

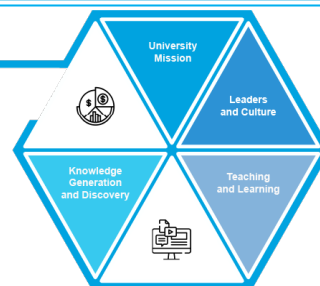
Embedding Interdisciplinarity at Arizona State University (ASU) (Dec. 2021)

by Paul Fain

Key University Design Imperatives

This article highlights four of six key domains that are critical to sustainable and future-ready higher education systems

- Embracing **the role of higher education in advancing social and economic well-being**
- Commitment to **nurturing agile and transformation-minded leaders and cultures**
- Supporting **teaching and learning experiences beyond academia**
- Working **across disciplines and industries to solve complex research challenges**

**Design Opportunity:**

How does an institution influenced by high specialization and disciplinary independence transform to appropriately meet the complex well-being and teaching and learning needs of its stake holders?

About this Paper:

This article is focused on how Arizona State University (ASU) has embedded interdisciplinarity across its academic enterprise. It seeks to provide takeaways about what has worked best for the university, as well as lessons learned in ASU's multi-decade effort to cross disciplinary boundaries to take on societal problems.

About Arizona State University:

Interdisciplinarity is one of eight design aspirations for ASU, the youngest major research institution in the U.S. Michael Crow became ASU's 16th president in July 2002. Since then, it has established more than two dozen new transdisciplinary schools. In 2021, ASU was ranked the #1 most innovative university by U.S. News and World Report, a distinction it earned for the seventh consecutive year.

About the Author:

Paul Fain is a journalist focused on the nexus between education and work. He writes *The Job*, a newsletter that explores those issues, and helped create a related weekly publication, *Work Shift*. From 2011 to 2020, Fain was a reporter and editor at *Inside Higher Ed*. He oversaw the news outlet's coverage of low-income students, college completion, community colleges, federal policy and emerging models of higher education.

A Few Key Takeaways for University Designers:

- **Be precise about what and who you are.** Every institution has a mission and a vision statement, but the vast majority are so broad that they don't hold any particular sway. Setting a more precise vision of the university's impact across disciplines can set an institution up to have a more sweeping impact.
- **Start with the outside world.** Academic programs should be designed to mirror today's careers. Research should be geared toward tackling the world's big challenges. Start any redesign from there – from what's needed, not with what already exists.
- **Structure matters.** A fundamental redesign of colleges and departments is needed to move past turf wars and to help ensure a focus on serving students best.
- **Change incentives around enrollment and funding.** Faculty lines and other funding for colleges and departments shouldn't be doled out based on student headcount, but on a more holistic concept of service and student success.
- **Marketing matters.** Interdisciplinarity doesn't mean anything to students and their parents- but talking about the blend of "liberal arts" skills and workforce preparation is a win.
- **Faculty promotion and reward systems must be inclusive and flexible.** Despite heavy investments in recruiting faculty interested in bridging disciplinary lines, biases still exist favoring faculty behavior along more siloed and disciplinary lines.
- **Society's grand challenges require grand or comprehensive collaboration.** An interdisciplinary team of over 100 people at ASU, motivated by ASU's Biodesign Institute, met daily for 100 days developing Arizona's first saliva-based test for COVID-19. ASU ran 850,000 of the tests within a year.

"Even as interdisciplinary collaboration flourishes in contemporary academic practice, persistent disciplinary partitioning represents one of the most pernicious design limitations to the further evolution of knowledge production in the American research university."

Crow and Dabars (2020)

About the University Design Institute

The University Design Institute (UDI) is a catalyst for transformation in higher education. Our guiding belief is that universities must become engines of social transformation and economic success. At the core of our work is a relentless commitment to reimagining and innovating higher education models. We bring rich expertise in design, a global network of experts, and partner organizations to support transformation efforts in higher education. Our approach is three-fold. We rethink the future. We co-design solutions with partners. And we advance innovative, scalable, and sustainable solutions.

For the full article or other UDI learning products, contact udi@asu.edu

Blueprints for University Design (BUDs)

This page intentionally left blank

Article: Embedding Interdisciplinarity at Arizona State University (ASU)

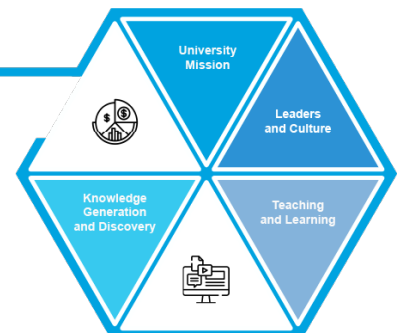
December 2021

By Paul Fain



This article highlights four of six key domains that are critical to sustainable and future-ready higher education systems

- Embracing the role of higher education in advancing social and economic well-being
- Commitment to nurturing agile and transformation-minded leaders and cultures
- Supporting teaching and learning experiences beyond academia
- Working across disciplines and industries to solve complex research challenges



About the Author

Paul Fain writes *The Job*, a newsletter about connections between education and work. He also recently helped found a new weekly publication, *Work Shift*, which features in-depth reporting on workforce issues. For the last decade, Fain was a reporter and editor at *Inside Higher Ed*. He oversaw the news outlet's coverage of nontraditional students, policy, and more. Fain also was the founding host of the successful podcast, *The Key with Inside Higher Ed*, and managed *IHE*'s coverage of the pandemic in 2020.

