Susan Cochran
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Chair of the Assembly of the Academic Senate
Faculty Representative to the Regents
University of California
1111 Franklin Street, 12th Floor
Oakland, California 94607-5200

April 5, 2023

ELIZABETH SIMMONS
EXECUTIVE VICE CHANCELLOR
UNIVERSITY OF CALIFORNIA, SAN DIEGO

Re: Approval of Pre-Proposal for UC San Diego School of Computing, Information, and Data Sciences (SCIDS)

Dear Executive Vice Chancellor Simmons:

In accordance with the *Universitywide Review Processes for Academic Programs, Units, and Research Units* (the "Compendium"), the Academic Senate solicited input from the Coordinating Committee on Graduate Affairs (CCGA), the University Committee on Planning and Budget (UCPB), and the University Committee on Educational Policy (UCEP), regarding the UC San Diego pre-proposal to establish a School of Computing, Information, and Data Sciences (SCIDS).

The Senate's three Compendium committees assessed the pre-proposal against the four Compendium review categories for new schools and colleges: academic rigor, financial viability, need for the program, and fit within the UC system and the segments. The committees agree that UCSD's pre-proposal is worthy of continued development.

The committees also made several suggestions for improving the proposal. These include clarifying the following aspects of the proposal: the revenue sources for SCIDS, its organizational structure, its relationship to other UCSD academic units, and its educational and fiscal impacts on those units; how SCIDS will achieve its long-term growth plans; how its administrative and academic features compare to similar programs at comparable institutions; the educational benefits of the program; and planned initiatives around equity, diversity, and inclusivity. We look forward to reviewing the full proposal in the future and would appreciate a complete accounting of how these comments have been addressed.

Please do not hesitate to contact me if you have additional questions.

Sincerely,

Susan Cochran, Chair
Academic Council

Cc: Provost Newman
UCSD Senate Division Chair Postero
Interim Chief of Staff Halimah
Director Corona
IRAP Analyst Procello
UCSD Senate Executive Director Hullings
Executive Director Lin

COORDINATING COMMITTEE ON GRADUATE AFFAIRS (CCGA)
Erith Jaffe-Berg, Chair
erithj@ucr.edu

ACADEMIC SENATE
University of California
1111 Franklin Street, 12th Floor
Oakland, California 94607-5200

February 15, 2023

ACADEMIC SENATE CHAIR SUSAN COCHRAN

Dear Chair Cochran,

Following deliberation at its February 1 meeting, CCGA voted unanimously via email to approve the pre-proposal from the San Diego campus for a School of Computing, Information and Data Science (SCIDS).

The proposed school is anticipated as UC San Diego's next leap forward in addressing the compelling need to transform data into knowledge. The founding units of SCIDS will be the Halicioğlu Data Science Institute (HDSI) and the San Diego Supercomputer Center (SDSC), supported by joint interactions and affiliations with existing Divisions and academic departments, including Computer Science and Engineering (CSE), Electrical and Computer Engineering (ECE), Cognitive Science, and Mathematics. The academic core of the new school will be HDSI.

In less than five years, HDSI has established a strong undergraduate program and now has approved graduate degree programs. SDSC will serve as the operational and translational science core, building on its history as one of the four national Supercomputer Centers established by the National Science Foundation nearly four decades ago, leading the development of high-performance computing and more recently big data and cloud computing. In addition, SCIDS will have strong academic interactions involving other UC San Diego departments, schools, and divisions supporting the goal of transforming data into knowledge through development of data and information science, advancing innovative computing paradigms, and developing new contextual learning algorithms and methodologies that can transform society. The educational programs that will be designed will train a new generation of qualified professionals who will play a key role in this endeavor.

