

Sample 1

Faculty Development Plan

Teaching

Self-Assessment

I came into my department as a visiting professor who had initially received very poor teaching reviews. I have since taught seven courses and have improved those reviews in many areas. While I can improve in every area, I look especially to improve my explanations of complex ideas and my course organization.

Student feedback in past courses revealed that many students wanted more visuals, especially when it came to complex ideas. I intend to offer visuals wherever possible. To this end, I obtained a tablet and pen that I can use in my online classes to offer a whiteboard experience. I'm also brainstorming ways to use the advantages of the online medium to improve in this area.

I have also received feedback that course content seemed disconnected and, particularly, that lectures did not prime the students appropriately for their assignments. I participated in the *Effective Teaching Workshop* (ETW) offered by the CTL to make the 330 course a more holistic experience.

I am also putting final touches on a new 401R class on the standard use of dependently-typed functional languages to assist in the formalization and verification of software. This topic is extremely relevant to industry and will not only greatly enhance the students' facility with programming languages, but also with formalizing properties of software mathematically. This ability will serve them whether they pursue graduate studies in CS or proceed to industry and whether or not they use automated tools in their efforts.

Long-term (3–5 year) plan

Long term, I would like to be known as a professor who offers well-organized courses which motivate and challenge students. I intend to become this professor by following the rubric given at the ETW. Per the ETW, a well-organized course comes from a pointed and coherent overarching purpose toward which all course activities are aimed. Students are motivated when this purpose frames expectations. hence, instructors should permeate their course elements with explicit purpose so that students can fully connect their efforts to course outcomes. Challenge comes from offering the students a deep and

foundational exposure to the material, though it must be accessible or motivation is destroyed.

Following this rubric effectively requires practice and organizing a course well requires iteration and feedback. For the next few semesters at least, I am teaching 330, which will give me the opportunity to iterate. To obtain feedback, I will solicit feedback from the students through mid-course evaluations and similar. I will practice applying this rubric in the design of my new 401R course.

2020 Goals

- Use the Effective Teaching Workshop to revamp CS 330 to provide a more holistic experience to students.
- Solicit feedback from students during the semester to assess motivation, challenge, etc.
- Create a new 401R on programming languages for formalization and verification.

Current Progress

I have made substantial progress revamping and creating the courses I will be teaching in the fall.

I participated in the Effective Teaching Workshop the CTL offers and subjected the 300-level course to it.

I have finalized most of the assignments and schedule for 401R.

Research

Self-Assessment

I have the tools to solve fairly significant technical problems in my area, and one of my core strengths has been a mildly unorthodox (but fruitful) perspective. At the same time, I would like to choose and position my work to have more impact. My dissertation laid the foundations of work that could substantially improve programming practice to produce reliable software. I intend to build my research program around this general theme and include the continuation of my dissertation work as a major part. In addition, I intend to apply the techniques and approach to critical areas, such as smart contracts.

It took me longer than I expected to ramp up my publishing as a PhD student. I intend to maintain current positive trends by collaborating more, seeking a wider variety of

venues, and becoming more involved in professional activities in my research community.

I also intend to perform more outreach in the department to attract students. I believe there is a sizeable amount of latent interest in my general research area, programming languages, and I am excited to offer students a rewarding outlet for it. I plan to reach out in my programming languages course, a natural venue, and spend a day near the end of the semester discussing open problems in programming languages that I am equipped to help students tackle. I also plan to discuss these things with my 400-level class, the content of which is rigorous and demanding enough to identify potential graduate students.

Long-term (3–5 year) plan

Long term, I would like to be established in the practical areas of smart contract language design and verification and query language design. I would also like to have an externally-funded research lab filled with motivated, excited students doing impactful work.

My 401R class concerns a mathematical theory of programming that will allow students to use advanced programming languages to perform software verification. Not only is this topic highly relevant in industry (and so has practical merit), but it will allow me to use this course as both a training ground and recruitment tool to get students involved in my smart contract verification research. At a smaller scale, my 330 course (which concerns programming languages generally) serves the same purpose for the language-design aspects of my research agenda.

2020 Goals

- Submit a paper to a flagship PL conference about the use of an easily-embeddable DSL with well-understood foundations to allow a naive expression of unrestricted parsers with state-of-the-art performance profiles.
- Submit a grant proposal to the NSF Secure and Trustworthy Computing program to develop new static analysis frameworks, techniques, and interfaces to assist development of trustworthy smart contracts.
- When circumstances permit, reorganize the informal *Programming Languages at Lunch* seminar and potentially form a campus club.

Current Progress

I have submitted two articles to top conferences in my area this year. Looking forward, I

have had numerous discussions with external collaborators about the topic of our paper and have begun writing the results of our research. I have brainstormed and search the literature to strengthen a previous proposal to NSF SaTC and am investigating several related topics for new proposals.

