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Date: September 1, 2022
To: Michael Scheibner, Chair, Graduate Council
From: Christian Fons-Rosen, Alex Petersen, Lace Padilla
Re: Revisions to the Proposal for a Master of Data Science and Analytics Program

Thank you for comments on our proposal to establish a self-supporting graduate professional degree program, Master of Data Science and Analytics, received on April 6, 2021. And we thank all reviewers for their thoughtful consideration of our proposal.

We are grateful for the opportunity to revise our proposal in light of faculty and administrator feedback. We have aimed to address all comments in the revision, and believe it is improved significantly.

Overall, the MDSA proposal has been revised to clarify (1) the financial model, including a data-based analysis of the program's price; (2) the governance model, including details of the program director role; and (3) other issues, including the relationship of the proposed program to the proposed Gallo School. In what follows, we discuss the comments received from the EVC/Provost and VPDGE (ADM), Graduate Council (GC), Committee on Academic Planning and Resource Allocation (CAPRA), Committee on Research (CoR), Committee for Equity, Diversity, and Inclusion (EDI), and Committee on Library & Scholarly Communications (LASC) – grouped into these three topics. In addition to the changes discussed below, we have also updated all tables and data with more current information, including for example campus enrollment data and state and national employment data.

Financial Model

Several comments (ADM, CAPRA, CoR) expressed concern about the affordability of the proposed program for our initial target population, recent UC Merced and Cal State graduates in the Central Valley. In particular, ADM notes "*the proposed $45,000 tuition for the program is higher than the 'expensive but would still consider' price point of $41,370 determined for UC Merced alumni*", and COR writes, "*Even with a projected 20% of tuition returned in student aid, the proposal should explain other ways it will help UC Merced students afford to be enrolled in the program.*"

We selected the original price-point after consultation with UC San Diego Extension Center for Research and Evaluation (CR+E), which performed two surveys in August, 2020, collecting feedback from: 301 nationwide respondents (39% from California); and 101 UC Merced Alumni (95% residing in California). Our goal was to balance perspectives from several populations: UC Merced Alumni, Central Valley workforce, and the general US population. To achieve this goal,

we selected a price point that balanced the input from all groups, and we also created a unique funding model to provide above-average return-to-student-aid. We added the following text and graphics to the revised proposal to clarify these two approaches for ensuring tuition is affordable and is reflective of a high-quality education (pages 28 - 30):

Based on the CR+E Market Analysis, we selected $45K as a price-point that balanced the respondents' beliefs about program costs. For example, Figure 1 shows the proportion of 301 nationwide respondents (39% from California) who indicated the proposed tuition being too cheap, a bargain, premium, or too expensive. The majority (~58%) reported that $45K would be a bargain (shown in grey). Roughly 12% indicated that any price over $45K was "Expensive but still would consider," and 8% of the respondents indicated that over $45K was "Too Expensive to consider." Responses assessing the quality, as opposed to the affordability, also indicated support for $45,000.[1]
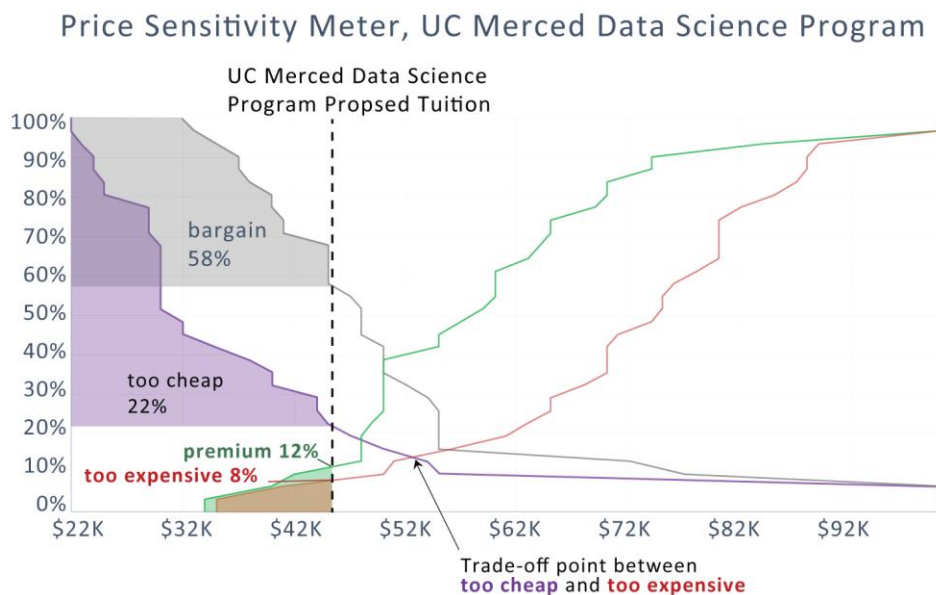

