UNIVERSITY OF SAN FRANCISCO | College of Arts and Sciences

EXECUTIVE SUMMARY

Academic Program Review

College of Arts and Sciences

DEPARTMENT/PROGRAM

Master of Science in Data Science

EXTERNAL REVIEWERS

Christopher Morrell, Ph.D., Loyola University, Maryland

Adrian Rusu-Sprincenatu, Ph.D., Fairfield University

Cathy H. Wu, Ph.D., University of Delaware

CAMPUS VISIT

November 18 - 19, 2019

Prepared by: Dr. Suparna Chakraborty, Associate Dean for Academic Effectiveness, CAS

Draft reviewed and approved by: Faculty of the MSDS Program & Dr. Christina Tzagarakis-Foster, Associate Dean for the Sciences

The review team read the self-study written by faculty in the Master of Science in Data Science (MSDS) Program, reviewed the curriculum, course syllabi and evaluations; interviewed faculty, students and staff; and met with the Dean, Associate Deans and other relevant members of the campus community. Prior to their visit, the reviewers were provided with USF's Vision, Mission, Values Statement, and other university materials.

1. **How did the external review committee rate the quality of the program – excellent, very good, good, adequate, or poor? How does the program compare with benchmark top-tier programs nationally? Please provide a brief rationale for the external review committee's rating.**

The external review committee gave the MSDS Program a rating of EXCELLENT**.** They wrote, "The program has excellent quality, performance and outcomes that would be readily recognizable by disciplinary experts in the field who are external to the institution." They agreed this Program ranks "highly among top-tier programs in liberal arts college or university" but note, "with the number of data science graduate programs [continuing] to expand rapidly nationally, the benchmark will become increasing[ly] competitive."

Overall, the committee viewed the Program as follows, "The program is very strong and is meeting its goals. The program has several major strengths. The faculty are devoted and the students are of high quality and well-prepared

for jobs. The latter is attributed to the rigorous process in the selection and recruitment of applicants, the curriculum and the Practicum component that focus on industry-changing technologies, as well as effort on matching graduates with jobs. The primary weaknesses relate to the concerns mentioned above in terms of the number of faculty, curriculum biased towards applied statistics / data analytics, and tight resources. Many faculty members teach overloads and some have put off sabbaticals. The staff is also stretched due to the labor intensive nature of the student recruitment and practicum-related tasks. As recommended above (**B.I #10**), the program need to recruit faculty and staff to provide appropriate coverage of curriculum and sustain the quality and future growth of the program."

2. **What are the most important general issues/challenges that emerged from the external review process?**
    - That the Program hire advanced computer science faculty and "should prioritize faculty recruitment and adding qualified adjuncts/staff" in order to stay relevant in the "rapidly developing field" of Data Science. The committee noted, "It will be critical to focus new faculty hires with leading edge computer science expertise to stay in the forefront of data science."
    - Address the low number of Black/African American students in this Program.
    - Build/continue a strong relationship with University administration as MSDS is "highly successful in student numbers, achievement, and placement. The University gains financial benefits from the program's significant tuition returns and profits." They also add, "It has a great potential to drive the intellectual agenda of data science" across the USF campus.
    - The reviewers noticed "the support staff appear to be stretched, as recruitment of new students and practicum-related tasks require individualized assessments and services that are labor intensive and time consuming."
    - They also mention, "Space and classroom needs is also a long-standing issue. In particular, there appears to be the lack of transparency in space allocation."
    - Committee members noted a feeling of isolation and/or disconnection from the main campus among students and faculty, due to MSDS being located at the downtown campus. They wrote, "the students in the program do not appear to participate in campus life separately from their coursework," although they do have a high-level of student interaction within each MSDS cohort.
    - The Program would benefit from gender and racial diversity.

3. **What specific recommendations for improving the program's quality has the external review committee made to the Dean?**
    - **Diversity: "**The committee recommends the program to work closely with appropriate USF office and programs to increase enrollment of a more diverse student population, particularly underrepresented Black/African American students."
    - **Diversity:** "The Committee recommends the program to prioritize hiring to obtain more gender and racial diversity, as well as disciplinary expertise in computer science."
    - **Curriculum:** "The Committee recommends the data science program to interact closely with the

Computer Science department to develop synergistic research and curriculum collaborations."

- **Faculty:** "The Committee recommends the program to recruit faculty with leading edge computer science expertise to stay in the forefront of data science."
- **Faculty:** "The Committee recommends the program to balance the workload of the program faculty, both to mitigate the risk of insufficient course coverage and to support faculty development."
- **Faculty/Staff:** "To address the human resources issue and lack of redundancy in the program, the Committee recommends that the program to recruit both additional full-time faculty and qualified adjuncts/staff – perhaps from top alumni."
- **Space:** "To address the space issues, the Committee recommends that USF establishes an independent body that can more equitably handle space considerations among the users and that the building administrator reports directly to the Provost."
- **Future Development: "**Considering the program's significant impact to the USF, the Committee recommends that the program be given a high priority at the University level with institutional support."

4. **In the opinion of the external review committee, is the program following the University's strategic initiatives?**

Yes. The committee wrote about how the Program meets its own curricular and institutional goals. They assert the Program is also a huge asset to the University and recommend that, "considering the program's significant impact to the USF… the program be given a high priority at the University level with institutional support." The "impressive number of applications… makes the program prestigious and helps keep the program in high regard by the industry."

5. **In what way is the program contributing to the goal of making the University of San Francisco a premier Jesuit, Catholic urban university with a global perspective that educates leaders who will fashion a more humane and just world?**

The committee recognized the MSDS Program as, "in line with the Jesuit mission of the University." They continued, "the program stresses ethical principles of the application of data science methods to address real world problems of societal impact. It has an integral ethics component in the curriculum. The program pays attention to inclusivity and diversity in their admissions procedures." The external review committee considers the "quality and performance" of this program to be excellent. In multiple sections of the report, the committee also notes the ability of students to engage with real-world problems through the Practicum component, which "allows students to have intensive interactions (9-month, 2-day per week) with a company, non-profit or government entity and assures that students contribute to society while still in the program."

6. **What is the timetable for the response to the external review committee's recommendations for program improvement? What can the Office of the Provost do to appropriately respond to the review?**

The next step is for the Dean and Associate Deans to meet with the faculty (full-time) of the MSDS Program and discuss the action plan based on the self-study and reviewers' report. Based on the reviewers' suggestions, the Office of the Provost could assist the program by maintaining an open and ongoing relationship with the MSDS Program leadership and think creatively about opportunities for this Program to act as a leader for data science needs across the USF campus. The Provost's Office could also assist the Program in handling concerns over physical space.

7. What general comments or issues, if any, are crucial to understanding the reviewers report?

No additional information is necessary to understand the report.