Where Else but at BYU?

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As I was sitting here, I was struck with the sort of terrifying thought that it’s a real risk for President C. Shane Reese to invite me to address the first forum of his presidency. It could leave a lasting stain on his term as president.

I often begin class at the start of the semester by asking students why they came to BYU. I admit to being quite disappointed that the most common response is “because BYU is cheap.” BYU is certainly affordable, particularly relative to other universities across the nation. At nationally ranked public colleges, the average tuition and fees for the current academic year is just over $10,000 for state residents and just under $23,000 for out-of-state students. The annual tuition for private universities in the United States this year is just under $40,000. By comparison, the annual tuition at BYU this year is just $6,304. I recently read that the total annual cost of education at Ivy League schools is approaching $90,000.

We at BYU are so grateful that the generous financial support of the BYU Board of Trustees makes attendance possible and affordable for so many. Perhaps the board’s generous support of BYU seeks to avoid the sad state of the Book of Mormon people just a few years before the Savior visited that people:

*And the people began to be distinguished by ranks, according to their riches and their chances for learning; yea, some were ignorant because of their poverty, and others did receive great learning because of their riches.*

I would hope that the low cost of attendance is not the primary reason that you students are drawn to Brigham Young University. But whether you are enticed by the low tuition or the promise of good dating prospects or urged by the insistence of your parents, I hope that once you arrive here you then learn to appreciate what it is that truly makes this university a remarkable place to pursue an education. The strength of BYU is so much more than its affordability. We can see that strength if we glance back over our shoulders to...
the beginning and review the vision behind the university’s founding. That look back has been wonderfully facilitated by the recent publication of BYU foundational documents in *Foundations and Dreams*, volume 1 of *Envisioning BYU*, edited by our colleague John S. Tanner.  

The Founding of BYU  

The founding of BYU begins with the life story of Karl G. Maeser, this award’s namesake and the spiritual architect of Brigham Young University. Karl joined The Church of Jesus Christ of Latter-day Saints in Germany, and because of his newfound faith, he was forced to abandon his prestigious position as a teacher in his homeland. He and his wife yearned to gather with the Saints in Zion. By the age that I was when I joined the BYU faculty, Karl had already sacrificed his position and his livelihood as well as served missions in London, Scotland, the German-speaking community in Philadelphia, and the southern United States—all before ever setting foot in Salt Lake City.  

After arriving in Utah, Karl barely eked out a living as a teacher. In 1867, just seven years after arriving in the Salt Lake Valley, he was called again to serve a mission, this time to Switzerland and Austria. He left his family in virtual poverty, with little means of support. While on that mission, Karl briefly returned to his native Meissen, Germany. During that visit Karl’s family and friends begged him to bring his family home and abandon his commitment to the strange new religion, promising him funds to relocate and his former position and prosperity if he returned. He could not be enticed to reject his faith in the restored gospel.  

In 1875, Brigham Young asked Karl to start a Church school in Provo, Utah: Brigham Young Academy. Brigham Young’s iconic charge to Karl was brief but powerful: “Brother Maeser, I want you to remember that you ought not to teach even the alphabet or the multiplication tables without the Spirit of God. That is all. God bless you.”  

In those early days of the academy, the students met in the old Lewis Building until the building was consumed by fire in 1884. The academy then moved temporarily to the ZCMI warehouse. A permanent structure and home for Brigham Young Academy would not be completed for seventeen years. Facing overwhelming odds, meager financial support, makeshift facilities, opposition from the local community, and the prospect of failure around every corner, Brother Maeser toiled to respond to the prophet’s call to build a Church school. He sometimes had to accept garden vegetables from students’ families as tuition payment. It was Karl’s faith in the prophetic mission for the academy that propelled him in the face of such challenges. Years later he said:  

Yet there were not wanting some signs prophetic of a more prosperous future . . . . . . . . . . The strength of the Brigham Young Academy was not in her financial condition . . . . , nor was her distinguishing characteristic to be sought in the professional efficiency of her teachers alone, for all of these advantages have been claimed and enjoyed by schools of learning before, and yet the necessity for the establishment of a new kind of educational institution for Zion had been revealed by the Lord to the Prophet Brigham Young.  

