

Office of the President

TO MEMBERS OF THE SPECIAL COMMITTEE ON INNOVATION TRANSFER AND ENTREPRENEURSHIP:

DISCUSSION ITEM

For Meeting of August 28, 2023

INNOVATION AND ENTREPRENEURSHIP AT UC SANTA CRUZ

EXECUTIVE SUMMARY

Chancellor Larive will provide an overview of innovation and entrepreneurship activities, barriers to overcome, and plans for the future at the Santa Cruz campus.

BACKGROUND

Campus Overview

UC Santa Cruz is a preeminent public research university and minority-serving institution centered on student success and leading at the intersection of innovation and social justice. UCSC faculty, students, staff, and alumni have been at the forefront of major research advances and cultural movements including sequencing the human genome, pioneering the global shift toward organic farming, and developing the very idea of nanopore sequencing, all with an eye to creating a more just and equitable society.

UC Santa Cruz has more than 19,000 students, over 600 ladder-rank faculty, and awards about 5,400 degrees annually across 66 graduate programs and 73 undergraduate majors. In addition to its residential and coastal campuses in Santa Cruz, UCSC has a growing impact in Silicon Valley with a campus in Santa Clara that is home to UC Santa Cruz Extension and houses four Baskin School of Engineering professional master's programs. UC Santa Cruz holds the distinction of being one of only five members of the Association of American Universities (AAU) designated as both a Hispanic Serving Institution (HSI) and an Asian American Native American Pacific Islander Serving Institution (AANAPISI), highlighting the campus's commitment to equitable educational access and research excellence.

The campus's distinguished faculty and emeriti include a Nobel Laureate, a Breakthrough Prize in Life Sciences recipient, 15 members of the National Academy of Sciences, 26 members of the American Academy of Arts and Sciences, three fellows of the National Academy of Inventors, and 42 fellows of the American Association for the Advancement of Science. UC Santa Cruz is also proud of its numerous rankings and accomplishments, including placing second among the

Best Public Universities for Making an Impact by Princeton Review in 2022 and 2023, being named in the 2022 PitchBook Universities: Top 100 colleges ranked by startup founders, and earning a spot on the Princeton Review Green College Honor Roll in 2023.

UC Santa Cruz has earned international distinction for research impact and influence and for its longstanding commitment to teaching, public service, and sustainability. The campus's research impact continues to grow with a roughly 63 percent increase in extramural funding over the past five years, reaching over \$203 million last year, and an innovation portfolio that now includes more than 350 U.S. patents under management. The campus has a long history of pioneering research advances. The first working draft of a human genome was assembled at UC Santa Cruz in 2000, which led to enormous leaps in the collective understanding of human biology and disease. Around the same time, advances in nanopore sequencing technology were being made by UC Santa Cruz biomolecular engineers. Today, the complete sequence of a human genome is accessible through the UC Santa Cruz Genome Browser, and licensed nanopore sequencing technologies commercialized by Oxford Nanopore Technologies are making sequencing accessible to scientists everywhere.

Innovation Transfer and Entrepreneurship Overview

Building on the momentum created by funding from the UC Innovation and Entrepreneurship Expansion bill (AB 2664), in 2019 UC Santa Cruz developed a shared vision and framework for innovation and entrepreneurship activities at the campus. The steering committee behind this work also drew on the efforts of the UC Santa Cruz Foundation's Task Force for Innovation and Entrepreneurship. In response to recommendations developed by the steering committee and task force and a review of plans and models at other UC campuses, in 2021 UC Santa Cruz leadership created the Innovation & Business Engagement Hub to advance innovation and entrepreneurship programs and activities, facilitate expanded industry partnerships, and engage in innovation-led economic development initiatives. To lead the new hub, UC Santa Cruz also created a new role, Assistant Vice Chancellor for Innovation and Business Engagement, with the authority, responsibility, and accountability for innovation transfer, industry alliances and corporate relations, and new venture development.

Organized as a partnership between the UC Santa Cruz Office of Research and the University Relations division, the Innovation & Business Engagement Hub represents a creative approach by campus units to pool staff resources and expertise to advance the collective work of the campus. The Hub acts as the point of entry for industry partners, investors, and entrepreneurs to connect with the campus's discoveries, innovations, resources, and talent. The Hub team manages relationships and coordinates engagement across campus academic, research, administrative, and business units, as well as the innovation and entrepreneurship ecosystem based on partner areas of interest and strategic opportunities.