Figure 1. Annotated version of a figure from the UC San Diego Extension Center for Research and Evaluation Market Analysis. Figure shows the proportion of US respondents who indicated their beliefs about the proposed tuition being too cheap, a bargain, premium, or too expensive.

We selected the price point of $45K (rather than the trade-off point between too cheap and expensive of $52K, as shown in Figure 1) because we sought to balance the perspective from the national sample with the UC Merced Alumni responses. As shown in Figure 2, when comparing beliefs about the program tuition being too cheap and too expensive between the national sample and UC Merced alumni, there is a range from $32K to $52K that balances beliefs from both groups.

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[1] Conversely, only 22.6% (respectively ~61%) of the respondents considered any price less than 45k to be "*Too cheap to be of good quality*" (resp., *"A Bargain or great buy"*), indicating that the $45,000 target cost is balanced around the bargain and premium sides.
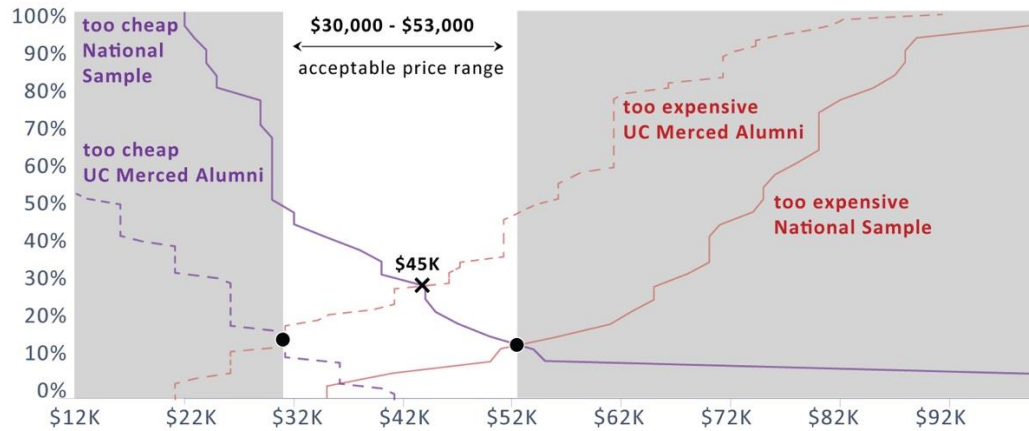
Figure 2. Acceptable price range using the national and UC Merced alumni responses based on the Van Westendorp price sensitivity method.[2] Data from the UC San Diego Extension Center for Research and Evaluation Market Analysis.

Note that a price point of $42K would be closer to an exact compromise between the beliefs about the cost of both groups. Rather than reducing the tuition as a whole by $3K, we created a funding model that prioritizes lowering the cost to low-income students. In this plan, 20% will be returned to aid, which is a far larger percentage than other programs we have found (the next largest being 3% return-to-aid). If we assume that half the enrolled students have need for financial aid, then 20% return-to-aid would provide about $20,000 per student with need. By prioritizing need-based support, rather than reducing the overall tuition, the MDSA program will be affordable for UC Merced alumni and other low-income students while maintaining a perceived high quality by the greater California and US populations.