Before *IHE*, Fain was a senior reporter at *The Chronicle of Higher Education*, where he covered leadership and finance for more than six years. A former staff writer for *C-Ville Weekly* in Charlottesville, Va., Fain has written for *The New York Times* and contributed chapters for books on innovation in higher education, published by the Harvard University Press and the Stanford University Press. A graduate of the University of Delaware, he is a native of Dayton, Ohio, and currently lives in Takoma Park, Md.



About Blueprints for University Design (BUDs)

Launched with an initial prototype in April 2021, Blueprints for University Design, or BUDs, is a product series published by the University Design Institute (UDI) that highlights university design problems, solutions, and designers from around the world. Higher education leaders, policy-makers, and funders are invited to submit design innovations, concepts, and stories of interest to be featured as part of the series.

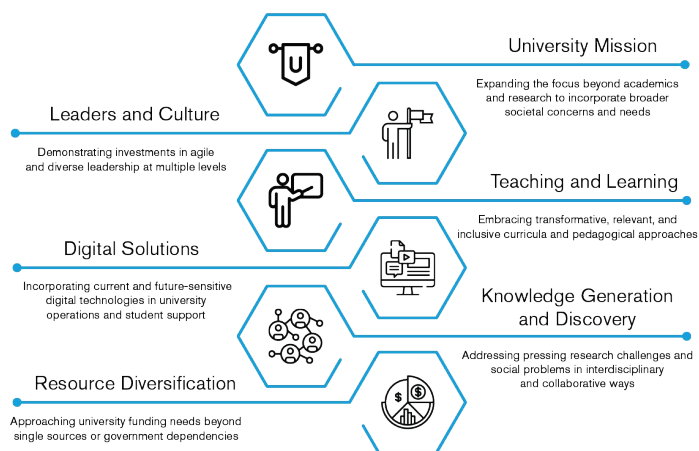
BUDs Series Editor-in-Chief: Tamara Webb, Ed.D.
Case Study Design Team: Abhishek Mathur

About the University Design Institute (UDI)

The University Design Institute (UDI) is a catalyst for transformation in higher education. Our guiding belief is that universities must become engines of social transformation and economic success. The work we do is centered on 6 design imperatives: University Mission, Leaders and Cultures, Teaching and Learning, Resource Diversification, Knowledge Generation and Discovery, and Digital Solutions. At the core of these imperatives is a relentless commitment to reimagining and innovating higher education models. We bring rich expertise in design, a global network of experts, and partner organizations to support transformation efforts in higher education. Our approach is three-fold. We rethink the future. We co-design solutions with partners. And we advance innovative, scalable, and sustainable solutions.

UDI Managing Director: Minu Ipe, Ph.D.

The Whys and Hows of University Transformation



Embedding Interdisciplinarity at Arizona State University (ASU)

This article focuses on how Arizona State University has embedded interdisciplinarity across the academic enterprise. It seeks to provide takeaways about what has worked best for the university as well as lessons learned in ASU's multi-decade effort to cross disciplinary boundaries to take on societal problems.

The organic response of Arizona State University (ASU) to the “grand challenge” of COVID-19 is exactly what the university hoped to see when it began reorganizing its research and teaching enterprises around interdisciplinarity two decades prior. Of course, not every endeavor has been a success – and for the higher education field, what the university has learned along the way about the challenges are as important as the grounding in both [teaching and research](#), organizing around “Grand Challenges,” building programs with [career opportunity](#) in mind, and creating an agile [culture of faculty collaboration](#).

KEY DESIGN TAKEAWAYS

- **Start with the outside world.** Academic programs should be designed to mirror today's careers. Research should be geared toward tackling the world's big challenges. Start any redesign from there – from what's needed, not with what already exists.
- **Structure matters.** A fundamental redesign of colleges and departments is needed to move past turf wars and to help ensure a focus on serving students best.
- **Change incentives around enrollment and funding.** Faculty lines and other funding for colleges and departments shouldn't be doled out based on student headcount, but on a more holistic concept of service and student success.
- **Harvest early wins.** When it comes to research specifically, it helps to start in fields where interdisciplinarity already is emphasized in grant making. Magnify existing collaboration and turn early successes into exemplars for fields that are tougher to tackle.

The Case of COVID-19

It was February 2020, the early days of the pandemic in the United States, when few tests for COVID-19 infections were available—perhaps just a thousand nasal swabs in all of Arizona. This posed a serious challenge for Arizona State University, which was preparing to offer tests to its roughly 75,000 students, 5,000 faculty members, and 12,000 other employees.

ASU President Michael Crow visited [Joshua LaBaer](#), executive director of the university's Biodesign Institute, to ask how to find enough tests. LaBaer, one of the nation's foremost investigators of biomarkers, the unique molecular fingerprints of disease, knew the answer would have to come from within the university.