The pre-proposal was analyzed by two reviewers in addition to the Lead Reviewer. Both reviewers were supportive of the pre-proposal. However, they also had some observations on ways the proposal should be strengthened before coming back as a full proposal. Some of the most important are listed below:

1. The organization structure needs to be defined in detail. The current organization chart's top-down nature does not match the stated goals of integrating data science and computing across units and disciplines.
2. The relationship between SCIDS and engineering must be defined and agreed upon by engineering. This relationship, represented as a dotted line in the figure, is the most important one in the organization chart, but it lacks any detail.
3. The relationship between SCIDS and SDSC needs to distinguish between academic and IT services. The SDSC provides core services across the UC, and these functions should be

managed separately from the UCSD-specific academic activities of research, innovation and teaching.

4. Equity, diversity and inclusivity (EDI) within the SCIDS should be described. EDI is well-addressed in the existing HDSI and SDSC, and the report implies those initiatives will continue, but the full proposal should explicitly specify how those efforts would be represented in the school.

CCGA agreed that these points should be taken under advisement, but did not feel that they should keep the pre-proposal from advancing to the full-proposal stage. The committee approved the pre-proposal unanimously, with one abstention.

As Chair of CCGA, I submit the review of this pre-proposal for your consideration.

Sincerely,

Erith Jaffe-Berg
CCGA Chair

cc: James Steintrager, Academic Senate Vice Chair
    CCGA Members
    Monica Lin, Academic Senate Executive Director
    Michael LaBriola, Academic Senate Assistant Director
    Chris Procello, Academic Planning and Research Analyst
    James Antony, UCSD Graduate Dean
    Lori Hullings, UCSD Senate Executive Director
    Ashley Hill, UCSD Senate Associate Director

Abbreviations:

HDSI: Halicioğlu Data Science Institute

SCIDS: School of Computing and Data Sciences

SDSC: San Diego Supercomputer Center

This review of the SCIDS prepropossal was prepared by the lead reviewer based on the materials and discussions with two reviewers who have deep experience in the leadership of academic computing and data science units.

1. The proposed school is viewed favorably, even though critical details are needed for the full proposal. Bringing the existing data science and computing expertise from the HDSI and SDSC into a school will allow teaching and research to expand from the existing centers, and facilitate integrating data science and computing across UCSD departments.
2. The organization structure needs to be defined in detail. The current organization chart's top-down nature does not match the stated goals of integrating data science and computing across units and disciplines. These goals and many of the intentions around collaboration and promoting innovation, or cross-pollination, suggest a matrix-like structure. That said, reviewers noted that there is no one accepted organizational approach in the top computing and data science academic units across the nation, so the recommendation is for UCSD to present a structure that is defined, explained, and reflected on in terms of potential conflicts or other pitfalls. Put another way, the structure should be deliberated on and justified.
3. The relationship between SCIDS and engineering must be defined and agreed upon by engineering. This relationship, represented as a dotted line in the figure, is the most important one in the organization chart, but it lacks any detail; both reviewers highlighted this relationship as the most critical. Examples of areas that need defining are the relationship between academic data science and computing programs as seen at the campus level, teaching of courses, and flow of funds if faculty from one school are teaching in the other. Evidence of support from the engineering faculty is needed.
4. The relationship between SCIDS and SDSC needs to distinguish between academic and IT services. The SDSC provides core services across the UC, and these functions should be managed separately from the UCSD-specific academic activities of research, innovation and teaching. This separation is not a barrier to the proposal, but the recommendation is to define a suitable organizational structure for the SDSC in light of its functions.
5. Consider supporting data science minors for students in other majors, allowing information advances to be incorporated into humanities and health sciences, for example.
6. Equity, diversity and inclusivity (EDI) within the SCIDS should be described. EDI is well-addressed in the existing HDSI and SDSC, and the report implies those initiatives will continue, but the full proposal should explicitly specify how those efforts would be represented in the school.

Further reflections without recommendations were noted.