Karl G. Maeser’s service was remarkable. It was he who first embraced the prophetic mission for a Church school and who labored selflessly to plant the seeds for its fulfillment. The magnificent university we now enjoy—some ten million square feet of beautiful, well-maintained buildings, more than 35,000 students, and 1,500 full-time faculty—is the fruit of that early labor.  

The Growing Vision of BYU  

That same prophetic vision spoken of and embraced by Karl G. Maeser has guided the growth of Brigham Young University since it transitioned from Brigham Young Academy in 1903. On the one hundredth anniversary of the founding of Brigham Young Academy, President Spencer W. Kimball delivered on this campus what has come to be known as the second-century address, in which he added his prophetic vision for the institution in its second century:  

There are many ways in which BYU can tower above other universities—not simply because of the size of its
Prophets have asked BYU to do better here what is done elsewhere and to do what is missing at other universities.

Brigham Young University exists not *just* to provide an academic experience—even an extraordinary academic experience—in business, music, sociology, biology, or the classics. The BYU education in these and other disciplines is as fine as you would receive anywhere. BYU exists not *just* to equip members of the Church to make a living. I'm confident that God would rather have us live faithfully in poverty than faithlessly in wealth. Higher education can be had at one of dozens of fine universities elsewhere. All of us know members of The Church of Jesus Christ of Latter-day Saints who have pursued their studies at other universities and who have been both faithful to their covenants and well prepared for their professional work. I heard President Cecil O. Samuelson say multiple times, “Attendance at BYU is not a saving ordinance.”

So what is it that one can experience uniquely at Brigham Young University and at no other university in the world? What can possibly justify the enormous financial support this campus receives from the Church?

You may have come today expecting to hear me share insights about my research, perhaps anticipating that I would have you on the edge of your seats with accounts of new discoveries in the spectroscopic theory of gases. As I have pondered what I might share today, rather than sharing collaborations or ground-breaking innovations, I have chosen to speak about the unique environment that has blessed and benefited my academic career. And I speak from the perspective of one who has experienced BYU as a student, a graduate student, a faculty member, and an administrator for almost fifty years of the institution’s second century. My life has been profoundly impacted by this institution.

In section 88 of the Doctrine and Covenants, the Lord gave what I believe is the foundational statement for our mission at BYU: “Seek learning, even by study and also by faith.” This is the primary objective of all instruction and research at BYU. Have you ever tried to drive your car or touch a distant object with one eye closed? Looking through only one eye seriously limits our depth perception and perspective. BYU was founded on the prophetic precept that the same is true of education: the eye of study and the eye of faith are mutually enhancing. At BYU we see our disciplines differently than they are seen at other universities, with perspective and depth. Where else but at BYU are we institutionally free—even encouraged—to view our disciplines through the complementary eyes of reason and faith? We see how man’s knowledge, vast and growing as it is, is clarified and sharpened by revealed knowledge.

Let me offer two simple examples from my discipline. First, the sun rises in the morning, sets in the evening, and provides energy that fuels the earth. The sun emits electromagnetic radiation (light) that is spread over many wavelengths. Our eyes are sensitive to that electromagnetic radiation only in a very small range of the full wavelength range. Thus our human eyes are not able to “see” most of the sun’s radiated energy that falls on the earth. Interestingly, the sun’s peak radiated energy lies in the small wavelength range in which our eyes are sensitive. In other words, the sun illuminates the earth with a wavelength distribution optimally matched to human eyes. Considering that scientific fact with the perspective of both faith and reason leads me to conclude that the Creator knew what He was doing in establishing the sun as the primary source of energy and light for our earthly home.

