UC Davis for the World: Vision 2065

Summary The vision for UC Davis in 2065 is an experience-based education, with interdisciplinary fundamental and applied research at a campus defined by diversity, equity and collaboration. The goal is to build a life-long community of Aggies with the knowledge and inspiration to address the grand challenges of our world.

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Prologue

2050 - Aggatha is arriving at the ‘UC Davis experience campus’ on a cool fall morning after completing the online portion of her course on ethical marketing strategies. Campus is already buzzing with people congregating in the various UC Davis Lily Pads - customizable outdoor pavilions where students and faculty discuss, collaborate and network around various topics. She parks her bike and rushes to her interdisciplinary training lab. This is her first graduate course after completing her in-depth undergraduate training at UC Davis. This morning her small team of students will visit the International Migration Hub together with their instructor to meet with a group of Sociology, Law, Cultural Studies and Public Health students and discuss their contributions to a project that works with the State to reach refugee communities that have settled in California. Aggatha is eager to develop an innovative strategy, since this problem-guided training will prepare her for an internship that provides a first-hand experience in a consulting firm. Aggatha hopes that this internship will bring her closer to her dream of becoming an ethical economy advisor.

2065 - Aggatha is returning to UC Davis to meet with friends and previous mentors. Campus looks familiar yet different with several new Innovation Hub and Foundational Knowledge Unit buildings, and she feels the vibrancy around the many UC Davis Lily Pads. She feels proud to have her roots here. Through UC Davis’ effort in collaborating with the state’s PK-14 education, she was optimally prepared for her college education. As a first-generation college student she was attracted to UC Davis’ commitment to equity and diversity and its reputation for excellent research and training to solve the grand challenges of California and the world. As an undergraduate student, UC Davis’ digitalized classroom concept and expanded student-mentor interaction provided her with a more profound training in her discipline and the interpersonal skills required to succeed in diverse workplaces. As a graduate student, UC Davis’ foundational training, together with capstone experiences in interdisciplinary and problem-guided innovation hubs enabled Aggatha to apply her knowledge to solve major challenges in her field and build an extensive network through continuous interaction with colleagues, peers and collaborators. Through her first career-building internship as a graduate student, she met her current employer, and now she is back on campus for one of the many technical workshops for UC Davis alumni that she has attended over the past 15 years to advance her career. Having studied at a world-leading research university with a diverse and interactive culture provided Aggatha with the tools to achieve her goals, and she is happy to remain part of and give back to growing the UC Davis community. Thinking this she wonders, how was it possible to create this university?
1. UC Davis’ mission, reputation and identity
   a. Mission and reputation
      i. Remain true to our mission

UC Davis’ mission emphasizes our role as a top-tier public research university with a land-grant heritage that provides comprehensive interdisciplinary research and training, with a focus on social responsibility and a sustainable global enterprise. The ability to translate this mission is the bedrock of our reputation. Our mission identifies our areas of strategic focus that distinguish us from other universities. Building UC Davis’ reputation over the next 50 years will require achieving a level of optimal distinctiveness – wherein UC Davis offers a distinct mission and opportunities that allow the public to easily identify UC Davis among other top-tier public universities as a place of career development, groundbreaking research and community.

Over time, staying true to our mission will further build a stable and coherent identity and reputation. Expanding on the history and experience of UC Davis provides deep institutional knowledge and culture that is difficult to develop quickly and a source of competitive advantage.

   ii. Establish a problem-solving based mandate

UC Davis already shows significant ability to adjust strategies and activities for accomplishing its mission and leveraging existing strengths into areas of societal need and strategic distinctiveness. For example, the Foods for Health Institute, UC Davis Health System, and Energy Efficiency Center are outgrowths of our mission and heritage that address pressing issues with national and global impact. The reputation of a research university is built on such excellence. We recommend a shift from a discipline-first focus to a problem-guided focus to give our research and training more traction in building a public reputation of excellence that is key to attracting students, faculty, and funding. Innovative solutions must be rooted both in deep disciplinary and interdisciplinary expertise (see section 2&3 for details).

b. Equity and access
   i. Inclusive education and curriculum

Our goal is for UC Davis to provide curricula inclusive of subaltern viewpoints. Curriculum and teaching methods that carefully consider engaging students of all backgrounds, particularly underrepresented groups, can improve retention and success for all students.