- The field of data science and related computing is showing massive growth, so new structures are needed to cater to the expanding demand. The field is expanding in breadth across disciplines, and in depth for some areas like machine learning including AI. Data science is creating social, economic and justice & EDI implications that extend beyond technical fields.
- The reviewers were encouraging of UCSD's effort to develop a new structure for computing and data science. UCSD is seen as a leader in this rapidly expanding and changing field, and reviewers expected UCSD would arrive at a successful solution that might be a role-model for other universities.
- There is no common solution across the nation to the location of computing and data science. In recent decades computer science has been located in engineering in more than half of universities, but there are still many non-engineering computer science programs and departments. Data science has emerged within existing departments and more recently in specific "data science" programs and units, but the field is evolving fast.
- A recurring theme in discussions was to consider possible outcomes in the future, say 10 years' time. For example, machine learning including AI cannot currently be separate from computing and data science, but this field is likely to massively expand to the point where it may need distinct academic units. The general point was that considering what might happen may help guide decisions about how to set up the SCIDS now.
- A minor question arose as to any association with Calit2.

In summary, the preproposal is sufficient to move ahead with developing a full proposal. The recommendations are intended to guide UCSD in preparing for the successful establishment of the SCIDS.

UNIVERSITY COMMITTEE ON EDUCATIONAL POLICY (UCEP)
Melanie Cocco, Chair
mcocco@uci.edu

March 22, 2023

SUSAN COCHRAN, CHAIR
ACADEMIC COUNCIL

RE: UC SAN DIEGO SCHOOL OF COMPUTING, INFORMATION, AND DATA SCIENCES PRE-PROPOSAL

Dear Susan,

The Systemwide Council on Education Policy (UCEP) of the UC Academic Senate discussed the proposed School of Computing, Information, and Data Sciences (SCIDS) that will be located at the University of California San Diego at our meetings on February 6, and March 6, 2023. Members of UCEP voted to endorse the pre-proposal. UCEP requests that the project's leadership respond to the Committee's concerns described below through a revised full proposal.

Key Interactions Among Units. Briefly, two founding units will comprise the SCIDS: the Halicioğlu Data Science Institute (HDSI) and the San Diego Supercomputer Center (SDSC). The HDSI was approved as an academic unit in spring 2018 and incorporated the data science major and minor (into HDSI) in 2019. The major is capped, with nearly 1000 students enrolled in the major (800) and minor (200+) degree programs.

Figure 1: Proposed relationships among academic entities.
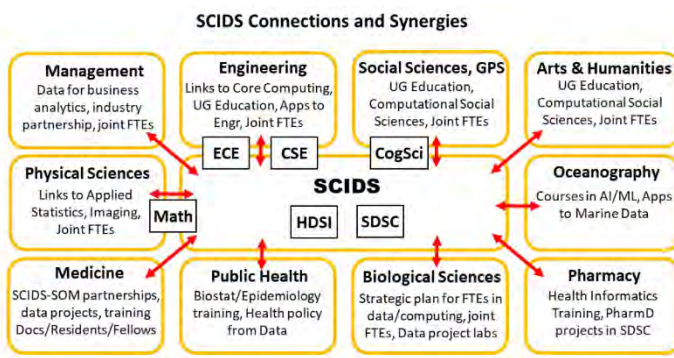
Multiple cohorts have graduated from the data science program since its inception. Master's and PhD programs were initiated in 2020. Figure 1 from the pre-proposal (shown here) conveys extensive connections between SCIDS and other units on the UCSD campus. However, it is not clear that all of these relationships are

equal. The next review would benefit greatly if the proposal could provide context for magnitude of each relationship. Specifically, we request that the synergies generally characterized in the pre-proposal be defined in greater detail and realistic appraisals. The pre-proposal describes a fully-enrolled major but fails to critically appraise potential risks and benefits to other undergraduates and their educational aspirations.

Comparison to Other Programs. The *steering* committee conceptualizes SCIDS as central to many academic entities across the campus (Figure 1). While the image suggests SCIDS is *the* central entity to the success of others, it may also be formulated as one of many equal partners in interdisciplinary work conducted with biological, social, and physical sciences; healthcare and public health; business; and the arts and humanities. The future proposal would benefit greatly from a critical comparison of the administrative structure, faculty teaching and research characteristics, and educational features of SCIDS and other data science programs from academically comparable institutions.

