

FACULTY DEVELOPMENT PLAN



A faculty development plan for the period of employment from my first year through my continuing faculty status review is proposed in this document. The plan will be updated annually based on input from my department chair during my annual stewardship interview. The faculty development plan is a planning tool, but my intent is that parts of the plan will form the basis for the personal statement I will produce at the time of the CFS review.

The faculty development plan describes my proposed activities in the areas of citizenship, teaching, and scholarship. The plan contains (a) self-assessment of my strengths, skills, competencies, interests, opportunities, and areas in which I wish to develop; (b) professional goals in citizenship, teaching, and scholarship and my plan to accomplish these goals; (c) the relevance of my individual goals to the department and university aspirations and needs; (d) a statement of resources needed to accomplish my professional goals, including budgetary support, equipment, and time; (e) activities and accomplishments so far in achieving my goals; and (f) a brief comment on the measures used to assess success in my professorial responsibilities and to help me accomplish the goals set forth in the plan.

A. Self-Assessment

The following is a self-assessment of my strengths, skills, competencies, interests, opportunities, and areas in which I wish to develop as a faculty member.

Strengths, skills, and competencies

I bring several abilities to Brigham Young University and to the Department of Civil and Construction Engineering in particular. Foremost among these is a strong commitment to the Church of Jesus Christ of Latter-day Saints. I have a testimony of the restored gospel of Jesus Christ and I strive to keep the commandments. This testimony informs all that I do in my scholarship and teaching.

I am a licensed professional structural engineer with a specialization in structures made of steel, wood, and composite (steel/wood and concrete) construction. Returning to academia after six years in industry has been challenging, yet immensely rewarding. While I value my professional experience, I have achieved the most professional growth during my time as a faculty member. Freedom to conduct research has also allowed me to fulfill BYU's motto to "go forth to serve" on a much larger scale than was possible in industry.

I joined BYU in May, 2020. Prior to that I held the rank of Assistant Professor at the University of Wyoming for five years. I have taught at three universities: Virginia Tech, the University of Wyoming, and BYU. I earned B.S. and M.S. degrees in civil engineering from BYU, and a Ph.D. in civil engineering from Virginia Tech. At Virginia Tech, I gained advanced training in structural analysis and design, with a focus on steel framed buildings. Accordingly, I feel

comfortable teaching most of the undergraduate courses in structures (e.g. mechanics of materials, structural analysis, structural design), and I am capable of teaching several graduate courses (e.g. advanced analysis and advanced design). I am especially excited to teach courses that take advantage of my professional experience, such as steel design and wood design.

I bring a unique blend of professional expertise and academic training. These experiences color my research and enrich my teaching. They allow me to productively collaborate with faculty and students both within my department and from without. Moreover, I strive to be collegial in all my relationships and to be an active citizen in my department, college, university, and in my profession. These abilities have prepared me to be a successful faculty member in the department and outstanding role model for our students.

Interests

My main research interest is to design and build civil infrastructure (buildings and bridges) to better withstand earthquakes, windstorms, overloads, and other extreme events. My research interest reflects personal experience. Growing up in the Monterey Bay area of California, my curiosity in structures was instinctive. In annual earthquake drills, my elementary school classmates and I would duck-and-cover under small desks. Our aptly named school, Salsipuedes (Spanish for “leave if you can”), was a reminder of the vulnerability of buildings to ground shaking. During the 1989 Loma Prieta Quake, however, I learned for myself the importance of structural engineering. Our home of 1950’s construction was not damaged extensively, but reeled during the 7.1 magnitude quake. This prompted my Dad to enlist me in retrofitting the interior garage shear wall using plywood and nails. That was a portent of what I would later study during my Master’s program. Subsequently, while living on the east coast, I personally witnessed the devastating effects of windstorms, especially derechos. As a natural result, both earthquake and windstorm resilience have become a common theme in my research.

Opportunities

My abilities and research interests align with the principal priorities of the National Science Foundation (NSF) and match key components of two NSF programs: the Engineering for Civil Infrastructure (ECI) program, and the Natural Hazards Engineering Research Infrastructure (NHERI) program. Both programs emphasize multi-hazard resilience, especially for earthquakes and windstorms. My experience with wood and steel has also opened the door to industry-sponsored research and educational collaboration. Over the years, I have formed strong relationships with the American Institute of Steel Construction (AISC), the Metal Building Manufacturers Association (MBMA), the American Wood Council (AWC), and the Timber Framers Guild (TFG). These relationships have been beneficial to me and my students.

