Three Vignettes

THE YEAR IS 2035. Agatha, an undergraduate student from California’s Central Valley, arrives at the “UC Davis-X Campus” on a cool fall morning after completing the online portion of her course on ethical marketing strategies. The campus is already buzzing with people congregating in and around the various UC Davis Lily Pads—customized outdoor pavilions where students and faculty discuss, collaborate and network around various topics and watch the most recent results of their work in a three-dimensional hologram off a small screen the size of someone’s palm. Agatha parks her bike and rushes to her interdisciplinary training lab. This is her first design course after completing her immersion training in data visualization at UC Davis.

On this particular morning, her small team of students will visit the International Innovation Hub together with their instructor to meet with a group of Sociology, Law, Cultural Studies, Public Health and Engineering students from four different countries. They will discuss the task at hand: how to quickly set up a remotely controlled robotic emergency room at a refugee camp halfway across the world in Kazakhstan. Agatha is eager to “speak” with the hologram of a colleague from France who is interested in the technology requirements of her project, which focuses on how to develop an innovative business strategy to raise funds for their activity. This problem-guided training will prepare her for an internship that provides a first-hand experience in a global consulting firm. Agatha is excited about the internship because it could bring her closer to her dream of becoming a global health economy adviser for migrant communities.

THE YEAR IS 2045. Hector is returning to UC Davis to meet with friends and previous mentors. The campus looks familiar yet different, with several new Innovation Hub and Foundational Knowledge Unit buildings, and he immediately senses the vibrancy around the many UC Davis Lily Pads. He’s proud to have his roots here. Through UC Davis’ efforts in collaborating with an international PK-14 education coalition, he was optimally prepared for his college education. As the first member of his family to attend college, his was attracted to UC Davis’ commitment to equity and diversity and its reputation for excellence in research and training to help solve the grand challenges of California and the world. During his graduate studies and research, Hector was provided with profound training in his discipline and the interpersonal skills required to succeed in diverse workplaces through UC Davis’ digitalized classroom concept and expanded student-mentor interaction, along with an on-demand learning and self-organizing curriculum.

UC Davis’ foundational training, together with capstone experiences in interdisciplinary and problem-guided innovation hubs, enabled Hector to apply his knowledge to solve major challenges in his field as an undergraduate and then graduate student. He was also able to build an extensive global network through continuous interaction with colleagues, peers and collaborators. Through his first career-building internship as a student, he met his current employer, and now he is back on campus for one of the many technical workshops for UC Davis alumni that he has attended over the past five years to advance his career.
and expand his professional network. Having studied at a world-leading research university with a diverse and interactive culture, Hector has the tools and confidence needed to achieve his goals. He is happy to remain part of and give back to growing the UC Davis community. Reflecting fondly on his experiences, he remembers how it was possible to create this innovative university.

THE YEAR IS 2060. Meili, a second-year Epidemiology resident, just finished her shift at the Global Disease Center at UC Davis at 6 p.m. on this rainy Saturday afternoon and runs up two flights of stairs to her studio to take a shower, have dinner and maybe sleep for a few hours before she joins her team again for the midnight shift. They are working around the clock since their team in Ivory Coast, a state of the African Union, informed them that they found evidence of a new, aggressive virus that has already claimed many lives. The number of victims has already reached 1,500 in less than 36 hours. Their lab in Ivory Coast has found a totally new strain that does not compare with any known viruses as their database indicates. She and her colleagues at the center are running algorithms to determine whether this strain was carried by a known animal or human, by correlating with the genotypes/phenotypes of all known animals, wild and domesticated in Africa. Their data banks have quadrillions of data that provide the phenotype of every known species on earth, but making the correlations will take hours. If they find the correct correlations, they will then know how to eradicate the virus in less than 24 hours. For the time being, they are all hands on deck at the UC Davis center, the United Nations, Centers for Disease Control and the World Health Organization.

