

The Regents of the University of California

**SPECIAL COMMITTEE ON INNOVATION TRANSFER AND ENTREPRENEURSHIP**

April 6, 2023

The Special Committee on Innovation Transfer and Entrepreneurship met on the above date at the Engineering Sciences Building, Santa Barbara campus and by teleconference in accordance with California Government Code §§ 11133.

Members present: Regents Hernandez, Leib, Park, and Reilly; Chancellors Christ, and Hawgood; and Advisory members Green, Ku, Taylor, and Walker.

In attendance: Regents-designate Ellis, Raznick and Tesfai; Chancellor Yang; Faculty Representatives Cochran and Steintrager; Staff Advisor Mackness; Secretary and Chief of Staff Lyall; Deputy General Counsel Wright; Provost Newman; and Vice President Maldonado.

The meeting convened at 10:40 a.m. with Special Committee Chair Park presiding.

Chair Park highlighted UCSB's achievements. She then invited remarks from Regent Hernandez and Regent-designate Raznick, who are both UCSB alumni.

Regent Hernandez stated that being at UCSB was a homecoming for him. He received his Master's degree at UCSB, which taught him how to do research. He brought this experience to Lawrence Livermore Laboratory, where he developed a way to optimize X-rays and create digital images. This led to the development of full-field digital mammography for the early detection of breast cancer and computer-aided diagnosis. He was more proud of this achievement than of being an astronaut. He attributed this success to UCSB, which gave him the skills to do research.

Regent-designate Raznick remarked on the campus' transformational change under Chancellor Yang's leadership. As an example, he noted that UCSB is at the lead of quantum science globally, which will revolutionize industry.

## **1. PUBLIC COMMENT**

Milan Mashanovitch, President of Freedom Photonics and UCSB alumnus, spoke favorably of UCSB's entrepreneurial spirit.

Victoria Christensen, a doctoral candidate in materials science and co-founder and CEO of Luxe Scientific, said she participated in a UCSB-sponsored venture competition and was accepted to the G2 Summer Launchpad, where she will use UCSB's incubator space to advance her company's mission to eliminate single-use packaging for beauty product samples.

Minh Tran, Director of Nexus Photonics and a UCSB doctoral alumnus, commented that UCSB's Technology Management Program class provided him with valuable entrepreneurial skills. He was able to leverage University resources like the California

NanoSystems Institute incubator to refine his technology and create a business plan. He attested to UCSB's effectiveness in fostering a culture of innovation.

Sergio Bocardo, a UC Davis student, advocated for investments in disability services. He noted that each disability specialist has, on average, a 1,000-person caseload, that UC Merced does not have a disability services director, and that UC Riverside was unable to hire one due to lack of funding.

Aaron Sotzen, a combat veteran, said he owed UC for giving him a second chance and advocated for disability funding to give other students a second chance.

Frank Granda, a UC Irvine undergraduate student, advocated for investments in disability services.

Ryan Manriquez, a transfer student at UC Davis and chair of its Disability Rights and Advocacy Committee, is the campus' first disabled student body president. He stated that he is proud that 70 students will attend the campus' first-ever Disability Commencement. He encouraged the University to increase funding and staffing for disability services.

Noah Dunning, a UC Berkeley student, urged the University to provide additional funding for disability services and noted that average caseloads for staff are 400 to 500 students and up to 1,000 students. He personally requested accommodations and did not receive them; he had to find his own solutions. He stated that according to a UCOP report, although the number of students with disabilities rose, there was no equivalent increase in funding.

## **2. INCREASING UCSB'S IMPACT AS AN ENGINE OF INNOVATION AND ECONOMIC ACTIVITY ON THE CENTRAL COAST**

[Background material was provided to the Special Committee in advance of the meeting, and a copy is on file in the Office of the Secretary and Chief of Staff.]