Areas to develop

I wish to develop as a scholar, teacher, and as a member of the university. There is much to learn. Although I have conducted scholarly work for over twenty years (my first archival journal paper was published in 2002), I endeavor to become an excellent scholar in my field. Likewise, although I have significant experience as a student and as a teacher, I do not believe I have arrived in education. Effective teaching requires constant development and continued adaptation,

as demonstrated by the COVID-19 pandemic. The following sections describe my plan to develop in these key aspects: citizenship, teaching, and scholarship.

B. Professional Goals

Citizenship

My professional goals in citizenship are to provide meaningful leadership and service to the department, university, and the profession. By doing so, I will represent the Church well.

Goal #1: Provide Meaningful Service. I want to serve others. I plan to serve as a faculty advisor to student-led initiatives, and I plan to accept invitations to serve as they arise. I want to assist the department and the university in administering its programs, according to their needs and as directed by the department chair. To accomplish this goal, I plan to continue to

- serve as advisor to the AISC Steel Bridge Team,
- provide an FE review course in structures 2 times each semester,
- accept invitations to present at ASCE meetings and CEEN 101 when requested,
- be an active member of the department graduate committee, and
- be an active member of the department ad-hoc faculty search committee.

Goal #2: Contribute to the Profession. I want to make a positive contribution to my profession by serving on national committees. I want to continue serving as an NSF panelist, and I want to continue to review articles for top-tier journals. I want to serve as a referee in my area of expertise. I plan to seek advice from others to improve my ability to give professional service. To accomplish this goal, I plan to continue to

- serve on standard development committees, and
- review approximately 10 to 20 top-tier journal papers each year.

Teaching

I have two professional goals in teaching: (1) to become an outstanding teacher, and (2) to become an excellent mentor. My overarching aim in these efforts is to help students become proficient in structural engineering and to contribute toward their faith-centered education. The chance to work with students was my main motivation for pursuing an academic career. Although this desire can be fulfilled at many institutions, teaching and mentoring students at Brigham Young University has provided the responsibility to prepare graduates who serve not only in the profession and the community but who, more often than not, lead in the worldwide ministry of the Church.

Goal #1: Become an Outstanding Teacher. Over the years, I have observed several characteristics of outstanding teachers. Chief among these is a genuine concern for individual students. Therefore, as an educator I want to create settings for meaningful, one-on-one interaction. One of the simplest ways to connect with students is to know their name. Being available in my office and to invite students to visit in person or via zoom is also important. However, my time is limited. I want to cultivate students to form “teams” (such as a class project)

to provide a second line of defense for struggling students. I believe this approach is similar to the Church welfare plan, which edifies the receivers and the givers, while fostering unity.

I want to engage students in their learning. In the classroom and in student mentoring, I seek to instill excitement for learning. Great educators are passionate teachers. I'm fascinated by many concepts in structural engineering, and I strive to convey that energy to my students—to pique their curiosity and get them excited about learning! As John Adams put it, “an inquisitive mind is essential.”¹ I believe this is still vital in our day.

I believe a true teacher invites students to be diligent learners. In this and other aspects of my approach to teaching, I am strongly influenced by my Church service. While my role as a teacher is important, ultimately students are responsible for their own learning. Real learning cannot be a passive experience. I want to encourage students to find answers to their own questions. When they do this, more often than not they develop a deep understanding of course material. I believe President Nelson said it best, “In the pursuit of education, individual desire is more influential than institution.”²

I believe another characteristic of effective teachers is that they focus on the significant. Fundamental understanding must precede application. For example, in steel design, students that understand the difference between considering equilibrium of a structure in the deformed configuration, compared to the undeformed configuration, are better able to understand and apply the stability provisions in the AISC Specification. Another reason to focus on fundamentals is that the process of learning is incremental³. We can't learn everything at once. When students encounter obstacles or have a setback, I want to encourage them to take the long view and to realize that education most often occurs as a sequence of small improvements over time. I want to have a balance of undergraduate and graduate courses to guide students through the learning process.

