but these options are things to consider and start thinking about. I took the approach of getting involved in and leading large-scale initiatives after tenure. As an associate professor, I was the Principal Investigator on an NSF IGERT (training) grant and led the development of a new program for data science education across the University of Washington (UW) through data science specializations, called “options”, which are now offered in many units at the undergraduate, graduate, or both levels. This leadership work, together with a general deeper engagement in the UW data science institute, called eScience, put me in a good position to later, after my next promotion to full professor, become the director of eScience, and recently the director of the Paul G. Allen School of Computer Science & Engineering. Many paths for impact beyond research are available to senior researchers and it can be exciting, challenging, but also very rewarding to take on these different types of opportunities. As a recently promoted researcher, it’s good to start thinking about such possibilities.

One aspect of seniority that is important but can easily be overlooked is the necessity to grow as a *mentor* for more junior researchers, especially those junior researchers who are underrepresented in computing. In our field these include women, people of color, people with disabilities, first generation college students, and others. A senior researcher must not think only about themselves and their own success. They cannot focus only on their direct reports or advisees. They must think about their broader team, their institution, their research area, even all of computer science as a field. We can all think back throughout our careers and remember great people who helped us along the way by providing advice, inviting us to give a talk, sending an opportunity our way, participating in a workshop we were organizing, etc. We can all remember being inspired by senior researchers describing entirely new research directions for the community. We can all remember being thankful to senior researchers for stepping up and arguing the importance of computer science as a field to higher level governments. As a senior researcher, it is now our turn to do the same. Everyone learns quickly to think and help their students and their immediate team.

Senior researchers must do much more than that. While this may feel intimidating, it need not be. Helping others can be as simple as providing respectful advice to an assistant professor from another university who just gave a presentation, or asking a committee to pause when the shortlist for an important role or keynote talk only contains the small set of individuals who get invited to everything. It can take the form of helping to try new ideas for how we run our conferences, serving as PC chair, general chair, or other. It can mean participating in a national organization, in the US these would be organizations such as the National Science Foundation Computer and Information Science and Engineering advisory council, the Computing Community Consortium, the Computing Research Association, or other. There are many ways to lead a community once one recognizes that it is a senior researcher’s responsibility and opportunity. When we get tenured and move into associate professor ranks, it’s good to start thinking about these types of contributions, start preparing oneself to take them on, and slowly start to explore these types of leadership roles.

On a related thought, senior researchers also need to take on greater leadership roles and responsibilities *at their home institutions*. Senior researchers need to contribute to the vision, direction, and success of their organization. We work at fantastic companies and established universities. We benefited from their support and resources to establish ourselves. Now that we are senior researchers, we need to take our organizations to the next level and ensure their continued success. This can also take many forms. One can chair a major committee such as an admission or hiring committee. One can work on revamping some aspect of the organization whether related to education, research, or policies and procedures. One can start a major initiative that builds on the organization’s strengths and enables some dramatic new fundraising. Whatever the approach, it is important to simply acknowledge and embrace the fact that our organizations are relying on us to significantly contribute as its senior members. As an associate professor, one approach to helping our universities in this way without becoming overwhelmed is to pick only one activity of this type and focus on it. Later, as a full professor, one can expand to leading multiple such activities.

While we embrace our senior role to take our career and impact to the next level, it's important to also remember *our community*: our partners, children, parents, friends, and neighbors are counting on us. We all know that life is short, and time goes by fast, but it can be surprising just how fast time goes. As an example, before the pandemic hit, I was planning to take my kids on a trip to Europe but didn't get around to it. They were too young, I thought. It's an expensive trip. Then the pandemic hit and now I'm realizing how few years I have left before my kids go off to college. At the same time, I look back fondly on all our ski outings, camping trips, violin recitals, soccer games, and other activities. I'm also proud of how well they are doing at school in spite of their learning differences and the school struggles that inevitably hit anyone who doesn't fit the mold. It can feel like a cliché, but a promotion to senior researcher is a really good time to pause and ask ourselves: "In addition to my exciting work, am I accumulating regrets in my personal life, or am I accumulating fond memories?" "Am I self-centered, or am I helping my family and community?" It's important to support our families and communities and do something meaningful outside of work.

Finally, while reaching a senior level can feel like one can sigh a sigh of relief, senior roles can also be very stressful. Between all the exciting projects, responsibilities, and challenges, we can get pulled in too many directions, and have to work non-stop. Everyone around us will say: "Remember to take care of yourself" but sometimes the question becomes "How can I do that with everything going on?" So let me leave you with three ideas that I learned much later than I wish I had. I hope you will find them helpful.

For stress, I learned from a colleague who is a professor of psychology that stress often comes from an imbalance between the demands that are put upon us and the resources we have to respond to those demands. For that reason, when stress becomes too high, it's good to share it with someone or look for extra resources in another way. For example, if there's a difficult situation at work and difficult decisions need to be made, can we find others to discuss the situation with and discuss the best response? If funding is challenging, writing grant proposals with others can be both more fun and less stressful. In case of a difficult situation at home, sharing the situation with our manager or department chair can help to identify options to perhaps reduce work

responsibilities temporarily. When one is faced with too many community-serving or other tasks, perhaps that is a good time to delegate something to a more junior person who could benefit from the exposure and learn to take on more of these responsibilities; or perhaps it is a good time to recruit one or two fewer Ph.D. students. When stress arises, it's good to recognize the imbalance and ask ourselves: I have insufficient resources to meet the demands that are put upon me. How can I either reduce those demands or access additional resources?

For overall self-esteem, it's good to remember that everyone around us is an iceberg: We see the tip of the iceberg, which shows all the successes and awards, but we don't see the much larger bottom of the iceberg with all the challenges and struggles. For that reason, if you find yourself comparing your accomplishments to that of others, stop right there. The only valid comparison is yourself now to yourself last year and yourself in the future. We can all grow and do better. The question to ask ourselves is how do we want to grow in the next year? How do we want to do better?

And, finally, when something doesn't work out, when we make a mistake, when we fail in some way, it can be really helpful to say it out loud ("This really wasn't my finest moment"; "I really could have done a better job with X"; "I need to figure out how to do better with Y"), acknowledge that we need to let ourselves grieve over that failure, and then conclude by saying: "I didn't fail. I tried and found a way that doesn't work. Let me try differently next time and see if it works out better". Thomas Edison said just that: "I have not failed. I've just found 10,000 ways that won't work."

I hope you found some of the above helpful. And while it's good to listen to advice, after listening, one should always do what one thinks is right and not necessarily what the advice recommended. Enjoy your new senior researcher role. I hope it will enable you to do great things, both for you and those around you.