“I thought about it a little bit, and I realized that my group had some of the expertise needed to develop a test,” said LaBaer. “So we pulled together seven people and said, ‘What do you guys think? Can we do this?’ And we started meeting every day.”

The seven researchers included a molecular biologist who knew how to conduct a laboratory technique for monitoring a targeted DNA molecule and a software engineer who could build a patient database, as well as experts on regulations and how to procure needed supplies.

The high stakes and unprecedented nature of the challenge required a full-court press by a wide range of senior experts, even on weekends.

“That group ended up blossoming into what later became a meeting of over 100 people every day for 100 days,” said LaBaer. “We could not afford to have an error go unfixed. We met daily so everyone could hear what everyone else was doing across all those disciplines.”

The team [developed](#) Arizona's first saliva-based test for COVID-19. The office of the state's governor, Doug Ducey, quickly asked ASU to begin running tests for the general public. Soon, the state paid \$60 million to run up to 10,000 tests a day at more than 100 sites around Arizona. ASU ran 850,000 of the tests within a year.

LaBaer said few research universities could have pulled off this accomplishment, even Harvard University, where he worked prior to coming to ASU in 2009. And he credits the university's deep commitment to interdisciplinarity for making this crucial work possible.

“I don't know of any other place that could've done what we did,” he said. “We had the built-in multi-disciplinarity already. It was just easy to just go. We just went.”

For more information about ASU's Biodesign Institute and the COVID-19 response, check out this [article](#) and [annual report](#).

Evolution

Arizona State's attempt to become a truly interdisciplinary institution goes back at least two decades. The road has been bumpy at times, according to both administrators and faculty members. And the work is hardly done.

"Collaboration is not easy for anybody who likes the value of autonomy," said [Christine Muldoon](#), a communications consultant at ASU tasked with supporting the translation and transmission of technical information across varied audiences. Muldoon is also an ASU alum who benefited directly from interdisciplinary approaches to her graduate studies at the institution.

The Bachelor of Interdisciplinary Studies

[Duane Roen](#) arrived at the university in 1995 as director of writing programs in the English department in the College of Liberal Arts and Sciences at the Tempe campus. Interdisciplinarity was practiced back then, he said, "but was very faint compared to what's here today."

A year later, ASU launched its innovative Bachelor of Interdisciplinary Studies degree. Many people at the university were less than thrilled about the program. Critics thought it would lack the rigor of a more traditional degree, said Roen, who most recently served as vice provost of ASU's Polytechnic campus and as dean of the College of Integrative Sciences and Arts, home to the interdisciplinary studies degree.

The personalized degree program allows students to pick two subject concentration areas from more than 170 on-campus options and 30 online ones. They combine those concentrations with six core courses and three electives, while getting field experience through an applied project, such as an internship, research project, or by assisting a faculty member with research. The degree offers 25,000 combinations, like leadership and human rights, economics and urban planning, or computer gaming and psychology.

ASU is creating new degrees all the time. And sometimes students in interdisciplinary studies leave that program to major in a field that was one of their concentrations.

"We're trying to give students the widest array of opportunities to learn what they want to learn. That's it," says Roen. "And my view is if a student leaves my college to go study in another college because that's a better fit, three cheers."

More than 12,000 ASU students have graduated with a degree in interdisciplinary studies – 2,500 were enrolled in the program in spring 2021. The College of Integrative Arts and Sciences is also one of ASU's largest, enrolling 6,700 undergraduates. The college is built to offer flexibility, with foundational courses in humanities, social and natural sciences, and mathematics. Its overarching goal is to prepare students for a rapidly changing job market.

Career outcomes for graduates of the college are impressive. Fully 90 percent were employed or received a job offer within 90 days of earning their bachelor's degree, with a median annual starting salary of roughly \$60,000.

These days, the Bachelor of Interdisciplinary Studies degree is far from the only ASU undergraduate program to combine curricula from different disciplines. And some of the university's explicitly interdisciplinary degrees now stretch across multiple colleges. For example, the College of Integrative Sciences and Arts offers a degree in user experience with the Fulton Schools of Engineering. Students can enter that program from either the engineering or technical communication side of the degree track.

Again, the idea is to mirror the way job roles and major projects function in the world of work.



Beyond Teaching

Teaching and Research

TAKEAWAYS:

- **Meaningful intellectual fusion requires knocking down silos.** Rearranging academic and research structures is difficult and likely to generate controversy. The payoffs from interdisciplinary research can take years to realize, but they're worth the wait.
- **A true culture shift around interdisciplinarity yields a broad range of benefits.** The thought process that goes into rethinking a department and its degree offerings is a good exercise with long-reaching implications for faculty recruitment and cross-departmental collaboration.

ASU expects its approach to interdisciplinary thinking to extend well beyond the undergraduate experience. During the last 20 years, the university has invested heavily in [recruiting faculty members](#) who want to work with colleagues on research projects that bridge disciplinary lines. It also has built several large interdisciplinary research buildings while creating colleges and institutes with academic orientations that reflect multidisciplinary realities of societal problems.

This philosophy of striving for “intellectual fusion” has become more common in higher education. But practicing truly collaborative interdisciplinary research remains elusive in an industry that still tends to reward scholars for being experts in their field. And to get where ASU is today “required the demolition of academic and research silos,” as noted by university leadership in 2012.

