

The Regents of the University of California

ACADEMIC AND STUDENT AFFAIRS COMMITTEE

November 15, 2023

The Academic and Student Affairs Committee met on the above date at the UCLA Luskin Conference Center, Los Angeles campus and by teleconference at 455 Golden Gate Avenue, San Francisco and Corral del Risco, 63727 Nayarit, Mexico.

Members present: Regents Batchlor, Hernandez, Park, Raznick, and Tesfai; Ex officio members Drake and Leib; Advisory members Beharry, Pack, Salazar, and Steintrager; Chancellors Christ, Muñoz, Wilcox, and Yang; Staff Advisor Mackness

In attendance: Regent Robinson, Assistant Secretary Bricker, General Counsel Robinson, Provost Newman, Vice Presidents Brown, Gullatt, and Maldonado, and Recording Secretary Li

The meeting convened at 10:20 a.m. with Committee Chair Park presiding.

1. APPROVAL OF MINUTES OF PREVIOUS MEETING

Upon motion duly made and seconded, the minutes of the meeting of September 20, 2023 were approved, Regents Batchlor, Drake, Hernandez, Park, Raznick, and Tesfai voting “aye.”¹

2. STREAMLINING AND SIMPLIFYING PRE-TRANSFER COURSEWORK FOR UNIVERSITY OF CALIFORNIA ADMISSION: IMPLEMENTATION OF CCC-UC TRANSFER TASK FORCE RECOMMENDATIONS THREE AND FOUR

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

Provost Newman introduced the item, a continuation of discussions at prior meetings about the California Community Colleges–University of California (CCC-UC) Transfer Task Force final report recommendations. With the passage of Assembly Bill (AB) 1291, UCLA would launch a new Associate Degree for Transfer (ADT) pilot program in fall 2026. UCLA would identify California Community Colleges for this collaboration, which would include at least eight majors. For transfer students who meet the necessary requirements and are not admitted to a UC campus of their choosing, AB 1291 has provided an admission guarantee to at least one other UC campus. If the UCLA pilot program is successful, the University would expand it to at least five campuses and 12 majors, four of which would be in science, technology, engineering, and mathematics (STEM) fields. UC intended

¹ Roll call vote required by the Bagley-Keene Open Meeting Act [Government Code §11123(b)(1)(D)] for all meetings held by teleconference.

participation by all campuses by the 2031–32 academic year. Ms. Newman noted that UC enrolled more community college transfer students than any other comparable university in the nation. The University was also committed to meeting its California Master Plan for Higher Education target to enroll one transfer student for every two freshman entrants.

Recommendation three of the final report called for the use of the California Community Colleges' common course numbering to increase the consistency of lower-division general education (GE) and improve major preparation curricula, credit mobility, and clarity for students regarding the applicability of courses toward UC and California State University (CSU) admission and degree requirements. Recommendation four called for consolidating lower-division GE transfer and major preparation requirements, supporting the development of courses that fulfill multiple requirements, and expanding opportunities to complete courses at community colleges.

Aisha Lowe, Executive Vice Chancellor of the Office of Equitable Student Learning, Experience and Impact at the California Community Colleges Chancellor's Office, shared progress made in establishing a common course numbering system per AB 1111. She remarked that such a system would streamline transfer by reducing excess credit accumulation and maximizing credit mobility. Students would then be able to build cohesive academic plans, understand how courses transfer, and make informed course selections. The AB 1111 Common Course Numbering Task Force, formed by the California Community Colleges Chancellor's Office, has been meeting since September 2022 and, following its last meeting in December, would issue a report that recommends an implementation plan for the beginning of 2024. Ms. Lowe emphasized the importance of UC and CSU participation in this endeavor; both institutions were represented in the Task Force. Phased implementation of common course numbering for over 40,000 courses would prioritize GE and transfer pathways courses.

