Final Report of the
Career Exploration and Services Committee

Preamble

The following represents the final report of the Career Exploration and Services Committee. This report was submitted in a draft form to Vice Chancellor Ian Waitz in October 2019. Since that time, the report has been briefed to many groups at MIT from students to academic administrators to deans and provosts. Further, many of the report's recommendations have already begun to be acted upon.

Then, starting in Spring 2020, the Institute has been dealing with the impacts of the COVID pandemic. Among the impacts with respect to career exploration: (1) much of the work on the report's recommendations needed to be put on hold, and (2) some significant changes, at least for now, had to be made to career exploration opportunities. For example, all career fairs since the early Spring have been virtual. In particular, the 2020 Fall Career Fair was broken into several more focused virtual fairs spread throughout the Fall semester. We believe this experience is likely to accelerate some of the changes that already were occurring more gradually prior to COVID, e.g. the use of virtual recruiting by employers.

As the report of this committee was effectively complete prior to these events, we have not altered the report to account for them (beyond the addition of this preamble). Our belief is that the findings and recommendations very much remain correct. Further, we expect that as we enter a "new normal", reflection will naturally occur about the implications of our experiences on improving career exploration and career services for all of our students.

Executive Summary

In February 2018, Vice Chancellor Ian Waitz convened a Student Career Exploration and Services Committee "to review aspects and activities associated with student career exploration and services, and to identify changes that would enhance exploration of, and access to, a broad range of careers in a manner that best serves student needs" (Committee Charge, Appendix A). The committee membership included faculty, staff, and students (both graduate and undergraduate) from across the Institute. Drawing on extensive reviews of existing programs and practices, internal and external research, and consultation with a variety of stakeholders across campus, we offer the following findings and recommendations.

While important programs and assistance are already in place to provide career guidance, much more needs to be done to better serve our students across not only the range of disciplines but also with an eye toward graduate school and work in non-profit and public sectors. Given broader national conversations taking place around career development and student support, MIT in

particular has an opportunity to provide real leadership in setting policies and practices that are focused on enriching student experience. At the core, we recommend a holistic and sustained approach to *exploration* that recognizes a diversity of interests, career paths, and needs.

Principles and Objectives for Career Exploration and Career Services at MIT

The following principles form a foundation for MIT career exploration and services:

- It is central to the Institute's mission
- It is a shared and collaborative responsibility
- It requires student ownership
- It must support the diversity of our student backgrounds, identities, and interests
- It must strive for excellence and leadership
- It must incorporate learning by doing

We recommend that MIT adopt four objectives for career exploration and career services.

- Foster in all students the career development skills to support a lifelong ability to work wisely, creatively, and effectively for the betterment of humankind.
- Enable effective career exploration for all students.
- Advocate on behalf of all students for equity in career exploration and career opportunities through engagement with external stakeholders such as employers, professional schools, graduate programs, fellowships and more.
- Employ a continuous improvement process that includes assessment of measurable outcomes for career exploration and career services that reflect our principles and objectives.

Key Findings

- *Peers matter*. For all students (independent of undergraduate, masters, or doctoral level) , peers are reported to be by far the most consistently utilized and useful information source for career exploration. Across all levels and across all programs, 90% or more of students utilize peers and have found the information useful.
- *Gender matters*. Gendered differences exist for undergraduate and masters in student perception of their ability to explore their careers. In particular, women report higher levels of dissatisfaction with career exploration. At all levels (undergraduate, masters, and doctoral), gendered differences exist within some departments and programs.

- *Department matters*. For all students, significant department-to-department and program-to-program variability exists in students' perceived ability to explore their careers.

- *Under-served career trajectories*. Undergraduate student satisfaction with career exploration is significantly tied to their current plans following graduation. Students planning on immediately joining the workforce upon graduation (including military) are more satisfied with the opportunities for career exploration than those considering graduate school or who are unsure or undecided about what to do next.

- *Importance of internships for graduate exploration*. Approximately 70% of graduate students (both masters and doctoral) are interested in having one or more internship experiences. This is not surprising given that for the approximately 30% of our students that have had graduate student internships, these experiences have had a wide variety of reported positive impacts on career and professional development for both masters and doctoral levels. Yet serious issues persist. Doctoral students report experiencing significant barriers to internships due to research and programmatic requirements as well as a lack of knowledge of internship opportunities. For international students (masters and doctoral), 50% report immigration issues as being a significant barrier (and another 30% somewhat of a barrier).

Key Recommendations

- *Create a Committee on Student Career Exploration and Development.* We strongly recommend the creation of a Committee for Student Career Exploration and Development composed of faculty, CAPD and other staff, students, and alumni to help elevate the importance and significance of career exploration to an MIT education. The committee would be charged with ensuring a holistic oversight of career exploration and development, including, critically, career fairs. The oversight role should include the implementation of an Institute-wide continuous improvement process for career exploration. With respect to career fairs, this committee would be able to set standards, avoid duplication of objectives and target audience, and ensure that revenues generated through career exploration events are utilized to support career exploration. CAPD staff are a critical component of this proposed committee providing the professional expertise around career exploration and career services.

- *Support Exploration for Graduate School.* Better support is needed for undergraduates who are considering an advanced degree. At the Fall Career Fair, we support having a significant UROP presence from both on-campus (e.g. have booths for departments, programs, or labs offering UROPs, in addition to the UROP Office) as well as off-campus

(e.g. UROP program offices from peer institutions). Similarly, graduate schools from on-campus and off-campus should be included at this Fall Fair. In addition, we recommend funding to assist students pursuing research-related experiences, and the development and incentivization of new career exploration opportunities that are graduate school focused within specific departments and domains.

- *Reset the Career Exploration Timeline.* In the interest of fostering a more holistic orientation around career exploration, in particular for first-year students, we recommend the Fall Career Fair be moved to the end of October and that curated exploration events happen before it occurs.

  To support this change, we acknowledge a systemic change has to occur at the recruiting level to make space for meaningful exploration. We recommend that MIT take leadership in mobilizing peer institutions to push back on the aggressive and early student hiring practices. We suggest advocating for later offer commitment dates for full-time and short-term internships (nominally 4 months prior to start date). We believe students should be granted automatic extensions to offer letters when they are also considering graduate school or non-profit/civic sector work. To balance potential new burdens on employers with these kinds of shifts we could see a system that also requires students to limit the number of open offers they have.

- *Expand Career Exploration Opportunities.* Develop new and continue to support existing effective career exploration opportunities with a specific focus on: creating opportunities to learn about a range of careers; fostering career development skills; and providing low commitment opportunities to "prototype" different paths. Further, consider the development of a focal point event for career exploration at MIT, i.e. a Career Exploration Conference. This conference would serve all students across levels (undergraduate, masters, and doctorates), interests, disciplines, backgrounds, etc.

- *Create a Career Exploration Hub.* Information about career exploration is spread across the Institute in a confusing array of resources that students (and support members) must traverse to learn about relevant opportunities. We recommend the creation of a centralized career exploration platform organized by CAPD to address all stakeholder challenges such as posting and finding career related opportunities. The platform should be accessible by all administrators, faculty, employers, students, and student organization leaders and promote a wide array of career exploration events, services, and resources to support MIT students at all levels, degrees and career interests. All stakeholders offering career exploration opportunities should be expected to contribute and use the centralized platform.

- *Adopt a Career and Professional Development Requirement for Graduate Students.* Graduate students should be encouraged to consider a wide range of career exploration and professional development opportunities during their studies. To do this, we recommend

that all programs adopt a flexible career and professional development requirement for graduate students with an approximate load of 1 unit for masters and 2 units for doctoral students. While we envision one option to satisfy this requirement is to perform an industry, government or academic internship, many other options are possible depending on the interests of the individual student. Regardless of the specific option, we would encourage that a short self-reflective report be a part of the requirement. An example of such a requirement may be found in the *Professional Perspective Graduate Requirement in EECS*, which is mandatory for all graduate students in EECS.

- *Increase Alumni Engagement*. Alumni represent a powerful bridge between our current students and future careers. More can be done to strengthen and support this connection. We recommend increasing support for, and development of, opportunities for MIT alumni to engage in student career exploration and development. Their involvement is critical to developing the range of services and advisement needed to not only help students envision paths (some of which they might never have explored) but also reduce the chance of students making career decisions based on limited exposure and knowledge.

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1. A Vision for Career Exploration at MIT

"*The goals of the MIT Committee on Student Career Exploration and Services are to review aspects and activities associated with student career exploration and services, and to identify changes that would enhance exploration of, and access to, a broad range of careers in a manner that best serves student needs.*" (From the Committee's charge from Vice Chancellor Ian Waitz. See Appendix A).

What is a career and what does career exploration mean? Through the Committee's work since early 2018, we have come to think of a career holistically, meaning that a career is the lifelong use of a person's skills, knowledge, and experiences. While a person may have many professions (both sequentially and concurrently) throughout their life, we each have a single career in that life. As such, we view career exploration as much more than a current student exploring a range of professions, or searching for a first job in a profession. Rather, career exploration critically encompasses developing a foundation of skills and knowledge to help support lifelong decision-making about one's career.

