Smart Farm at UC Davis
A UC DAVIS BIG IDEA
A Big Challenge, A Big Vision

Developing next-generation agricultural solutions for an uncertain future is one of humanity’s greatest challenges. Two billion people—nearly a third of the global population—are currently food insecure, a number expected to increase by 30 percent in the next four decades. Climate change is projected to decrease the yields of California’s crops by approximately 15 percent over the same time period. The potential for labor shortages and prolonged drought adds further uncertainty and threatens agricultural economic sustainability. At the same time, sustainable crop production and humane food-animal practices are areas of growing concern for many consumers and farmers.

Vast amounts of data offer unlimited insights into how to better care for livestock and crops while maximizing yields. Smart technologies offer the possibility of ultra-precise resource use in the face of a changing climate. But how do we ensure that the perspectives and toolsets of different disciplines are working together, pushing the limits of what we can achieve? How do we turn Big Data into action on the ground? How do we prepare tomorrow’s workforce to continually innovate and apply these powerful tools in securing a bright future for food?

A Big Opportunity

UC Davis’ Big Ideas are forward-thinking, interdisciplinary programs and projects that build upon the strengths of the university to positively impact the world for generations to come.

UC Davis seeks to partner with visionary philanthropists to lead the way into a new era of agriculture—a future where everyone has access to safe and nutritious food.
Among top-tier research universities, UC Davis is first in the nation and second in the world for agricultural expertise. The exceptional depth and breadth of our research enterprise, coupled with our location in the heart of one of the world’s most agriculturally productive regions, uniquely positions us to lead the way into a new era of agricultural resilience.

Smart Farm is UC Davis’ vision for the future of farming—spearheading a new paradigm of cutting-edge agricultural practices in harmony with nature and people. In collaboration with industry and philanthropic partners, Smart Farm will advance solutions to rapidly interpret plant and animal responses to their environment, accelerate crop yields, enhance animal welfare, reap actionable insights from Big Data, optimize nutrient and water-use efficiency, and minimize agriculture’s environmental footprint while increasing productivity. Every step of the way, students in the new Agricultural Technology program—from undergraduates to Ph.D. candidates to extension certificate participants—will be actively engaged in this groundbreaking work, gaining valuable experience and skills that prepare them to lead the industry forward.

To realize this revolutionary vision, we need an approach that is equally ambitious in scope, powered by forward-looking investments in people, infrastructure and technology. Smart Farm will forge pathways for next-generation leadership in every aspect of the industry—from training a highly skilled workforce, to innovative crop production practices that respond to global environmental and economic shifts, to data-driven decision making, to proactive farm animal care and management—all connected by a state-of-the-art innovation hub.
The Agricultural Innovation Hub

Labor shortages, environmental impacts, resource constraints and more extreme weather conditions are already threatening global food security. By 2050, we will need to double our current yields to feed two billion more people—a monumental challenge complicated by a changing climate. Increasing food production today while protecting tomorrow’s resources demands creativity and innovation.

The Agricultural Innovation Hub will be the international nexus for Smart Farm’s transformative work at the intersection of agriculture, technology and the sciences. We envision a state-of-the-art facility where technology development is guided by agricultural specialists with a unique understanding of the realities of the industry and the needs of farmers and ranchers. This will be the place where UC Davis expertise unites with industry partners to accelerate smart technologies, encourage the cross-fertilization of ideas, and drive scalable solutions for the future of high-value specialty crops and animal systems. And it will be the place where the next generation of talent comes to gain hands-on experience that prepares them to lead and innovate.

Pioneering Next-Generation Solutions

- **Build the Agricultural Innovation Hub to power solution-driven collaborations through dedicated spaces for research, design, innovation and training**
  
  Goal: $50,000,000

- **Fund research and training programs that will develop the next generation of agricultural innovators**
  
  Goal: $12,000,000

- **Endow faculty positions to attract top talent from around the world**
  
  Goal: $40,000,000
Technology is transforming farming, allowing operations to become more resilient, profitable and efficient. This new era of advanced technologies such as autonomous robots and wireless sensor networks calls for highly skilled workers and forward-thinking individuals to lead the way. In order to excel, the people who grow our food need a new kind of education—a program with cutting-edge technologies and hands-on field training at its core.