In addition to the text added to the proposal, we note that for UC Merced alumni, the mean price point for "expensive but still would consider" was $41,370, and the median was close to $45,000.[3] Because this category most closely matches the decision bifurcation for professionally-minded candidates, despite considering $45,000 expensive, half of the respondents would consider the program as priced. Further, respondents ranked cost consistently as the second most crucial factor influencing their likelihood to enroll in the proposed program (after "Skills/Knowledge learned" in both survey samples). We believe the proposed target price-point would not deter many UC Merced alumni, especially after considering the substantial portion of tuition returned to financial aid, which makes this program unique among other UC SSGPDP programs.

By maintaining a $45,000 price point, we will still be able to offer a significantly reduced cost for students demonstrating financial need. To the best of our knowledge, this is the only UC SSGPDP program that defrays costs of attendance through substantial return to aid (at a level of

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[2] https://www.forbes.com/sites/rebeccasadwick/2020/06/22/how-to-price-products/?sh=10a801855c75

[3] If we neglect the 10% of survey respondents indicating a price point between $10,000 and $20,000 as being "*Expensive but still would consider,*" then the average price point for this category among the remaining 90% of respondents is $44,300.

20% tuition returned to student aid), which highlights this program's contribution to supporting diversity.

Regarding additional ways to provide financial support (CoR), we will explore other options for making this program affordable to UC Merced alumni. For example, in the original submission, we proposed we would

> … establish a need-based scholarship program to help students offset program costs, living expenses, and the costs of supplies and equipment. For instance, to ensure all enrolled students have a personal computer that is appropriate for our computationally intensive program, we will provide students with financial need with up-to-date computing hardware, such as an Apple Macbook Pro laptop with multi-core processor for parallel computing, 16GB RAM for loading large datasets, and a second portable monitor, totaling roughly $3,000 per qualifying student. In addition, the capstone project may be another source of possible student support, for instance in the case that a student matches with a faculty or other external sponsor that has funding to compensate the capstone team for the timely delivery of a viable product at the end of the project.

Beyond being suitable for UC Merced alumni, the $45,000 SSGPDP program fee (covering the direct costs of the instructional program, but not including campus-based fees) is significantly less than the $60,104 (2022) SSGPDP program fee for the most comparable program in the most proximal UC: the 12-month UC Davis MS in Business Analytics.[4] Notably, many other comparable programs (see Table 1 of the original proposal) are more than 12 months, and so the total cost is significantly higher than our proposed program.[5]

CAPRA also noted that the proposed 4% increase in program fees from year to year might affect affordability.

Given current economic climate, it is difficult to say whether 4% annual increases will reflect inflation for the foreseeable future. We note that the original proposal was based on a survey administered in 2020, and we have not modified the initial tuition level of $45,000, which would likely not take effect for at least two more years. We will monitor economic conditions and increase tuition only as costs increase over time. For now, we will maintain 4% annual increases in the financial model on both tuition and cost sides.

Several comments also highlighted the systemic risk associated with starting this program, as it may draw resources from other campus needs such as the Library (LASC), and as delays in the projected enrollment growth may negatively impact the viability of the Gallo School (ADM).

We note that LASC indicated that they are otherwise "In support of the establishment of the MDSA program at UC Merced", and that in our consultation with this valued campus entity, we will be respectful of their financial constraints associated with curriculum and database costs that

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[4] https://www.ucop.edu/operating-budget/_files/ssgpdp/attachment_a_description_and_summary_table.pdf

[5] For example, the 24-month UCSB MA in Statistics (which includes a Data Science specialization) has annual in-state tuition of $27,100.

the MDSA program may incur. However, as indicated in the original proposal, we expect very minimal (and possibly no) curriculum or database costs, given that much of the open data and software (e.g., Python and R) that this program will leverage are free of charge.[6]

The financial relationship between the Gallo School and the MDSA program (ADM), was addressed in the revised financial model for the Gallo School pre-proposal (submitted March 1, 2022). In the original model, the proposed Gallo School depended on revenues generated by the MDSA program starting in Year 3 to help support school operations. In the revised financial model, the proposed Gallo School does not depend on revenues generated by the MDSA program for critical operational support; rather, such revenues would be used for discretionary expenses, such as faculty and student programs, marketing, and the like.