In this report, we will use the following definitions for a variety of career-related terms:

- **Career:** The lifelong use of your skills, knowledge, and experiences.
- **Job:** One person in one position doing a set of tasks.
- **Occupation:** A definable work activity or field found in many locations.
- **Profession:** An occupation requiring significant training.
- **Professional development:** The process of attaining and strengthening skills needed to maintain currency and/or advance in a profession.
- **Career development:** The lifelong process of setting (and re-setting) career-related goals and planning a route to achieve those goals.
- **Career-related opportunities**: Any events, panels, workshops, internships, fairs and more that give students access to information about their career.

For this report keep in mind that **career exploration** is a widely-used concept in literature related to vocational behaviors and is defined as: *the purposeful behavior to access information that is new to the individual about one's career* (see for example, Stumpf et. al. 1983). This information can be over a wide range of career-related topics including not only types of jobs, occupations, and professions but also, critically, career development (e.g. strategies for recognizing, setting, and re-evaluating career goals). Clearly, significant overlap exists between

career exploration and career development. **Career services**, by contrast, are resources to assist individuals in developing, evaluating, and/or implementing career goals and plans.

In this introductory section, we recommend a set of principles and objectives, which together form our vision for career exploration and services at MIT. Further, in Appendix D: Measurable Outcomes, we propose a set of measurable outcomes which can help track achievement of this vision.

Our Principles

We begin with the principles which underpin MIT's objectives in career exploration and career services. We note that these principles closely align with the principles of an MIT education as described in the Final Report of the Institute-wide Task Force on the Future of MIT Education (2014). Specifically, our recommendation is that MIT adopt the following principles with respect to career exploration and career services:

1. **Central to our mission.** Career development is an integral part of an MIT education. The importance of preparing students for their careers (i.e. career development) is a part of MIT's mission statement: "*We seek to develop in each member of the MIT community the ability and passion to work wisely, creatively, and effectively for the betterment of humankind.*" Gaining knowledge, for the sake of knowledge, while clearly important has never been the end goal of an MIT education, rather using that knowledge (which is our definition of a career) to improve the world is our focus. Through our mission statement, we express our commitment to developing the careers of our students (and all members of the MIT community).

2. **Shared and collaborative responsibility.** Career exploration and career services is a shared and collaborative responsibility. Like many aspects of MIT, the responsibility for career exploration and career services does not rest with one organization. Rather, this responsibility is shared among Institute-wide offices (e.g. Office of the Vice Chancellor), schools, colleges, departments, programs, alumni (through the Alumni Association), etc. While this shared responsibility can (and has) lead to undesired variability among our students' perception of the effectiveness of career exploration and career services, a strength of this shared responsibility is that domain-specific knowledge is often critical for effective career exploration and development. At the same time, we emphasize in this principle that this responsibility is collaborative in nature. That is, MIT can better achieve its goals when we work together across and within all organizations of the Institute and leveraging connections outside of the Institute, in particular through alumni.

3. **Student ownership.** Students are the owners of their individual career development. While the Institute shares responsibility for offering exploration opportunities, as the primary stakeholder in their career, students are expected to be actively engaged in, and responsible for, determining their career values, interests and goals.

4. **Supporting diversity.** Career exploration and career services must support the diverse interests, needs, and values of all students. This includes not only programs of study; degree level; academic class (first year, sophomore, … graduating doctoral student); career interests; and industries, but also race; ethnicity; sex; gender identity; sexual orientation; religion; national origin; disability; citizenship; age; political views; socioeconomic status; veteran status; immigration status; physical appearance, etc.

5. **Excellence and leadership.** Excellence is desired in our support of career exploration and career development. At a minimum, we must be cognizant of best practices and apply them (when appropriate to our context) including those arising externally as well as internally (e.g. among MIT departments). It's also the case that there are critically important conversations happening nationally and at our peer institutions that MIT should be acting as a leader within. From constricted hiring cycles to diversity and equity in the workplace, we have an opportunity to help shape the policies and practices for our student's well being.

6. **Learning by doing**. MIT's education values the importance of learning by doing. This emphasis can be observed in the many hands-on experiences and projects throughout MIT's subjects, UROP offerings, or the almost unlimited number of academic and extracurricular activities that focus on experiential learning. In the realm of career exploration and career development, learning by doing also can play a critical role most often realized, though not exclusively, through internships, UROPs, MISTI, etc.

Our Objectives

In considering objectives for career exploration and career services, we focus on *what* we seek to accomplish rather than *how*. It is vital that we start with a values-led orientation (while later in the report, we make specific recommendations for accomplishing these objectives).

Our recommendation is that MIT adopt the following objectives for career exploration and career services:

1. **Foster in all students the career development skills to support a lifelong ability to work wisely, creatively, and effectively for the betterment of humankind.**

Current college students will hold many jobs over their lifetime. While the average number of jobs for young baby boomers with college degrees was about 12 , the expectations are that this number will be even larger for millennials and Gen Z (Bureau of Labor Statistics, 2019). Further, many jobs of the future do not exist today. The World Economic Forum (2016) has noted that "65 percent of children entering primary school today will ultimately end up working in completely new job types that aren't on our radar yet".

Some research has also emphasized how crucial our professional lives are to our well being. Gallup research studied five components of well-being (social, physical, community, financial, and career), and found that career well-being is the most important predictor of well-being across the board (Rath & Harter, 2010). Not only will our students face continual decision making about their careers but that aspect of their lives is a critical part of their overall well-being.

Given this context, we believe that MIT has a responsibility to develop in its students an awareness of and skills for the lifelong development of their careers including self-reflection and assessment, understanding the connection between one's values and the world of work, and decision making. This responsibility is also echoed in MIT's mission statement which notes that, "We seek to develop in each member of the MIT community the ability and passion to work wisely, creatively, and effectively for the betterment of humankind." Our recommended objective extends that by emphasizing this is a lifelong pursuit and highlighting the importance of career development skills.

Helping students gain personal insight into who they are as an individual, what they value, where they are starting from and what the next steps are is key. Developing their understanding of different career pathways, including within domains they may not have thought about before, is an important part of career exploration.

2. Enable effective career exploration for all students.

Career exploration, the "*purposeful behavior to access information that is new to the individual about one's career*," is a part of the lifelong process of career development. A student's time at MIT is a critical moment in the development of that process.

We take the view that effective career exploration is best achieved through a wide range of opportunities that include activities designed to learn about:

- one's self
- majors (including the impact choice of major has or does not have one's career path)
- professions
- industries
- companies
- civic engagement
- additional studies beyond current degree

Echoing our *Learning by Doing* principle, career exploration opportunities will naturally include experiential activities such as internships, research opportunities (e.g. UROPs at the undergraduate level), shadowing experiences, cooperative education, volunteerism, and service learning.

Further, enabling effective exploration implies that students should have reasonable time to make informed decisions about their career. Recruiting trends have continued to accelerate such that

some employers of MIT students are requiring decisions on full-time employment (i.e. post-graduation) in early fall. MIT, like many other universities, have employer recruiting guidelines which ask for deadlines of no earlier than the end of October.

These employment offer timelines are incongruent with graduate school timelines. Notification of admission to graduate school programs typically begins to occur around late January. A Council of Graduate Schools resolution (which MIT and over 350 other institutions have signed) requires any offer of financial support for graduate studies remain open until at least April 15. Similarly, most graduate student fellowships from government or other outside organization (i.e. not from the academic institution) are not made until mid-spring.

These different decision timelines between employment and graduate studies are driven in part by differing "start dates": typically early-to-mid-summer for employment but late summer/early fall for graduate school. However, this two-to-three months difference in start dates would suggest the acceptance of employment should be made in January/February as opposed to the current October/November deadlines. Consistent with our principles, MIT should take a leadership role in resetting the recruiting timelines to enable more effective career exploration for not only our students but students everywhere.

3. **Advocate on behalf of all students for equity in career exploration and career opportunities through engagement with external stakeholders such as employers, professional schools, graduate programs, fellowships and more.**

MIT has a responsibility to advocate for equity for our students and alumni in career exploration and career opportunities in the world beyond our campus. It is not sufficient for MIT to strive for diversity, equity, and inclusivity within its walls, only to have its students and alumni face barriers within MIT and outside. Finally, MIT has a significant ability to provide leadership to the nation and the world, advocacy for our own students and alumni can, and we argue should, extend to be a force for change for the betterment of humanity.

4. **Employ a continuous improvement process that includes assessment of measurable outcomes for career exploration and career services that reflect our principles and objectives.**

Continuous improvement through assessment with respect to our principles and objectives must be a part of our commitment to career exploration and career services. Following Makela and Rooney (2014), we suggest our continuous improvement process should include assessment of:

- Needs: To determine what career exploration opportunities and career services support student achievement of our objectives.