Lastly, as a teacher-learner I, too, am committed to life-long learning. I continually update my course content and evaluate my pedagogy. I want to keep the subject fresh and use modern teaching techniques, like a “flipped classroom” or VR. At the same time, I plan to take advantage of department, college, and university workshops. To accomplish this goal, I plan to

- know each student's name,
- have an open-door policy,
- teach both undergraduate and graduate courses,
- consistently have excellent student ratings and positive student comments,
- attend the New Faculty Series in 2021, department and college training,
- apply for the EXCEED Teaching Workshop,
- have a peer evaluation, and
- carefully review student comments after each semester, and implement changes.

¹ David McCullough, *John Adams* (Simon & Schuster, 2001), 364.

² Russell Nelson, <https://www.lds.org/study/ensign/1992/11/where-is-wisdom?lang=eng>.

³ Yo-Yo Ma, <https://www.npr.org/2018/08/16/639206471/yo-yo-ma-tiny-desk-concert>; D&C 98:12.

Goal #2: Become an Excellent Mentor. An effective way to inspire active learning is to look for opportunities to engage students in scholarly work. In the process of discovery, students gain practical skills, regardless of where their future career path may lead. My own undergraduate research experience at Brigham Young University was formative and life-changing, and I will be forever grateful to Dr. Fonseca for being an excellent mentor. To accomplish this goal, I plan to

- mentor 2 new undergraduate students each year,
- advise 2 new graduate students (as committee chair) each year, and
- meet weekly with each undergraduate and graduate student that I mentor.

Scholarship

My professional goal in scholarship is to form a productive, high quality research program that is supported through external funding. The long-term purpose of my research is to develop civil infrastructure that is safer and less prone to damage when subjected to strong ground motions, rare large-magnitude windstorms, vehicle overloads, and other extreme events. In my scholarly work, I draw equally from analytical methods (i.e. computer simulation) and from experimental methods (e.g. tests in the Clyde Building Structures Laboratory). I want to be a conscientious scholar, keeping in mind that nothing less than public welfare is at stake. I want to conduct high-quality research that is both visible and transformative, and to enable my ideas and papers to become not only a part of the current scholarly conversation, but to make an impact on the way we design and construct structures. Thus, my two professional goals:

Goal #1: Conduct Impactful Research. I want to conduct high-quality research that is both visible and transformative. This is possible. Both analytical methods and experimental methods can be visually appealing, and both can have a direct impact on society. However, there is usually a significant lag between the time when a project is awarded, to the time when the findings are published. As a result, I find it important to present and publish interim findings. Therefore, I plan to

- submit 3 papers to top-tier journals each year,
- publish 2 journal papers each year, and
- publish 4 refereed conference papers each year.

Goal #2: External Funding. I want to win externally funded grants, because this is the best way to accomplish Goal #1. I will strive for a consistent level of funding and for competitive grants. My basic approach to winning funding is to first identify potential sponsors in my areas of interest, determine how my research fits within their mission, and then write a compelling proposal. Once a project is awarded, I find it effective to involve students early in the planning phase. I avoid micromanaging the students I work with. My experience has been that students who have “ownership” of a research project are more likely to be successful. Therefore, I plan to

- submit 2 proposals for externally funded grants each year,
- win 1 new externally funded grant each year,
- submit an NSF CAREER proposal prior to candidacy for CFS,
- involve students in publication of each journal paper or conference paper, and
- attend the 2021 UDOT Research Workshop. If not admitted, I will reapply.

C. Relevance

The relationship between my individual goals and department and university aspirations and needs are described in this section. The mission of the department is to prepare world-class civil engineers and leaders who are committed to the gospel of Jesus Christ. The goals put forth in this plan support that mission. In addition, these goals help me to become a role model of a life that combines intellectual rigor with spiritual integrity, thus assisting BYU and the Church fulfill their mission: to assist individuals in their quest for perfection and eternal life.

D. Resources Needed

The resources needed to accomplish my professional goals, including budgetary support, equipment, time, etc. are briefly summarized in this section.

Citizenship

To accomplish my goals in citizenship, I need time (and in some cases, funding) to support my service. The university has provided a start-up fund that is sufficient for this purpose. In some cases, professional organizations (i.e. ASCE) will offset travel costs. Due to the pandemic, however, no travel outside of BYU is currently scheduled.