Regarding a related point (ADM), because this would be the campus' first (proposed) SSGPDP program, we look forward to working with the relevant committees and administrators to establish campus protocols that comply with UC requirements regarding student fee revenue sharing across all the graduate groups involved in delivering the proposed MDSA program.

Governance Model

We acknowledge critical points highlighting the need to develop 3-year assessment plans to comply with standard CCGA review (ADM).

We will work with the campus to develop an appropriate policy for assessing MDSA, one that: (a) reflects the university's core mission to provide financially responsible educational programs that do not negatively impact state-supported programs; and (b) ensures that there are equitable opportunities for student enrollment and faculty involvement, particularly leadership roles, as pointed out by EDI; and (c) contains a mechanism for sunsetting the program if enrollment or financial targets are not met.

On a related point regarding program governance (COR), because the proposed MDSA program is a self-contained one-year SSGPDP based upon pre-existing curriculum, we are not in need of a new graduate group. Rather, we will establish shared governance by way of an executive committee comprised of senate faculty representatives from the participating graduate groups and the MDSA Program Director.

Regarding sunsetting protocols (ADM), we have added text to the revised MDSA proposal that provide a clear set of financial evaluation milestones to determine if the program is likely to reach or sustain self-supporting status (pages 40-41):

> We propose that the primary indicator for program sustainability is student enrollment: if, in two consecutive years, we fail to meet the anticipated enrollment targets according to a lagged two-year threshold, we should consider sunsetting the program. For example, we will consider sunsetting if there are no more than 10 students in Year 3 (corresponding to

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[6] One hidden cost that LASC brought to our attention regarding all students (undergraduate and graduate) at UC Merced is the non-incremental staff effort associated with responding to student inquiries (e.g., regarding availability of texts, datasets, and other resources required for completing the course).

the anticipated number for Year 1), 15 students in Year 4, and 20 in Year 5. This plan will provide sufficient flexibility to accommodate uncertainties during the ramp-up phase.

CAPRA raised the concern that the annual director stipend ($41,000 per year in the opening year) was unreasonably high relative to other graduate group chair stipends on campus.

In the original proposal, we were not sufficiently clear about the leadership, operational, and administrative duties of the MDSA Program Director, which are more than what a traditional graduate group chair is tasked with – including but not limited to marketing, recruitment, professional engagement to link students with capstone projects involving faculty/industry partners, managing curriculum and course schedules, serving as formal adviser to all MDSA students, program assessment and review, and managing all finances of the self-supporting operation (including collecting revenues, paying for instruction, and maintaining an up-to-date budget). The requirements of this position are distinct those of a graduate group chair.

Further, to ensure the program director's incentives are aligned with program, school, and campus needs, we will create a contract for the program director that ties salary increases (projected at 3% annually) and contract renewal to performance, particularly program finances and program enrollment (details to be developed by the appropriate dean in consultation with the Executive Committee).

To clarify the duties and incentives for the program director, we have modified the section on "Governance" as follows (pages 55-56):

> The Master of Data Science and Analytics Program will be overseen by a Program Director and an Executive Committee. The Executive Committee will include one faculty member from the three affiliated graduate groups—CIS, ECON, and MCS. The program will be governed by this Executive Committee rather than a graduate group because the proposed MDSA program is a self-contained one-year SSGPDP based upon pre-existing curriculum. Duties of the Program Director and Executive Committee are laid out in the proposed program bylaws (see Appendix I). Core members of the affiliated Graduate Groups are automatically Program faculty members and may vote on major decisions related to the Program. The Program Director is appointed by the appropriate Dean given names of nominees provided by the Executive Committee in consultation with Program faculty. The Program Director serves as the head Graduate Advisor, and chairs the Executive Committee, which makes decisions about hiring instructors and staff, and appoints or acts as the Program's Membership Committee, Admissions Committee, and Education Policy Committee.