Smart Farm is reinventing UC Davis’ land-grant teaching mission for the 21st century to prepare a highly skilled workforce for agriculture’s digital transformation. The new Agricultural and Environmental Technology (AgTech) program will be an innovative pathway that integrates digital technologies and world-class agricultural research into a new point of entry for those interested in STEM careers in agriculture—infusing practical training with UC Davis’ signature excellence in providing students with a solid research foundation.

Comprising an interdisciplinary undergraduate major, a graduate group, and an extension certificate for mid-career professionals, the AgTech program will give students opportunities to work and research alongside faculty and industry partners. To ensure the pipeline of talent reflects California’s rich diversity, we will develop vibrant outreach programming to inspire K-12 students, with special emphasis on 4-H and FFA members. AgTech will play a key role in preparing the next generation to reimagine agriculture’s future.

Training Tomorrow’s Agricultural Technology Leaders

Building a Highly Skilled Pipeline

- Create endowments for scholarships and fellowships to attract top undergraduate, graduate and certificate students
  Goal: $12,000,000
- Establish the Agricultural and Environmental Technology program including an endowed lecturer position, flexible program support, and state-of-the-art teaching laboratory equipment
  Goal: $12,000,000
To prosper in the face of climate change and international competition—for labor, markets, land and water—agricultural producers must become more nimble, integrative and sustainable in their approaches to crop management. At the same time, we must develop new crops with natural resistance to pests and pathogens and with the ability to thrive in future climates. The next great leap in crop productivity and development will come from a deeper understanding of plants’ genetic and physiological traits as well as the complex manner in which crops interact with their environment.

While Smart Farm will focus on high-value agricultural commodities that are central to California’s economy, its impact and relevance will be global in scope as these solutions and innovations are translated to the production of staple crops that feed the world.

Smart Farm will improve crop productivity and accelerate new crop development by combining advances in traditional and controlled-environment agriculture with transformational technologies like high-throughput phenotyping, smart machines, artificial intelligence and more. Establishing the Plant Science Center will create a hub for developing mobile, easily deployed sensors that will help predict traits, generate data for traits and crop responses that are difficult to measure, and provide better understanding of water and nutrient use.

As home to the most diverse and productive agriculture in the U.S., as well as the world’s leading IT and equipment industries, California is an ideal testbed for innovations at the leading edge of crop science. Smart Farm will leverage the breadth and depth of expertise at UC Davis and across the state to use limited resources efficiently and optimize decision-making.

Ensuring Abundant, Resilient Crops

Feeding a Growing World

- Build the Plant Science Center to enable high-impact plant research, high-throughput phenotyping, cultivar and technology development
  Goal: $50,000,000

- Fund research and training programs that will develop the next generation of agricultural innovators
  Goal: $12,000,000

- Endow faculty positions in applied plant biology, computational plant biology, plant sensing and agricultural systems, controlled environment engineering, and precision crop management
  Goal: $25,000,000
Big Data and the Internet of Things (IoT) hold enormous potential to revolutionize agriculture. Through the IoT, sensors can be deployed to collect data and communicate in real time. Yet data must be effectively managed and analyzed to extract their full value. Analyzing sensor data to convert information into actionable insights for farmers and ranchers is a pressing need that is largely unaddressed.

Harnessing and disseminating the data from a complex biological system requires the multidisciplinary expertise unique to UC Davis. Smart Farm will build a cadre of data scientists, computer engineers, plant breeding specialists, statisticians and genomicists to support precision farming and develop more resilient agricultural breeds. This consortium will create interfaces and algorithms that combine historical and real-time information about crop and animal status, allowing farmers and ranchers to predict performance, adjust best practices and rapidly improve yield and resilience. Leveraging UC Davis’ network of industry partners across the Central and Silicon Valleys, Smart Farm will empower data-driven decision-making through widespread data analysis, user-friendly mobile apps and more.

Key to leading this effort will be the establishment of an endowed chair in data analytics. Endowed positions are decisive tools in attracting remarkable faculty of international distinction, and the creation of an endowed chair in this area will ensure the sustained impact of the consortium’s work.