- Participation: To determine who is using existing career exploration opportunities and career services and help to identify if any student populations are being under-served.
- Satisfaction: To determine the level of satisfaction of users of existing career exploration opportunities and career services.
- Outcomes: To measure the impact of career exploration and career services. In particular, we believe that *learning outcomes* are important as a more direct measure of developmental change compared to e.g. satisfaction assessment. Learning outcomes will generally be more difficult to assess than participation and satisfaction outcomes. However, especially when considering changes to career exploration opportunities aimed at improved learning, assessment of these outcomes is important.

Further, as career exploration and career services are a shared and collaborative responsibility at MIT, we believe this continuous improvement process must include assessment of the effectivity of the interactions between all providers of career-related opportunities.

References

Makela, J.P. & Rooney, G.S. (2014). Framing assessment for career services: Telling our story. *New Directions for Student Services,* 148, pp. 65-80.

Rath, T., & Harter, J. (2010). Wellbeing: The five essential elements. New York, NY: Gallup Press.

2. Current State

In this section, we consider the current state of career exploration and career services at MIT. We begin with a discussion of the structure of career services and then address our current standing relative to our objectives.

Structure of Career Services at MIT

The structure of career services on college campuses are often described as centralized, decentralized, or hybrid. The 2017/2018 survey of college career services conducted by the National Association of Colleges and Employers (NACE) shows that all three models occur essentially equally for Tier 1 research institutes. Specifically, 30%, 34%, and 36% of Tier 1 research campuses have centralized, decentralized, and hybrid models, respectively.

MIT's career services have a hybrid structure with the centralized Career Advising and Professional Development (CAPD) office working alongside a variety of "local" career services in Schools, Departments, and Programs. CAPD supports all undergraduate, graduate, and PhD students, in addition to Post-Docs and recent Alumni two year out from graduation. Local services may be supported by multiple people (typically staff), however, in many cases the local staffing are (significantly) less than one full-time equivalent, especially for smaller programs. Based on inquiries of this Committee during Spring 2019, the staffing distribution are shown in Figure MIT-Staffing.

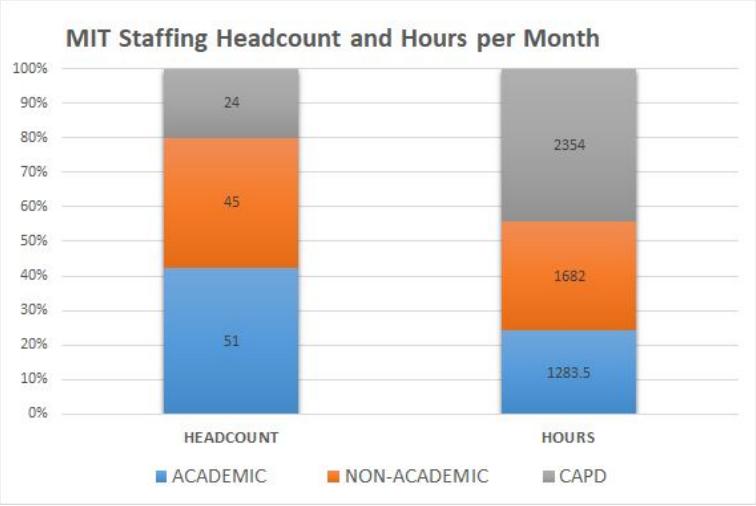
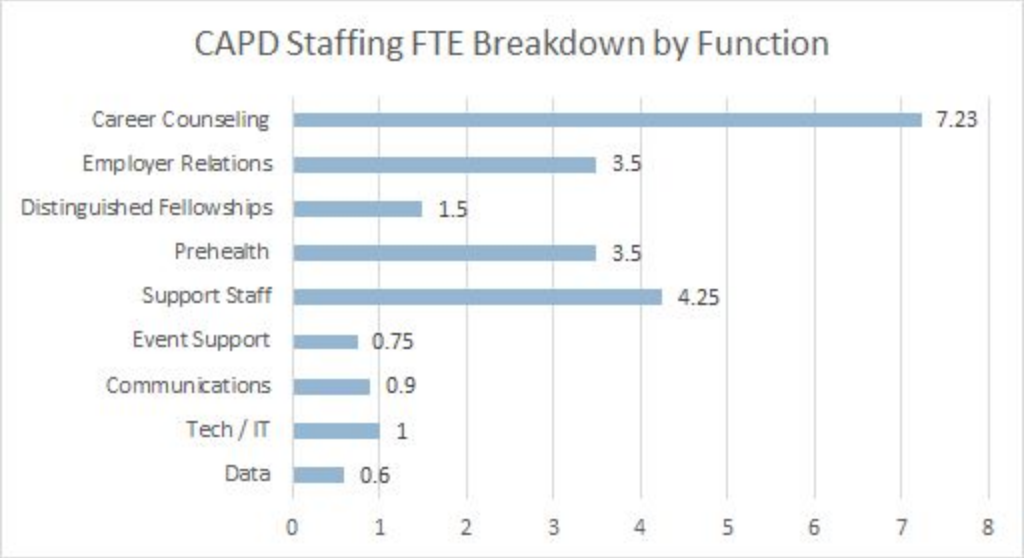


Figure MIT-Staffing: Staffing of people supporting career services across MIT. Data is based on a Spring 2019 survey. Total headcount is 120 staff. Hours is estimated time actually spent in support of career services and totals about 5320 hours. Assuming 174 hours/month, the actual staffing is about 30.5 FTE.

CAPD has a current FTE of 24.2 staff members of which 18.2 FTE are staff divided into three distinct function areas Career Services, Prehealth Advising, and Distinguished Fellowships for

which all seek to offer and support career and professional development opportunities for students. The remaining 6 FTE are support staff in a variety of roles. Staff work effort is divided in varying amounts toward counseling, programming, administrative tasks, supervision, writing, data collection and outreach based on the team member's specific role and function in the office.



Career counselors are assigned to specific academic departments and student cohorts (first year undergraduates, underrepresented minorities, international students, athletes, LGBTQ students, and more) in an effort to become knowledge experts in the fields and industries of interests, understand student needs, and offer tailored resources and support.

As part of our work, we surveyed MIT academic departments, student organizations, and a wide variety of other campus organizations (e.g. UROP, UPOP, etc.) about career exploration opportunities they offered. Our hope was to have a better understanding of the range of activities currently available to students, as well as how those opportunities supported different segments of our population (e.g. first-year undergrads versus undergrads generally; variations among departments; etc). This effort proved exceedingly difficult for a variety of reasons including lack of reporting and lack of clarity in what activities support career exploration.

Another subtle issue is quantifying the number of offerings. This includes our ability to compare the number of opportunities provided by different offerors or available to different cohorts. A typical example would be the First Year Pre-Orientation Programs (FPOPs). FPOPs provide 4-5 day discovery opportunities typically in areas aligned with majors and there are around 30 of these FPOPs for incoming students to select from. In Fall 2019, 626 first year students participated in one FPOP which is about 55% of the first year class. A fundamental question is: do we count FPOP as one single opportunity or 30 different opportunities? From the student perspective, while they have a wide choice, they will still only participate in an FPOP once. From the offeror's perspective, each FPOP is its own opportunity.

While we have some coarse data, collecting more granular material to allow for a comprehensive overview or comparisons proved challenging. Though there are difficulties of collecting and quantifying career exploration opportunities currently on campus, we offer nonetheless the following observations:

- We know that hundreds of opportunities exist for career exploration which include career fairs; career-life workshops, seminars and classes; company information sessions; internships; UROP; graduate and professional school planning; career counseling; resumé writing; etc.
- We believe about ⅓ of these opportunities are intended for all MIT students, while about ⅓ each are more specific to graduate or undergraduate students.
- We believe that these opportunities are offered in relatively equal amounts (i.e. about ¼ each) by CAPD, academic departments/programs, student organizations, and other organizations (e.g. UROP, UPOP, GEL, Alumni Association, etc).
- For students seeking to explore their career, learning about what opportunities may be of interest to them is difficult as there is no one central portal or site. This is especially true for first-year undergraduate students that are not affiliated with a department yet.

Assessment of Objectives

1. **Foster in all students the career development skills to support a lifelong ability to work wisely, creatively, and effectively for the betterment of humankind.**

Numerous offices and programs such as CAPD, UPOP, GEL, PKG Center, Student Support Services, and others seek to teach students the career development skills of self-reflection, understanding one's values and decision-making through workshops and events. Examples include:

- Career Counseling: Meetings with students ranging from 20-45 minutes for one-on-one counseling to help students in self-reflection and exploring options for choice of major, co-curricular activities, and gaining practical experience through internships and research to help them with their career development. These career counseling meetings are predominantly held in CAPD but also occur in programs like UPOP and academic advising meetings. In 2018-19, CAPD held a total of 4,988 non-unique student appointments, quick queries and online sessions.
- Self-assessment: CAPD offers online tools and guided interpretation for the following assessments: Clifton Strengths, Myers Briggs Typology Indicator (MBTI), and Strong Interest Inventory. In addition, UPOP provides the Hermann Brain Dominance Instrument (HBDI) annually to roughly 275 sophomores and conducts an internal assessment measuring self-efficacy on career decision making.