Second, water is the most abundant substance on the planet. Unlike most common substances, the density of water decreases slightly as it freezes. This is why ice cubes float. If this were not so—if water became *more* dense as it froze—water at the surface of the ocean in the earth’s cold polar regions would freeze and fall to the ocean floor. Then more water at the ocean surface
would freeze and fall to the bottom, and so on. Ice would accumulate at the bottom of the ocean, and the same would happen in lakes exposed to cold weather. Can you imagine what that would produce? This process would likely disrupt the delicate thermal and ecological balance for the entire planet and make it a rather inhospitable place. Now, with vision afforded by both faith and reason, we see how the density of water is providential—creating a sustainable place for Heavenly Father’s children to live.

I can’t speak authoritatively for other disciplines, but I’m confident that in them we can see similar advantages through the eyes of faith and reason. Often we see in the advancement of knowledge man’s understanding finally catching up to heavenly truth. Collectively and uniquely, at BYU we can make those connections and share them openly with each other. Without the benefit of study and faith, BYU becomes just another very fine university.

By Study and by Faith

The Wise Men who came from the East to welcome the birth of the Savior at His First Coming were learned—highly educated for their day—and they were also devoted believers in the prophecies that foretold the Savior’s coming. They were guided by both study and faith. Wouldn’t it be a shame if we at BYU became learned but not wise?

Just over fifty years ago, I sat here in the Marriott Center as a teenager for the dedication of the Provo Utah Temple. In the dedicatory prayer, President Joseph Fielding Smith implored:

> Let that great temple of learning—the Brigham Young University and all that is associated with it and all other Church schools, institutes and seminaries—be prospered to the full. Let Thy enlightening power rest upon those who teach and those who are taught, that they may “seek learning, even by study and also by faith.”

You students are among the most well-prepared university students in the nation, both academically and spiritually. You deserve the depth and breadth of the highest quality instruction in an environment illuminated by the restored gospel. We faculty members feel the weight of that responsibility, as articulated in President Kimball’s words from his 1967 devotional on this campus:

> It is proper that every professor and teacher in this institution would keep his [or her] subject matter bathed in the light and color of the restored gospel and have all his [or her] subject matter perfumed lightly with the spirit of the gospel. Always there would be an essence, and the student would feel the presence.

Starting in 2006, the BYU Faculty Center conducted a study to determine student attitudes toward the university’s aims of delivering an educational experience that is both “spiritually strengthening” and “intellectually enlarging.” The study authors aggregated student course evaluations for fall and winter semesters and spring and summer terms over two academic years. They found a strong correlation between courses that students found spiritually strengthening and those in which they also reported having learned a lot. Student interviews conducted as part of the study also revealed that 90 percent of students agree at some level that every course at BYU should be both spiritually strengthening and intellectually enlarging.

Student comments from my course evaluations regularly bear this out. These findings suggest that BYU courses need not—and should not—sacrifice intellectual rigor in order to incorporate faith. At BYU, rigorous study is no substitute for faith, and faith is no substitute for rigorous study. Neither faith without rigor nor rigor without faith will achieve the prophetic purposes of the university.

Where else but at BYU can we collectively and institutionally combine scholarship with faith? The BYU mission statement—approved by the prophets, seers, and revelators who composed the university’s board of trustees in 1981, the year before I left this campus to go to graduate school—directs that “scholarly research and creative endeavor among both faculty and students, including those in selected graduate programs of real consequence, are essential and will be encouraged.” Research and creative work are
perhaps the most expensive elements of a university’s function, requiring faculty time, space for laboratories and studios, equipment, and administrative support. One might wonder why the BYU Board of Trustees, desirous to give as many students a BYU experience as possible, would direct that a portion of its precious resources be used to support scholarly work. In his vision for the second century of BYU, President Spencer W. Kimball stated:

This university shares with other universities the hope and the labor involved in rolling back the frontiers of knowledge even further, but we also know that through the process of revelation there are yet “many great and important things” to be given to mankind that will have an intellectual and spiritual impact far beyond what mere men can imagine. Thus, at this university, among faculty, students, and administration, there is and must be an excitement and an expectation about the very nature and future of knowledge that underwrites the uniqueness of BYU.15

That prophetic aspiration could scarcely be realized if we were not engaged in scholarly activity both as faculty and as students. President Joseph Fielding Smith declared:

There has never been a step taken . . . in discovery or invention, where the Spirit of the Lord . . . was not the prevailing force, resting upon the individual, which caused him to make the discovery or the invention.16

Where else but at BYU—a community of believers and covenant makers with collective access to the gift of the Holy Ghost—can research and revelation be combined?