> Duties of the MDSA Program Director include marketing, recruitment, professional engagement to link students with capstone projects involving faculty/industry partners, managing curriculum and course schedules, serving as formal adviser to all MDSA students, program assessment and review, and managing all finances of the self-supporting operation (including collecting revenues, paying for instruction, and

maintaining an up-to-date budget). To ensure the program director's incentives are aligned with program, school, and campus needs, we will create a contract for the program director that ties salary increases (projected at 3% annually) and contract renewal to program performance, particularly program finances and program enrollment (details of this agreement will be developed by the appropriate dean in consultation with the Executive Committee).

And we have updated the proposed program bylaws (Appendix I) to include more detail on the Program Director role (Article IV.B – pages 140-141):

The Program Director carries out the following duties:

- Oversee the progress of graduate students through the program, including satisfaction of degree requirements in coordination with advisors, faculty, and staff
- Represent the program faculty in all matters related to the degree program to the lead dean, the graduate dean, Graduate Council, and School Executive Committee(s)
- Determine resource needs and administer program finances (including collecting revenue, paying for instruction, returning funds to student aid, and managing payments to the campus and graduate groups), in consultation with Executive Committee, program faculty, and lead dean
- Oversee graduate student recruitment, graduate program website, admissions, and financial aid, in consultation with Executive Committee, program faculty, lead dean, and graduate dean
- Determine graduate course offerings, including curriculum changes, in consultation with Executive Committee, program faculty, school staff, graduate groups, and departments involved in course scheduling and teaching assignments
- Determine graduate course resource needs for equipment, staff support, and other resources, in consultation with Executive Committee, program faculty, and lead dean
- Serve as Program Faculty Accreditation Organizer by overseeing annual program assessments and periodic program review, to monitor and maintain academic excellence
- Consult with Executive Committee, program faculty, and lead dean in selecting and reviewing support staff assigned to the program
- Coordinate participation of the graduate program in School and University program activities
- Develop and maintain a plan for promoting diversity among matriculated graduate students
- Manage and respond to program feedback and inquiries from faculty, students, staff, and reviewers

<u>**Other Comments and Revisions**</u>

Several comments involved more general campus-related issues.

There was a request to elaborate on "*how the labor market analysis supports the proposal that the program will serve recent graduates of UC Merced at least for the first few years, including as an exclusively on-site program*" (ADM).

Several main takeaways from the UCSD CR+E analysis, particularly the Executive Summary, indicate that UC Merced graduates would benefit significantly from the opportunities provided by the MDSA program. Regarding workforce and regional relevance, the analysis concluded that there is a wide range of jobs requiring data science skills, which is in great excess of the job descriptions specifically mentioning "data science" in the job title. The excess of data science jobs is highly concentrated in California, creating a high regional demand.

While the number of master's level data science and analytics programs may also be growing, our program has a competitive advantage in that it provides unique on-site training on real-world problem-solving (i.e., context) that may be lacking from other online-only and/or technically-oriented programs. Compared to other on-site programs, the target price of the MDSA is significantly lower, especially when factoring the cost of living into the total cost of attendance.

Another finding from the UCSD CR+E survey that supports the idea of alignment with UC Merced graduates is "Survey respondents whose highest degree is in engineering expressed the most definitive interest (62%) in the proposed program, followed by those with the highest degree in the social sciences (57%)". This finding indicates that our program has a multi-disciplinary appeal, supporting our enrollment targets and a team-oriented programmatic design that seeks to capitalize on the advantages of this diversity. Both engineering and social science graduates see value in the combination of skills and application contexts provided by this curriculum, which provides a straightforward "+1" pathway for UC Merced graduates to obtain valuable professional training.

Another comment suggests that the program name "Data Science and Analytics" is misaligned with the curriculum (CAPRA).