- Workshops: In 2018-19 CAPD held 200 workshops, presentations, speaker panels, employer events, and information sessions with a total of 4,559 non-unique attendees. Topics range from learning about varying careers, to conducting the Internship and Job Search and negotiating offers. Each workshop engages students in some self-reflection and guided activities to help students be mindful of their values and interests when making decisions. In addition to CAPD's offerings, programs such as GEL, UPOP, PKG and academic departments also host targeted events to assist with career exploration.

Efforts to engage students in opportunities to develop career development skills are more commonly successful when taught as a by-product of something more enticing or tangible such as writing resumes, recruiting activities, meeting with alumni and/or employers, etc.. It is fairly common for career development workshops and events to have low turnouts, or for resources to be underutilized due to competition for a student time and attention. Academic responsibilities, recruiting activities and co-curricular activities can often lead to busy schedules and time management challenges. Unfortunately, when the career development skills of self-reflection, understanding one's values and decision-making are most sorely needed, students are under highly stressful situations and already struggling. Proactively creating opportunities for these skills to be developed through pre existing commitments could be beneficial.

At present, the above mentioned resources are assessed through surveys and anecdoctal feedback, with the findings being used to determine how to improve the events and resources. Efforts to assess the impact of these resources longitudinally would be beneficial to determine if we are succeeding in strengthening these skills for our students, as they are necessary life long skills.

2. Enable effective career exploration for all students.

We next consider student participation and satisfaction with career exploration while at MIT. For this purpose, we have found the Career Exploration Survey useful. Conducted in January 2017, all students at MIT were invited to participate. Figure All-Explor shows the overall agreement that students had the ability to explore their career interests at MIT. The results indicate that approximately 80% of undergraduates and masters students agreed (the combination of strongly and somewhat agreed), while approximately 70% of doctoral students agreed. This approximately 10% difference was statistically significant at the 95% confidence level, and is tied to an approximately 10% decrease in the strongly agree response rate. We will consider this difference in more detail later.

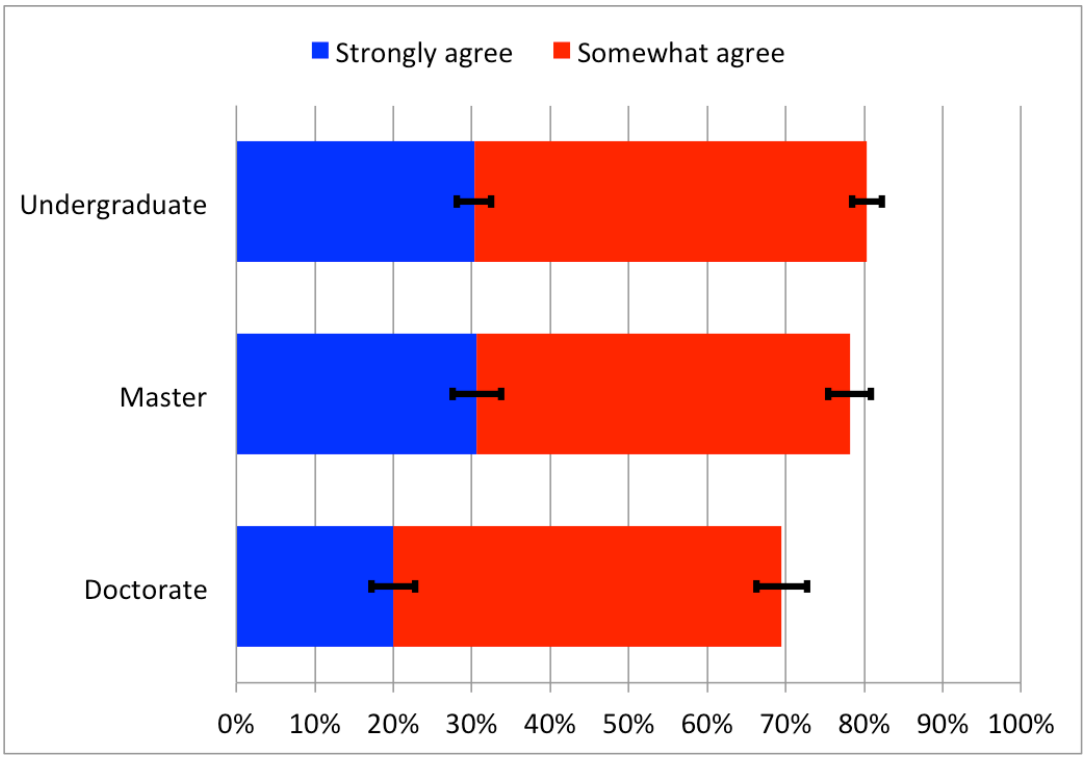


Figure All-Explor: Response to "To what extent do you agree with the following statement: I have been able to explore career-related opportunities of interest to me at MIT. (e.g. attending career events, graduate/professional school info sessions, tech talks)". Options were: Strongly Agree, Somewhat Agree, Neither Agree nor Disagree, Somewhat Disagree, Strongly Disagree. Error bars are 95% confidence on Strongly Agree response rate and on the combined Strongly Agree+Somewhat Agree response rate. MIT Career Exploration Survey (January 2017).

Undergraduates

At the undergraduate level, the ability to explore careers at MIT varied most significantly with the department while the differences among year, gender, and ethnicity were much less. Figure UG-Explor-Dept shows the Agree percentage by primary department[1], sorted from highest (Course 15 with 94%) to lowest (Course 12 with 33%). The average department is a 75% Agree rate. With 95% confidence, Course 15, 10, 6, 16, and 3 are all higher than this average, while Course 8 and 12 are lower.

[1] First-year student responses are not included in department-based statistics, as first-year students do not declare a major until the Spring semester.

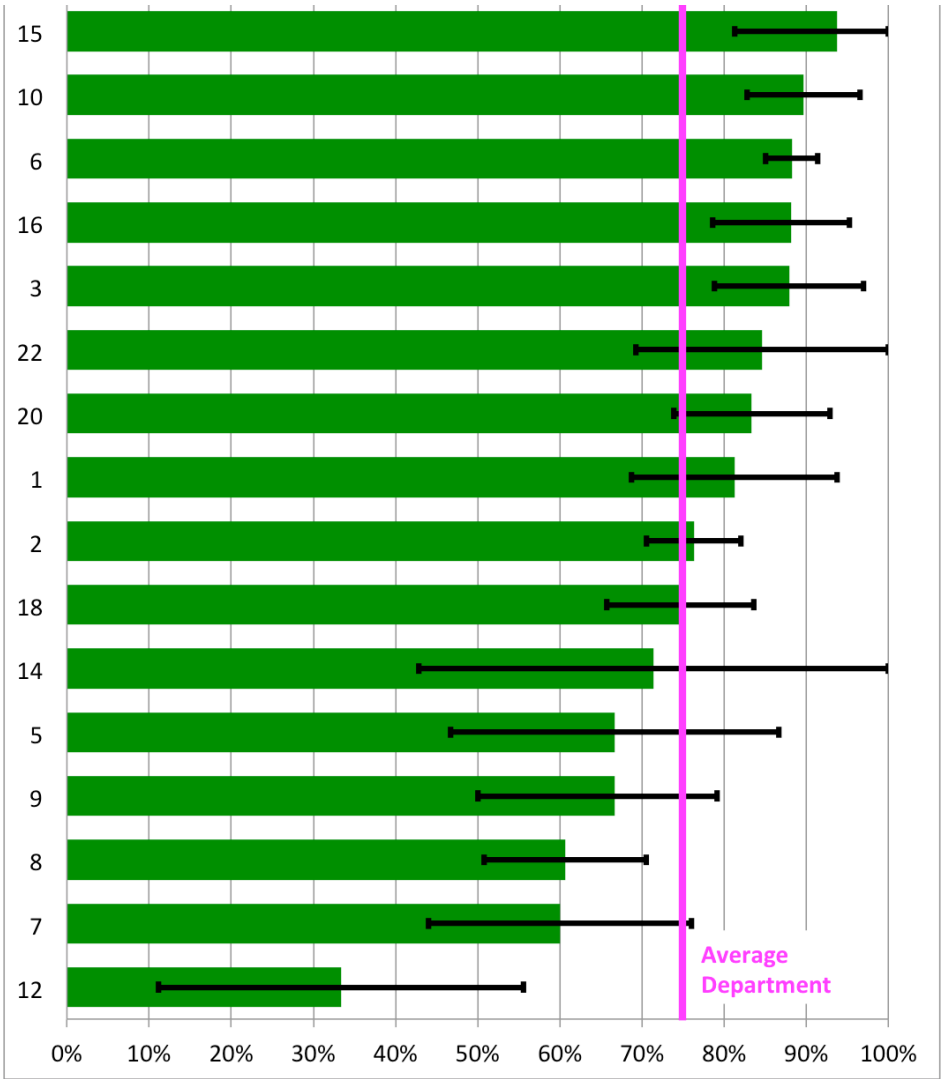


Figure UG-Explor-Dept: Variation by department for undergraduate agreement with ability "to explore career-related opportunities of interest to me at MIT." Only shown is the Agree response rate (combination of Strongly and Somewhat Agree) because of lack of consistent sample size. Also, some smaller departments still lacked enough sample size to include. MIT Career Exploration Survey (January 2017).