Chancellor Yang stated that UCSB is an intellectual powerhouse in innovation. For example, the California NanoSystems Institute (CNSI) incubator brings together faculty, students, and industry partners. In 2013, the College of Engineering launched a Master of Technology Management degree to prepare innovation leaders, which is unique in the UC system. Over 90 startup companies based on UCSB intellectual property have been established and there were 59 new disclosures in 2022. Chancellor Yang commented that UCSB was fortunate to hire Claire Driscoll as its new Director of Technology and Industry Alliances. She previously was the director of the National Institutes of Health (NIH) National Human Genomics Research Institute's technology transfer office. He noted that UCSB's future plans include building a quantum science institute with \$200 million in private support.

Vice Chancellor for Research Joseph Incandela stated that UCSB was the first Hispanic-Serving Institution in the top 60 research universities and also has been designated as an Asian American and Native American Pacific Islander-Serving Institution (AANAPISI). UCSB is proud that over 34 percent of its students are first-generation and that the campus is number two on the New York Times College Access Index. Research accolades include

that one in eight STEM (Science, Technology, Engineering, Mathematics) faculty are members of the National Academies and UCSB is the number one public university for faculty who received National Science Foundation Early Career Awards in the past five years. He noted there also has been a steep upward trend in extramural awards received.

Mr. Incandela provided an overview of UCSB's innovation and entrepreneurship (I&E) ecosystem, including: the Technology Management Department in the School of Engineering, which has 1,100 undergraduates, as well as masters and doctoral programs; the Bren School of Environmental Science and Management; CNSI, which includes a wet laboratory incubator and an innovation workshop for creating prototypes; the Solid State Lighting and Energy Electronics Center, which created LED lights that drastically reduced the energy used for lighting; and several shared experimental facilities.

He described UCSB's aspirations to expand programming, increase incubator space at CNSI, add staff to support licensing and technology transfer, raise critical resources for a proof-of-concept (POC) fund to support translational research and development, and increase engagement with UCSB entrepreneurial alumni and angel and venture capital investors.

Regent Leib provided an update on the University's efforts to secure State legislative support for a POC fund.

Regent-designate Raznick asked how UCSB assists entrepreneurs with the business tools needed to bring their inventions to the marketplace. Mr. Incandela asked Victoria Christensen, a doctoral candidate, to respond. She described her experience in the Technology Management Department, where she took classes in entrepreneurship, marketing, and finance, and participated in the New Venture competition, which provided her access to lawyers and mentors to help develop her business idea.

Regent Hernandez asked about faculty diversity in this area. Chancellor Yang replied that diversity is a key priority for the School of Engineering. Mr. Incandela added that the campus is currently recruiting three faculty of color in the STEM area. UCSB does outreach to groups such as the Society of Women Engineers to recruit faculty. He noted that while the campus has been successful in recruiting women in STEM fields, there is room to improve diversity overall.

Regent Reilly asked about the campus' three major challenges. Mr. Incandela stated that lack of laboratory space is the main obstacle to expansion and faculty recruitment. He noted that the campus hopes to secure funding by 2024 to build a quantum science building.

Regent Blas asked what the campus is doing to expose first-generation students from diverse backgrounds to research and innovation. Mr. Incandela said that nearly 60 percent of UCSB undergraduate students participate in research. Programs such as the Center for Black Studies Research and the Center for Chicano/Chicana Studies connect diverse student with research opportunities in STEM fields. For instance, the SEEDS (Student Engagement and Enrichment in Data Science) program, funded by Google, provided 50 black students with the opportunity to work with faculty on research projects. Chancellor

Yang added that the four UC campuses designated as HSIs (Riverside, Santa Cruz, Irvine and Santa Barbara), along with other HSIs, approached federal agencies to fund fellowships for Latino/a graduate students. Their goal is to double the number of Latino/a doctoral students and increase the Latino/a professoriate by 20 percent by 2030.

### **3. MEASURING THE ECONOMIC AND SOCIETAL IMPACTS OF UC INNOVATION TRANSFER AND ENTREPRENEURSHIP**

[Background material was provided to the Special Committee in advance of the meeting, and a copy is on file in the Office of the Secretary and Chief of Staff.]