We respectfully disagree. In consultation with the UCM IRDS office, we received an analysis of "Job Types" and "Key Competencies" based upon Burning Glass data that was tailored around the following four Classification of Instructional Program (CIP) categories: 30.7001 - Data Science, General; 11.0199 - Computer & Information Science, General; 30.7101 – Data Analytics, General; and 14.0901 – Computer Engineering, General. Results provide a matrix for mapping the skillset that this proposed MDSA program offers against available jobs and the skills that are mentioned in their descriptions (report available upon request). This mapping indicates that our program appropriately corresponds to Data Science + Data Analytics – (Computer & Information Science + Computer Engineering). As such, whereas graduates of the proposed program may not be appropriate for "data engineering" or analog positions that require developing novel data science computing platforms and algorithms from scratch, such as those

found in more "science-heavy" computer science or statistics programs, they will, however, be proficient in the *sourcing* and *implementation* of data science methods.

In this regard, we designed the curriculum to train students in the essentials of data science as it applies to extracting insights from data for strategic decision-making (i.e., data analytics). For this reason, we arrived at the compound name "Data Science and Data Analytics," with the appropriate contraction of the second "Data" for brevity. Couched within "Data Analytics" is the standard stream of "business analytics" commonly found in many management and business schools. Nevertheless, because this program introduces scenarios for decision-making in contexts beyond business – particularly public policy, human behavior, social media, and environmental studies – we strongly feel that the compound degree title is merited. It is also inclusive because it leaves various options open for other data science programs to be developed on campus.

To this end, our team has been meeting with other campus stakeholders in data science since our original submission of the proposal, such as Applied Math and Computer Science departments. Our objective in meeting with other stakeholders is to clarify this framing and offer our support for other future programs on campus that seek to develop more technically-oriented data science programs – either at the masters or undergraduate level.

Both LASC and COR asked for more clarity regarding the relationship to the timing and contingency of the MDSA program on the Gallo School initiative.

In revising the Gallo School proposal, much effort has been made both in communication and the financial model to decouple these proposals and clarify that they are separate initiatives. As mentioned, the revised financial model for the Gallo School does not rely substantially on the projected revenue from the MDSA, with projected revenues from the latter accounting for roughly 1% of total Gallo School revenues at steady-state. From the complementary perspective, because this is a graduate-level program, it is much easier to implement across existing Schools (SOE and SSHA, specifically) if the Gallo School initiative lags behind the current prospective timeline. In this sense, the contingency plan is the same as the formal plan, which is to develop a cross-department executive committee that provides the same administrative function as a graduate group (e.g., to the extent of establishing program policies and procedures), but without calling for the formal establishment of a graduate group as the MDSA is a one-year non-research and non-thesis based program that does not have the administrative characteristics of a typical graduate group. If the establishment of the Gallo school lags behind the establishment of the MDSA program, the program will operate under the School of Engineering.

CAPRA noted that letters of support were requested from four similar UC programs, but no responses were included in the proposal.

That is correct. We had requested letters, but none were received. Prior to submitting this revision, we requested letters again, however none were received (see appendix I – pages 130-138).

EDI emphasized the need to support various underrepresented groups, both from the student and program administration sides.

We fully support the emphasis of EDI, and we have demonstrated a commitment to diversity and equity in the composition of the MDSA proposal team. Further, we have consulted with the new Vice Chancellor and Chief Diversity Officer, Dr. Delia Saenz, and her team. Concerning comments from EDI specifically, we have modified the section on "Equity, Diversity, and Inclusion" to (a) include mention of LGBTQ, non-binary, and disabled populations; (b) describe more fully our proposed student retention efforts; (c) describe more concretely our approach for ensuring diversity of faculty in program leadership roles; and (d) provide more information on how we propose to evaluate climate for underrepresented students and faculty (pages 52-55):

