

Graduate Council

Questions for annual online degree program check-in: MIDS, 2016

The following questions will form the basis of the four-year review of online degree programs. As a way of checking in on how your program is doing before that review, please answer these questions based on the past year.

Wherever possible, please provide statistics or evaluation comments to help the GC gauge the program's development. The report should not exceed 10 pages.

- 1. What is the quality of the admitted students (e.g., test scores, GPA) compared to on-campus degrees offered by your unit, or peer programs at other institutions (if known)? How does the diversity of your admitted students compare to similar on-campus and peer institution programs? What percentage of students are expected to graduate on time? What is the attrition rate?**

We enrolled 166 new students in the online Master of Information and Data Science (MIDS) program in 2015. This is more than triple the number (54) we enrolled in our on campus Master of Information Management and Systems (MIMS).

The quality of students admitted to MIDS nevertheless remains comparable to those admitted to MIMS. Undergraduate GPAs (cumulative) are equivalent for the two programs: 3.5 MIDS v 3.5 MIMS. Test scores are also comparable: average verbal GRE 81% v. 81%, and average quant GRE 82% v 84%.

MIDS 2015 admitted students (n=220)

Avg GRE VP: 81
Avg GRE QP: 82
Avg Dom UG CGPA: 3.5
% women: 27
Countries represented: 10

MIMS 2016 admitted students (n=71)

Avg GRE VP: 81
Avg GRE QP: 84
Avg Domestic UG CGPA: 3.5
% women: 54
Countries represented: 14

Retention in MIDS remains high, with 91% of students expected to graduate on time. The program has had a 4% attrition rate from inception to date.

We are focused now on increasing enrollment of women in MIDS. In 2015, 27% of admitted MIDS students were female, compared to 21% in 2014, and to the data science industry average of 18%. (This compares unfavorably to our on-campus MIMS program, where we admitted 54% women for fall 2016.) In fall 2015 we launched a free, intensive "bridge" class in Python for Data Science with the goal of expanding the pool of women admitted to the program. 36 students enrolled in the first iteration of the class, of which 39% were female. While this is promising, it is still early. We are hopeful that these women will be better positioned to enter and succeed in the program, and that the "bridge" class will continue to attract qualified women to MIDS in greater numbers.

The online MIDS students are older, on average, than MIMS students, and most online students work full time. In 2015 the average admitted MIDS student was 34 years old (v. 27 for MIMS.)

Self-reported ethnicity for 2015 admits to MIDS is below.

	Admits	Percent %
2 or more races	13	6
African-American/Black	2	1
Chinese/Chinese-American	2	1
Hispanic or Latino	3	1
Other	4	2
Other Asian or Asian-American	84	38
Unknown	10	5
White/Caucasian	102	46
Total	220	100

2. To what extent has the program met its academic objectives in the past year as laid out in the initial proposal? What metrics have been used to measure these outcomes and how have the evaluations been done?

MIDS course ratings, grades, and retention rates are comparable to our on-campus program. Since all of our MIDS courses were created from scratch for this degree, they do not have on-campus counterparts for direct comparison. Nevertheless we are pleased that the courses have, for the most part, been highly rated by students, and student performance, as measured by grades, suggests they are meeting the learning objectives. We completely rebuilt the one course that was problematic in our last review (Storing and Retrieving Data) and the new iteration has been run twice to solid reviews.

The main goal of a professional master's degree is to expand students' career opportunities: either a promotion within an organization or a position in a new organization. Two cohorts of students completed MIDS in 2015: 23 students in August and 17 in December. We do not have complete data for the December grads, but based on the career placement data for the August cohort of graduates, we judge the program has been successful in improving job opportunities.

The August 2015 graduates report a median salary of \$120,000, which represents a 65% increase over the median salary of this cohort entering the program. Their salaries range from \$60,000 – \$211,000 (the lowest salary is a student who chose to work for a non-profit organization) and they report signing bonuses ranging from \$5,000 - \$42,000, with a median of \$13,000. Over one-third (38%) of graduates report receiving a promotion after completing MIDS and 72% report a salary increase. Graduates who took new positions were hired at companies including Nest, Pandora, AirBNB, and Fenix International. Others continued to work at their original companies, including Google, Microsoft, and Cisco.