Ms. Lowe also provided an update on AB 928 implementation. In May, the Intersegmental Committee of Academic Senates (ICAS) finalized the California General Education Transfer Curriculum (Cal-GETC), a 34-unit pathway for transfer to UC and CSU, and recently published the 2023 Cal-GETC Standards, Policies and Procedures manual. In September, Ms. Lowe, Vice President Gullatt, and CSU Deputy Vice Chancellor of Academic and Student Affairs Nathan Evans commissioned a Cal-GETC implementation work group, which comprised transfer and articulation leadership and staff from each segment, staff from the ASSIST platform, and representatives from each segment's Academic Senate and student government. This work group was tasked with identifying the management and infrastructure necessary for Cal-GETC implementation by fall 2025, as well as designing an implementation plan that included a timeline, process, guidance to colleges, a communications plan, and webinars. The Associate Degree for Transfer Intersegmental Implementation Committee (AB 928 Committee), which has been meeting since 2022, was set to ratify recommendations due to the State in December.

Regent-designate Salazar asked if faculty from all segments supported a common course numbering system. He remarked that renaming a course that one has taught for many years could be difficult to accept. Ms. Newman stated her belief that common course numbering

was generally embraced for its purpose of improving the transfer process, a goal shared by all faculty. Ms. Lowe added that this effort went beyond changing course names or numbers and emphasized the herculean task of curricular alignment across 116 community colleges and 73 community college districts. This was a multi-year effort in partnership with the Academic Senate for California Community Colleges, during which discipline faculty would examine courses and determine their core elements.

Regent Hernandez asked if community college campuses were committed to ensuring consistent course quality, noting that the relationships that these campuses had with UC and CSU varied. Ms. Newman responded that, rather than quality or commitment, students' location, financial status, and family obligations contributed to the differences in transfer rates. UC has received grant support for new programs reaching out to campuses with lower transfer rates. Ms. Lowe stated that common course numbering would bring about statewide uniformity. Discipline faculty from the community colleges, CSU, and UC would be engaged so that courses are well designed for articulation and future course templates would apply to all community college campuses. Vice President Gullatt added that common course numbering would manifest in ASSIST, an online articulation repository. With the help of the Regents and new Student Academic Preparation and Educational Partnerships (SAPEP) funding, UC campuses could provide additional support to community colleges who have historically had a low number of transfer students to a four-year institution. Recently, UC Berkeley and UC Davis hosted community college students from Northern California to their campuses for an immersive experience.

Regent Raznick asked if the University was considering long-term strategies to address regional disparities. Ms. Newman observed that regional disparities reflected economic disparities. She praised the Office of the President's efforts beginning at the high school level, such as providing additional access to A–G courses and increasing contact with counselors. Economic disparities also meant disparities in available time and access to courses, and more could be done to address them in collaboration with community college faculty. Ms. Gullatt remarked that there was no singular solution. For instance, students attending Imperial Valley College, whose closest four-year university was 1.5 hours away, had an educational plan they developed in high school. The AB 928 Committee has begun to examine the regional disparities in order to design collaborative regional solutions. Ms. Lowe indicated that the AB 928 Committee aimed to devise ways to close these regional gaps, but the lack of regional data made strategic planning challenging. The AB 928 Committee planned to ask the State for these data.

Regent Raznick asked whether there was funding for these efforts. Ms. Newman replied that there was some funding from the Bloomberg Foundation and SAPEP but expressed particular concern about the great ideas that could not be funded with current resources. Ms. Gullatt added that resources across all sectors would be needed. Regent Raznick expressed support for finding more funding. Ms. Newman stated that UC wished not only to develop programs but also to collect data on their effectiveness, which could be used to advocate for more resources. UC was working with the California Community Colleges on evaluating strategies.

Regent Tesfai, referring to the written materials, asked what steps would be taken to reduce equity gaps by race and ethnicity and achieve 70 percent postsecondary credential attainment, as discussed by the AB 928 Committee. Ms. Newman replied that progress has been made in shrinking those gaps but expressed more concern about the gaps between the students who come to UC and those who do not. By closing regional gaps, one hoped to close race and ethnicity gaps as well, but it is no small challenge to close gaps that are the result of cumulative inequality that students begin to experience before they come to UC. The University was working on summer bridge, enrichment, and outreach programs to high schools, affinity groups, belonging programs, and more.

Regent Tesfai asked Ms. Lowe how the AB 928 Committee or the segments would collaborate to reduce gaps. Ms. Lowe responded that, after the AB 928 Committee provides recommendations for implementation to the legislation, there was no clear directive. The AB 928 Committee planned to recommend intersegmental collaboration to achieve the goals laid out in the legislation. Identifying and closing equity and opportunity gaps has been codified in Vision 2030, the California Community Colleges' collaborative action plan. Vision 2030 focused on providing support for working or low-income students, such as basic needs, shorter or evening courses, and credits for prior learning.