> Like most of the technology industry, data science is not particularly diverse. A 2020 industry survey of 1,001 data scientists found that 71% were men.[7] A 2017 analysis of part-time students in general data science courses found that 46% were White and 28% were Asian, while only 8% Latinx and 4% African American.[8] In addition, critical race scholars have noted that a broad "Asian" racial category elides important class and cultural differences between, for example, born citizens, white-collar professional immigrants, and refugees. Scholars of race and technology have argued that the underrepresentation of women and people of color in the tech industry has contributed to problems such as embedding racist and sexist stereotypes into search results.[9]
>
> The proposed MDSA program at UC Merced is poised to help address this underrepresentation problem in data science two ways. First, the program is designed to be open to students with broad undergraduate backgrounds, not just those with a degree in computer science, engineering, or mathematics. Members of underrepresented groups who majored in fields such as biology (15% of 2019-2020 US Bachelor's degrees awarded to Latinx students; 9% to Black students) or social science (19% Latinx; 10% Black) will be able to use the program as a gateway to the tech industry.[10] Second, by targeting the same student population for the proposed program as UC Merced's undergraduate programs, we expect to draw from a very diverse pool: Over the last five years, UC Merced has awarded bachelors' degrees to 50% Hispanic, 5% African American, 22% Asian, and 12% White students.[11]
>
> However, the relationship between the technology industry and social injustices is not just a matter of underrepresentation. Structural factors and high-level business decisions are also substantial. For example, Ring, Inc., is an Amazon subsidiary that manufactures and sells home surveillance technology, particularly web-connected doorbell cameras. Ring has actively cultivated relationships with law enforcement and has provided advice on how law enforcement can request access to recordings from Ring devices.[12] Take another example: A

[7] See https://365datascience.com/career-advice/career-guides/become-data-scientist-2020/

[8] See https://generalassemb.ly/blog/data-science-gender-race-disparity/

[9] Noble, Safiya Umoja. 2018. Algorithms of Oppression: How Search Engines Reinforce Racism. NYU Press.

[10] Data available at https://nces.ed.gov/programs/digest/d21/tables/dt21_322.30.asp

[11] Data available at https://visualizedata.ucop.edu/t/UCMerced/views/DegreesAwarded-Internal/DegreesAwardedStory/a5c4b06d-ba7b-41c9-a719-a7a0f5ebe47d/0d5d5ce3-ccbf-4ba9-aba0-2bc3b75397e9?:display_count=n&:showVizHome=n&:origin=viz_share_link

[12] See https://www.washingtonpost.com/technology/2019/08/28/doorbell-camera-firm-ring-has-partnered-with-police-forces-extending-surveillance-reach/, https://www.vice.com/en_us/article/43kga3/amazon-is-coaching-cops-

recent study found the LGBTQ professionals in STEM fields, such as data science and data analytics, are more likely to experience career limitations and harassment, reported more frequent health difficulties, and were more likely to intend to leave the field than non-LGBTQ peers – and that these depend mainly on workplace factors.[13] Simply diversifying the data science workforce will do little to address both such behaviors. In this context, our Ethics PLO is crucial, as it includes both training in ethical theory and techniques of applied ethical analysis as well as character formation. Students will be taught not only how to ethically evaluate projects, but also to refuse to participate in projects that are severely and unavoidably unethical.

The creation of the proposed MDSA degree presents an opportunity to address these equity, diversity, and inclusion issues in data science. A commitment to diversity in faculty, students, and research populations is an essential element of the current practices within each group and department collaborating on the MDSA program. More specifically, MDSA will advance UC's goals for diversity, equity, and inclusion in a number of ways:

- Create new pathways to ensure both **recruitment and retention of underrepresented students**, including LGBTQ, non-binary, and disabled students.

  - In describing the program, we will emphasize how inclusion will be prioritized, and at orientation, we will discuss the importance of dignity and upholding the value of difference.

  - Faculty will be required to undergo specific EDI training, and the CDO has agreed to provide inclusive pedagogy seminars for our program.

  - We will ensure that every course syllabus includes a statement of how inclusion and upholding dignity are critical and provides resources describing how underrepresented students can connect to campus offices for allyship, support, or celebration of their identities.