Last year, I organized *Programming Languages at Lunch*, a weekly informal seminar in which we discussed specific PL topics. Though our only publicity was hallway fliers and word of mouth, a had over a dozen students attend over the course of the semester, and have had several other students since express their interest and ask if I'm continuing it. This experience has given me confidence that latent interest in PL exists.

Citizenship

Self-Assessment

One of my major weaknesses is that I don't speak up often as a junior member of a lab, class, or department. Another is that I sometimes delay speaking up so that, when I do, the discussion is moving on.

I intend to be more active as a citizen of the department, to feel more comfortable voicing my perspective in general and committee discussions. It is important to me that discussions be edifying and want to make sure that anything I voice is an uplifting contribution, not unduely negative, and especially not dismissive of or disrespectful to other faculty or students.

Long-term (3–5 year) plan

Within the next 3–5 years, I hope to have a significant (but not outsized) impact on the undergraduate curriculum, which the undergraduate committee is undertaking to revamp. I hope that compatible with this revamp is an integration of systematic program design to offer students tools to the discovery of solutions in addition to their implementation.

I also would like to see CS-related campus clubs flourish as an environment for enrichment and networking.

2020 Goals

- As a member of the undergraduate committee, become informed so that speaking up early and often will be constructive the the committee's goals.
- Become informed enough to be able to take the lead on assignments and

subinitiatives.

- As ACM club advisor, work with ACM club officers to recruit new members, offer valuable networking opportunities, and expose members to career-enhancing technical content.

Current Progress

I have made no progress so far, since these responsibilities begin in the fall.

Goal Alignment

My teaching goals are centered around providing students with courses that are rich, well-organized, expanding, and career-relevant. My research goals are centered around doing impactful research with students. My citizenship goals are centered around supporting individual members of committees and organizations in my department to fulfill their respective missions. I believe that each of these emphases is in accord with the goals of both the department and university.

Needed Resources

At this time, I have the resources (or the means to obtain them) to help me achieve my goals in each of these areas. In particular, the department has provided time (through reasonable teaching and service expectations) and the college has provided seed funding. To maintain my ability to support students in my research program, I intend to seek external funding. I expect the department to remain reasonable with respect to the time demands it places on faculty members.

Sample 2

**SAMPLE
Faculty Development Plan
August 2020**

This is my plan for how I can become the type of colleague, teacher, and researcher that I want to become in the next 3-5 years. I will begin with a self-assessment that should motivate the more concrete goal and plans that will make up the remainder of this document.

Self Assessment

I have had, to this point, 7 years of experience as an Assistant Professor and as such I have some experience to draw from as I consider my strengths and weaknesses, and the things I need to do to improve and become better.

Strengths. I enjoy teaching, and measured by student ratings and other feedback, I have been successful at it thus far in my career. I love the challenge of understanding and presenting material in such a way that it will click with students, and so that they will be motivated to study and learn and apply the things that we are covering. Another strength has been my mentoring relationships with students. I have been able to develop good relationships with the students I have advised so far, and I feel that this has been a positive thing for them and me. This has not always immediately led to the level of research productivity that I have hoped for from those students, but I know that each student I have mentored knows that I care about them personally and I am confident that I have been able to treat them in a Christ-like manner. A final strength I will mention here is that the research I have been involved with has been quality, and I am pleased with it.

Interests. I am fascinated in agent interaction and assessment, and in strategic planning. Personally, I love sports and games and my research largely focuses on overcoming the challenges inherent in developing and assessing agents for these types of situations. I love working with students and collaborating with others to accomplish challenging tasks. I am particularly interested in expanding my work into areas like “ad-hoc teamwork” which focuses on developing agent strategies that are able to collaborate successfully with arbitrary partners. I want to become known for doing fundamentally sound, novel, and insightful research into these types of problems. I think that there are opportunities that abound to make positive contributions.

Areas for Development. The biggest areas I see that I can continue to develop are in scholarship. First, I would like to get better at writing and submitting competitive grant proposals in order to fund my research lab. Second, I would like to be better at collaborating with other researchers to make progress towards shared goals, both on proposals and papers. Third, I would like to get better at increasing my research output, in terms of papers submitted. The goals and plans that I discuss later in this document are aimed at helping me get to the place I would like to be at in 3-5 years.

Goals

In this section I will discuss my goals in each of my three areas of responsibility. For each I will give the actionable plan that will help me to reach those goals, as well as how these goals tie into the aims of the department and university, and my progress towards these goals.

Citizenship. Citizenship is not an area where my goals over the next 3-5 years involve a great deal of change to my current behavior. I will now list my goals and discuss plans and other details for each one in turn.