The following quotes are from students who graduated in August 2015. They agreed to share their names and current jobs:

The MIDS program helped me get my dream job and double my salary. Before enrolling, I had no industry experience and I was concerned that I would have a hard time getting a job as a data scientist . . .the MIDS program seemed like a perfect fit. The courses provided me with a solid foundation of a broad set of both technical and less technical skills, as well as final projects to showcase and discuss in interviews. The UC Berkeley School of Information provided me with data-related conferences to attend, opportunities to network, and one-on-one career

advising. I was also able to get a data science internship at Tesla Motors in Palo Alto, which helped me gain immensely valuable industry experience before I graduated with my degree. Enrolling in the MIDS program was certainly one of the best decisions I've made in my life!
–Kelsey Clubb, Associate Data Scientist, Fitbit

I applied what I learned in the program in a number of ways in the work I did at Autodesk over the past two years. Additionally, I took full advantage of the MIDS network when I was considering my options for my next career move.

I should also mention that although the MIDS program is a relatively young program, it has already provided me with a lot of exposure, as several top companies I have interacted with over the past year are aware of and think very highly of the program and its graduates.”

–Milad Davaloo, Data Scientist, LinkedIn

I rely heavily on the knowledge and confidence that I gained from the MIDS curriculum as I approach open-ended data science problems to inform company strategy at Fenix. As the sole data scientist in the company, I am often approached with questions that have no clear answer; my professors at UC Berkeley, however, have provided me with a strong basis in structured problem solving and critical thinking as a data scientist. I am often thinking back to our discussions on the importance of testing assumptions for various statistical methods, evaluating more than just the accuracy of a model, and considering the ethical implications of the models we are building. As I have learned from my Fenix colleagues, these were the skills that so many applicants to the data scientist position were lacking. MIDS graduates have more than just the skills to “do”; more importantly, they have a steadfast curiosity to understand.”

–Erin Boehmer, Data Scientist, Fenix International

3. What changes, if any, have been made in the delivery of the degree, either for individual courses or for integrating components of the degree (e.g., developing a community, the capstone project, advising)? What changes are anticipated in the upcoming year?

The changes we have initiated this year (or plan to initiate in 2016) have several goals: (1.) changes to maintain educational and programmatic excellence as we scale the program, (2.) changes to support communication and community building within the program, and (3.) changes to build external visibility.

(1.) Programmatic and educational excellence

We created a new staff position, the MIDS Faculty Director, and recruited a specialist in online learning and learning analytics from the University of British Columbia. His responsibility is to oversee the curriculum (ensuring each course has learning objectives and goals, measuring relevant learning outcomes, strengthening connections between courses, eliminating overlap, etc.) and to work with the postdoctoral scholars who are responsible for teaching the 15-person live sessions of the courses.

There are now more than 15 postdocs (each has a 33% lecturer appointment and 67% postdoc researcher appointment) in the program. The MIDS Faculty Director holds bi-weekly meetings with the postdocs to discuss online pedagogy, running live sessions, developments in the field, and so forth. He also works instructors who are having difficulties with teaching, and with faculty who are refreshing a course or building a new one.

As noted above, we introduced the “Python for Data Science” bridge class in fall 2015. The course is available without cost to admitted students who lack adequate programming experience so that they will be better prepared for the program. We previously developed bridge classes on Linear Algebra, Data Structures, and Algorithms and Analysis of Algorithms. The goal of all of these bridge classes is to make the program more accessible to students without advanced technical backgrounds—particularly to women who lack confidence or exposure to the skills. We are also in the process of launching a

“Women in Data Science” reading group in response to strong student interest. One of the postdocs has offered to take the leadership role in organizing. The group will meet bi-weekly on the Adobe connect platform provided by 2U. We have also used the platform for peer and alumni mentoring of students, and would like to formalize this mentoring program over time.

We introduced two new advanced electives in September: a course on “Advanced Regression and Time Series Analysis” and one on “Machine Learning at Scale.” Both have been extremely popular. We are in the process of developing a course on “Natural Language Processing” that will be launched in Fall 2016. We also are continually revising and refreshing the curriculum for the existing core and elective courses because the field changes quickly (and our faculty are perfectionists who want to keep improving their courses).

(2.) Internal communication and community building

We established a MIDS Student Representative program to help us stay connected with the growing student body (there are currently over 300 students enrolled). We asked the students to select 1-2 representatives for each of the entering cohorts; there are now 6 MIDS student reps who meet regularly with our Student Affairs staff regularly to provide student input and perspectives on issues related to the curriculum, the program, and community building.

We announced the MIDS for Life program, which offers alumni lifelong access to the I School Virtual Campus, where students can retrieve all of their previously completed MIDS coursework and recorded class sessions. Alumni may also view the most up-to-date asynchronous course content, including content for newly released courses, at no cost. Students say this is a major advantage of MIDS over face-to-face programs they considered.