Joint Faculty Appointments. The pre-proposal presents evidence of academics, research, faculty welfare, equity, inclusion and community engagement as well as HDSI's and SDSC's commitment to SCIDS. However, the report minimizes the risks and exaggerates the *benefit* of joint faculty appointments, especially to new hires. Earning tenure in any R1 university reflects hard work, but earning tenure with appointments to multiple academic units is even more difficult. While the report underscores the important efforts HDSI and SCSD have committed to creating equity and inclusion, they fail to contemplate the effects that joint appointments will impose on junior faculty members.

Benefits to All Students. A broad discussion of the benefits students will experience beyond the benefits of being admitted to the major and the anticipated future employment opportunities is missing from the report. The authors outline increased financial benefits and administrative complexity for the unit, but present limited evidence that these benefits will directly improve valued outcomes for students. For example, could other administrative models produce savings, at all, especially savings that enhance valued student outcomes with lower administrative overhead? Do shifting enrollments narrow student and faculty options and levy some downside risks (to other departments) when SCIDS is inaugurated as a stand-alone entity? Relationships with California State Universities and community colleges are discussed in the report, including bootcamps that may expand opportunities to enter the major. While the high demand for data science courses is acknowledged, the report fails to identify ways that *SCIDS alone* can fix an impacted major, or provide access to data science courses to non-STEM majors (e.g., general education science courses). In addition, the report would benefit by a reflection on the *major prep* curriculum that community

college students might complete to enter the data science major(s). They might also reflect on the supports needed to engage historically underrepresented populations in this School and its majors: *women*, race and ethnic minorities, and *people with disabilities.*

UCEP appreciates the opportunity to comment on this matter. Please contact me if you have any questions.

Sincerely,

Melanie Cocco, Chair
UCEP

UNIVERSITY COMMITTEE ON PLANNING AND BUDGET (UCPB)
Donald Senear, Chair
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December 14, 2022

SUSAN COCHRAN, CHAIR, ACADEMIC SENATE

**RE: UC SAN DIEGO SCHOOL OF COMPUTING, INFORMATION AND DATA SCIENCES
PRE-PROPOSAL**

Dear Susan,

UCPB has reviewed the Pre-proposal for the establishment of a School of Computing, Information and Data Sciences at UC San Diego. Two existing units, the Halicioğlu Data Science Institute (HDSI) and the San Diego Supercomputer Center (SDSC), will form the core of the proposed school. These will be augmented by interactions and affiliations with several additional campus departments. A new Dean will be appointed to lead fundraising efforts and administer the School. The School is endorsed by very enthusiastic letters of support from across the UCSD campus.

UCPB finds this to be an attractive concept with sound academic justification. The Halicioğlu Data Science Institute and the San Diego Supercomputer Center provide a firm foundation for the development of the School. The HDSI offers large and expanding undergraduate programs and is expected to account for most of the growth of the School. The SDSC offers an additional major research component. Both components have a successful grant-securing record. The pre-proposal presents a broad overview of the new School and how it will fit into the existing campus ecosystem. The Committee's review of the preproposal revealed several areas in need of more detailed planning in preparing a full proposal.

First, the proposed revenue sources for the new School need clarification. The HDSI has regular support from campus funds, but it has also enjoyed significant philanthropic support. The pre-proposal does not indicate how much of the expanded costs of the proposed School would be supported through philanthropy. It is unclear whether and how much the anticipated growth in campus support would come from an increased allocation of state general funds in response to campus enrollment growth or might shift resources from other programs. Both additional faculty and staff for the new School represent significant increases in funding needs. Proposed faculty costs represent the bulk of the proposed growth of the budget from $5.6M to $11.5M. The new dean's office will need $1.8M at full proposed growth. Discussion of new masters programs that are envisioned does not include projections of professional fee

or SSP revenue that might contribute to supporting this growth. Funding is projected to remain flat for the Supercomputer portion of the School, and the Center has had great success securing federal funding. There is no reason to believe that would change with the proposed School.