- *Serve whole-heartedly on committees to which I am assigned, and in other assignments within the department.* This is something that has been a pleasure to do so far, and I anticipate it will continue to do so. This has been a great avenue to meet and associate with other members of the department and have in-depth discussions about what our vision for the department is. So far I have worked on the Graduate committee, where we have had the aim of focusing the entire graduate program more singly on producing high quality research. I will measure the success of my achievement of these goals by what we are able to accomplish on the different committees on which I serve, as well as the general atmosphere of the department, along with feedback from the department chair and others when the opportunities arise.
- *Mentor promising undergraduate students.* In my short time at BYU I have already been amazed at the quality of the undergraduate students. There are many ambitious, highly motivated, and intelligent students. I have already been working with 4 undergraduate students in a few capacities. 3 have been doing undergraduate research, and I think all will continue into the fall. 1 was doing undergraduate research hours for class and will graduate in a few weeks. I don't want to overextend myself with too many of these students, but so far it has been great interacting with them and we have had a chance to start exploring several new topics that interest me greatly and I can see leading to publishable research in the not-to-distant future. This also is a great way to prepare these students for graduate school and/or jobs. I plan to continue to accept and mentor these students as my capacity allows. I will be able to measure my progress in this goal by the number of undergrads I mentor and by how they are impacted by this, in terms of what they go on to next, as well as other feedback they might give along the way. This goal coincides with the recent focus at all levels of the university on mentoring and giving undergraduates opportunities to participate in more close settings with faculty.
- *Serve as a reviewer for conferences, journals, and panels in my area.* This is also something that I have been doing for a while now and I plan to keep it up. I will measure my progress in this endeavor by the number of reviews I am able to perform each year. I don't necessarily want to increase it too much, since this is not something I want to dedicate too much time to, but I plan to maintain it at current levels.

Teaching. Teaching is one of the main things that excites me about being a professor at BYU. My goals in this area are mainly divided based on improving the different individual classes that

are in my planned stewardship for the next 5 years, and obviously adjustments to this might have to be made as those assignments change. A few goals in this area are slightly more general as well.

- *CS 470*. This class has such potential. Sometimes I feel that it has become a sort of random grab-bag of various AI topics. My goal is to give it much more sense of purpose and cohesion. I taught this class for the first time in Winter 2020, and basically used the same class that I had taught before at Mississippi State, with a few adjustments due to the fact that other classes (like Machine Learning) exist here at BYU and so those topics didn't need to be covered in the AI class. In the time since that class has ended, in preparation for Fall 2020, when I will be teaching it again, I have put a lot of effort into restructuring the topics in the class to form a more cohesive whole. I have also met with my CTL contact to discuss my plans for the class, and he has given me great feedback. I plan to continue these efforts, refining and honing the class content until the class is awesome. I will continue to utilize the resources at the CTL from time to time as I do this. The main feedback I will get to measure this goal is my own personal reflections after the class, student reviews and ratings, and feedback from other professors who are involved with the class, or have their students in the class. I will also be able to get feedback from student who are involved in research with me and take the class, and see how prepared they are by the class to think deeply and precisely about AI research topics.
- *AI Curriculum*. There has been some discussion among other AI faculty regarding providing a more experiential AI education for our students. I want to be an active participant in these discussion and help move our AI curriculum to a place where more of the AI faculty feel good about it, and that it can really be an asset to our students as they move on from BYU. This isn't something that I can do by myself, but if we can be successful I think it can have a large impact on the students. I will measure progress on this goal by changes to the AI curriculum, and especially how involved I can be with the discussions and deliberations regarding these changes.
- *CS 670*. This is a graduate class that I will be able to focus on my own research area. I have not yet taught this class, and expect to teach it 2-3 times over the next 3-5 years. My goal for this class is to help develop researchers, especially those graduate students involved in my lab. I plan to continually refine this class as I teach it, based on student feedback and my own personal reflections. I will measure my success by how students are able to contribute to research following the class, and especially by how many student researchers are able to incorporate ideas from the class and use it as a boost to help them make progress towards publications. Essentially, the end goal of this class is to produce better research, both from myself and my students as well as from other graduate students in the class. This goal aligns well with the graduate committee's recent focus on publications as the main target for graduate students.
- *CS 224*. This is the core class that I am involved with, and I love it. I think that it is a fundamental and foundational class that can really help our students become computer scientists. I taught a section of this in Winter 2020, with Eric Mercer teaching the other

section. We modified the class pretty significantly from what it was before, and I think by and large this was a success. My goal is to make this class a strength in the department, and for students coming out of it to really grasp the material that we want them to know. My plan is to continue to work with the rest of the faculty that teach this class, use student reviews, and my personal reflections to improve the class from semester to semester. This class would also be a good one to get input from the CTL on ways to make it better. I will measure success in achieving this goal based on student grades in the class, specifically on the culminating Bomb and Attack labs. Another indicator that I will track is the number of students that pass the class (as opposed to withdraw or fail). I will also rely on feedback from teachers of later classes to see if students seem better prepared for later classes with a more solid grounding from this class. Granted that feedback will be largely anecdotal, but it is important none-the-less. This goal forms an integral part of our department's goals to provide all of our CS students with a solid and fundamentally sound CS education, and to give them the knowledge, perspective, and skills they need to be successful.