Through hiring initiatives and incentives for current faculty, UC Davis can build a more diverse faculty body invested in inclusive education. This will be a virtuous cycle, where successful reframing of curriculum and teaching methods makes UC Davis a destination for a diverse faculty body as well as domestic students of color and international students.

   ii. Strengthen social mobility

California’s Master Plan for Higher Education reflects America’s philosophy of being a place where social mobility is possible and where hard work trumps the inequities that a person faces. However, we have yet to achieve our goal of serving all students equally, particularly those from underserved communities.
UC Davis is already known as a place for social mobility based on recent rankings, and as a “Best Value University” we already surpass most U.S. institutions at supporting low-income students. Building on our strength can give us a sustained advantage in attracting diverse faculty, staff and students. We have a superb foundation for further expanding our leadership in offering equal student access and opportunity. The UC Davis of the future will provide "on ramps" to prepare underserved students for success at UC Davis, and personal support systems to improve the experience, retention and success of all students. For example, this will include cohort-based programs that provide continued preparation of underserved students for success throughout their education and career. This requires UC Davis to address the student experience (living and learning environment), affordability (limiting student debt and improving access), and preparing and facilitating career development.

iii. Promoting success for all students

UC Davis’ present undergraduate student body does not reflect the state’s diverse population based on measures of race, ethnicity, and income level. In addition, those from underrepresented groups (black or African-American, Hispanic/Latino, and Native Americans) are also less likely to graduate than the average UC Davis student. Moreover, many students, particularly those from disadvantaged backgrounds and underrepresented or marginalized groups (including students of color, English language learners (whether domestic/international), first generation college students, low income students, disabled students, immigrants, LGBTQ students, women in STEM fields, and intersections of these groups) are facing not only the challenges and rigor of a first-rate university education, but also emotional stressors both on and off campus.

The UC Davis of the future will provide individualized support services to help incoming and continuing students navigate life on campus. This includes, for example, mental health, academic and financial support through counseling, coaching, emergency financial aid, flexible enrollment and disenrollment. These support services will then evolve with the changing student population. Focusing on success for every student aligns with and complements our strength and mission to make California and the world a better place to live.

iv. Enhancing coherence with the PK-14 educational system

Consistent with our mission as a land-grant institution, UC Davis shall continue to educate Californians and collaborate with the community in solving problems faced by the state. The education ecosystem can span a student’s lifetime, starting in infancy through the elementary and secondary education system, community college and University. All members of this ecosystem share the mission of educating the next generation. We should strengthen relationships between the University and PK-14 institutions and instructors to ensure that students from all socioeconomic groups are prepared to succeed at the University level. The need for expanded coordination is expected to grow as demographics shift statewide over the next 50 years. Consequently, a larger number of students will come from low-income backgrounds, and the percentage of first-generation college students will increase. These changing student demographics and the increased cognitive and social demands of a problem-guided education make it clear that the elementary and secondary education system will need support in better preparing
students for university. Additionally, there may be a shift to a greater number of students accessing UC Davis through community colleges. Recent proposals, such as President Obama’s free community college program, could encourage a greater number of students to start their higher education journey in the community college system. Coordination with community colleges for preparation and a seamless transition to UC Davis will ensure more students are able to access UC Davis and succeed once they arrive.

Such collaboration will build on ongoing efforts, including funded opportunities for PK-12 teachers to engage students in University research (e.g. the Young Scholars Program), educational outreach taking place in schools, alignment of expectations within the educational ecosystem, and collaboration with school districts to develop mutually beneficial partnerships for funding, internships and other support services.

2. A new approach to organizing the university
   a. ‘Problem-guided Innovation Hubs’ and ‘Foundational Knowledge Units’

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 to providing innovative solutions for addressing major societal and global challenges through true collaboration of experts from multiple disciplines together with industry and professions.

Such expansive interdisciplinary collaboration has been hindered by the historical university structure of single discipline-specific departments as primary research and teaching units. This structure poses the risk of creating artificial barriers between researchers that hampers interdisciplinary efforts, limits the hiring of cutting edge interdisciplinary scholars (or forces arbitrary departmental assignments), shifts the University’s focus toward disciplinary differences as opposed to shared interests, and reinforces the disconnect between scholars and the public.