It is advantageous that Meili lives so close to work; many times she feels that her studio is home to everything—work, friends and family. She suddenly remembers she has a date with her family to “meet” for dinner/breakfast; they call it dine-break. The 16-hour difference between her and her family in Shanghai makes it possible for them to eat together every Saturday when she has dinner at 6 p.m. and they have Sunday breakfast at 10 a.m. They share amazing Chinese food, her mom’s recipes. They sit around the table because the wall that her table is directly attached to turns into a liquid crystal projector and brings the rest of her family next to her in absolute physical size and extraordinary detail. This allows them to eat together regularly, as if they all shared the same physical space.

Many times she wonders what life was like when this technology did not exist. She would have missed her family terribly. They’re all eating the same food because she simply
warms up what her mom sent her frozen a couple of days before their family meal. They discuss everything from work to politics. Her little brother, Bo-lin, wants to know more details about last week’s international computer game competition. He is anxious to become a famous player himself. It seems to be a very lucrative profession these days, not to mention the fame and glory that come with it. He is only 10 years old, but he already designs software for these games. Along with his friends, they are selling this software like lemonade or cookies were sold in the old days. Bo-lin’s computer club needs this money to buy equipment and more access to online micro-courses that give the most recent cues on smart designs.

Meili is happy to be on this integrated campus where work, learning, family and fun can all happen in the same spaces. She has access to every place in the world and any information whenever she needs it. Every wall in her studio is another window to information, to friends and family and to the rest of the world. She feels connected and engaged. Whenever she feels the urge for a change of scenery from her home in Sacramento, she can take off for a few days and bring her work with her. No one would notice the difference.

UC Davis: The University of the 21st Century

IF THE ABOVE THREE VIGNETTES PRESENT A GLIMPSE OF THE FUTURE, WHAT WILL TRANSFORM UC DAVIS TO THE UNIVERSITY WHERE THIS FUTURE BECOMES A REALITY?

• INNOVATIVE CURRICULA
• BIG IDEAS
• INNOVATIVE SPACES

Innovative Curricula: Davis-X

A PROGRAM BASED ON NEW FORMS OF LEARNING, DISCOVERY AND INNOVATION

The world’s most pressing problems (e.g. climate change, food and energy security, immigration, poverty, aging populations, inequality) are inherently interdisciplinary. The role of research universities will continue to shift from an emphasis on advancing disciplinary knowledge and learning to providing innovative solutions for addressing major societal and global challenges through true collaboration between students and experts from multiple disciplines, together with industry and professions.

Such expansive, interdisciplinary learning and discovery-based collaboration has been hindered by universities that have historically been organized around primary research and teaching units composed of specific departments focused squarely on a single discipline. This structure poses the risk of creating artificial barriers between researchers that hamper the type of interdisciplinary efforts and breakthroughs we need to solve some of the world’s most complex problems. The old structure also hinders the ability to hire cutting-edge, interdisciplinary scholars; often forces arbitrary departmental assignments; shifts the university’s focus toward disciplinary differences as opposed to shared interests; and it broadens the gap between scholars, their students and the public. To position UC Davis as a world leader in cutting-edge learning environments, research and training that equips our students with the skills to solve the grand challenges of our time, we must value and support the establishment and maintenance of new and flexible curricula that will be supported and delivered by interdisciplinary innovation hubs. Existing centers and institutes at UC Davis could form the kernel of a network of interconnected and intertwined “Problem-Guided Innovation Hubs” which will support on-demand learning and could provide the students with self-assembled and customized curricula.

We envision that in the year 2050, most students and scholars will not be housed by discipline, but by shared problem-guided goals they will work on collaboratively. These
innovation hubs will be far more flexible and nimble than the current rigid disciplinary departments. And they will evolve to more effectively respond to new obstacles in problem areas that may be unforeseen today. Like a plant nourished by a diverse and complex root system that expands and gives rise to new life, these hubs will grow through the joined forces of scholars who are learning along with students about the ever-changing knowledge and paradigms of education, discovery and innovation from across the university. If a particular hub diminishes in relevance, or if goals have been achieved, the hub would disintegrate completely or morph along with changing priorities to give way to new ones. We further envision a much larger proportion of faculty will engage in problem-guided hubs.