Recent Progress

In recent years, UC Santa Cruz has made significant progress on several programs and initiatives to advance innovation and entrepreneurship. The Hub is working hard to encourage a campus

culture that emphasizes societal and economic impact, recognizes the value of innovation, and fosters an opportunities-centered mindset around translational research, commercialization, entrepreneurship, and partnering. The following two examples, created and managed by the Hub, were designed with this objective in mind.

- The UC Santa Cruz Chancellor's Innovation Impact Awards Program recognizes and celebrates UCSC faculty, researchers, staff, students, and community partners for their valuable contributions to innovations that have catalyzed transformative change and societal impact. Innovator of the Year, Community Changemaker, and Lifetime Achievement in Innovation awards were presented at an inaugural event held on May 30, 2023 that brought together the region's extended innovation community.
- The Innovation Catalyst Grant is a proof-of-concept program focused on providing targeted gap funding, training, mentorship, and support to UC Santa Cruz researchers to help reduce risk and/or validate the implementation and adoption potential of early-stage technology innovations. In the inaugural grant cycle, two exciting projects were awarded funding and teams are participating in immersive lean launchpad training and structured engagement with experienced external mentors.

Hub leaders have emphasized the need to build resources and structures for effective operations calibrated to the size and scope of the institution and crafted around established best practices and benchmark goals. The Hub was established as a team of six, including the Assistant Vice Chancellor, and over the past two years the campus has developed the infrastructure, filling four vacancies and adding two new positions to establish a base level needed to address the broad scope of work led by the Hub. Three of the Hub's positions are now dedicated to intellectual property (IP) management, including cultivation, protection, marketing, and licensing.

The Hub is also focused on cultivating a coordinated innovation ecosystem that effectively leverages resources, collaborates to fill gaps and address unique needs, and aligns partners with a common strategic direction. Shortly after arriving at the campus, the Assistant Vice Chancellor for Innovation and Business Engagement organized and convened a new campus Innovation Champions Network designed to provide a regular forum for information sharing, strategic planning, and special initiatives coordination and collaboration among the Hub team and those involved in core innovation and entrepreneurship efforts at UC Santa Cruz. The network includes regular, meaningful engagement from the campus' Center for Innovation & Entrepreneurial Development (CIED) and its affiliates, student organizations like Student Creativity Empowerment and Entrepreneurship (SCEE) and the campus's two Institutes for Science and Innovation (ISIs), QB3 (the California Institute for Quantitative Biosciences) and CITRIS (the Center for Information Technology Research in the Interest of Society). Recently, the network has been focused on creating a collective roadmap for building the campus's entrepreneurial ecosystem. The Hub has also pursued several cross-campus collaborations to fill gaps and enhance innovation and entrepreneurship programs. For instance, the team is actively working with collaborators at UC Berkeley regarding the Nucleate Innovation Fellows venture development experiential learning program for graduate students in life sciences, Bay Area I-Corps immersive lean launchpad short courses for translational and use-inspired projects and

innovations, and Research Infrastructure Commons (RIC) core facility services access for external users, which have all resulted in demonstrated benefits for the UC Santa Cruz innovation community in the past year.

The four examples below show how different elements of the campus ecosystem are making important and unique contributions to innovation and entrepreneurship at UCSC.

- CIED, established in 1979, empowers student entrepreneurs by providing coursework, boot camps, pitch competitions, and internships. This year, CIED is launching a new Innovation and Entrepreneurship Certificate program available to all students; this three-course program supports venture creation, instills the entrepreneurial mindset, and prepares students to use relevant innovation tools and methods. CIED is home to the campus's Blackstone Launchpad instance, maintains a close connection with the Student Creativity Empowerment and Entrepreneurship group, and collaborates with partners like Santa Cruz Works on business pitch competitions. CIED is also connected to the Get Virtual program, which teaches students how to be project managers while supporting small businesses by building websites and social media campaigns free of charge and offers paid internships in partnership with the Santa Cruz Small Business Development Center (SBDC).
- Established in 2001, the Center for Information Technology Research in the Interest of Society (CITRIS) engages in interdisciplinary work to create information technology solutions for society's most pressing challenges. In addition to facilitating engagement in multi-campus initiatives like seed funding for early-stage research projects, the Tech for Social Good program, the Foundry incubator, and the Workforce Innovation internship program, CITRIS at UC Santa Cruz brings three unique elements to the campus. First, it has established the Interdisciplinary Innovation Program (I2P) to support early-stage research projects led by at least two UC Santa Cruz principal investigators from at least two different campus divisions. Second, the UC Santa Cruz CITRIS Initiative for Drone Education and Research (CIDER) offers educational training and research support for the development and use of drone technology across all academic disciplines and many industry sectors. Third, a UC Santa Cruz professor of electrical and computer engineering was recently appointed inaugural director of CITRIS Aviation, an initiative created to support interdisciplinary development of cutting-edge technologies and applications to help improve environmental monitoring, urban air mobility, wildfire response, security policy, and more.
- Led by The Humanities Institute, Humanizing Technology is a Humanities Division certificate program launched in 2023 that provides humanities training to early-career engineering undergraduates. Funded by the National Endowment for the Humanities under its Humanities Initiatives at Hispanic-Serving Institutions program, the project brings humanistic methods and thinking to contemporary issues in technology and engineering to help students better understand the social and cultural impacts of technological change.