The university created the [Biodesign Institute](#) in 2002 as part of this rethinking. The institute is explicitly interdisciplinary, with research that emulates the design rules found in nature and focuses on biomedicine and health outcomes, sustainability, and security. Its 150 tenured faculty members have attracted \$760 million in research funding. The Biodesign Institute is one of over a dozen interdisciplinary research centers within the ASU Knowledge Enterprise.

ASU's first major academic reorganization continued through the first decade of this century. It combined two colleges to create the Herberger Institute for Design and the Arts, which offers cross-institute degrees featuring architecture, art, dance, design, film, music, and other disciplines. Likewise, the university around this time created its School of Human Evolution and Social Change to integrate the natural and social sciences to answer questions about the human story, as well as the School of Geographical Sciences and Urban Planning, a merged college with a mandate of crossing disciplines to tackle climate policy, water resource management, disaster relief, and more. The School of Life Sciences, which incorporated the three academic departments of Biology, Plant Biology and Microbiology, began operation in 2003.

Geography is an interdisciplinary field, with climatologists, biologists, geomorphologists, and social scientists, said [Elizabeth Wentz](#), a geographer and professor at the school who is also vice provost and dean of the graduate college at ASU. Accordingly, the change to an interdisciplinary structure wasn't that big of a leap for Wentz and most of her colleagues in the department. But the formal partnership with urban planning made for an initially bumpy marriage, in part because of the strong professional development tradition in planning, which is lacking in geography.

“That was a little bit of a culture shift for us in the school – to think about what it means to have a practice and a practicum component to our framework, our degree course offerings and the way that we did research,” Wentz said.

However, she said the experience was a good exercise that has paid many dividends over the years. “We've now hired people who really have their training in geography, but they align themselves as planners,” said Wentz. “And then we've got some people we would call our traditional planners, but they've seen their research being influenced by geography.”

Since 2002, under the leadership of ASU's 16th President, Michael M. Crow, ASU has established twenty-five new transdisciplinary schools, including the School of Earth and Space Exploration, and the School for the Future of Innovation in Society, and launched trailblazing multidisciplinary initiatives including the aforementioned Biodesign Institute, the Julie Ann Wrigley Global Futures Laboratory, and important initiatives in the humanities and social sciences. The university has also created various innovative certificate and degree programs through focused partnerships.

One example is the public-private partnership between ASU and Mayo Clinic, which aims to transform health sciences and medical education, collaboratively solve comprehensive research problems, and improve health outcomes through cross-disciplinary specialized educational initiatives. The collaboration offers six dual degree programs, graduating its first cohort at Mayo Clinic's Rochester, Minnesota campus in 2020 and graduating its [first cohort in Arizona](#) in 2021.

In early 2021, the 150,000 square foot [ASU Health Futures Center](#), home of the Mayo Clinic and ASU Alliance for Health Care, became one of the latest signature developments in the nearly two-decades-long relationship between the two institutions. The state-of-the-art facility will significantly advance interdepartmental research and collaborative programs with Mayo Clinic — including ASU's College of Health Solutions, Edson College of Nursing and Health Innovation, Ira A. Fulton Schools of Engineering, and the J. Orin Edson Entrepreneurship and Innovation Institute. When launched, the Health Futures Center became one of seven [Innovation Zones at ASU](#).

Grand Challenges

Organizing Around Grand Challenges

TAKEAWAYS:

- **Be precise about what and who you are.** Every institution has a mission and a vision statement, but the vast majority are so broad that they don't hold any particular sway. Setting a more precise vision of the university's impact across disciplines can, counterintuitively, set an institution up to have a more sweeping impact.
- **Commit to that vision in the everyday.** Don't just talk about the interdisciplinarity sometimes. Make it a constant focus in language, structures, and processes.
- **External incentives will continue to work against you.** Long-established incentives in education — and especially research — will continue to work against any efforts around interdisciplinarity. Researchers are rewarded for being hyper-focused by colleagues, prestigious journals, and even funders. This is a challenge that universities will constantly have to work against.

The ASU Charter

The university's prioritization of interdisciplinarity was formalized in 2014, with the creation of the [first charter](#), describing ASU's responsibilities as a "New American University." The university has received widespread attention — and imitation — for the charter's mandate that it be measured not by the students it excludes, but by those it includes and how they succeed. That pledge was an unusual and noteworthy development among research universities, which have been typically [designed around](#) competition and prestige.

The charter also said ASU must assume "fundamental responsibility for the economic, social, cultural, and overall health of the communities it serves." These aren't empty words — both faculty members and administrators know the charter and apply it to their work. And interdisciplinarity is a crucial piece of meeting that core promise.

"Our charter trumps in many cases that loyalty that we once felt to discipline," said [Todd Sandrin](#), vice provost of ASU's West campus and dean of the New College of Interdisciplinary Arts and Sciences.

The university's leaders called the charter's creation an "inflection point" in ASU's evolution. It set a goal for the university to become a "global center for interdisciplinary research and development." Roen said:

"If we're going to serve the community, we need to solve big problems. And if you're going to solve big problems, it's probably never the case that it can be done from a single disciplinary perspective. You need to have teams of people with a wide range of perspectives, a wide range of expertise, who can come to work on this problem and see all the possible ways that it can be solved."