**Empowering Data-Driven Innovation**

- **Endow a faculty chair in data analytics to lead advancements at the intersection of computer science, production agriculture and software development**
  Goal: $5,000,000

- **Fund state-of-the-art equipment, software and cloud-based storage to enhance data quality, analysis and application**
  Goal: $2,000,000

- **Fund research and training programs that will develop the next generation of agricultural innovators**
  Goal: $12,000,000
As the global population grows and the demand for animal-based protein increases, so does the number of livestock and poultry worldwide. Providing individualized care for these animals is a significant challenge, requiring breakthrough research to find solutions that protect animal health and welfare while ensuring sustainable and safe food for the world.

Smart Farm experts will advance cutting-edge technologies that optimize animal-centered care, such as wireless sensors that detect signs of illness in individual cattle by analyzing feeding patterns, or microphones that track the movement of chickens and assess their health. Created in partnership with industry, Smart Farm’s innovations—from devices that generate continuous information about animals, to software that analyzes data and alerts ranchers to specific animal needs, to automated systems that deliver individualized care—will promote highly sustainable animal agriculture systems and call for a new generation of skilled individuals to meet the needs of tomorrow’s farms. Smart Farm will provide students with hands-on opportunities to invent and deploy technologies that will redefine 21st-century animal care and farm management.

Protecting Animal Health and Welfare

Precision Care for Animals

- Establish Smart Farm’s multi-species Animal Care Facility—a leading-edge center committed to developing, testing and showcasing new solutions for advancing animal care
  Goal: $25,000,000

- Endow faculty positions in Computer Science for Automated Animal Health Care and SmartSensor Engineering for Automated Animal Health Care and Management
  Goal: $10,000,000

- Fund state-of-the-art smart machines and equipment to drive innovations in animal agriculture
  Goal: $2,000,000
Ensuring the resilience, security and environmental sustainability of food production systems by the year 2050 is a vital goal and a monumental undertaking. Revolutionizing agricultural production requires expert knowledge and collaboration across a range of life, physical, environmental and social sciences. As one of the world's leading academic universities for agricultural, engineering, veterinary and environmental research, and as a vital partner to California's farming and food industries for more than a century, UC Davis is one of the few institutions around the globe with the multidisciplinary expertise and sustained leadership needed to meet this challenge.

Of all the world's universities, UC Davis is uniquely situated—both geographically and intellectually—to lead modern food production systems and environmental stewardship into a new era. Smart Farm will advance UC Davis' leadership as a pioneering innovator for 21st-century farming and expand our impact through the development of transformational solutions for modern agriculture, beginning in California.
Philanthropy has always been key to the university's success in moving great ideas forward. Smart Farm has the vision and the expertise that, with your partnership, will catalyze innovative solutions to the most critical agricultural challenges.

Thank you for your consideration of this exciting Big Idea. We look forward to discussing how your philanthropic goals may be achieved through this transformative initiative.

For more information please contact:

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Ways of Giving

We respect that, for each donor who wishes to provide significant philanthropic support, there are personal, financial and gift planning aspects to consider. We will work with you to realize your philanthropic vision and develop the gift plan that best meets your needs. At your request, we can also work with your tax and financial advisors. Following are various gift types and their associated benefits. You may wish to consider a mix of gift types to help you achieve both your philanthropic and financial objectives.

Cash Gifts
- Are the simplest and most popular giving method
- Are tax deductible in the year they are given

Gifts of Securities
- Include stocks, mutual funds and bonds
- Avoid capital gains taxes
- Provide an income tax deduction for the full fair market value of long-term, appreciated securities

Gifts of Real Property
- Include land, farms, personal residences, and rental or commercial property
- Avoid capital gains tax on appreciated assets
- Provide an income tax deduction for the full fair market value of long-term, appreciated property
- Eliminate property expenses and taxes
- Can provide continued use for life through a retained life estate gift

Bequests and Living Trusts
- Establish the UC Davis Foundation as a beneficiary of your estate
- Provide an estate tax deduction equal to the value of the gift
- Offer flexibility by allowing you to provide for family first

Retirement Plan Gifts
- For current gifts, utilize the IRA Charitable Rollover provision (for donors aged 70½ and older)
- Name the UC Davis Foundation as a beneficiary
- Eliminate income tax on the plan distributions
- Preserve the plan’s full value for gift purposes

Life Income Gifts
- Include charitable remainder trusts and gift annuities
- Provide potential tax savings on income, estate and capital gains
- Generate income for you and/or your loved ones for a fixed period of time or until your passing
- Distribute the remaining assets to the UC Davis Foundation