Inspiration and Innovation

The generation of new knowledge, new understanding of the world around us, and new solutions to humanity’s problems is indeed a noble endeavor—a divine endeavor. But I wonder if there may be more to this prophetic vision regarding the role of research and creative work at BYU than just the advancement of our disciplines through new discovery.

In my early years as a BYU faculty member, I was anxious to make a research contribution to my discipline that would be of enduring value. At the time, my research focused on the study of the heat transfer and flow characteristics of liquid jets striking hot surfaces. Liquid jets offer the potential of the most effective heat removal of any cooling configuration. My research group had been studying through careful experiments the cooling effectiveness of liquid jets impinging against hot surfaces, and I was anxious to conceive an experimental program that would provide understanding into the detailed nature of the liquid flow of the problem.

Around that time I attended a research conference in Boston. I was seated in a lecture room of the conference venue listening to a technical presentation when an idea burst into my mind. I remember nothing about the presentation, but the impression came to me so powerfully that I remember to this day how the lecture room was configured, where I was seated in the room, and the impression that came. What was presented in my mind was a radically different experimental approach for studying the liquid flow directly under a liquid jet and in the very thin layer that forms. I returned from that conference and shared the impression with my PhD student, and we pursued that novel approach for the next several years. Using laser instrumentation, we imaged the flow in the jet as it struck a transparent jet and looked at it from the back side. Now I am confident that the idea came to me by the Holy Ghost.

The result of our work in that experimental effort didn’t change the world, but it did bring new understanding to a difficult problem, impacting both the academic knowledge and the industrial implementation of this cooling technique. I ask myself, “Why would God want to share that impression with me?” I believe it was, in part, to demonstrate to me early in my career that learning is always magnified by the Holy Ghost—to tutor me in the divine direction to “seek learning, even by study and also by faith.” I have witnessed this pattern repeatedly in my research activity at BYU. Most important, I have seen it manifest in my students as we have worked together.
In the early 1990s a PhD student and I tackled the very difficult theoretical problem of predicting thermal radiation heat transfer of gases at high temperature. When seated around a campfire, one feels the heat of the flame, even when sitting at some distance from the fire. This is thermal radiation heat transfer; it happens when the hot combustion gases and soot produced in the fire radiate energy in the form of heat. Engineers and scientists had been working on this problem for more than half a century without making much headway in getting accurate, efficient predictions.

At the time we began our work, the rigorous approach for accurately predicting the energy transfer by thermal radiation from hot gases required days of computer time. As we dove into this problem, I saw clear inspiration come to my PhD student, and it exploded in his work like a flash. He was energized by the excitement, and the result of that energy was a radically new theoretical method to tackle the problem. Beginning with that PhD student, and others who followed, our research group developed and refined this new modeling approach. The result is a highly accurate method that requires a tiny fraction of the computing time used in previous approaches. We are pleased to have seen our method adopted by researchers and industrial users across the globe.

**Inspiring Learning**

Brigham Young University, the flagship university of the Church Educational System, has as part of its prophetic mandate student-centered scholarly research guided by revelation born of faith in an omniscient God. Why? Certainly it is to address pressing problems of humankind. Perhaps more important, it is to train students to think and reason and process, assisted by the Spirit. President Kevin J Worthen has aptly termed this process “inspiring learning.” Now more than ever the kingdom of God needs deep thinkers from all disciplines who are anchored in faith and who are capable of reconciling scholarly observations with an authentic, defining belief in God. The world needs thinkers who approach their disciplines both rigorously and prayerfully and who are willing and able to access the perspective that comes from seeing with both eyes: faith and reason. The world needs thinkers who are “ready always to give an answer to every [person] that asketh . . . a reason of the hope that is in [them].”

Where else can this be done so effectively as at BYU, where study and inspiration and students are included in research and creative work?