[Watch the ASU Charter Video](#)



ASU is definitely not alone in this awareness, yet there is still a lot of open room on the standard-setting stage. A decade ago, the University of California, Los Angeles became one of the first U.S. research universities to orient itself around “Grand Challenges” in an attempt to solve big societal problems.

The university has harnessed a wide range of scientific research across disciplines as part of its two [Grand Challenges](#): to create a sustainable Los Angeles and to prevent and treat depressive disorders. Each project features a heavy dose of the humanities to help people understand how the science applies to their lives.

A handful of other universities have followed suit. For example, the University of Indiana (IU) launched its Environmental Resilience Institute in 2017 as part of an ambitious Grand Challenge program to prepare the state for environmental change. The project is designed to predict the impact of climate change and to connect faculty research in the natural and social sciences to the lives and work of the state’s residents.

“Great research universities like IU are uniquely positioned to help lead these partnerships and provide the intellectual talent, resources, and expertise to develop and implement innovative and high-impact solutions to the most pressing needs of our local communities, our state and our world in the face of environmental change,” said Michael McRobbie, IU’s president emeritus.

Interdisciplinarity is fundamental to university Grand Challenges, which LaBaer described as a “version of what we do routinely for everything” at ASU.

The pandemic has helped make clear the need for crossing disciplines to work on sweeping challenges. Sandrin, whose background is in microbiology, said the world’s failures to respond to the pandemic largely haven’t been due to limitations in his discipline’s scientific understanding of infectious diseases – the biggest problem has been effectively talking about the science to the general public.

Why weren’t we able to communicate, in a compelling way, why this was important, what needed to be done? Things became wickedly complex and that’s the new normal – wicked complexity. What are the ways in which we as microbiologists, for example, need to be intertwining powerful, emotional, and compelling narrative, storytelling, in what we do rather than falling back on, ‘Trust me, I got this. I can show you some charts and graphs’? We do more than that, definitely. But now more than ever, it’s easier to make a compelling pitch for interdisciplinarity.”

The pull of academic disciplines, nonetheless, remains strong. By definition, an academic with a terminal degree is an expert in a specific field. Those who reach the top of their field, members of the National Academies of Science, for example, in general are hyper-focused on a hyper-specific discipline. And a diverse interdisciplinary research portfolio can make it less likely that a scientist will be nominated to the National Academies.

“Sometimes with junior scholars, my mentoring advice is to try to be a little bit narrower,” said Wentz. “You still need to be known for something as opposed to just being a contributor to a bunch of things.”

As the challenges of actualization remain evident, the lure of ASU’s interdisciplinarity often has been noted a factor in faculty recruitment. Many are drawn to the position descriptions because of the opportunity of working in a collaborative space with researchers from different disciplines. Faculty who have truly embraced interdisciplinarity have reported benefits from engagement, especially by seeing former students applying lessons to their work and lives after graduation.

Standard operating procedure in industrial and government laboratories, interdisciplinary collaboration in academic settings is essential to applied research initiatives that depend for their effectiveness on team efforts to address intractable challenges on the scale of global climate change and destruction of ecosystems

Crow & Dabars, 2020, *The Fifth Wave in American Higher Education* (p. 375)

Career Opportunity

A Growing Campus

TAKEAWAYS:

- **Marketing matters.** Interdisciplinarity doesn't mean anything to students and their parents – but talking about the blend of “liberal arts” skills and workforce preparation is a win.
- **Build strong business partnerships.** Interdisciplinarity at the undergraduate level should be paired with a deep understanding of labor-market demand. Strong connections between businesses and faculty help the latter know how to design a curriculum that's both rigorous and career-aligned.

Interdisciplinarity isn't the easiest sell to prospective university students and their parents, particularly for students who are the first in their family to attend college. The word itself doesn't mean much to non-academics.

The New College of Interdisciplinary Arts and Sciences is the fifth largest of Arizona State's 17 colleges. The college doubled its enrollment over the last three years, and was projected to see a 20 percent bump in its first-year student enrollment in 2021. More than half of the students in that year's incoming class were eligible to receive federal Pell Grants, 44 percent were Latino, and 40 percent were first-generation college students. The first-year student retention rate at the college has stayed above the university-wide goal

of 90 percent during the pandemic. This is a very high rate for any institution that serves large numbers of lower-income students, who tend to face more barriers while pursuing a degree, particularly during the COVID crisis.

The college is located on the university's 300-acre West campus, which enrolls roughly 5,500 students in northwest Phoenix. West campus was the university's second when its first buildings went up in 1989. (ASU now has five campuses). It was designed for teaching and research that is interdisciplinary and collaborative. And the schools and colleges at West campus feature a blend of the liberal arts with 21st century workforce preparation.

The approach appeals to residents of the [fast-growing](#) West Valley, which is projected to add 400,000 residents in less than a decade, and where roughly 80 percent of current residents lack a college degree. As a result, Sandrin said the message that connects with many in the local community isn't about interdisciplinarity, per se, but about its results, both in taking on local challenges and in helping to prepare students for success.