We launched a “Capstone Showcase” for MIDS students completing their capstone projects to present their work to the entire community and to receive feedback. More details below.

In response to overwhelming MIDS student demand, we will underwrite student use of Slack as an online collaborative tool. Starting in 2016 we will provide accounts for all I School students, both online and on-campus.

(3.) External visibility and collaborations

We continue to hold an annual 2-day [DataEDGE](#) conference on the Berkeley campus that brings leading industry and academic thinkers on data science to campus to discuss the latest trends in the field. The conference attracts faculty, staff, and students from all over campus. MIDS students attend in large numbers, some as part of the immersion and some who choose to attend on their own. The May 2016 DataEDGE will feature high profile speakers including Jake Porway, the founder and executive director of DataKind and Jeremy Howard, CEO of Enlitic.

We recently secured a philanthropic commitment of funding for “Data For Good” scholarships that will be awarded to MIDS students who come from a community serving background/or can demonstrate how they intend to use the data science skills garnered in the program for the betterment of society. We plan to launch this program in fall 2016 and to award 3 scholarships per year. We have also started conversations with non-profit organizations dedicated to using data for social good, such as Bayes Impact and DataKind, to organize student capstone projects and find other ways to collaborate.

4. Have there been changes in the competitive environment (e.g., new programs at peer institutions) that have changed the landscape for this degree?

There were ongoing new program launches in the area of data science, as well as related fields such as analytics, statistics, data mining, and machine learning in 2015. Most are on-campus programs. The most notable new programs in peer institutions include:

- Master of Science in Business Analytics at MIT Sloan School (on-campus)
- Master's in Data Science (online) at the University of Wisconsin, Madison
- Data Science Masters (online) at Illinois Institute of Technology

Despite continuing new program launches, we continue to see substantial continued demand for MIDS.

We receive approximately 300 applications for each of 3 semesters' year, we admit 20-25% of the applicants, and our yield averages 85%, which is very high. We believe that we have built a strong reputation in the field by being an early mover and by designing a program with a focus on educating data science leaders with a broad, multi-disciplinary curriculum drawing on insights from the social sciences, computer science, statistics, management, and law. We benefit from the Berkeley brand and our proximity to Silicon Valley. Our students and alumni have also become advocates for the MIDS program in their own workplaces and social networks.

Our goal has been to offer online a degree that is equal in quality to our on-campus programs, and we think we have achieved that goal. In the words of Sharon Lin, an August 2015 MIDS graduate: "What surprised me the most about this program is that the online classes feel just like a regular classroom, despite being hosted online. You can interact with instructors and classmates in a similar fashion as any classroom interaction. The classes are small so instructors can pay attention to every student."

MIDS is arguably the most successful online degree on the UC Berkeley campus--perhaps in the entire UC System. We attract first-rate students, they are happy with the program and complete it on time, and they get desirable, high paying jobs. Many of them have their choice of multiple jobs. We are providing education for working professionals who would otherwise not be able to attend a university like Berkeley, and we are providing much needed educated professionals for California business.

5. What is the degree of student satisfaction in the advising and community-building aspects of the degree program?

Student satisfaction in the program remains very high. We evaluate student satisfaction with advising using a net promoter score (NPS), an index that ranges from -100 to 100. Students are asked whether they would recommend the MIDS advising team to their peers. NPS can be as low as -100 (everybody is a detractor) or as high as +100 (everybody is a promoter). An NPS that is positive (i.e., higher than zero) is considered good, and an NPS of 50 is excellent. (For reference, Netflix has an NPS of 50 and Apple is 68.) In 2015 MIDS academic advising received an NPS of 59.

The required on-campus immersion provides one of the most important opportunities for community building among MIDS students. In the words of students who attended the 2015 immersion:

The immersion has built a sense of community amongst my classmates in just four days. It was amazing to interact with individuals from so many different backgrounds and experiences. This immersion has left me with friendships that I know will live on past the length of the program. - Nitin Kohli

Visiting Uber [as part of the immersion] was an amazing experience. After a 40-minute presentation, we spent over an hour asking questions to Kevin Novak (leader of the data science division) on everything from data science at Uber, to data science at small startups, to

the evolving place of data science in the world. It was invaluable to get an inside perspective on data science in the tech world. I left inspired, and with a better idea of the kinds of problems I might like to solve. -Chris Llop

Though I attended without any understanding of cybersecurity, the lecture showed me that it's tied inextricably to data science. It was the highlight of my immersion experience, not just for this new perspective on discrete issues in our field, but also for the renewed appreciation the session gave me for my peers. The breakout groups, in particular, let me hear their unique perspectives and reminded me how many new things I could learn from working with every member of the program. -Nihar Patel

The results of our 2015 program survey indicated that 74.4% of MIDS students agree with the statement, "I feel like a member of my university community" and 93.7% of students agree with the statement, "This program has helped me develop a network with fellow students." We were also proud that 22 out of 23 members of our inaugural MIDS graduating cohort physically attended the School of Information's graduation ceremony in May of 2015.