May I share an example from the arts on campus? Just before Christmas last year, my wife and I attended a concert performed by the BYU Concert Choir. It was spectacular. I was particularly struck by the choir’s rendition of a piece titled “In Christ Alone” shown in a music video as part of the concert. I wondered how the faculty conductor could coax such music, both brilliant and inspiring, from the student singers. Just a week or so after the concert, I ran into the faculty conductor of that student choir in the Provo Utah Temple. At that moment the reason for his powerful influence on students became clear to me. The faculty conductor’s work was imbued with the spirit and power that comes from temple worship. He inspired his students because he was inspired. He is a prime example of President Kimball’s charge to the faculty:

> As scholars you must speak with authority and excellence to your professional colleagues in the language of scholarship [and, I will add, creative work], and you must also be literate in the language of spiritual things. We must be more bilingual, in that sense, to fulfill our promise in the second century of BYU.

It is no wonder that at BYU we have such ready access to the temple; through our attendance it can refine our capacity for spiritual learning.

**BYU as a Gathering Place**

BYU is a place where students can gather from all over the world with others of like mind and heart to pursue their university studies. Here students, staff, and faculty live true to covenants that guide their lives and that create a unique environment freed from the distractions found on other campuses. Here we aspire to see the ideals of the Lord Jesus Christ embraced and modeled at scale in a university community among those who seek to be His disciples while they are deeply engaged in their disciplines.
In December 1830, the Lord directed the members of the young Church of Jesus Christ of Latter-day Saints to gather from the eastern states to “the Ohio.” In that gathering place, the Prophet Joseph Smith was told to launch the School of the Prophets in Kirtland. Here they studied “history, current events, reading and writing, mathematics, language study, and doctrinal teaching.” It was in this special school setting that learners in the Church first began to merge the secular and the sacred in their study, which was accompanied by powerful manifestations of the Holy Ghost. Perhaps it wasn’t coincidental that the gathering of the Saints to Ohio and the charge to study in faith occurred at the same time, setting the pattern for what happens at Brigham Young University.

Such a collective of people anxious to learn and to be assisted by the power of heaven is part of the secret of BYU. I find it touching that when I invite students to pray at the start of each class period, a student will often implore Heavenly Father that I will teach with the Spirit and that they will understand the same way. (It is clear that the students know my limitations as a teacher.) Where else could this happen—a gathering of students devoted to the gospel of Jesus Christ unitedly and unashamedly seeking to understand thermodynamics through the help of the Holy Ghost?

I am convinced that faculty at BYU seek to be eligible for the guidance of the Spirit to communicate their disciplines and that students seek to master those concepts in the same way. Students come to the university hungry for this environment and the blessing of Spirit-assisted instruction. Their parents pray for such an environment when they send their children to BYU. Those parents share Karl G. Maeser’s caution: “I would rather trust my child with a serpent than to place him [or her] in the hands of an irreligious teacher.”

One of the most gratifying student comments I have received in my course evaluations is “He helped me believe I could master the material.” Understanding human potential in its fullest sense is unique to BYU, and it comes from our understanding of Heavenly Father’s plan. Where
else but at BYU do professors recognize that teaching a college student brings the heavy stewardship of teaching a child of God, and where else do students see their university studies as having eternal implications?

In this BYU gathering of disciple-scholars and disciple-learners, we are all lifted and motivated by the gospel-centered lives of others. Several months ago, faculty in my department met to discuss applicants for vacant faculty positions. These meetings included lively discussions of possible future department faculty, often with strong differences of opinion expressed as the faculty reviewed candidates. We know that hiring new faculty is a nominal thirty-year decision, with the potential for significant impact on students and the university. In a particular faculty meeting, one of my department colleagues shared an observation regarding a faculty candidate. Another colleague found the observation offensive, and the offended colleague quickly, abruptly, and pointedly reacted with a comment. The next time we met as a faculty, the department chair gave some time at the start of the meeting to my offended colleague. This was a colleague who is widely published and recognized nationally and internationally for his scholarly work. At his own request he stood humbly before the entire faculty and asked for the forgiveness of the faculty for his pointed response. Knowing our true identity can't help but affect interactions on this campus.