One prominent example of such is seen in [Alexis Hermosillo](#), a graduate of the undergraduate degree program in interdisciplinary arts and performance. Hermosillo is now the mayor of El Mirage, a Maricopa County city located about 10 miles from West campus.

Research [shows](#) that first-generation college students often struggle with doubts about whether college is for them. And they lack the help their more privileged peers get from family members in navigating the university experience. But by telling stories about successful graduates, Sandrin said the university is able to break through with prospective students and their families.

“We exist here at ASU in the West Valley as the necessary catalyst to grow some of the workforce,” Sandrin said, noting that most of the roughly 2,500 students who graduated from West campus programs in 2021 arrived as transfer students, typically from one of several nearby community colleges. “Part of the reason behind our multiple campus, different modality model is to meet learners where they are.” ASU's connection of degrees to careers helps seal the deal.

Cybersecurity

Cybersecurity is a hot field, with huge demand among employers that colleges are struggling to meet. The New College of Interdisciplinary Arts and Sciences offers bachelor's degrees in applied computing, and students can add a cybersecurity concentration to the degree. Many of the college's graduates have been successful in the field.



But some of its most prominent alumni in cybersecurity were humanities majors. Edward Vasko, for example, graduated with a history degree from the college. He went on to found Terra Verde, a cybersecurity firm that has become one of the region's largest. When [asked once](#) how his university experience helped him in the industry, Vasko referenced 19th century philosophies about frontier discovery and exploration, comparing them to principles around new technologies. "I had always been curious about how and why things worked the way they did," he said. "What ASU provided me was the ability to synthesize that innate curiosity and analyze topics outside of technology."

A strength of the university's approach to cybersecurity training is its willingness to tap expertise from the working world, including [Kim L. Jones](#), who directs ASU's [Cybersecurity Education Consortium](#). Jones joined the university in 2016 after working for 30 years in military intelligence, security, and risk management, including as chief information security officer for the nation's largest debit-card processor.

The consortium was created to address the growing talent gap in cybersecurity, in part by working with local businesses to help students gain real-world experience through internships. That work is now part of ASU's [Global Security Initiative](#), which conducts research on artificial intelligence, visualization and analytics, and disinformation, as well as cybersecurity. The initiative's interdisciplinarity is represented by its roughly 150 faculty members, who come from 12 of ASU's colleges.

For example, the Global Security Initiative [launched](#) the Center on Narrative, Disinformation, and Strategic Influence in March 2021. It practices an interdisciplinary method of researching disinformation, said [Nadya Bliss](#), executive director of the Global Security Initiative. The center "brings together strengths in narrative theory, computer science, social sciences, humanities, journalism, and other disciplines so we can better understand, identify, and combat the purposeful spread of false or misleading information," she said.

As with other programs at the New College of Interdisciplinary Arts and Sciences, Sandrin said cybersecurity degree programs include a strong disciplinary core on coding and computing. But they also feature courses on risk communications and ethics, as well as strong relationships with employers in the field.

"That connects industry with the university in a way that we as faculty, as curriculum builders, have a better sense of what's moving in the industry, what's moving in the market," he said. "It also connects industry, to us more closely, to our graduates and to the workforce pipeline."

The ASU Alumni Association each year honors the [Sun Devil 100](#) – the top 100 fastest-growing organizations owned or run by alumni. In 2021, seven of those businesses were run by graduates who were interdisciplinary studies majors.

Faculty Collaboration

TAKEAWAYS:

- **Be careful not to just create new silos.** True interdisciplinarity requires intentionality and regular adjustments. Structure is important, but it should be built with flexibility and agility in mind.
- **Interdisciplinarity requires a different kind of focus on equity.** By its very nature, interdisciplinary work demands collaboration, not isolated expertise. Funding, recognition, and other incentives need extra attention, with a particular focus on ensuring that faculty from historically marginalized groups are treated equitably.

Both administrators and faculty members at ASU say the university's commitment to interdisciplinarity is a draw for graduate students and professors. Grad students in particular feel they're gaining interdisciplinary skill sets that are harder to get at other institutions. But this wasn't always the case, and the transition remains difficult for some faculty recruits.

"In some of the early years, sometimes it felt like the square peg in the round hole, because all people weren't really open to having that kind of structure," Wentz said. "Now we have more square pegs in square holes. We're really bringing in the right people who want to be in an environment like this."

Yet good hires, an academic reorganization, and cutting edge facilities alone will fail to create a thriving interdisciplinary enterprise. True collaboration requires intentionality and regular adjustments, say many at ASU. Otherwise, they say, an institution is merely creating new forms of silos, ones that may be no more permeable than what they replace.

Actualization or Aspiration?

Laura K. G. Ackerman is an assistant professor in the School of Molecular Sciences. She came to the university in 2020, after working as a postdoctoral researcher at Princeton University's prestigious Doyle Lab. ASU's commitment to interdisciplinarity was unique and appealing to Ackerman, who noted in particular the draw of sharing laboratory space with scientists from other disciplines.

"They were so supportive about collaboration," she said.