As part of the Career Exploration Survey, students were asked "How useful do you find the following sources of information about career opportunities?" with possible responses being: Very useful, Somewhat useful, Not useful, I have not used this information source. Figure UG-Sources-Useful shows the departmental mean percentage of undergraduate respondents that found the information source Very or Somewhat useful.

- Peers are the overwhelming source of useful information with the mean across department's being 94%. Further, the department-to-department variability in usefulness of Peer information is quite low (as indicated by the error bars).
- The next most useful information sources are Internships (78%) and UROPs (76%), though the department-to-department variability is quite large.

- The most variable information source is the Fall Career Fair (60% mean with 5% and 95% values of approximately 27% and 82%). Though not shown in the figure, the Fall Career Fair is the second-most utilized source of career information with 93% of undergraduates (excluding first years) using the Fall Career Fair. Thus, the variability is related to the usefulness of the information (rather than attendance).

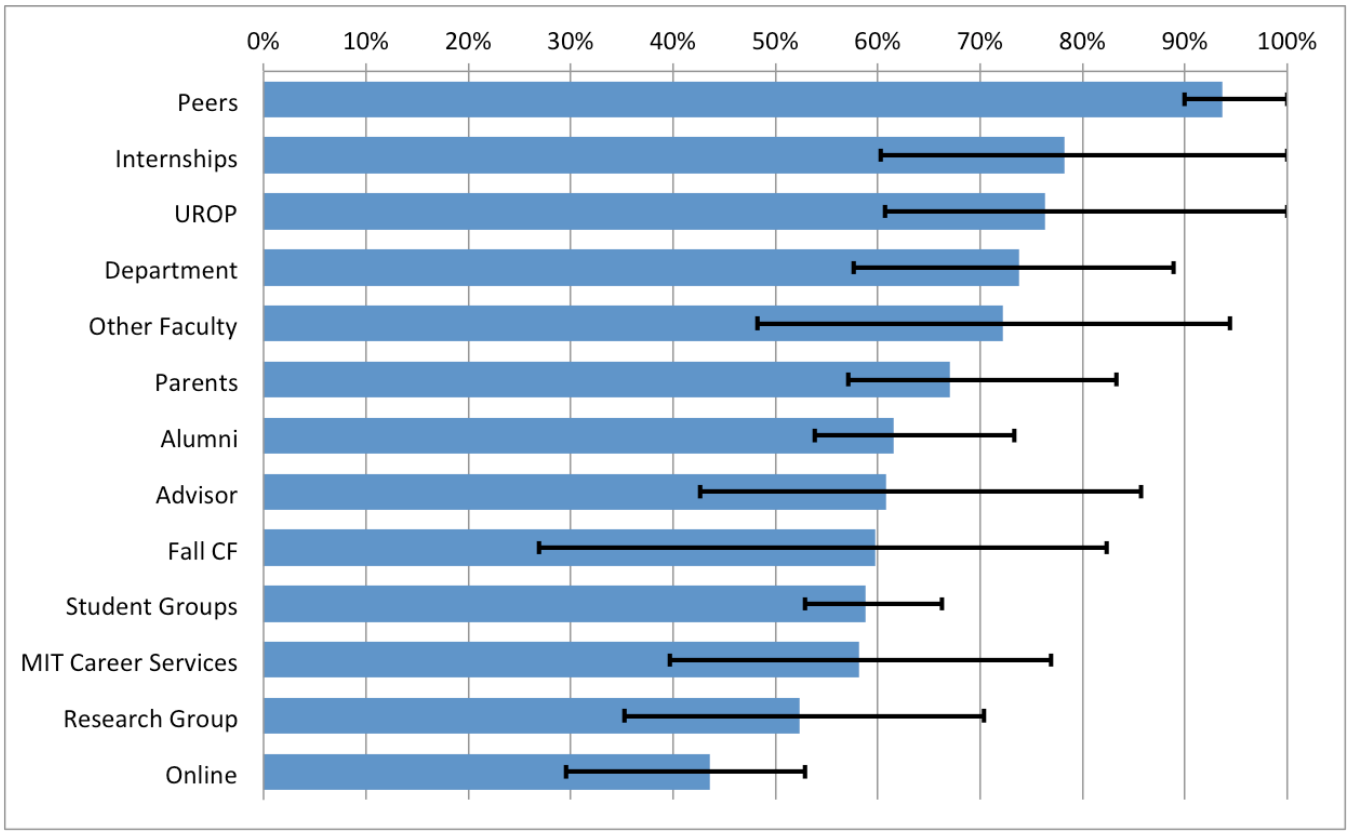


Figure UG-Sources-Useful: Departmental mean percentage of undergraduate respondents that found an information source useful for exploring career-related opportunities. Error bar show the smallest and largest department response, removing the lowest and highest response (roughly the 5% and 95% values). MIT Career Exploration Survey (January 2017).

To better understand what the main factors might be in the departmental variation in student ability to explore careers, we investigated the correlation among different career information sources and students ability to explore careers. The detailed results of this analysis are available in Appendix: 2017 Career Exploration Survey Analysis. Based on this analysis as well as the overall usefulness of different information sources (Figure UG-Sources-Useful), we arrived at the following qualitative model shown in Figure UG-model for how career exploration occurs and in particular can vary among departments.

- Peers are their most useful source of information with little variability among departments.

- CAPD does have department-to-department variability but it has little correlation to overall ability for career exploration.

- The three statistically significant drivers of departmental variability in career exploration are the Fall Career Fair, Internships, and the Department itself. In other words, when the students in a department agree (or disagree) that they have been able to explore career-related opportunities, then the Fall Career Fair, Internships, and the Department will have typically provided (or not provided) them useful career information.

- A strong negative correlation exists between the usefulness of UROPs and Research Groups and the usefulness of the Fall Career Fair and Internships. That is, when students find UROPs/Research Groups as useful sources of career information, then Fall Career Fair/Internships will tend to be less useful, and as a result, students will tend to be less satisfied with the overall ability to explore their career.

- This negative correlation can also be observed between overall ability to explore career opportunities and student interest in pursuing an advanced degree immediately after graduation. In fact, the percentage of students interested in immediately pursuing advanced degrees is negatively correlated (with at least 95% confidence) with not only the ability to explore career opportunities but also the usefulness of Internships, Fall Career Fair, Alumni, Parents, Online, and Student Groups. The only significant positive correlation with interest in pursuing an advanced degree is Research Groups.

- We further investigated how a student's immediate plans after graduation were related to their overall satisfaction with career exploration. The distribution of responses for students planning immediate employment/military or for those planning another degree/undecided are shown in Figure UG-Satis-Plan. The nearly 13% difference in strongly agree responses is significant with $p<0.01$ uncertainty.

- Another indication of the less effective career exploration for students considering additional school can be observed in the frequency with which different sources were used to explore graduate and professional school programs. Figure UG-Sources-AllvsDegree shows both the percentage of all students that used an information source for career exploration as well as the percentage of students planning on another degree that used an information source to explore graduate/professional school opportunities. For **every** information source, a smaller percentage of students use it for graduate/professional school exploration than for career exploration. For example, 98% of students use their peers for career exploration but only 67% of students planning on additional education use peers to explore graduate/professional studies.

- These results suggest that an important opportunity exists to improve the overall effectiveness of career exploration by broadening support for career paths focused on research or in general requiring more education beyond an undergraduate degree. This could include:

    - Having a significant presence of UROP as well as non-MIT research-focused organizations at the Fall Career Fair
    - Holding research-focused panel sessions/etc. during Career Week
    - Providing increased financial (e.g. housing) assistance for summer research programs that may not pay sufficiently (including for staying locally for participation in summer UROPs)

- The usefulness of Alumni is strongly coupled to both the usefulness of Internships and the Fall Career Fair. Further, the usefulness of Alumni and Online resources are strongly coupled to each other, suggesting students are connecting to alumni through on-line means (as well as at the Fall Career Fair).

- The usefulness of information from Parents is also strongly correlated to Internships. This coupling was also surprising to us and could suggest that parents are helping students find internships, or perhaps their advice is more useful when making decisions about internships.

- The usefulness of the Department is strongly correlated to their Faculty and Advisors, though Advisors are on average about 10% less useful than other Faculty. This is perhaps not surprising given that students can search out any faculty member for advice/information, while their advisors may have been assigned to them. This suggests a possible improvement (though perhaps small) would be to lower barriers for switching advisors to better match a student's career interests as they evolve.