To position UC Davis as a world leader in cutting-edge research and training to equip our students with the skills to solve the grand challenges of our time, we must value and support the establishment and maintenance of interdisciplinary hubs. UC Davis’ existing centers and institutes form the kernel of a network of interconnected and intertwined “Problem-guided Innovation Hubs”.

We envision that in the year 2065 most scholars will not be housed by discipline but by shared problem-guided goals toward which they work collaboratively. These innovation hubs will be much more flexible and nimble then the current rigid disciplinary departments, and will evolve to more effectively respond to new obstacles in changing problem areas. Like rhizomes on a plant, these hubs will grow through the joined forces of scholars 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. We further envision a much larger proportion of faculty to 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 (see section 2.d.iii)

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 (see section 3 for details) and research excellence in variety of fields that will greatly enhance our capacity for innovation with global impact.

UC Davis is well positioned to implement this recommendation. From our historical roots in agriculture and life sciences, we have a history of practical application of new knowledge and solving real problems for real people. Our graduate group structure is unique among the UC campuses and can serve as a model of cross-disciplinary teaching and research (see section 3 for details).

b. Enhance support of fundamental research

Critical challenges in the future cannot be predicted accurately and innovative solutions will rely on a broad knowledge basis. Hence, it is acutely important to maintain UC Davis' excellence in fundamental research, which is undertaken primarily to acquire new knowledge regardless of its applicability, and targeted research that is fundamental in nature, but focused on an ultimate application.

During the past decade, fundamental and targeted research accounted for less than 20% of the total US R&D budget. Traditionally, universities have been the drivers of fundamental research, while the business sector has provided 60-80% of funding for applied research and development. However, the federal government and industry are in agreement that continued support of fundamental research is important to expand knowledge and resources for future innovation, economic growth, improved human health and well-being, and U.S. strategic advancement.

We believe that fundamental research must be financially supported in part with UC Davis funds to provide the knowledge foundation for future innovation hubs and maintain a competitive advantage in an increasingly spare funding landscape. Existing support at UC Davis for interdisciplinary collaborations and fundamental research should be built upon. Specifically, emphasis should be placed on augmenting federal funding and expanding prior fundamental research efforts can be built upon to broaden and promote large foundational projects that span disciplines, departments and campuses, with the capacity for critical groundbreaking research discoveries. UC Davis’ established undergraduate and graduate education programs that draw talent from around the world, and the excellent and continuously advancing campus facilities and laboratories provide the resources needed to invest in expansive fundamental research.

c. Dynamically integrate fundamental and applied research

Historically, there has been a clear divide between fundamental and targeted/applied research within disciplines, colleges and departments, limiting the capacity for collaborative progress. Furthermore, most benefits gained from fundamental research are long term and often not apparent for decades in the future. In alignment with UC Davis’ existing programs for innovative collaborative research and our vision for dynamic
organization of interconnected innovation hubs and foundational knowledge units, we believe that UC Davis must continue and expand the existing support for integrated research. This includes the development of technology incubators for innovative spin-off companies and the establishment of interdisciplinary problem-guided hubs. This strategy will be embedded in bringing together fundamental and applied researchers under the umbrella of ambitious interdisciplinary research initiatives. Collaboration between innovation hubs and foundational knowledge units will be actively promoted through sharing of physical space, resources (staff and infrastructure) and a culture of open knowledge exchange and social networking.

d. Supporting infrastructure and organizational changes

We recognize the substantial organizational problems associated with having multiple areas of focus. UC Davis’ ability to achieve a flexible organizational, physical, and incentive structure will be key to being able to deliver on our interdisciplinary promise.

i. Proactive facilitation of collaboration

To facilitate the flexible organizational structure envisioned in this report, we recommend the creation of a “research liaisons” team whose charge it is to connect faculty with diverse expertise. These research liaisons will work jointly with UC Davis’ Tech Transfer and Innovation Access teams to proactively foster interdisciplinary groups, potentially serving as a catalyst for new research hubs. Additionally, industry partners and community stakeholders will be invited to participate in growing this innovative research environment, where experts are supported to solve complex problems. For example, cognitive psychologists, ethicists, social movement sociologists, agricultural economists, civil engineers, environmental law scholars and climate researchers might form a team to more effectively address important questions regarding more energy efficient communities.

ii. Architecture and design supporting a collaborative environment:

“UC Davis Lily Pads”

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 (see appendix). Creative people and collaboration move more quickly and unpredictably than 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, through architecture. The relationship between environment and collaboration has been identified and employed with varying levels of success in academia and private industry. Surprisingly, optimal collaborative environments are relatively straightforward: create spaces that allow people from different disciplines to share laboratories, equipment, social spaces, 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; researchers are isolated in department-specific buildings. In the distant, well-capitalized future, UC Davis will have followed the success at campuses like University of Pennsylvania and reshaped its buildings to promote 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.