Second, campus-level impacts are not yet adequately addressed in the pre-proposal. Committee members wondered what the implications of dedicating more FTEs to the proposed School might be. Ladder rank faculty have been growing more slowly than enrollment at UCSD, as across the UC system. Would instructional needs pull faculty or other instructors from other Schools? Would graduate students be funded to teach? How would the reallocation of FTEs affect other units on campus?

Third, what are the staffing and academic supervision implications of the five master's programs, many with capstone projects? Will non-Senate faculty, professional instructors, and Unit 18 members, perform a large amount of the necessary teaching? Faculty at the Supercomputer Center currently serves as research faculty. Would they add teaching responsibilities with the formation of the new School?
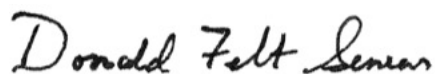
UCPB devoted much discussion to the impact of a new, consolidated data program on other majors featuring data components on campus. For example, would an undergraduate choose this School over majoring in a discipline with a data component? Would that relieve over-burdened departments or deprive them of students? Data programs at other campuses are over-subscribed forcing majors to be capped. It is unclear how the School would handle robust/overwhelming student demand. More investigation of these consequences would strengthen a final proposal. What effect would the School have through interactions and affiliations with various engineering and computer science departments on campus?

As currently proposed, the curriculum lacks a clear ethics component in the undergraduate curriculum. This is particularly relevant since Data Sciences are not only central to the proposed School, but are also tools for academic inquiry in a wide range of disciplines in the biological, medical, and social sciences where they often raise thorny ethical issues. In addition, while the pre-proposal includes a discussion on the ideal student demographic composition there is a lack of DEI focus in the undergraduate curriculum. Meeting target numbers for students of varying backgrounds cannot substitute for serious wrestling with substantive issues.

Space for the proposed school is available at Warren College. As the program grows, server space will need expansion. The campus has already relocated server banks and realized substantial cost savings through that project, but longer-range plans to meet future growth needs should be outlined.

UCPB encourages that the issues outlined above be addressed during the development of a full proposal. A proposal containing careful consideration of the potential negative consequences, along with the hoped-for positive ones, would be looked upon very favorably.

Sincerely,

Donald Felt Senear

Donald Senear, Chair
UCPB

Attachment
cc: UCPB, CCGA

UCPB Pre-Proposed School of Computing, Information and Data Sciences Review UCSD

Name and location of program: **School of Computing, Information and Data Sciences** at UCSD

Lead reviewer: Maximilian Auffhammer, UC Berkeley

Academic Justification:
UCSD proposes the creation of a new school of Computing, Information and Data Science (SCIDS), focusing on research, learning and technological developments in the broader landscape of data, information, and computing sciences. The core of the school will be formed by the Halicioğlu Data Science Institute and the San Diego Supercomputer Center, augmented with interactions and affiliations with on campus divisions and departments (e.g. Computer Science and Engineering, Electrical and Computer Engineering, Cognitive Science, and Mathematics).
The academic justification revolves around a broader mission of "turning data into knowledge". The proposal lays out broad anticipated synergies across various units on campus to achieve various flavors of this goal. The undergraduate programs forming the core of the undergraduate teaching mission are growing rapidly with 800 majors and 200 minors enrolled today, which will support UCSD's planned enrollment growth targets.

Planning and Budget Overview

Funding of existing Core Units: The core building block of the SCIDS (the Halicioğlu Data Science Institute) has been supported financially through regular campus funds for standard activities (*faculty recruitment, start-up costs, retentions, building infrastructure and administrative Structure)* supplemented by significant philanthropic funds since 2018. From the pre-proposal it is not clear what the scale of philanthropic contributions has been and is currently committed for future growth. Total Operating Resources for FY2022 were listed as $5.6 million and are proposed to grow to $11.5 million by FY2025 with almost all of this growth coming from additional faculty salaries and benefits. Staff costs are also projected to roughly double. The San Diego Supercomputer Center (SDCC) has a long history of successful federal funding. The core operating funds of roughly $6 million are expected to stay almost flat out to FY2025. Hence most growth will stem from the HDSI side. Both units appear to be successful in attracting extramural grants.