Teaching

To accomplish my goals in teaching, I need physical resources (i.e. classrooms equipped with web cameras, microphones, and projection screens) and mentoring from senior faculty. To date, these needs have been met by the college, the department, the BYU Faculty Center, and the BYU Center for Teaching and Learning.

Scholarship

To accomplish my goals in scholarship, I need time, equipment, and students. The university has provided a start-up contract that is sufficient for this purpose. Specifically, I have a reduced teaching load my first year (2 courses or 6 credits) to establish my research program. After the first year, it is anticipated that my teaching assignment will be the typical department teaching load (3 courses or 9 credits during an equivalent two-semester period, and 1 course or 3 credits in the spring or summer terms). However, I have an external grant that is contracted to provide summer funding for the next two years. In terms of equipment, I need computer hardware, software, and experimental equipment. These needs are being met through the start-up funds provided by the university. Therefore, I plan to

- spend my start-up fund allocated for capital equipment, and
- request an adjustment of my teaching load to be 3 courses, subject to department approval and the university's needs.

E. Accomplishments

My activities and accomplishments so far in achieving the citizenship, teaching, and scholarship goals is described in this section.

Citizenship

- In December 2020, I was honored to be an Outstanding Reviewer for the *ASCE Journal of Structural Engineering*. This is the premier journal in my field.
- I was invited to be a member of the Steering Committee for the ASCE 7-22 National Design Snow Load Map effort. This effort started in January 2020 and is expected to be completed in 2021.
- I continued to serve as a member of the ASCE 7-22 Subcommittee on Wind Loads. This is a six-year commitment that culminates with the ASCE 7 code cycle in 2022.
- Within the Department, I served on the graduate committee and as an advisor for the undergraduate AISC Steel Bridge Team.
- I provided an FE review course in structures 2 times during Fall 2020.

Based on these accomplishments and the department rubric (CEEN Evaluation Matrix), my self-evaluation of my performance in citizenship is: Good.

Teaching

- I attended the 2020 Effective Teaching Seminar (BYU Center for Teaching & Learning).
- Since joining BYU in May, I mentored 3 Master's students.
- Since joining BYU in May, I mentored 4 undergraduate students.
- I prepared and taught CE 529 (Structural Wood Design) for fall semester. The BYU Student Ratings were as follows:
 - Section 4.5 - 5.0
 - Course 4.8
 - Department 500+ 4.4 - 4.8
 - College 500+ 4.6
 - University 500+ 4.6

The student comments were generally positive.

Although I have taught CE 529 before, it was like a new prep. I converted the course from a TTh class to a MWF class. I changed the delivery mode from in-person to a hybrid format (in person and live remote). I modified the content to fit the department curriculum (e.g. changing materials to match BYU course abbreviations) and made other enhancements.

- I completed 4 of my 5 remaining graduate students at the University of Wyoming:
 - 2 Ph.D. students completed in August, and
 - 2 Master's students completed in December.

My remaining Master's student at the Wyoming plans to defend her thesis in May.

Based on these accomplishments and the department rubric (CEEN Evaluation Matrix), my self-evaluation of my performance in teaching is: Very Good.

Scholarship

My main achievement in scholarship has been establishing a new research program at BYU. Since joining BYU in May,

- I secured 2 externally funded research grants.
- I have a total of 4 externally funded grants.
- I submitted 4 papers to top tier archival journals.
- I published 2 papers in top tier archival journals.
- I submitted 7 papers to refereed conferences.
- I published 3 refereed conference papers (some conferences were postponed due to the pandemic).
- I was awarded BYU Engineering seed funding to conduct two proof of concept experiments of a new structural system that self-centers a building after an earthquake or windstorm and concentrates damage into replaceable structural fuses.

Based on these accomplishments and the department rubric (CEEN Evaluation Matrix), my self-evaluation of my performance in scholarship is: Very Good.

F. Assessment Measures

The measures used to assess success in my professorial responsibilities and in accomplishing the goals set forth in the plan meet the definitions of what qualifies as excellent involvement in teaching, scholarship, and citizenship, as defined by the Guidelines for Evaluation of Faculty adopted by the department on December 12, 2013. I look forward to guidance from the department chair, the Department's Faculty Development committee, and my Faculty Mentor. I plan to update and review this plan based on their input.