Committee Chair Park requested more information on the progress of the California Cradle-to-Career Data System and UC's role in its success, as well as on improvements being made to ASSIST. She asked what the AB 928 Committee's vote on its recommendations would represent for the segments. Ms. Lowe stated that the AB 928 Committee would be voting to approve recommendations for fulfilling the goals laid out in the legislation and committing on behalf of the segments to determine an implementation plan for the recommendations. AB 928 Committee members were tasked with relaying information back to their respective segments, which presented many opportunities for public engagement and public comment.

Committee Chair Park noted that, according to the Regents' Bylaws, approval of criteria for University admissions and the conferral of certificates and degrees was reserved to the Board upon recommendation of the Academic Senate. She suggested that the Regents contemplate whether to ratify the recommendations in full or in part. She stated that the Regents wished to stand alongside the University's fellow segments in these efforts.

3. **ALLIANCE FOR RENEWABLE CLEAN HYDROGEN ENERGY SYSTEMS (ARCHES)**

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

Provost Newman introduced the item. The Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES) was established by the Board in September 2022 to pursue U.S. Department of Energy (DOE) funding for Regional Clean Hydrogen Hubs on behalf of the State of California. ARCHES H2 LLC was then formed as a partnership between UC, the State, the State Building and Construction Trades Council, and the Renewables

100 Policy Institute. In October, ARCHES was selected to receive up to \$1.2 billion to create a hydrogen hub in California. ARCHES was one of seven hubs selected out of 80 entrants and one of two selected to receive more than \$1 billion. ARCHES aimed to facilitate the state's transition to clean, renewable energy and reduce its dependence on fossil fuels. These efforts were expected to help improve air quality; create clean energy jobs in disadvantaged communities; reduce hospitalizations, health insurance costs, and missed workdays; create other health-related economic benefits worth billions of dollars per year; and bolster California's national leadership in environmental policy and practice.

President Drake thanked the State and federal government, the State Building and Construction Trades Council, and the Renewables 100 Policy Institute for helping to make ARCHES a reality. He recalled participating in a project to evaluate hydrogen fuel cell vehicles at UC Irvine nearly 20 years ago.

Provost Newman presented a table illustrating the DOE Office of Clean Energy Demonstrations process. ARCHES was presently negotiating the terms and conditions of the award and how it would meet the target budget. ARCHES did not have to compete further for the \$1.2 billion award but must submit plans to ensure compliance with the expectations of the federal government during four phases. A grant would be provided for planning in Phase 1, project development in Phase 2, construction in Phase 3, and operation in Phase 4. After Phase 1 funding is settled, individual ARCHES projects must submit separate proposals to receive funding for the next phase. ARCHES and the DOE Office of Clean Energy Demonstrations would become a partnership through a cooperative agreement. Projects were expected to run from 2024 to 2032, and all 39 were expected to be operational in their final two years.

Adam Weber, Senior Scientist and Principal Investigator at the Lawrence Berkeley National Laboratory (LBNL), explained that ARCHES had 39 Tier 1 projects, which would receive federal funding, and 31 Tier 2 projects. The projects chosen for the proposal to the federal government were evaluated by community members, unions, stakeholders, and UC hydrogen experts. The \$1.2 billion award unlocked \$11.7 billion in cost share from the State, municipalities, private entities, and others. Eleven Tier 1 projects would produce hydrogen through electrolysis, which would generate no emissions aside from oxygen, and two Tier 1 projects would use biogenic sources of energy, which would incorporate carbon capture into the process. Over 500 metric tons of hydrogen would be produced, some of which would be transported in 160 miles of new pipelines or shipped by trucks. Substantial storage would not be needed as supply matches demand over time. ARCHES would focus supply on power generation, transportation, and ports. Power generation could help rural communities and address power grid firming and management. Hydrogen-powered buses and trucks would replace diesel-powered vehicles, and hydrogen stations would be built. Hydrogen would be used in cargo handling at ports and potentially with tugboats and ferries. These sectors were chosen because they were the most amenable to decarbonization using hydrogen according to the State's 2024 Scoping Plan. Furthermore, the technology would be available within the timeframe of the hub project, and companies were engaged. The large volumes of hydrogen that would be generated would help reduce cost and address pollution around ports, where disadvantaged communities were typically located.