- Faculty and Advisors are also (not surprisingly) positively correlated to UROPs/Research Groups. As a result, we believe the relatively small correlation of Faculty and Advisors to overall career exploration is a consequence of the cancellation of a negative effect from UROPs/Research Groups->Fall Career Fair/Internships and a positive effect from the Department.

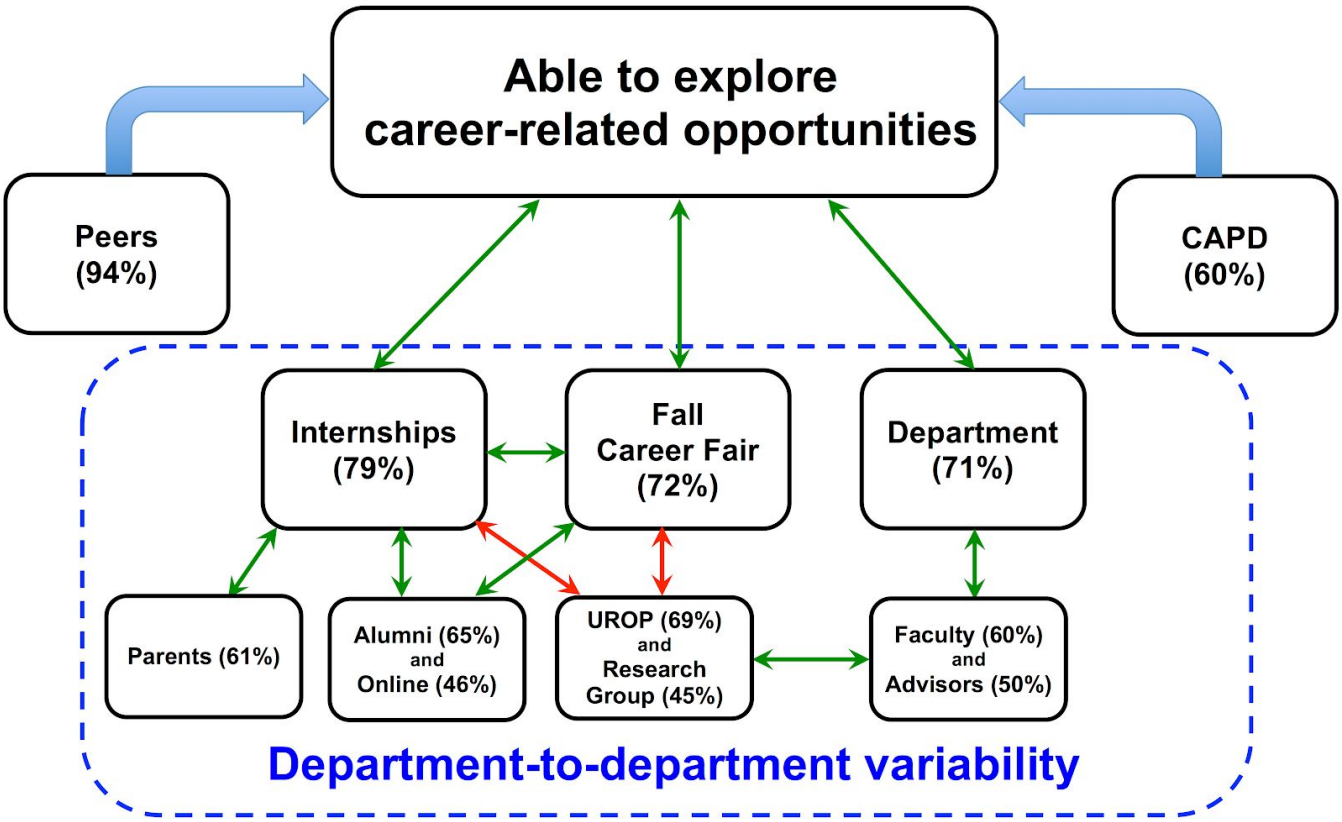


Figure UG-model: Model for how career exploration occurs among undergraduate students. Percentages indicate the fraction of undergraduate students (excluding first years) that found that source of information useful for career exploration. The two-way arrows indicate statistically significant correlation of usefulness with green/red arrows indicating positive/negative correlation.

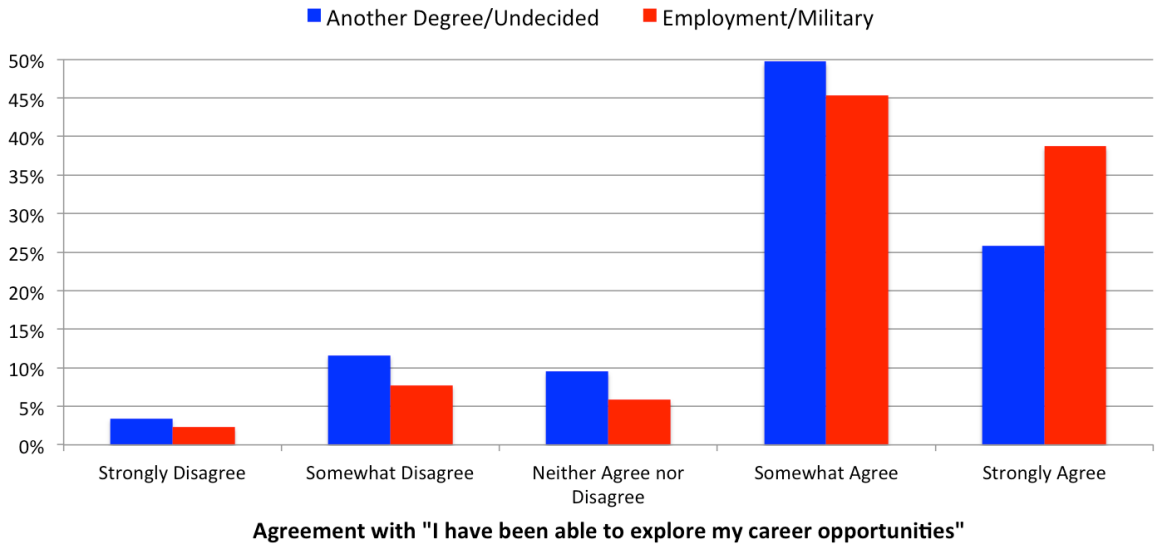


Figure UG-Satis-Plan: Comparison of agreement with ability to explore career opportunities for students whose immediate plan after graduation is employment or military service versus students who are undecided or pursuing another degree. Approximately 46% of student respondents had an immediate plan of employment or military service. The strongly agree difference is significant with less than 1% uncertainty ($p<0.01$).

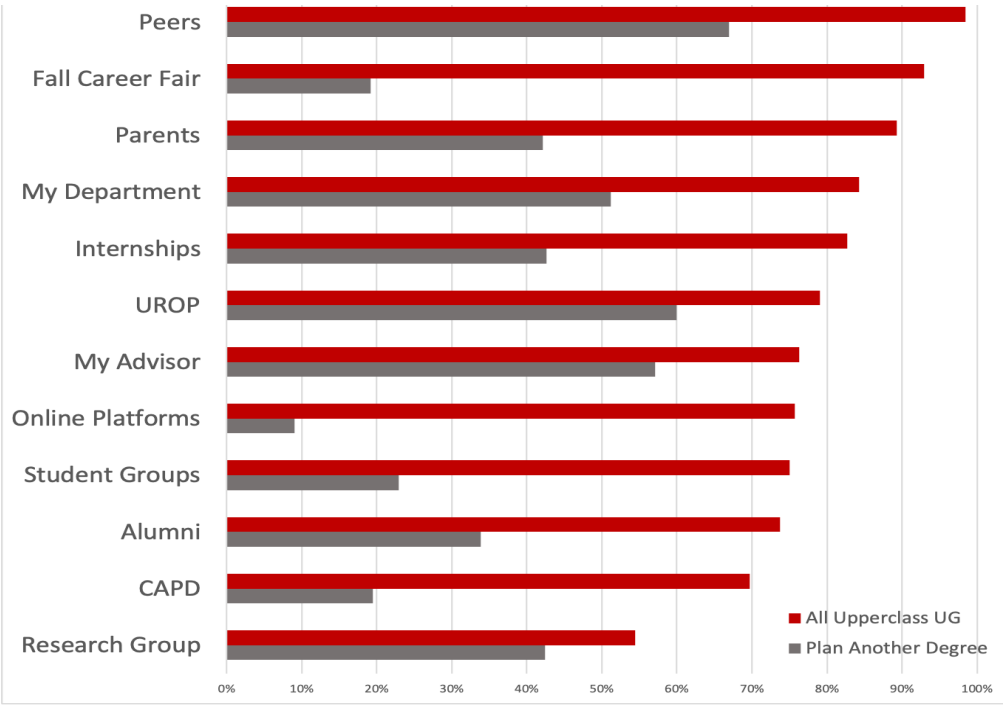


Figure UG-Sources-AllvsDegree: Comparison of information sources used by all upperclass undergraduate students vs. undergraduate students planning on pursuing another degree.