Special Committee Advisor Ku introduced the topic by highlighting the federal Bayh-Dole Act, which provided incentives for universities to engage in technology transfer, as one of the most significant pieces of legislation enacted in the past fifty years. She noted that University-based technology transfer is critical to the nation's economic vibrancy. However, measuring its value to and impact on society is difficult. She opined that quantifying the number of patents, licenses, and disclosures only portrays part of the story. It also is critical to convey that University research results in life-saving drugs, climate solutions, and new jobs to explain the importance of investing in University research.

Tim Gage, former Director of the California Department of Finance and co-founder of Blue Sky Consulting, stated that Californians have an interest in understanding the return on investment from innovation and research at its public universities. He posited that it is possible to estimate the economic impact of innovation and entrepreneurship (I&E) efforts by examining inputs such as sales and investments by licensees and startup companies to evaluate the effects of those inputs on economic output and employment, and thus state and local revenue generated by this economic activity. To supplement publicly available data, the University could conduct case studies of high-impact commercialization and surveys of a representative sample of companies. This would provide a more complete picture of economic impact.

Elizabeth Lyons, Associate Professor of Management at UCSD's School of Global Management and Strategy and founder of its Policy and Strategy Entrepreneurship Lab, argued that measuring I&E impact can support a better understanding of UC's role in California's economy and the willingness of the public and state lawmakers to invest in University research.

Ms. Lyons encouraged University administrators to measure both the impact of research beyond the University, and how it benefits UC, itself. She emphasized the importance of measuring follow-on research and patenting activities, not just the fact that a technology was licensed. The dissemination of knowledge developed by public institutions and funded by taxpayers is an important justification for spending on research. Similarly, job creation is a major benefit to the economy and is easily tracked. Broader social welfare impact is more difficult to capture but can be done via case study analyses on a subset of UC innovations.

In addition, she urged that metrics demonstrating the benefits to UC should be compiled. For example, the University could report on the significant financial investments and in-

kind donation of time provided by UC spin-out founders, inventors, and licensees. Support for I&E activities can lead to faculty recruitment and retention gains, which also can be measured.

Sean Randolph, Senior Director at the Bay Area Economic Council Institute, said the Institute conducted two studies on behalf of the University, one in 2014 for UC Berkeley examining the impact of Berkeley alumni who founded companies, and one in 2016 sponsored by UCOP which did the same analysis for all UC locations. He asserted that such analyses should be performed on a regular and systematic basis to communicate the value of UC I&E to a broad audience.

Mr. Randolph summarized the methodology that the Institute employed. They limited the analysis to technology companies founded by UC alumni, faculty, or students within one year of their separation from campus, focusing on successfully commercialized products and services in high-impact sectors that the public cares about and that serve the interests of the state of California. A campus-by-campus assessment focusing on their different specializations and regional impact would be more meaningful than a UC-wide analysis. The data should be supplemented by interviews with entrepreneurs involved in campus I&E programs to understand the campus' asset base and should feature incubators, accelerators, and initiatives. Finally, he emphasized that the information should be conveyed so that the public understands the value of UC research to their lives.

Kelly Sexton, Associate Vice President for Research and Innovation Partnerships at the University of Michigan (UofM), said that the office of Innovation Partnerships gathers standard metrics such as the number of disclosures, licenses, and start-up companies created, but this does not convey a story of impact to the public. To this end, the office is creating new ways to measure impact. One audience for these metrics is on-campus stakeholders. The office aims to show university leaders why they should invest in technology transfer. For instance, one measurement describes how technology transfer drives corporate-sponsored research funding. Another is the percentage of UofM's total research awards received by faculty engaged with the office of Innovation Partnerships. In addition, Innovation Partnerships worked with the human resources department to track the diversity of faculty inventors.

Ms. Sexton stated that economic impact metrics target external stakeholders. Current metrics include the percentage of venture capital and angel investment raised by start-up companies, both in-state and out-of-state; start-up survival rates; and the number of jobs created by UofM start-up companies.