This gathering of Latter-day Saints at BYU brings a shared commitment to Karl G. Maeser’s feeling that education should shape both the head and the heart.26 Two years ago I taught a young woman in an introductory class in the mechanical engineering program. She was eager to learn and to take advantage of all that BYU has to offer. Since that course she has dropped by my office from time to time to keep me updated on her classes, activities, and plans for the future. During her time as an undergraduate student, she involved herself in the research project of a faculty colleague in another department. Not long ago this young woman approached her bishop about the possibility of receiving her temple endowment and began to prepare herself. When the time came for her to enter the temple, neither her father nor her mother was able to join her. Among those few whom she invited to share with her that first temple experience were her BYU research faculty advisor and his wife. Where else but at BYU could such associations be cultivated and where else could a student turn to a faithful faculty member to share in such a sacred experience? I would call that inspiring learning.

At BYU we can candidly and safely acknowledge the gaps between what we know—or think we know—and what we don’t know. In fact, this is the beginning of learning. In my classes I often encounter two extreme types of students: those whose technical ability exceeds their confidence and those whose confidence exceeds their technical ability. (The latter is more dangerous.) My job as a teacher is, in my view, to bring into alignment their technical ability and their confidence and to raise them both. That process sometimes involves failure on the part of the students. Early in his term as president of Brigham Young University, Kevin J Worthen spoke to the students about learning “how to fail successfully,”27 a message driven by the BYU mission statement. He observed:

Failing is an essential part of the mortal phase of our quest for perfection. We don’t often think of it that way, but that is only because we tend to focus too much on the word perfection and not enough on the word quest when we read the mission statement. Failure is an inevitable part of the quest. In our quest for perfection, how we respond when we fail will ultimately determine how well we will succeed.28

And sometimes acknowledging what we don’t know can lead to unsettling questions. Elder Dale G. Renlund taught:

God in His wisdom knows that a vital part of our mortal experience is to not know everything. There is something about trusting Him that allows us to progress to become like Him.29

When questions arise that trouble us—when we see what appears to be a conflict between the world’s view and heaven’s view—we at BYU are uniquely positioned to help each other default to devotion rather than to doubt.
Conclusion

I conclude with an experience from several years ago. At the beginning of each academic year, BYU holds a series of meetings called university conference to help faculty and staff become energized for the coming year. The president shares his vision and counsel in a general session that is both inspiring and motivating. The academic vice president shares remarks of particular relevance to faculty in the faculty session of the conference. Several years ago, one of the college deans accompanied a new faculty member to his first faculty session of university conference. The new faculty member had spent a number of years at another university. Some 1,200 university faculty assembled in the de Jong Concert Hall and, as we always do, began the meeting with a hymn and a prayer. In the middle of the hymn, the dean happened to glance at the new faculty member and see tears streaming down his cheeks. The dean asked what might be wrong, and the new faculty member said simply, “You have no idea what you have here.”

As I now close, you may conclude that this lecture was more devotional than it was forum. But my point is “Isn’t that the point of BYU?” I express my deep gratitude for what we have here—for BYU’s unique place among universities and for its special prophetic mission. From someone who has been around BYU for a while, I plead with you students to take advantage of all that BYU has to offer. And I pray that as faculty members we will take our stewardship here as seriously as did Karl G. Maeser. Here at BYU, faith and reason as well as research and revelation are complementary. Here in this gathering of disciples, it is our opportunity and charge to seek “the full realization of human potential.” This place matters. Of this I bear witness in the name of Jesus Christ, amen.

Notes


4. 3 Nephi 6:12.


6. Brigham Young, in Reinhard Maeser, Karl G. Maeser: A Biography by His Son (Provo: Brigham Young University, 1928), 79.


17. 1 Peter 3:15.
21. Church History Topics page, “School of the Prophets,” under Church History, Gospel Library, Church of Jesus Christ.
30. Mission of BYU.