Ackerman said the potential for science that crosses disciplinary boundaries is there – with the right mix of people, resources, and commitment from the university. But it hasn't worked that way for her, at least not yet. "We really don't share that much," she said. "You're almost on an island."

Interdisciplinary collaboration requires a shared view among faculty members about how their fields intersect, according to Ackerman and others at the university, as well as thoughtfulness about the mix of contributors and their personalities.

"You have to overlap a little bit," she said. "The chemistry has to be right for the collaboration."

Likewise, universities need to think through the ramifications of real interdisciplinarity for the career trajectory of faculty members, particularly those who are in an early phase. And administrators must also be careful to make sure that faculty members who are women or members of underrepresented minority groups are getting their voices heard as well as a fair share of the recognition for their contributions to interdisciplinary research.

The challenge of being a contributor, not the expert, is a feature of interdisciplinarity. And it can be more of a problem for scholars who are people of color.

Junior scholars may require additional mentoring as they adjust to an interdisciplinary structure. They also need access to shared resources. This can be trickier in an interdisciplinary environment. For example, it's not always clear where a lab's budget is coming from if faculty members report to different departments or schools. And that, in turn, can cause problems for the equitable distribution of costs or in perceived biases about budgets, especially for individuals who are not in the position to make final and related spending or policy decisions.

However, open and regular communication between faculty, facilitated by senior faculty or administrators who are good at listening, may be the most important piece for creating true intellectual fusion at a research university.

"That's how multi-disciplinary teams have to work," said LaBaer, "They have to meet regularly. They have to converse all the time and they have to advocate for what they need in the context of what the rest of the group needs."

Wentz said universities must make real changes to their incentives for faculty and must commit to "continuously assessing policies and procedures for potential biases."

Gustavo Fischman, professor of educational policy and comparative education at the Mary Lou Fulton Teachers College, is convinced of "the importance of interdisciplinary research and teaching as one of the most effective ways of contributing to better science and addressing pressing local and global problems." Still, he echoes others at ASU in noting critical university design limitations.

“The key challenge is to find ways to align the structures of assessment (annual performances, tenure and promotion, etc.) with the demands of promoting interdisciplinary and collaborative teaching and research. Interdisciplinary scholarship is more complex, expensive, takes longer time, and fundamentally is collaborative. Our current systems of scholarly assessment rely on simple measures, taken at shorter periods and fundamentally, looking at the individual contribution. If we don't change the ways of assessing teaching and research, interdisciplinarity will remain an aspiration.”

To get a better handle on what works and what doesn't, Fischman said the university should create experimental prototypes for assessing groups that collaborate on interdisciplinary teaching and research projects. "Participation in these experiments should be voluntary, carried over several years, and rewarded adequately," he said.

Still Evolving

Embedding interdisciplinarity into the academic enterprise is still a lofty design aspiration. And the transformation of Arizona State University into an efficient and impactful center of cross-curricular teaching and research is on-going. The impetus to persist in the arduous journey, however, is evident and is driven by both internal and external forces. Yet the university remains committed to this cause, because interdisciplinarity is the best way to tackle society's wicked problems.

Even as interdisciplinary collaboration flourishes in contemporary academic practice, persistent disciplinary partitioning represents one of the most pernicious design limitations to the further evolution of knowledge production in the American research university.

Crow & Dabars, 2020, *The Fifth Wave in American Higher Education* (p. 372)

FOR FURTHER EXPLORATION

The following articles and resources authored and co-authored by ASU President Crow provide a deeper examination of the concept of interdisciplinarity as a distinctive university design problem and how ASU has approached interdisciplinary in the journey to become a “New American University.”

Crow, Michael M. and William B. Dabars. (2020). *The Fifth Wave: The Evolution of American Higher Education*. Baltimore: Johns Hopkins University Press.

Crow, Michael M. and William B. Dabars. (2020). [The Emergence of the Fifth Wave in American Higher Education](#). In *Issues in Science and Technology*. Vol. XXXVI, No. 3, Spring 2020.

Crow, Michael & Dabars, William. (2019). [Restructuring Research Universities to Advance Transdisciplinary Collaboration](#). 10.1007/978-3-030-20992-6_37.

Crow, Michael M. and William B. Dabars. (2018). *Designing the New American University*. Baltimore: Johns Hopkins University Press.

Crow, Michael & Dabars, William. (2014). *Toward Interdisciplinarity by Design in the American Research University*. 10.14361/transcript.9783839426166.13.

Crow, Michael M. and William B. Dabars. (2014). Chapter 14. *Interdisciplinarity as a Design Problem. Towards Mutual Intelligibility Among Academic Disciplines in the American Research University*. In O'Rourke, Michael & Eigenbrode, Sanford & Wulfhorst, J.D. & Crowley, Stephen. (eds). [Enhancing Communication and Collaboration in Interdisciplinary Research](#). 10.4135/9781483352947.