We recognize that this vision requires a flexible organizational structure and a modification of human resources practices—including the promotion and tenure system—to enable freer movement of faculty and staff across organizational units. These flexible innovation hubs would be closely associated with “Foundational Knowledge Units” that focus on developing cutting-edge, discipline-specific knowledge, akin to some of the current departments on campus. Together, innovation hubs and foundational knowledge units will generate a strong framework for in-depth undergraduate and graduate training and research excellence in a variety of fields that will greatly enhance our capacity for innovation with global impact.

Temporary iterative architectural installations can inspire and nurture interdisciplinary research collaborations at UC Davis over the next 50 years, starting immediately. We envision the introduction of UC Davis “Lily Pads,” low-cost modular pavilions installed around campus, to foster and promote a quick-moving, experimental approach to academic research outside of traditional spaces on campus. Creative people and collaborations move more quickly and unpredictably than whole institutions. Breakthroughs emerge from unanticipated “collisions” between the work of researchers from different fields, collisions that by their nature cannot be predicted.

The most potent and well-documented methods for promoting interdisciplinary collision spaces is through the physical shape of the environments we work in via design and architecture. The relationship between environment and collaboration has been identified and employed with varying levels of success in academia and private industry. Yet surprisingly, optimal collaborative environments are relatively straightforward: creation of spaces that allow people from different disciplines to share laboratories, equipment, social gathering places, hallways, staircases and entrances.

The public space of UC Davis is latent energy that will be activated with temporary structures to inspire conversation, collaboration, new ideas and delight. Currently, the physical layout of campus is an impediment to interdisciplinary collaboration, with researchers isolated in department-specific...
The Future at UC Davis

**Lily Pads will be highly visible ongoing declarations of UC Davis’ commitment to collaboration and experimental learning and research. These temporary spaces, designed to promote interdisciplinary engagement, will be installed as quarterly or annual projects, with metrics designed to measure and record their success. The modular, iterative design will allow design refreshing over the course of the year. In this way, Lily Pads will be continuously improved as they respond to the specific conditions of the UC Davis community, weather, pedestrian/bike traffic flow, and the evolving identity of our campus.**

**Successful Lily Pads will be renewed, while less frequented structures will be adjusted, improved or discontinued. Lily Pads will be designed from a system of building blocks that could be reconfigured for different purposes, including gathering spots for interdisciplinary researchers, collaborative art/science installations, miniature film-screening rooms, temporary architecture experiments or gardens designed by landscape and architecture students.**

Buildings. In the distant, well-capitalized future, UC Davis will have followed the success at campuses such as the University of Pennsylvania, reshaping our built-space structures to promote and spark greater collaboration. In the meantime, UC Davis Lily Pads will inspire and foster an atmosphere of collaboration on campus, and prepare the ground for the more permanent structures of the future.

**Big Ideas**

**DEGREE PROGRAMS, RESEARCH PATHWAYS AND COMMUNITY OUTREACH THAT COULD DEFINE THE UNIVERSITY OF THE 21ST CENTURY**

UC Davis is at a pivotal moment, one in which we are poised to establish ourselves as the leading public research University of the 21st Century. As we build our strategic framework, a crucial aspect of our success will depend on our ability to address complex global problems through the development of institutional Big Ideas—interdisciplinary and transformational initiatives that will position UC Davis to make a profound impact on the quality of life in California and worldwide. These forward-looking programs and projects will also be the hallmarks of UC Davis’ next philanthropic campaign, enabling us to build on our strengths, leverage our most powerful assets and catalyze new partnerships across disciplines to keep UC Davis at the forefront of academia, positioning us for continued excellence for decades to come.