ARCHES demonstrated a new paradigm that shortened the time between discovery and deployment, incorporated the work of public policy and health schools, advanced research and development and innovation, and changed policymaking.

Bruce Appelgate, Associate Director of Ship Operations and Marine Technical Support at Scripps Institution of Oceanography, stated that ARCHES has enabled the development of the California Coastal Research Vessel (CCRV), the world's first hydrogen-powered research vessel. The maritime industry relied heavily on fossil fuels, and pollutants emitted from ships blew ashore, harming inland communities. UC research vessels consumed over 1.6 million gallons of diesel fuel and emitted 36 million pounds of carbon dioxide per year. About eight years ago, Scripps partnered with Sandia National Laboratories to determine whether a non-polluting research vessel could be built with existing technology and found that it was possible using liquid hydrogen and fuel cells. Such a vessel would be much quieter, which was important for oceanography research and would reduce the impact of noise on wildlife. CCRV would carry more than 500 students to sea per year and be a platform for federally sponsored research. The development of CCRV was creating a pathway for broader adoption of this technology in the maritime industry, bringing together the U.S. Coast Guard, the American Bureau of Shipping, naval architects, and shipbuilders. This project would also create a new work force with expertise in the maintenance and operation of hydrogen-powered maritime systems. CCRV would be an important early part of ARCHES' hydrogen economy. As a predictable consumer of liquid hydrogen, CCRV would allow the production and transportation sectors to plan operations.

UC Irvine Professor Jack Brouwer presented a map of communities near the Ports of Long Beach and Los Angeles and along transportation corridors that were most affected by diesel combustion emissions, much of which contributed to shorter lifespans. For instance, the life expectancy of those who live near the Port of Long Beach was seven years shorter than those who live in Beverly Hills. UCI has applied spatial and temporal resolution of emissions and has simulated subsequent atmospheric chemistry and transport, and its modeling has indicated that replacing diesel combustion with hydrogen as proposed by ARCHES would result in significant reductions in ozone and particulate matter. Hydrogen would replace diesel in port operations, trucks, and power plants. Mr. Brouwer emphasized the potential health and air quality benefits of these substitutions.

Associate Vice Provost for Research and Innovation Scott Brandt presented a map of ARCHES project sites. Offtake sites, where ARCHES projects would use hydrogen, would be clustered around Los Angeles and the San Francisco Bay Area, including the ports, power plants, and transit agencies in those areas. Hydrogen production sites would be located where there are abundant solar and wind resources. The hydrogen market was expected to become self-sustaining by 2030, as hydrogen demonstrates its viability and its prices become competitive with traditional fuels, at which point adoption of hydrogen would accelerate and market liftoff would occur. Mr. Brandt noted the overlap between project sites and areas of the state with disadvantaged communities, low incomes, and high air pollution. These regions, which had low rates of health insurance and high rates of childhood asthma, tended to be adjacent to ports, power plants, and freeways. The annual benefits of ARCHES projects included an estimated 6,900 fewer tons of nitrogen oxide

and 239 fewer tons of sulfur dioxide emitted, 2,097 fewer hospitalizations, 48 fewer premature deaths, and \$2.95 billion of economic value. Each ARCHES project would commit one percent of project budgets to community benefits such as workforce development, and ARCHES would have an independent monitoring team assessing a project's community benefits, as well tribal, community, and environmental non-governmental organization (NGO) representation on its board. With an overall budget of nearly \$13 billion, ARCHES was estimated to produce over 200,000 new careers. All projects have committed to project labor agreements, and ARCHES has committed \$229 million for workforce development, which would go toward labor training centers, training at all segments of public higher education, and outreach in high schools. Further benefits were expected from the 31 Tier 2 projects, as well as thousands of other projects that would likely follow as hydrogen consumption grows.