- Hosted by the Coastal Science and Policy Program, Hacking 4 Oceans is an entrepreneurship and coastal conservation course focused on using lean design and innovation methodologies to advance solutions to key ocean problems. The first class of its kind was offered in 2020, and in 2023 the program was expanded for enrollment across the UC system, the Monterey Institute of International Studies, and the Association of Pacific Rim Universities Virtual Student Exchange Program.

Barriers to Overcome

The May 2021 Regents Working Group on Innovation Transfer and Entrepreneurship report and related Special Committee efforts provide a framework for helping to address four of UC Santa Cruz's most immediate barriers to enhancing innovation transfer and entrepreneurship.

1. *Advancing innovation transfer and entrepreneurship efforts while operating in a small campus environment with limited resources*

Innovation transfer and entrepreneurship operations at UC Santa Cruz are evolving and the campus is establishing a foundation that may allow it to absorb some additional functions over time. The partially decentralized operating model being advanced as part of Recommendation 1 of the Working Group's report (refresh UCOP's roles, responsibilities, and business processes) will allow the campus to continue to utilize the types of back-office support and specialized services where centralized economies of scale are beneficial to a small campus like UC Santa Cruz. Staffing and infrastructure needs will continue to expand as the team takes shape and with sustained growth in the research enterprise and with innovation activity being primed by new initiatives. These evolving needs in the context of the partially decentralized operating model were also recognized in Recommendation 6 which suggested budget augmentations for emerging innovation transfer programs at three campuses, including UC Santa Cruz, to build programmatic infrastructure and expertise and boost opportunities for success. The augmentation contemplated is still needed and could allow UC Santa Cruz to fill gaps, enhance operations in line with other campuses, more quickly absorb some additional functions, and realize improved innovation transfer outcomes.

2. *Ensuring that promising innovations can receive gap funding to reduce risk and validate implementation and adoption potential*

Evaluation of the innovation pipeline and patent portfolio, as well as early experience with the new Innovation Catalyst Grant proof-of-concept program, suggest that, even with intended allocation of some patent royalty income and targeted climate action initiatives, there are more fundable projects at UC Santa Cruz than available resources. In addition, the campus is unable to consider providing larger project budgets or follow-on gap funding to position innovations to move out of the campus. Recommendation 5 (create a proof-of-concept fund) is squarely aligned with this challenge, as are the potential efforts of the recently announced Entrepreneurship Council aimed at attracting additional investment in early-stage commercialization.

- 3. Using staff time more effectively by eliminating inefficiencies created by antiquated centralized software tools*

Like other UC campuses, UC Santa Cruz has adapted innovation transfer operations to align with the existing Patent Tracking System (PTS) structure and constraints, resulting in the need to create unnecessarily complicated time-intensive procedures and adopt supplemental tools to address needed capabilities. The recent progress on Recommendation 4 (replace the Patent Tracking System) is encouraging and has the potential to address this challenge, especially if the expected benefits outweigh the associated cost burden for the campus.