Students develop online communities in the MIDS program. Students have used the virtual group feature of the ISVC to launch more than 30 groups related to both their academic/professional/social interests: there is a Consulting group, a MIDS Careers group, a Machine Learning group, a Bridge Course group, a Happy Hour group, an Australia group, and so forth. Most MIDS students also use Slack for a wide range of activities, including work collaboration, problem solving, and networking.

6. What has been the educational benefit of the capstone project or comprehensive exam?

The capstone project is an essential element of the MIDS program. We require students to draw upon and synthesize what they've learned during their coursework in a semester-long, team project. The course is set up to mimic a real-world organizational context with milestones, deliverables, and regular feedback from both peers and "superiors."

Students report that the capstone project has been key to getting a job offer in the current competitive environment. One August 2015 graduate wrote a Job Search Guide for MIDS students. In a section on Prepping for Interviews, he has a subsection on Personal Website:

I made one [a website.] It was the first thing I did after updating my resume . . . I tried to make the page as visual as possible. I knew most people wouldn't want to read much of the text, so I kept the text short. I linked to Github and my project websites whenever possible.

I made the first project on the page my capstone project. People generally responded positively to my capstone project, about machine learning in baseball. What I didn't realize is that people almost always only read the first project. So do your best to have one great project, put it first, expect people to read about it, but don't expect people to read any other pages on your website! Of course this makes the capstone project even more important, since it's a natural choice for that first project.

In 2015 we developed the "Capstone Showcase." All students are now required to present the findings of their capstone projects to an online audience composed of all members of the MIDS community. The students must prepare and present their projects to a wider audience than the class of 15 students in a 20 min session, including Q&A. We have now held two Capstone Showcases; both were very well attended (150+ attendees) and the presentations elicited outstanding questions and answers from the audience via chat.

7. Has offering the online degree program affected any on-campus programs (positively or negatively)? If so, how?

The revenues from the online MIDS program have made our financial situation far more stable. It positioned us well to weather the recent budget cuts without significant disruption. The revenues have allowed us to hire 2 new Adjunct Faculty who teach in MIDS and also contribute to the wider I School community. The program has also allowed us to increase the size of our Student Affairs staff, to provide a wider range of career services for all of our students, and to attract more recruiters because we now have over 400 students. Last but not least, MIDS has raised the visibility of the I School—and we believe it will continue to increase as we grow our community of students and alumni.

We make all of our public events equally available to our on-campus and online students (via streaming or webinars) and we have worked to provide as much opportunity for the groups to interact as possible—given the constraints. Since a large proportion of our MIDS students are from the SF Bay Area we invite them to participate in all school-wide social and work events. Our online students have become active contributors to the school “noise” list; a school wide list serve that includes current students and alumni from all programs on a wide range of I School-related topics. Our on-campus students have asked about access to curriculum from the MIDS program. We are working on that.

8. Have any financial concerns emerged in the past year related to the development or delivery of the degree?

We have no financial concerns. We have covered our startup costs, and scaled MIDS to a point that we have a steady stream of revenue to support the I School into the future.

We have been very happy with our partnership with 2U. We could not sustain a program of this scale without their expertise in marketing, content production, student support, tech support, and operations. They earn a large share of the program revenue, but they provide significant value for the money. Their services and experience with online education have been critical to our continued success.

9. How and to what extent have campus-wide resources been drawn into the online program? Have there been any benefits for students in the online program?

We rely on the services of several campus entities, including Financial Aid and Scholarships (FASO), Graduate Division, the Registrar, and the Library. We are particularly appreciative of the work that the Graduate Admissions Office does to accommodate our 3 times per year off-cycle admissions process with tight turnaround times. The Registrar has also made special accommodations to enable our registration 3 semesters per year, and our Library Liaison has assisted our growing population of students to gain access to materials through the online system, as well as our faculty course developers who need materials on reserve.

MIDS students do not enjoy many of the benefits that our on-campus students enjoy (e.g. access to health insurance, campus recreational facilities, ASUC, intramural sports, etc.). They are nevertheless required to pay Campus Fee to cover these and other services and activities.