- *Better include the Spirit in my teaching.* The Spirit is important to any successful teaching, but a big change for me personally in moving to BYU has been the fact that I can now explicitly invite the Spirit into the classroom, acknowledge and discuss His influence, and testify of Gospel truths. I understand that this is a big change for my teaching, and my goal is to continue to improve in this aspect of my teaching. My feedback from my first semester teaching here was positive, but I know it can also improve. I will rely on my student reviews and own observations, especially of times when I feel the Spirit in class, to give me feedback as I try to improve. I also plan to discuss this subject with other faculty at department functions, like after-devotional-bagel lunches, and also get ideas from my contact at the CTL. Perhaps most importantly, I need to include prayer as an integral element of my preparation and planning for classes. As I make progress towards this I will better contribute to the university's goals of spiritually enriching our students.

Scholarship. This section contains most of the goals that I believe will require the most concerted effort and, at times, improvement and change. These goals are the desired "steady-state" of my scholarship in 3-5 years, and my plans are the concrete smaller things that I aim to do to make those goals a reality. I have also tried to make the goals and plans largely things that we (together with my students) can control.

- *Submit 4+ tier-one publications from my research group each year.* These should pretty much all be submissions that involve students as a first or co-author. This level of research output will probably require a lab of 1-3 PhD/MS students, and 4-5 undergraduate students. I am currently advising 1 PhD student, 1 MS student, and I know there is at least one I am going to start advising in the fall. I also have 3 undergraduates that I am already working with, and other potentials for fall. This is a good start to growing my group, and as these students mature I hope to add more to the group in order to maintain productivity from year-to-year as students graduate. Last year

I had 1 submission that qualified, and this year there are currently two papers in the works. Several other ideas are developing with students that just joined my lab over the summer. As these students and their ideas progress, I can see reaching this goal in the next few years. This will require me mentoring my students effectively, helping them develop as researchers, and helping them generate and evaluate good, impactful ideas. I plan to submit publications to lower-tier venues when warranted by the work itself or by feedback from initial tier-one submissions. Department support to fund students, my lab, and travel, until I reach my next goal, would be very helpful in my being able to reach these goals. My startup package provides enough funding for this at present, and I am grateful for the opportunities that it provides me to work with students right away. I will measure success on this goal quite simply by the number of papers that we submit. A secondary metric will be how many are accepted for publication, but that is sometimes a bit out of our control and will only increase as I increase the number and quality of our submissions.

- *Externally fund my research group.* My specific goal here, that I can measure, is to submit at least 1 grant proposal each year. On a more fine-grained level, I have a goal to write every-(work)day for 20 minutes to make progress on developing ideas and polishing them for grant proposals. I also plan to utilize the university's resources to identify appropriate funding venues. NSF is at the top of my list, but I recognize that there are other possibilities as well, and I intend to pursue them also. I submitted one grant proposal last year, as a part of a team of BYU CS researchers, and I plan to submit a more individual proposal later this year. I will measure my success in this goal by the number of submissions I make, as well as by whether or not I am able to fund my students with external funds.
- *Successfully convert undergraduates to graduate students, either in my lab or at other universities.* This is a goal that I will be able to measure, based on what happens to the undergraduates that work with me on research. It largely speaks to the goal I want to have as I work with them. To accomplish this, I will need to be producing quality research with those undergrads, and helping them fall in love with research. I have been inspired by Sean Warnick and how he has succeeded in getting his undergraduate and MS students to matriculate into PhD programs both here and across the country. We are seeing the impact of that as his former students are now top candidates for positions here or at other universities, and I think that they will be able to have a huge impact on the world in either location. My plan for accomplishing this goal is to treat the undergrads on my team as full-fledged equals in research, just as if they were grad students already. Of course I will need to offer them more guidance and teach them things they need to learn, but I think that by giving them a taste of the fun, open-ended nature of research, they will be successful at this.
- *Collaborate with other researchers.* My specific plan to make progress towards this goal is to make at least 2 contacts each semester with potential collaborators. I have been able to accomplish this so far here at BYU, but nothing solid has come of this yet. As I continue to get out of my "bubble" and speak to others I think I will get better at this skill and it will hopefully lead to fruitful outcomes. I will measure and track the contacts that I

make to see if I have reached this goal. If I have already been successful at establishing a productive collaboration then I will reduce my plan to 1 contact per semester.