In November 2015, UC Davis issued a public call for Big Ideas to all levels of the academic community, including faculty, students, department chairs, center directors and staff. The response has been impressive, with more than 40 submissions to date. The initial proposals have been vetted by a committee of deans and select administrators to determine both their content and feasibility. While a number of early submissions have warranted further study, several have moved on to the development stage. Below we have outlined five example proposals that are in various stages of development for your consideration and feedback. These are promising, single-concept initiatives we hope will build on the unique strength and foundation of UC Davis, moving us forward along exciting and transformative new pathways.

A. **New Pathways for Impacting Local and Global Policies in the 21st Century**

A primary goal of all research is to communicate its complexity in ways that are understandable, responsive and well-targeted to the decision makers in our state and nation. Professor Ann Stevens will lead a new institute comprised of faculty in the College of Letters and Science, the Institute for Transportation Studies, the School of Education, the School of Medicine, and the World Food Center that will join together to educate students, conduct research and play a leadership role in solving policy challenges of the 21st Century, particularly in the areas of food, health, energy, agriculture and transportation. Students will be uniquely trained to synthesize and digest policy-relevant quantitative studies, and to understand and communicate the complexity of quantitative policy research. Several of the major policy centers on campus will be coordinated under one innovative umbrella called the Policy Research Consortium, which will support and disseminate research on core policy topics.

A unique, multidisciplinary training program in policy analysis
and communication will be created that reaches Ph.D. and master’s students from all parts of campus. The mission would be to teach researchers best practices for how careful analysis of complex issues can be translated and used to better inform policymakers in Sacramento, Washington D.C., the United Nations in New York, the European Union in Brussels and elsewhere around the globe.

B. Treating Trauma Patients Using Regenerative Medicine
There is no reliable solution for bone loss in patients that sustain major trauma following surgical treatment for infection, and following aggressive treatments for cancer. An accessible, long-lasting and reliable technique for bone regeneration would restore function to this patient population, bringing back their ability to walk, care for themselves, return to work and alleviate their pain and suffering. A new interdisciplinary team of scientists from the School of Medicine led by Dr. Mark Lee; the College of Engineering; the School of Veterinary Medicine; the Institute for Regenerative Cures; and industry partners will develop a revolutionary solution to this problem by combining expertise in stem cell biology, cell and tissue engineering, and veterinary and clinical medicine. Faculty in the School of Veterinary Medicine will develop clinically relevant animal models for testing therapies. Biomedical Engineering will collaborate with School of Medicine faculty to create functional scaffolds that will carry, protect and guide the implanted cells. The Institute for Regenerative Cures will perform clinical trials and produce a clinical grade implant.

C. A Living Laboratory for Innovation in Agriculture
Without dramatic advances in food production, the world will face a severe shortage of food in the middle of the century due to population growth and climate change. Innovation will be the key to feeding and maintaining social stability. An interdisciplinary team of UC Davis faculty led by Professor Kate Scow, director of the Russell Ranch Sustainable Agriculture Facility, will create a “Living Laboratory for Resilient Agriculture.” The laboratory will dramatically affect our ability to develop solutions that California and the world’s agricultural systems need to adapt and thrive in changing climate and environment. Together with other stakeholders, the laboratory will cultivate a new, global platinum standard for dry-land and irrigated food production with the smallest carbon footprint, the most fertile and resilient soils, and the highest yields requiring the least amounts of water. The Living Laboratory will be a shared space for innovation—a farm laboratory where partners can co-design and scale up environmentally sustainable, economically viable and systemic changes in food production.

D. New Pathways in Sustainable Living and Learning
The world is in dire need of trained specialists that can teach the fundamental principles of sustainability. A group of faculty from eight different colleges, schools and units led by Professor Tom Tomich, will create “Sustainable Living and Learning Communities” designed to engage students across majors to develop leadership talent and hands-on problem-solving skills focused on sustainability. The Sustainability Living and Learning Communities will be an interdisciplinary and learning environment that sets a new standard in higher education for experiential learning, student leadership development and STEM education, all grounded in real-world problem solving for sustainability. The Sustainability Living and Learning Communities will be the cornerstone of a campus neighborhood where students live, work and learn. The focus will be on best practices for food, housing, energy and wellness.