Lily Pads will be highly visible ongoing declarations of UC Davis’ commitment to collaboration and experimental projects. 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 refreshes 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 the UC Davis community. 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, stages for plein-air dance and theater performances, and tests of new UC Davis scientific inventions (see appendix).

iii. Restructure of recruitment, promotion and tenure

UC Davis' scholars in 2065 will be recruited by the University through a bottom-up process, thus unifying the faculty’s shared vision and goals, and removing college level inequalities. For example, each college currently has its own mission, finances, teaching structure, and course buy-out rate/policy. These cultural and policy differences reinforce arbitrary boundaries between disciplines. Restructuring colleges and departments into problem-guided innovation hubs and foundational knowledge units will address inequalities and reiterate the value of all research on campus.

In 2065, innovation hubs and foundational knowledge units will submit requests for hires with specific skills, training and expertise. The incumbent will begin work aligned with a hub or unit based on shared interests, but as the scholar's research develops, or the hub’s focus evolves, the faculty member can align him/herself with new or existing hubs. With this strong faculty interconnection across campus, and without artificial administrative boundaries that constrain research agendas, faculty can easily affiliate with multiple hubs and units or shift between them based on research objectives.

This adaptable organization of research and faculty recruitment will make a restructure of promotional and tenure evaluations necessary to guarantee fair and comprehensive merit evaluation for all faculty. An important aspect of institutional support for research and scholarship involves mentoring. We propose that the centralized hiring structure be combined with ad-hoc tenure committees composed of internal experts qualified to review
individual faculty’s research programs and whose emphasis is on supporting the untenured faculty member. Each tenure committee will work with the faculty member through the tenure process and will help guide the university on the appropriate evaluation metrics and attainment of external reviews and reports.

3. Education priorities
a. Excellence for graduate and professional school students

We support our current graduate group structure, which provides most students with the expertise necessary to succeed in their field of interest. Innovation hubs represent a variety of expertise and offer a superb foundation to further improve graduate-level training. Jointly, the innovation hubs and foundational knowledge units will provide all graduate students with the deep expertise and skills to address future problems.

It will also be important to maintain professional schools and to ensure their freedom to set curriculum and deliver instruction independent of scholars in unrelated fields. Professional schools have strict accreditation and licensing guidelines that govern the training they provide to students, and currently apply interdisciplinary approaches to ensure that students develop these competencies and successfully function as professionals in their respective fields. Thus, we envision the maintenance of deep professional education, coupled with meaningful opportunities for students in professional schools to be involved with problem-guided innovation hubs.

Graduate programs in 2065 will be training graduate and professional students by building on the framework of their in-depth education and expand this with interdisciplinary and applied training components. This will be in alignment with the proposed innovation hub and foundational knowledge unit structure across campus. Further funding will, in part, be provided by federal training grants, scholarships, and industry or community partnerships. Graduates will have the opportunity to build networks with program partners and the graduate programs will be evaluated partly on their ability to create employment opportunities. Combining in-depth disciplinary training and hands-on experience in conducting collaborative problem-guided research will generate a student body uniquely qualified for the workplace.

b. Interdisciplinary undergraduate education and problem-guided learning

The concerted shift away from disciplinary silos for researchers would consequently be accompanied by a parallel shift away from disciplinary majors at the undergraduate level. Many undergraduates aspire to solve problems in specific areas or enter a professional career. To avoid forcing students to major in multiple disciplines and take classes that satisfy the requirements of these majors but are not relevant to their career training and development, undergraduate degrees in 2065 will be custom-designed based on the career goals of individual students. In addition to the foundational knowledge units outlined in section 2, innovation hubs will offer classes that provide undergraduates with the theoretical knowledge and practical skills relevant to their majors. Advisors affiliated with innovation hubs will advise students on their undergraduate curriculum.