Regent Hernandez stated his understanding that ARCHES would create an infrastructure capable of producing 515 metric tons of hydrogen per day and would reduce the cost of production by 80 percent. He asked about the advantage of hydrogen production when other forms of renewable energy already exist, and whether ARCHES has reached out to fossil fuel manufacturers about their early investment in hydrogen. ARCHES Chief Executive Officer Angelina Galiteva replied that, while energy is lost during hydrogen production, desalination, or the charging of batteries, California needed an outlet for its excess energy, which has been curtailed, sold to neighboring states, or given away. In addition to utilizing the energy grid, hydrogen would enable the state to decarbonize sectors that previously could not be decarbonized directly with electricity and batteries. In addition to hydrogen and other renewable resources, the use of offshore wind was anticipated. ARCHES was working with fuel providers like Chevron on the location of hydrogen fueling stations and with transit agencies, as hydrogen would meet their needs and be similar to traditional fueling. Battery application was proving to be more complicated.

Chancellor Wilcox asked if research investment was an aspiration for Tier 2 projects and beyond. Vice President Maldonado responded that, to achieve the goal of reducing the cost of producing one kilogram of hydrogen by 80 percent in ten years, much research was needed in energy conversion efficiency, life cycle, and health implications. New partners would join ARCHES as new projects are launched. As with UC's climate action projects, community engagement would be integral to research definition and implementation. Ms. Galiteva added that ARCHES selected 39 of almost 100 project proposals for its proposal to DOE, with 31 ready to launch. There was an estimated \$56 billion worth of projects throughout the state with the potential for regional growth. Ms. Newman added that ARCHES would greatly benefit UC Riverside, as UCR researchers could examine the public health benefits to the region resulting from hydrogen production.

Staff Advisor Mackness asked about ARCHES' engagement with and investment in labor unions. Ms. Newman responded that the many construction jobs associated with this project allowed unions an opportunity to expand into the clean energy sector. Ms. Galiteva added that union involvement in renewable energy was relatively new. Through ARCHES, unions could train members for renewable energy jobs and create valuable careers. Unions such as electrical, pipe fitting, construction, carpentry, and longshoremen could be

represented. ARCHES was scheduled to launch its Community Benefits Plan at the Electrical Training Institute, which would partner with the unions and UC to create a certification program that begins at the high school level.

4. **MULTI-YEAR COMPACT UPDATE: GRADUATE ENROLLMENT**

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

Provost Newman introduced the item, an update on the University's progress in adding 2,500 graduate students by 2026–27 per the multi-year funding Compact with Governor Newsom. Graduate enrollment has not kept pace with undergraduate enrollment. In recent years, 20 percent of UC students were graduate students, compared with over 30 percent in the 1960s, while other Association of American Universities (AAU) institutions had higher or increasing percentages of graduate students. The proportion of graduate students at UC Berkeley and UCLA was similar to that of AAU public institutions and higher than that at other UC campuses, and the Merced, Santa Cruz, and Riverside campuses would like to grow their proportion of graduate students. The Office of the President (UCOP) has worked with the chancellors and other campus representatives on enrollment management plans that are updated every spring. Three-quarters of graduate student enrollment growth was proposed in academic master's and the health sciences programs and ten percent growth was proposed in academic doctoral and Ph.D. programs. Professional and health sciences graduates played a significant role in meeting California's workforce needs. In October, UCOP hosted the Systemwide Congress on Innovations in Graduate Education, and a joint work group of the Academic Senate and UC administration on the future of doctoral education at UC planned to submit its final report by the end of the academic year.

UC Riverside Provost and Executive Vice Chancellor Elizabeth Watkins shared that, as an AAU member, UCR must now enroll more graduate students because of their role in the research enterprise and the application of new discoveries. As one of the most diverse campuses, UCR could help diversify the professoriate as well as leadership in the public and private sectors. UC Riverside also planned to enroll more students in the medical school, master's programs, and combined bachelor's and master's programs known as "4+1" and "3+2" programs. The UCR School of Medicine opened in 2013 with a cohort of 50 students, enrolled 86 students this year, and was on track to enroll 100 students by 2026, when total enrollment was expected to be closer to 400 students. Forty percent of UCR medical students completed their residency in the Inland Empire. UC Riverside has doubled enrollment in master's programs in the past decade and planned a similar future trajectory. Master's degrees were becoming a more common employment requirement; they helped students enter professions at higher levels, improved earning potential, and allowed working adults to obtain skills for career advancement. Ms. Watkins highlighted a new master's program in business analytics, a master's program in public health awaiting approval, and the development of new master's programs in the School of Education, all of which were designed to address workforce needs in the state. The 4+1 and 3+2 programs that UC Riverside sought to grow enabled students to complete both bachelor's and master's degrees in five years without changing institutions and helped students explore

their interest in advanced training. Students began graduate courses in their fourth year of study. The campus measured the success of its graduate programs by tracking graduation rates, time to degree, and career outcomes.