- 4. Building a culture that embraces innovation and entrepreneurship*

In recent years, UC Santa Cruz has focused on expanding access to targeted programs, building partnerships, and aligning incentives to encourage the campus community to engage in innovation and entrepreneurship activities with an eye toward social impact and transformative change. This culture has begun to take hold in areas primed for innovation and is beginning to permeate other parts of the campus. Recommendation 8 (revise promotion and tenure guidelines to include consideration of innovation and entrepreneurship), Recommendation 9 (revise academic personnel policy regarding leaves of absence to include pursuit of innovation and entrepreneurship activities), and Recommendation 10 (create a program to recognize innovation and entrepreneurship) have the potential to accelerate the pace of this shift. Notably, the type of recognition contemplated in Recommendation 10 has the opportunity to stack broader recognition on top of the campus' Innovation Impact Awards program.

Looking Ahead

The long-term vision for innovation and entrepreneurship at UC Santa Cruz will set a beacon for the campus to create and support an innovative and creative environment with a well-connected and accessible ecosystem that allows the campus community – faculty, students, staff, and alumni – to develop exciting innovations, build an entrepreneurial mindset, and pursue startup ventures as a means to drive transformative change and societal impact.

UC Santa Cruz will cultivate and build its unique ecosystem around established and emerging areas of excellence, crossing domains of human and planetary health, drawing on computer science and engineering synergies, and leveraging authentic strengths in social justice and community engagement. The campus community will ultimately benefit from support at every phase of a learn, prepare, launch, and develop continuum and will find an integrated pathway addressing their distinct needs and circumstances.

- Learn - through academic courses, training workshops, project-based activities, experiential learning opportunities, and other offerings, the campus community can build an entrepreneurial mindset and associated skills that are broadly applicable across job titles, career paths, organizations, and industries.

- Prepare - the campus community can hone their knowledge, skills, and abilities to develop innovations, advance promising technologies, create the foundation for new startup ventures, and contribute to innovative organizations with access to supplemental training, capacity-building activities, funding programs, and other resources.
- Launch - by engaging programs, partnerships, and networks, those in the campus community interested in taking the leap can find the customized support needed to help them structure and form new startup ventures and integrate into entrepreneurial leadership roles.
- Develop - the campus community can take advantage of facilitated access to the connections, tools, resources, and expertise necessary to get their startup ventures and associated founding and leadership teams on the path to successfully traversing the “canyon of death.”

In the short and medium term, UC Santa Cruz is particularly well-positioned to accelerate activity in two areas—climate action and advanced aviation—that will serve the citizens of California and support the state’s worldwide leadership.

In terms of climate action, UC Santa Cruz has seen tremendous success with the recently launched Center for Coastal Climate Resilience and the campus is excited to build on this momentum and continue implementation of the complementary Climate Action Solutions Catalyst program, funded through the UC Climate Action Innovation and Entrepreneurship Awards. This new program will deliver a suite of innovation and entrepreneurship activities across three main elements that will advance development and drive adoption of solutions addressing California’s most pressing climate challenges: 1) ideation and problem solving, 2) development and capacity-building, and 3) engagement and outreach. Initial implementation has occurred through integrating a special climate action award as part of the Santa Cruz Launchpad pitch competition and facilitating mentor engagement with campus laboratories and innovators. In the coming year, UC Santa Cruz anticipates building out targeted use-inspired research and proof-of-concept funding as well as sustainable collaborations with key external innovation partners to provide targeted programming and facilitate extended network engagement.

On the advanced aviation front, UC Santa Cruz has a unique opportunity to build on its leadership in the CITRIS Aviation and CIDER initiatives, increase its role in the extended Central Coast region, and enhance its contributions to economic and workforce development by activating its Monterey Bay Education, Science, and Technology (MBEST) property. MBEST is part of the land that UC received in Monterey County in 1994 from the U.S. Army as part of the Fort Ord closure. The prime development areas at MBEST are adjacent to the Marina airport, which currently houses the prototyping and pilot production facility of one of the world’s leading fully integrated Electric Vertical Take-Off and Landing (eVTOL) aircraft companies. The broader surrounding region is also home to other prominent advanced aviation companies and this innovative industry cluster has been reflected in ongoing economic development initiatives led by the Uplift Central Coast coalition and regional partners like the Monterey Bay Economic Partnership (MBEP) and Monterey Bay Drone, Automation and Robotics Technology (DART).

UC Santa Cruz recently completed a feasibility study led by an external consultant team with expertise in university-led innovation district development that recognized this unique opportunity and showed the potential for a mix of commercial and residential development aligned with this industry cluster and broader regional needs. The campus is in the early stages of exploring development potential based on the results of the feasibility study and is actively pursuing funding and collaborative efforts focused on workforce development with key partners and community colleges in the region.