E. A School for Global Population and Health
Promoting population health will be the central focus of health care organizations in the future and a new School for Global Population and Health will greatly enhance UC Davis’ ability to be a leader in these efforts. Personalized health care will begin at birth, be ongoing throughout an individual’s life and fully utilize technology. The UC Davis Health System will employ a transdisciplinary approach and big data to assess and address patient needs. Such a school will also expand the UC Davis Health System’s ability to provide the best education in the health professions by offering students holistic, foundational knowledge and an integrated undergraduate/graduate program as an entrée into the health professions for nurses, pharmacists, therapists, veterinarians, nutrition, informatics, genomics and more. Clinicians will learn in cross-disciplinary teams. The school would also provide an environment for making the most impactful health discoveries by working closely with the communities it serves, targeting areas of discovery that will provide the greatest impact.
Third Campus

A NEW CAPITOL-AREA CAMPUS IN SACRAMENTO—BUILDING A BRIDGE TO A BRIGHTER FUTURE FOR UC DAVIS AND THE REGION

As the only research university a short drive from the Capitol of a state known for its technological and policy advances, UC Davis has a unique opportunity to become California’s true University of the 21st Century. But we must first bridge the divide that separates our main campus from the rest of the Sacramento region. The Davis campus and the California Capitol are just 15 miles apart, but that distance and the Yolo Causeway have served as more of a psychological barrier than a true link between our two communities. As a result, at the Capitol and in the government and private sector offices nearby, America’s most dynamic state works on policy matters and a host of compelling challenges without the full engagement of our university.

Now, with UC Davis’ reputation for excellence growing around the world, it’s imperative that we seize this opportunity to lead and be of even greater service to California and the students we serve. Developing a new campus in greater proximity to the Capitol will allow our students, faculty and researchers to work more closely with California’s policy leaders. This is particularly true in the areas of our greatest strength—at the intersection of food, health and sustainability. A new UC Davis campus near the Capitol would enable UC Davis students, faculty and researchers to work directly with state elected officials and policymakers and the many nongovernmental offices and agencies that engage with Sacramento. Such a campus would also provide much-needed new and additional space as UC Davis grows to meet increasing public demand for the education, research and health care we deliver to the public.

The additional Sacramento campus would have a strong public policy orientation and provide a dynamic urban setting for new academic programs not currently offered in Davis. A new campus in Sacramento would also provide opportunities for our Health System campus to utilize additional clinic space and expanded services to meet the needs of a changing and increasingly diverse urban population. Our work on this new campus would not divert resources from existing needs and new or planned activities at our existing campuses. We will rely instead on new philanthropy, innovative and unique partnerships, and additional revenues.

There is another compelling and practical reason to develop a new Capitol-area campus. As we look for ways to meet the growing demand for higher education and innovation for our region, state and nation, UC is being challenged to grow in our programs and in the number of students seeking admission into the UC system. With the state instructing us to enroll more California residents, we know that—in addition to our own internal aspirations for continued excellence—we will need to improve the quality of existing spaces and add new ones. Bringing several thousand additional people to the Davis campus over the next decade will create significant demand for classrooms, labs, housing, dining, faculty offices and other academic services. By building a new campus to take better advantage of our opportunities, we would also be creating a satellite location where some of this new growth can more readily occur.

At the present time, we are studying our future space needs through our Long Range Development Plan. We are also developing a Capital Investment Master Plan to identify financially viable ways to address $1.3 billion in deferred maintenance and other capital needs that require spending about $2 billion a decade for the foreseeable future. Soon, we plan to release a Request for Expressions of Interest to property owners and others in the Sacramento area who might want to partner with us on developing a robust, Capitol-area campus that can help us fulfill our research and academic mission and our obligations to California. It is both an opportunity and a challenge we have every intention of meeting, and we want to measure market interest in our vision. If we move forward boldly and wisely, the results can pay dividends for UC Davis, for the Sacramento region and for California for decades to come.