Administrative Costs: Currently, HDSI reports directly to the Executive Vice Chancellor at UCSD. The new school will be headed by a new dean, which will require the establishment of a Dean's office. The projected total expenses are projected at $1.2 million/year and projected to grow to $1.8 million/year by FY2026.

Capital Requirements: HDSI is currently co-located in the Supercomputer center and will shortly move to a renovated Data Science Building in Warren College. It is expected that this location will be sufficient to accommodate initial growth, but the proposal urges campus leadership to fundraise for a dedicated building. Some of the need for more real estate stems from space needs for a growing program, both on the instructional side as well as the research side. As the school will hold dedicated faculty lines, there will be need for space similar to those of a regular department. Further, the pre-proposal makes it quite clear that there is a need for more server space for SDSC. UCSD has relocated servers across campus and is saving $4+ million a year in energy costs due to this effort, but is at capacity.

Start up costs: There is no discussion of "transaction" costs to get the college stood up. Much of the startup costs were already invested by standing up HDSI, which was achieved via philanthropy (it appears). The new dean's office is not a startup cost, since it is not a one time expenditure but a flow.

Revenue sources: The proposal does not discuss steady state targets for student numbers , but growth has been strong and the undergraduate major is currently capped. While there is talk of continuing to attract revenue via grants, direct service contracts, and philanthropy, the proposal seems to indicate that the core of the funding will come from the same sources as those for a regular department – which are central campus funding streams. This revenue is already coming to UCSD and I assume some of which will be transferred from existing colleges into the school. However, this is an environment with growing enrollments at UCSD. Increasing enrollments might mean that this does not mean reduced allocations for other campus players, but rather an allocation of new revenues towards this operation. The enthusiastic endorsements by the deans across campus make me think that this is the case. A full proposal should discuss this reallocation in much greater detail.

Personnel costs and FTE requirements: As mentioned above, the most significant increase in personnel costs will go toward new faculty lines and administrative and supervisory staff and a number of support staff. HDSI has recruited 16 dedicated faculty FTE and joint lines total 25 faculty FTE so far. The proposal does not provide a list of these faculty, but a review of the website suggests that the majority are ladder rank faculty with a small number of teaching professors. In a full proposal we will need a much more in-depth discussion of the personnel aspects of this proposal. Specifically, the following questions deserve a more detailed discussion and analysis:

- *Faculty FTE:* What are the campus wide implications of dedicating more faculty FTE to this new school? Since the ladder rank faculty, as discussed in reports from the committee, are growing very slowly in relation to the growth in campus level student enrollments, it would be important to understand how this reallocation will affect other campus units.
- *Graduate Student FTE:* There is a discussion of five masters programs, many of which require a capstone experience. Advising capstone experiences can be labor intensive. How does the new school intend to meet that demand? I assume the individual Master program proposals discuss this, but it would be important to understand what the anticipated scale of staff resources required to meet graduate student und undergraduate student demand is. There is a budget, but it is not clear how this matches growth.
- *Undergraduate Student Growth:* Some universities that have rolled out these schools have seen a massive shift from data intensive majors to these programs. Does UCSD anticipate significant impacts on other undergraduate programs. If so, is this welcome (e.g. takes pressure off overenrolled programs) or does this affect resource allocation to these programs if the number of majors in the other programs is anticipated to shrink.
- *Non-Senate Faculty:* Many data science programs rely on professional faculty and unit-18 lecturers to staff courses. There is no discussion of the role of non-senate faculty in the pre-proposal.
- *Graduate Student Funding:* While the proposal discusses the extensive growth in graduate student enrollments at the Masters and Ph.D. level, the funding dimensions are not discussed. The current core programs attract a significant amount of extramural funding and I assume that some Ph.D. students will serve as GSRs and GSIs. But it is not clear what

the overall graduate student funding budget will look like. Does the school rely on revenue from the Masters' programs to subsidize the doctoral program? Some overall scenario planning here would be helpful to further understanding of the feasibility.