We have also considered how perceptions of career exploration varied among gender as well as ethnicity. In general, we found little evidence of differences among ethnicity. However, with respect to gender, female undergraduates were 5-6% more likely to disagree that they have had the ability to explore their careers (Figure UG-Gender). Gender differences also did occur within specific programs (see Appendix: Analysis of Gendered Differences).

		Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree and Strongly Agree
All undergrad	Female	3%	**12%**	8%	**77%**
	Male	2%	**7%**	8%	**83%**
	p		**0.008**		**0.027**

Figure UG-Gender: Undergraduate student agreement by gender with ability "to explore career-related opportunities of interest to me at MIT." 2017 MIT Career Exploration Survey (January 2017). Significance level shown for two-sided tests of equality for which p< 0.05 (highlighted by red text). Note: significant gender differences exist within programs (see Appendix: Analysis of Gendered Differences).

Masters Students

Figure Masters-Explor-Dept shows the overall satisfaction with career exploration among masters programs. Similar to undergraduate students, the department-to-department variability in career exploration for masters students is much larger than other factors (such as gender and ethnicity). Some observations about specific programs are:

- The Supply Chain Management (SCM) program (which has the highest overall satisfaction with career exploration opportunities) is a one-year program requiring at least 2 years of work experience. SCM has significant career services support for its students starting even before they arrive on campus.
- Course 6's M.Eng program and Course 16's SM program high overall satisfaction with career exploration (these are the second and third highest rated programs) appears to be directly related to a correspondingly high usefulness of the Internships and the Fall Career Fair. Course 6 has the highest percentage of students that find these useful (90% and 85%, respectively) and Course 16 has the next highest percentages (74% and 80%, respectively).

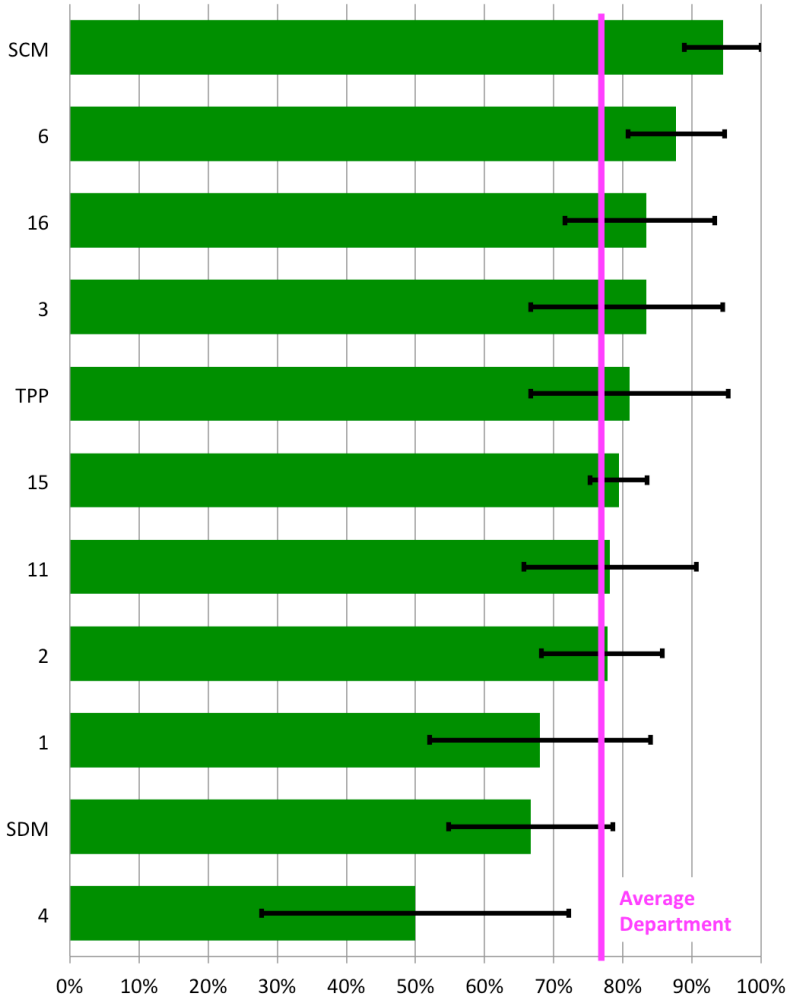


Figure Masters-Explor-Dept: Variation by department for masters students agreement with ability "to explore career-related opportunities of interest to me at MIT." Only shown is the Agree response rate (combination of Strongly and Somewhat Agree) because of lack of consistent sample size. Also, some smaller departments still lacked enough sample size to include. MIT Career Exploration Survey (January 2017).

- Sloan's MBA program (Course 15) has a (not-surprisingly) significant support for career exploration. In particular, one of its clear strengths is its student groups, with 73% of its students finding them useful (compared to Course 1 at 57% which is the next highest usefulness of student groups).
- The Department of Urban Studies and Programming (DUSP, Course 11) has very strong usefulness of department-provided resources (94%), other Faculty (97%), and Alumni (83%).
- DUSP and Sloan are the masters programs with the lowest usefulness of the Fall Career Fair. In fact, only 31% and 39%, respectively, of their students even attend the Fair.

The data from the 2017 Career Exploration Survey also indicates that an opportunity may exist across most programs to improve the utilization of internships for masters students. As shown in

Figure Masters-Usefulness_v_utilization, internships (when utilized) are the second most useful source of information only lower than peers. However, the utilization is much lower, with less than 70% of masters students utilizing internships.

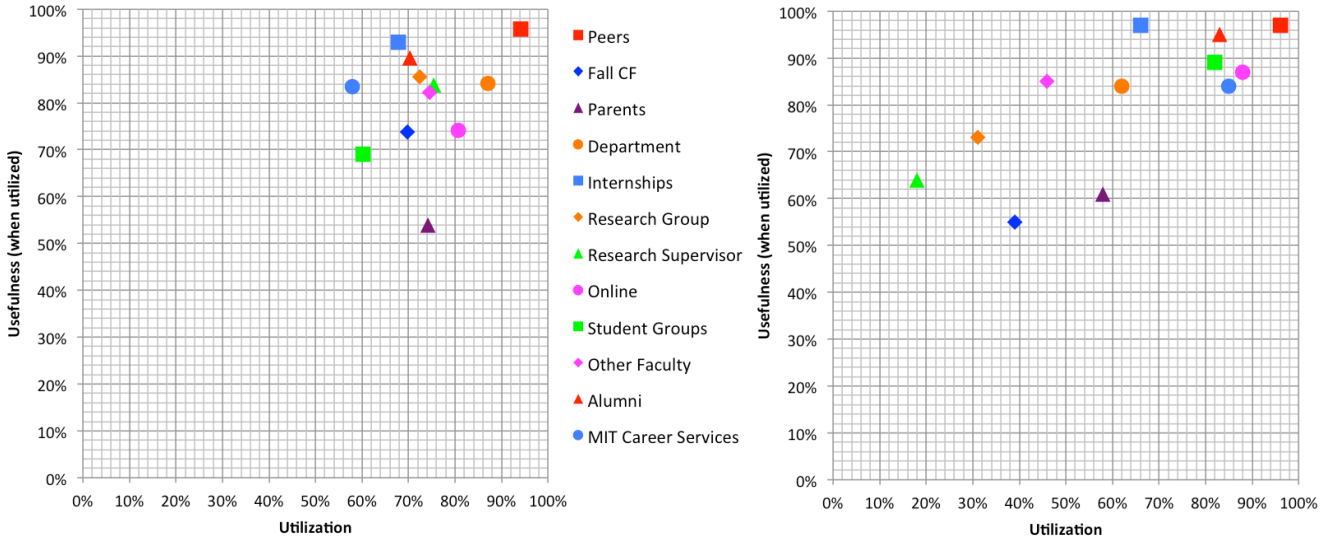


Figure Masters-Usefulness_v_utilization: Response of masters students to "How useful do you find the following sources of information about career opportunities?". On the left are the responses for all masters students outside of Sloan. On the right are the responses for Sloan masters students. Utilization is the percentage of respondents that utilized that source (utilizers). Usefulness is percentage of utilizers that found the source either Very or Somewhat useful. 2017 MIT Career Exploration Survey (January 2017).

In fact, significant variability exists in utilization of internships among masters programs (see Figure Masters-Intern-UtilUse-Dept) with a low of 46% utilization for Course 3 to a high of 93% for Course 6. We note that the variability of usefulness is small, in fact the lowest usefulness is 87% among all programs. One problem with the survey is that graduate students may in fact be referring to internship experiences they had prior to attending graduate school. We will investigate graduate student internships in more detail in 6. Graduate Student Internships, where we will show that there are significant benefits and unmet demand for internship experiences as graduate students.