Regent Hernandez congratulated UC Riverside for joining the AAU. He expressed concern about the declining number of graduate students at UC, opining that students who would have attended UC were choosing private institutions. Regent Hernandez asked why private institutions were more attractive than UC. Ms. Newman replied that heavily endowed private institutions had far more resources than UC. Princeton University, for instance, offered \$50,000 per year to its graduate students. In response to budgetary changes, public institutions have had to expand their undergraduate populations, but graduate students played an important role in educating undergraduate students and advancing research. Ms. Newman remarked that most States do not recognize the importance of graduate students in their funding allocations in the same way that they do for undergraduate student growth. Vice President Brown added that California has allocated support for enrollment growth primarily in the undergraduate population, but the funding Compact acknowledged the importance of graduate enrollment growth.

Regent Robinson expressed deep concern and asked for detailed data on graduate enrollment trends by discipline, particularly disciplines related to industries in California that most urgently need Ph.D.s. He asked how the new United Auto Workers labor agreement was affecting graduate admission by discipline, how this was affecting undergraduate enrollment, and whether having fewer graduate students had a collateral effect on various departments. Regent Robinson wished to know in real time what was transpiring at the campuses in light of the new labor agreement. Ms. Newman responded that this information could be provided in granular detail. For example, UC Riverside has had to balance cost vectors and revenue streams when considering an increase in graduate enrollment. Differential growth was needed to support areas that were less revenue-oriented.

Regent Robinson asked for anecdotal information about the difference in the number of graduate students this fall. Ms. Brown responded that fall enrollment data was being collected and would likely be published in December. More detail on enrollment was included in the written materials. In the last decade, graduate enrollment has grown by 6,500 students: about 2,100 of these were academic doctoral students, about 3,500 were academic master's students, and about 900 were professional students. She noted that much of the recent growth in doctoral programs was in science, technology, engineering, and mathematics (STEM) fields. Master's programs saw similar growth in STEM, as well as in business and the health sciences. These were areas highlighted in the Compact as needing growth. New programs were being proposed in public health, data science, and business and management. The growth of graduate education has not kept pace with the significant expansion of undergraduate opportunities. Ms. Newman added that fall 2023 graduate enrollment reflected caution that campuses exercised following the UAW strike. She predicted that enrollment would start to normalize.

Committee Chair Park stated that the Committee was interested in the factors that drive campus-level decision-making in light of the Compact and new labor contract. UC San Diego, for instance, was responsible for over 2,000 more academic master's students. Ms. Brown stated that trend data for academic doctoral and professional degrees were provided by campus in the written materials, and additional information could be provided.

Staff Advisor Mackness asked how campuses decided to invest in various graduate programs and how UC was balancing workforce demands with revenue generation from self-supporting degree programs. Ms. Newman replied that this information could be provided. Campuses were considering grant revenue, research opportunities, undergraduate enrollment fluctuations, general education requirements, and the labor market. Ms. Watkins stated UC Riverside's decisions were driven by the need to provide support to graduate students already on campus, reliance on graduate students in UC's current model of instruction, and career outcomes. This year, UCR chose to keep constant the Ph.D. levels of the incoming cohort and made investment choices accordingly.

In response to a question from Committee Chair Park, Ms. Watkins explained that UCR encouraged its Ph.D. programs to accept the same number of students as the previous academic year. Committee Chair Park asked what proportion of UCR's proposed graduate student increase would be doctoral students. Ms. Watkins replied that there would be more master's and medical students than Ph.D. students. There was now an opportunity to reexamine curricula being delivered, and Ms. Newman would convene a similar work group to explore undergraduate education.

Committee Chair Park, noting UC Berkeley's significant reduction in doctoral students over a ten-year period, asked whether the modest graduate growth being proposed by the campus would be in academic master's students. Chancellor Christ responded that professional degrees have grown more than academic master's degrees. Departments decreased their doctoral production due to available job opportunities in various fields. Committee Chair Park asked for more information about the job opportunities that affect doctoral production at UC Berkeley.