APPENDICES

- Interdisciplinary Schools and Colleges at ASU:

School of Arts, Media, and Engineering
 School of Biological and Health Systems Engineering
 School of Civic and Economic Thought Leadership
 School of Complex Adaptive Systems
 School of Computing, Informatics, and Decision Systems Engineering
 School of Community Resources and Development
 School of Earth and Space Exploration
 School of Electrical, Computer and Energy Engineering
 School for Engineering of Matter, Transport and Energy
 School of Film, Dance and Theatre
 School for the Future of Innovation in Society
 School of Geographical Sciences and Urban Planning
 School of Historical, Philosophical, and Religious Studies
 School of Humanities, Arts and Cultural Studies
 School of Human Evolution and Social Change
 School of International Letters and Cultures
 School of Mathematical and Natural Sciences
 School of Mathematical and Statistical Sciences
 School of Molecular Sciences
 School of Life Sciences
 School of Politics and Global Studies
 School of Social and Behavioral Sciences
 School of Social Transformation
 School of Social Transformation
 School of Sustainable Engineering and the Built Environment
 School of Sustainability
 School of Transborder Studies
 New College of Interdisciplinary Arts and Sciences
 T. Denny Sanford School of Social and Family Dynamics
 The Polytechnic School
 The Design School

- Dual Centers from [ASU Centers and Institutions](#):

American Indian Policy Institute
 Dual: College of Liberal Arts and Sciences and Law
 ASU-SFI Biosocial Complexity Initiative
 Dual with School for the Future of Innovation in Society
 Blockchain Research Lab
 Center for Accelerating Operational Efficiency
 Dual: Engineering and Global Security Initiative
 Center for Behavior, Institutions and the Environment
 Dual with College of Liberal Arts and Sciences, Social Sciences and Office of the Provost
 Center for Biodiversity Outcomes
 Dual School of Life Sciences and Julie Ann Wrigley Global Institute of Sustainability
 Center for Bioelectronics and Biosensors (BB Center)
 Dual Engineering and Biodesign Institute
 Center for Biosignatures Discovery Automation
 Dual Engineering and Biodesign
 Center for Convergence of Physical Sciences and Cancer Biology
 Dual with Office of the Provost and College of Liberal Arts and Sciences, Natural Sciences
 Center for Cybersecurity and Digital Forensics
 Dual Engineering and Global Security Initiative Center for Evolution and Medicine
 Dual with Biodesign Institute
 Center for Human, Artificial Intelligence, and Robot Teaming
 Dual Engineering and Global Security Initiatives
 Global Drylands Center
 Dual with Julie Ann Wrigley Global Institute of Sustainability
 Swette Center for Environmental Biotechnology Dual Engineering and Biodesign Institute
 Urban Climate Research Center
 Dual with Julie Ann Wrigley Global Institute of Sustainability
 Interplanetary Initiative
 Dual with the Office of the Provost and College of Liberal Arts and Science

The [ASU Knowledge Enterprise](#) supports several interdisciplinary research institutes and initiatives. These university-wide research centers enable scientists and scholars to collaborate freely across disciplines; connect researchers with clinical, government and corporate partners; and provide the teams and infrastructure to win significant funding opportunities.

Julie Ann Wrigley Global Futures Laboratory™

Designing and shaping a future in which Earth will thrive

Interplanetary Initiative

Building the future of humans in space and advancing society through exploration

J. Orin Edson Entrepreneurship + Innovation Institute

Supporting entrepreneurs at ASU and in the greater community at every stage as they turn their big ideas into reality

Biodesign Institute

Improving health, protecting lives and sustaining our planet

Global Institute of Sustainability and Innovation

Finding practical solutions to environmental, economic and social challenges to enable better lives

McCain Institute for International Leadership

Advancing character-driven global leadership based on security, economic opportunity, freedom and human dignity

Global Security Initiative

Addressing global security challenges in partnership with defense, development and diplomacy communities

Institute for Humanities Research

Exploring social and scientific issues through historical, philosophical and creative perspectives

Institute for Social Science Research

Supporting the social sciences at ASU by helping students and faculty develop the research skills needed in today's world

LightWorks®

Discovering and inventing energy solutions to address the world's fuel, electric, security and justice challenges

Decision Theater

Exploring decision-making in uncertain times through advanced modeling and visualization technology

NewSpace Initiative

Leading the integration of academic and commercial space enterprises

Flexible Electronics and Display Center

Advancing flexible displays, flexible sensors and flexible electronics systems, part of the advanced materials and manufacturing efforts within MacroTechnology Works

Become a UDI Product Partner

To maximize depth, relevance and diversity of content, Blueprints for University Design (BUDs) are published by the University Design Institute in collaboration with various internal and external product partners.

For more information on how to become a product partner,
contact udi@asu.edu

About the University Design Institute

The University Design Institute (UDI) is a catalyst for transformation in higher education. Our guiding belief is that universities must become engines of social transformation and economic success. The work we do is centered around 6 design imperatives: University Mission, Leaders and Cultures, Teaching and Learning, Resource Diversification, Knowledge Generation and Discovery, and Digital Solutions. At the core of these pillars is a relentless commitment to reimagining and innovating higher education models. We bring rich expertise in design, a global network of experts, and partner organizations to support transformation efforts in higher education. Our approach is three-fold: re-imagining, co-designing, and transforming. We rethink the future. We co- design solutions with partners. And we advance innovative, scalable, and sustainable solutions.

For more about UDI or other UDI learning products, contact udi@asu.edu