  - We understand that no one person can be characterized by a single dimension, and we recognize that categories, such as first-generation and working class or racial and ethnic membership and social class, cooccur. Our goal is to create a new model of human interaction within our program to capitalize on the bringing together of different lived experiences and perspectives.

  - <u>We will aim to ensure students see themselves reflected in relevant industries and positions (separate from the faculty and campus).</u> For courses with guest speakers, we will ensure at least one guest speaker is a member of underrepresented group. For recruiting activities, we will target at least some companies that are minority-led or women-led.

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on-how-to-obtain-surveillance-footage-without-a-warrant, and https://www.wired.com/story/ces-2020-amazon-defends-ring-police-partnerships/.

[13] Cech, E. A. & Waidzunas, T.J. (2021). Systemic inequalities for LGBTQ professionals in STEM. Science Advances, 7(3), 10.1126/sciadv.abe0933.

- Program resources will be allocated for recruiting trips to undergraduate programs enrolling high numbers of underrepresented students, including California State Universities.

- Using at least 20% of revenues for student aid, we will establish fellowships for underrepresented students with demonstrated financial need; as program revenues increase, the number of fellowships will increase.

- Retention of underrepresented students (within the one-year program) will be enhanced through targeted mentoring that incorporates faculty and others from underrepresented groups, and on program staff to provide targeted job/internship support that is tailored to the needs of individual students.

- Create a student advisory group to serve as a conduit to report issues that students might be having in the program.

- Integrate **social justice and ethics** into the curriculum.

  - The curriculum includes a full course on Data Ethics, and ethical topics will be integrated as modules into other courses. (For an example, see the sample syllabus for Methods of Data Science I, Appendix D.)

  - The assessment rubric (Appendix B) covers both theoretical knowledge of the ethical, legal, and social implications (ELSI) of technology as well as the application of this theory to data science work.

  - Theme courses may also touch on specific ethical and social justice issues in other contexts, e.g., environmental justice and courses in the *Sustainability and Environment* theme.

- Ensure **leadership opportunities** for faculty from minoritized groups.

  - To establish a leadership pipeline from faculty across the constituent groups, we will nominate and support their participation in professional development, such as the Inclusive Excellence Institute that will be sponsored by the Vice Chancellor/Chief Diversity Officer, and professional development opportunities for faculty to participate in national programs that provide leadership development.

- Develop **community** for faculty and students from minoritized group.

  - We will create opportunities for our alumni to be continuously engaged in the data science program, cultivating a diverse culture of inclusive learning and student-to-alumni connections.

- o We will seek to develop research funding opportunities for underrepresented faculty members and students through targeted development efforts in conjunction with the campus's Office of Philanthropy and Strategic Partnerships.

- o We will host periodic workshops or conferences focused on diversifying the data science and analytics profession, inviting professional, faculty, and students to discuss challenges and innovative approaches to increasing diversity.

To evaluate our progress, we will track the number of faculty and students from historically minoritized groups and track the number of these faculty in leadership roles. We will also track the job and internship placement of minoritized students. To track our performance and outcomes, we will consider all aspects of diversity, including race, ethnicity, gender identity, among others, and we will administer annual surveys for students and faculty to provide anonymous feedback on culture and climate in the program, aiming to capture whether faculty and students feel respected and appreciated.

We will continually assess climate, workload, and satisfaction among both students and faculty in the program. We will be very intentional in capturing demographic information without identifying individuals, and we will be very sensitive in how we report the data given small sample size, especially as we start. Our goal is to ensure that we are promoting perspective taking and a growth mindset, and that dignity and respect characterize the classroom in our program. Program faculty will come together on a regular basis to review the data with the commitment to continuous improvement. In addition, the Program Director will meet with the Associate Dean for Equity, Justice and Inclusive Excellence, and the Executive Committee of the proposed Gallo School (or of the School of Engineering, as appropriate) at least annually to review the program's strategic diversity plan and make necessary revisions to align itself with the campus priorities and system-wide initiatives.