Chancellor Hawgood noted that the cost of maintaining the technology transfer enterprise must be subtracted from benefits to the campus. He also raised the issue that recent challenges to the Bayh-Doyle Act could fundamentally change the economics of discovery sciences at universities and requested that this be addressed at a future meeting.

**4. SPEAKER SERIES: DEVELOPMENT OF GROUNDBREAKING INTELLECTUAL PROPERTY AND FACULTY VIEWPOINTS ON INNOVATION AND ENTREPRENEURSHIP AT UC SANTA BARBARA (for discussion)**

[Background material was provided to the Special Committee in advance of the meeting, and a copy is on file in the Office of the Secretary and Chief of Staff.]

Dr. Steven DenBaars, UCSB Professor of Materials and Electrical and Computer Engineering, and Co-Director of the Solid-State Lighting and Energy Electronics Center (SSLEEC), explained that SSLEEC is one of the premiere compound semiconductor research facilities in the U.S. Its nanofabrication facility is funded entirely by donations and unrestricted corporate grants (\$78.4 million over the past 20 years) using a member company program. As a result, SSLEEC is able to pay for its own patent costs. He reported that 322 patents have been granted to SSLEEC worldwide, comprising 20 percent of the entire UCSB patent portfolio.

Mr. DenBaars stated that SSLEEC's Dr. Shuji Nakamura invented gallium nitride (GaN) semiconductors which have a wide range of applications from power devices (e.g., electric cars and chargers) to light emitting diodes (LEDs) and laser diodes. GaN semiconductors are far more efficient than using silicon; the Department of Energy estimates that they will save the equivalent amount of energy produced by up to 50 power plants in the next five years. He asserted that SSLEEC's most important role is in developing a highly educated workforce in this specialized field. In the last 10 years, the program has produced 60 Ph.Ds. and hundreds of masters and bachelors students.

Dr. Nakamura described his invention and stated that GaN lighting is 100 times brighter than regular LED lighting and is used in such applications as automobile headlamps.

Mr. DenBaars said that the UCSB administration is very supportive of faculty and staff who engage in applied research. For example, Chancellor Yang helped fundraise for SSLEEC in Japan. He noted that academic policy provides 42 days for consulting, and additional leaves of absence and sabbaticals to pursue entrepreneurship are supported. He added that UCSB's Technology and Industry Alliances office also has been very helpful.

He reported that SSLEEC generates one patent per \$242,000 in research funding, which is ten times more productive than the U.S. university average and five times more productive than private industry. It has created four spin-off companies and over 350 mostly local jobs. In addition, an average of four to eight companies are formed each year based on UCSB-owned technology. Fifty-one companies have been formed based on a license to UCSB intellectual property and 40 of those companies remain active today, a 70 to 80 percent survival rate. He briefly described two spin-off companies, Transphorm, which raised \$70 million to bring GaN-based semiconductors to market and now employs 150 people, and SLD Laser, which manufactures laser lights used for high beams in cars, movie projectors, and communication devices. The company was acquired by Kyocera in 2021.

Mr. DenBaars recounted UCSB's filament LED patent infringement case before the International Trade Commission (ITC). The campus is seeking an injunction on the

importation of filament LED bulbs into the U.S. Legal costs will be covered by the law firm hired and a private equity company in exchange for a stake in any settlement. The ITC issued an unfavorable non-infringement ruling and the University appealed; the case will be heard in May. Mr. DenBaars highlighted the need for the University to enforce its patents but noted the high cost of doing so.

Provost Newman asked for an estimate of the net revenue that UCSB receives from SSLEEC's inventions. Mr. Incandela replied that he could not provide an estimate for specific inventions, but overall, UCSB earned approximately \$7 million in revenue over the last 10 years, one-third of which was distributed to the inventors. The campus netted between \$1 and \$1.5 million. He noted that the technology transfer office is completely self-funded.