Committee Chair Park asked why UC Santa Barbara proposed the addition of just two graduate students. Chancellor Yang replied that UCSB's primary emphasis was on Ph.D. students, who made up some 89 percent of the graduate population. UCSB did not offer degrees in law, medicine, or business administration. Ms. Brown explained that campuses had different opportunities, goals, and workforce considerations. Many campuses were considering growth in doctoral programs and master's degrees in the health sciences. UC Berkeley and UCLA, whose numbers were closer to the AAU average for public institutions, had different considerations. The admissions process was decentralized across academic units.

Committee Chair Park noted that UC Santa Cruz's proposed numbers did not reflect the graduate growth it has proposed in its 2030 plan. Ms. Brown stated that the 2030 timeframe differed from the Compact timeframe. Some growth had occurred before UC entered into the Compact with the Governor.

Regent Batchlor encouraged a continued focus on diversifying the graduate student population. Ms. Newman expressed agreement, adding that UC had much data and many programs designed to increase diversity.

Regent Tesfai asked that the Committee be provided with fall enrollment data as soon as they become available. He expressed concern about anecdotal reports of smaller cohorts in response to the new labor agreement and funding issues. Regent Tesfai asked how these changes, and the decisions leading to them, affected UC initiatives like Growing Our Own. Ms. Newman reiterated comments made by Ms. Watkins, that the campuses' first responsibility after UC entered into the UAW contract was to ensure compliance with regard to existing students. She acknowledged the complexity of balancing allocations to students with the need to diversify and grow.

Faculty Representative Steintrager underscored the decentralized nature of graduate admissions, which were managed by faculty who then control the size of the programs. It would be difficult and misguided to expand graduate enrollment in a "command economy" way. Faculty should be given tools, guidelines, and resources to make the best decisions about admissions and program sizes. He called for a bottom-up approach. Ms. Newman added that this was one reason why UC was collecting data on job placement rates. Committee Chair Park remarked that UC was not migrating toward a centralization model.

5. **MATH PREPARATION AND UNDERGRADUATE ADMISSIONS**

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

Provost Newman introduced the item, emphasizing the time and expertise devoted to evaluating the standards and courses that prepare high school students for UC admission.

Faculty Representative Steintrager stated that this discussion would address the shared governance process through which UC policies are developed and reshaped to support students' preparation for UC admission and academic success in college. In particular, it would highlight UC mathematics admission requirements in light of new approaches to mathematics preparation and the changing mathematics policy landscape in California.

Barbara Knowlton, Chair of the Academic Senate's Board of Admissions and Relations with Schools (BOARS), detailed the three components considered when making changes to college preparation and admissions. The first component was the expectations of college readiness as defined by K-12 standards, academic preparation policy, and institutional statements about mathematical competencies. The second was the course options that students decide to pursue or are counseled to pursue for college preparation. For some, these options are determined by how they were tracked in middle school or earlier. The third was the mathematics requirement for college admissions that may reinforce perceptions of competitiveness for UC applicants. The "race to calculus" phenomenon was based on the widely held assumption that calculus is the "golden ticket" to UC admission.

Any substantive change would require collaboration, alignment, and shared goals from the kindergarten to postsecondary levels.

In 2010, the California State Board of Education adopted the Common Core State Standards in mathematics for public K–12 schools and, in 2013, a Mathematics Framework for designing college preparation courses. In the 2013–14 academic year, BOARS updated mathematics course criteria and policy to account for new course sequences in high schools. In 2020, BOARS adjusted the criteria for advanced mathematics courses to support curricular changes and encourage more options that satisfy UC’s mathematics admissions requirement. In July 2023, the State Board of Education revised its K–12 Mathematics Framework to include guidance on developing data science courses, and BOARS decided to review whether changes to A–G mathematics course criteria were warranted. Throughout these policy changes, the University’s fundamental mathematics admissions requirement has remained the same—three years of coursework covering topics in elementary algebra, advanced algebra, and geometry. Also in July 2023, BOARS discussed whether currently approved data science courses met advanced mathematics criteria and could satisfy the third year of subject area C requirements through validation, a longstanding practice in which more advanced courses could fulfill lower-level A–G requirements as long as the advanced courses built on knowledge gained in lower-level coursework. BOARS concluded that one could not substitute data science courses for lower-level, subject area C mathematics courses like Algebra 2 or Integrated Mathematics 3 unless such courses included prerequisite mastery of relevant advanced algebra content. In fall 2023, BOARS convened a subject area C work group, comprised of faculty from mathematics, statistics, data science, computer science, and neuroscience disciplines, to review UC’s definition of advanced and foundational mathematics for college preparation and to clarify the criteria for validation. Deliberations would engage faculty representatives from public education segments, including the K–12 system, to align expectations for mathematics preparation. In December 2023, the work group would recommend to BOARS a definition for advanced mathematics and validation criteria. By May 2024, the work group would recommend a definition for foundational mathematics. BOARS would review and give final approval. If the proposed amendments to Academic Senate regulations do not include changes to the fundamental three-course mathematics admissions requirement, such revisions would go before the Assembly of the Academic Senate for review and final approval. Ms. Knowlton presented a chart with steps for review and approval if the work group recommends substantive changes to the mathematics admissions requirement. BOARS would need to approve such changes before they advance to the Assembly of the Academic Senate and the Board of Regents for review and approval.