To prepare students for succeeding in a rapidly changing world with fast evolving challenges, all undergraduate classes must emphasize universal skills of critical thinking, problem-solving, and personal expression. This will be extremely important as virtual
communication and information will be rampant in 2065. As scientific communication and technologies become more available to the public, students will have more opportunities to test hypotheses and ask questions of their own. This will place an increased demand for critical thinking, problem-solving skills and ability to design and conduct experiments and studies. In 2065, classroom learning of foundational knowledge will be greatly reduced as virtual instruction becomes the norm, but personal interaction with faculty mentors will be increasingly valuable. Moreover, UC Davis faculty will be immersed in tackling the immediate challenges of broad problem areas, and will be most qualified to guide students using real-life scenarios and case studies. Faculty will provide training in understanding the critical “behind the scenes” steps, limitations, and pitfalls of the most pressing challenges in the broad problem area the students are passionate to address.

The innovation hubs in conjunction with industry, government or non-profit partners will provide practicum opportunities (internships, research experiences, and projects) that allow undergraduates to acquire skills in an applied setting. For example, an innovation hub on poverty would have clear connections with legislators in Sacramento, health clinics, legal assistance clinics, welfare agencies and more, in the surrounding counties. Students focusing on specific problems will be expected to acquire hands-on experience in the innovation hub research labs and/or with associated partners. Advisors will mentor students in selecting practicums and integrating them into their undergraduate curriculum.

c. Digitalization of the education experience

Digitalization will be a necessary component of a problem-guided and experience-based campus. UC Davis has always been a leader in providing hands-on experiences on campus. Since 1936 the campus has hosted its Arboretum exhibiting more than 22,000 trees and plants; it is famous for its livestock animals and horses housed on campus; it has been a pioneer for agricultural field experimentation and scientific discovery through virtual reality simulation, such as the 3D KeckCAVES. To expand our strength in experience-based learning on and off campus, we must expand the personal student-mentor interaction. This may include significant changes in faculty teaching commitments, and the repurposing of traditional lecture spaces.

Replacing existing lectures with more effective interactive, digital content permits the transformation of lecture spaces and existing buildings into innovation hubs. Rather than devoting time and resources to lectures which repeat similar content year after year, faculty can take full advantage of the opportunities offered by the digital revolution to draw from a variety of online modules to develop comprehensive course contents that then become online commodities. This will greatly reduce the didactic delivery commitment, allowing faculty to design, participate in and lead experience-based learning exercises. This teaching structure will also provide unprecedented opportunities in assessing course content, outcome, and impact, and offer new possibilities to embrace and foster diversity. The digitalization of traditional classroom learning can also increase learning quality through more individualized and interactive learning styles. As campus expands and changes, digital learning can be an avenue to tie the different locations into a community. In addition, as a public university, the digitalization of traditional classroom teaching has the positive externality that course content becomes available to the general public, offering new opportunities for reaching a larger and more diverse student body and expanding lifelong learning.
The transition toward experience-based learning hinges on the liberalization of existing resources through digitalization. However, the move to digitalization will necessitate significant upfront investments, and the fruits of such transition might not be realized for several years. This includes sufficient funds and other resources for large-scale digitalization of course content, and the establishment of a much larger team of experts that assist faculty in this process. UC Davis has already set up a small team of Academic Technology Services and a Center for Educational Effectiveness, which will need to be significantly expanded to accelerate this transition across campus.

d. Lifelong learning and alumni involvement

As technology, the market and economy continue to rapidly change, the average American adult can expect to change jobs and/or careers multiple times throughout their working life. These changing career trajectories will make lifelong learning increasingly important to meet the required expertise of individual workers. This increasing need for lifelong learning will provide opportunities for UC Davis to better connect with its large alumni population.

We believe that there is a significant amount of lifelong learning already taking place on campus, which can be further leveraged. Our alumni are an incredibly valuable and important part of our community. They can provide employment, internships and networking opportunities for our students, government and industry connections for our faculty and research endeavors, and represent an important population of donors in terms of funds, time and experience. Alumni will also benefit from their continued association to UC Davis. In this regard, minimizing financial and administrative barriers will allow alumni to participate in learning at UC Davis. A varied collection of courses or workshops should be accessible to alumni through online/extension/in-person offerings. Focused or continued re-education at UC Davis should be recognized to the extent possible (e.g., certificates, awards of completion). We should strive to be the first and go-to source for lifelong learning for our alumni to better facilitate a sense of community and involvement.
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