Regent Reilly asked what the University has done to protect its filament patents or support the lawsuit and how much the litigation cost. Mr. DenBaars replied that the University faced an army of lawyers from 10 companies that could pay for top legal talent and experts. The cost of the lawsuit was \$18 million, paid for by the law firm and private equity investors; the University could not have afforded to pursue such costly litigation on its own. He asserted that the ITC is known to have a political bias against inventors and the University could have chosen a better venue to pursue its claims. He added that the University did prevail on one element at the ITC, which ruled that UC had standing, and specifically that a research activity at a university is the equivalent of a domestic industry.

Chancellor Hawgood commented that UCSF also funded a patent infringement case in this way. This approach shares any benefits but not the risk. He asked the presenters to explain the company member program through which SSLEEC is funded. Mr. Denbaars replied that if a member company provides an unrestricted grant, they get access to the resulting research. They pre-negotiate intellectual property rights and the company receives first right of refusal. Other member benefits include an annual review and the opportunity to have a visiting researcher work with students. Chair Park asked him to share this model with the committee and other UC campuses.

Regent Hernandez asked if the patent infringement could have been avoided by marketing and outreach to potential users of the technology or if the issue was that bad actors chose to blatantly infringe the patent. Mr. Denbaars noted that UC is not as aggressive as Stanford University in enforcing its patents and that perhaps they could have settled before trial. Advisor Ku observed that the approach to licensing is industry-specific and noted that the biotechnology and life sciences industry is far more willing to license early-stage technologies, while physical science companies (especially information technology) engage in "efficient infringement," that is, they infringe and dare universities to sue.

## **5. PTS UPDATE: A NEW SHARED SERVICES MODEL FOR MANAGING UC INNOVATION**

[Background material was provided to the Special Committee in advance of the meeting, and a copy is on file in the Office of the Secretary and Chief of Staff.]

Provost Newman displayed a chart indicating a menu of 30 distinct business processes that are part of intellectual property (IP) management and the anticipated roles and responsibilities for each campus and for UCOP. The Chancellors and UCOP agreed on this division of labor, although she noted that this may change over time based on the ability of the campuses to manage these tasks and the capabilities of the software selected to replace the Patent Tracking System.

Chair Park asked if the campuses are choosing to have UCOP perform certain functions due to lack of labor or to lack of expertise. Senior Research Strategy Officer Dorothy Miller replied that for tasks like data entry, the choice is due to labor issues; for some accounting functions, it is a combination of expertise and labor; and for intellectual property management, UCOP could provide greater efficiencies of scale.

Regent-designate Raznick asked who will be responsible for patent enforcement. Ms. Miller responded that UCOP's Ethics, Compliance and Audit Services is developing recommendations regarding compliance and auditing, including the consideration of tools to flag licenses that deserve scrutiny.

Ms. Miller presented information that UCOP gleaned from vendors' responses to a Request for Information (RFI) for a new IP management software system. All of the vendors indicated that they would provide implementation solutions, so there is no need to issue a second RFI as planned. However, she noted that the responses varied widely in terms of cost estimates. UCOP plans to use this information to inform the requirements in the RFP.

Chair Park observed that the RFI did not rule out the need for customization. Provost Newman responded that following Advisor Ku's advice, UC does not intend to request customization and instead will reorient its own business practices to fit off-the-shelf software.

Chair Park asked about efficiency improvement goals and the timing of achieving those vis-a-vis the deadline for campuses to enter into Service Level Agreements with UCOP. Ms. Miller stated that many of the efficiencies will be achieved through the software selected. Provost Newman added that some process improvements can be made now independent of the tool selected. Chair Park explained that she wanted to understand how efficiencies would translate into the fee level and level of service UCOP would provide. Provost Newman replied that responses to the RFPs are due at the end of May. The campuses will evaluate those proposals and soon thereafter decisions will be made about costs and services.

Regent Hernandez expressed concern that if some campuses opt out of the system, it will create higher fees for those who use the system, yet those campuses are the least likely to



be able to afford higher costs. Provost Newman replied that the goal is to make opting in attractive to all campuses because the system will be more efficient.

The meeting adjourned at 2:10 p.m.

Attest:

Secretary and Chief of Staff