Regent Tesfai asked for more information about the consideration of data science courses. Ms. Knowlton replied that there has been concern that, since some data science courses are considered advanced mathematics courses and validate Algebra 2, students in these data science courses would miss concepts from Algebra 2. The University recommended four years of mathematics for admission, and the majority of students who took data science courses also took Algebra 2, so a small number of students use statistics and data science courses for validation. She expressed hope that the work group could identify aspects of Algebra 2 that are critical for student success, determine which data science courses include

those aspects, and provide guidance on enhancing courses that do not have those aspects. Mr. Steintrager added that the work group was comprised of disciplinary experts and was the appropriate body to make these decisions.

Regent Tesfai stated his understanding that more data science options could fulfill the admissions requirement as long as they meet certain standards. Ms. Knowlton responded in the affirmative. Subject area C could be a barrier to access to UC, but one must make sure that these courses contain important foundational concepts present in Algebra 2.

Regent Raznick asked how certain data science courses might be less suited to student preparation and whether pathways could be created within subject area C such that data science and algebra courses could both be options. Ms. Knowlton responded that all students are currently required to take elementary and advanced algebra and geometry courses. The work group would address whether courses that build on those courses could fulfill the third-year requirement. UC currently recommended that students interested in science, technology, engineering, and mathematics (STEM) go through a calculus pathway. She acknowledged that there is some divergence based on what a student wishes to study, but foundational expectations should be identified regardless.

Committee Chair Park remarked that this discussion was related to both admissions and the makeup of the STEM work force. She was heartened by the consultation with various stakeholders, as well as consideration of the changing landscape of mathematics policy and of mathematics as an equity issue. Committee Chair Park wished to ensure that the K–12 system and other segments understood why UC has undertaken this effort. Ms. Knowlton replied that California State University (CSU) faculty would join the subject area C work group in January 2024.

Committee Chair Park asked if parameters for validation are set by the Academic Senate and enacted by the Office of the President (UCOP). Ms. Knowlton responded that UCOP and campus admissions staff evaluated courses to determine whether they meet the criteria for advanced mathematics. For instance, many statistics courses built on the probability and statistics aspects of Algebra 2 but not on functions, and content experts were needed to identify those important aspects. Ms. Newman added that the criteria would be developed by the UC Academic Senate in collaboration with CSU. High school articulation analysts understood how to apply these guidelines but did not develop them, so this work would begin and end with faculty. However, faculty would not be managing the implementation process.

Regent Raznick noted that the National Assessment of Education Progress found that eighth grade students were underperforming with regard to a number of areas. He asked whether “Mathematics in Context” curriculum or real-world applications of mathematics were part of UC’s considerations. Ms. Knowlton responded that UC was strongly supportive of innovations in the mathematics curriculum, and many UC faculty were searching for better ways to teach mathematics and improve outcomes. She did not want this effort to appear as if UC was opposing innovation in curricular development. In her

view, the goals of having an innovative curriculum and making sure that courses had foundational concepts were not at odds with each other.

Committee Chair Park asked when the work group would conclude its review. Ms. Knowlton replied that a recommendation regarding the validation policy was expected by the end of December. The broader investigation into foundational courses that would involve other segments would conclude in the spring.

Committee Chair Park stated that the Committee looked forward to future updates.

The meeting adjourned at 12:55 p.m.

Attest:

Secretary and Chief of Staff