We also note that alumni are the third most useful source of career information (see Figure Masters-Usefulness_v_utilization), though also have relatively low utilization. We will consider alumni engagement in more detail in 7. Alumni Engagement.

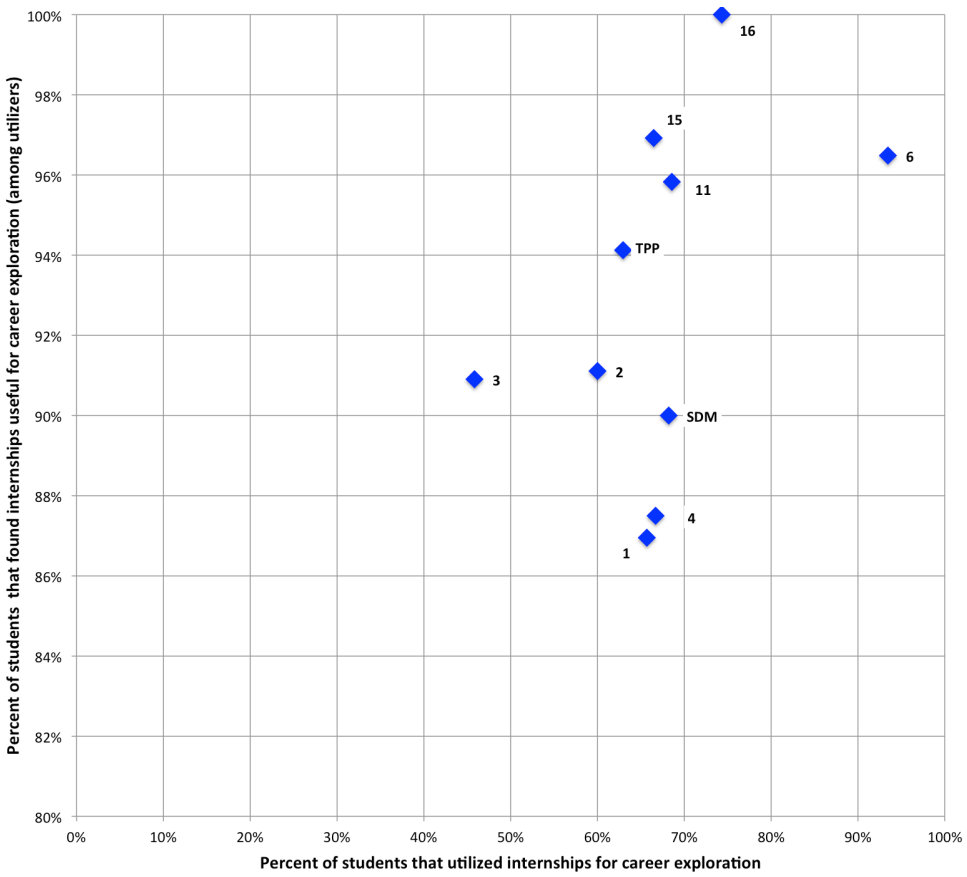


Figure Masters-Intern-UtilUse-Dept: Departmental mean percentage of masters respondents that utilized internships for career exploration and the percentage of those utilizers that found the internship useful for career exploration. MIT Career Exploration Survey (January 2017).

We have also considered how perceptions of career exploration varied among gender as well as ethnicity. In general, we found little evidence of differences among ethnicity. However, with respect to gender, male masters student were 9% more likely to agree that they have had the ability to explore their careers (Figure Masters-Gender). Gender differences also did occur within specific programs (see Appendix: Analysis of Gendered Differences).

		Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree and Strongly Agree
All masters	Female	4%	9%	**14%**	**73%**
	Male	4%	6%	**8%**	**82%**
	p			**0.016**	**0.004**

Figure Masters-Gender: Masters student agreement by gender with ability "to explore career-related opportunities of interest to me at MIT." 2017 MIT Career Exploration Survey (January 2017). Significance level shown for two-sided tests of equality have p< 0.05 (highlighted by red text). Note: significant gender differences exist within programs (see Appendix: Analysis of Gendered Differences).

Doctoral Students

Figure Doctoral-Explor-Dept shows the overall satisfaction with career exploration among doctoral programs. Similar to undergraduate and masters students, the department-to-department variability in career exploration for doctoral students is much larger than other factors (such as gender and ethnicity).

The utilization and usefulness of different sources of career information for doctoral students in shown in Figure Doctoral-Usefulness v utilization. We again find that both internships and alumni are highly useful though with relatively low utilization. As well, significant variability exists in utilization of internships among doctoral programs (see Figure Doctoral-Intern-UtilUse-Dept) with a low of 35% utilization for Course 8 to a high of 84% for the OR program. Again, the variability of usefulness is small with the lowest usefulness is 83% among all programs. We will investigate graduate student internships in more detail in 6. Graduate Student Internships.

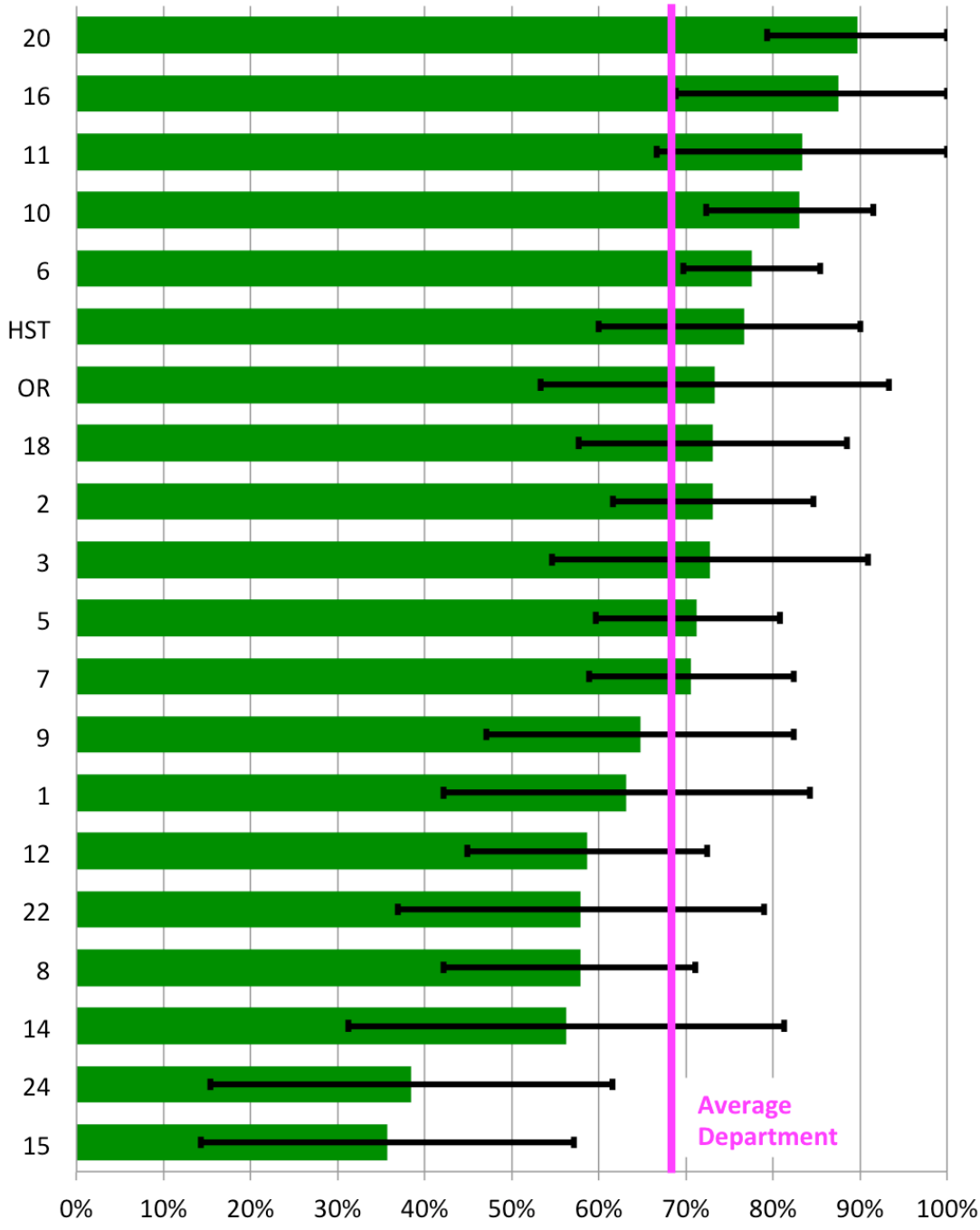


Figure Doctoral-Explor-Dept: Variation by department for doctoral students agreement with ability "to explore career-related opportunities of interest to me at MIT." Only shown is the Agree response rate (combination of Strongly and Somewhat Agree) because of lack of consistent sample size. Also, some smaller departments still lacked enough sample size to include. MIT Career Exploration Survey (January 2017).

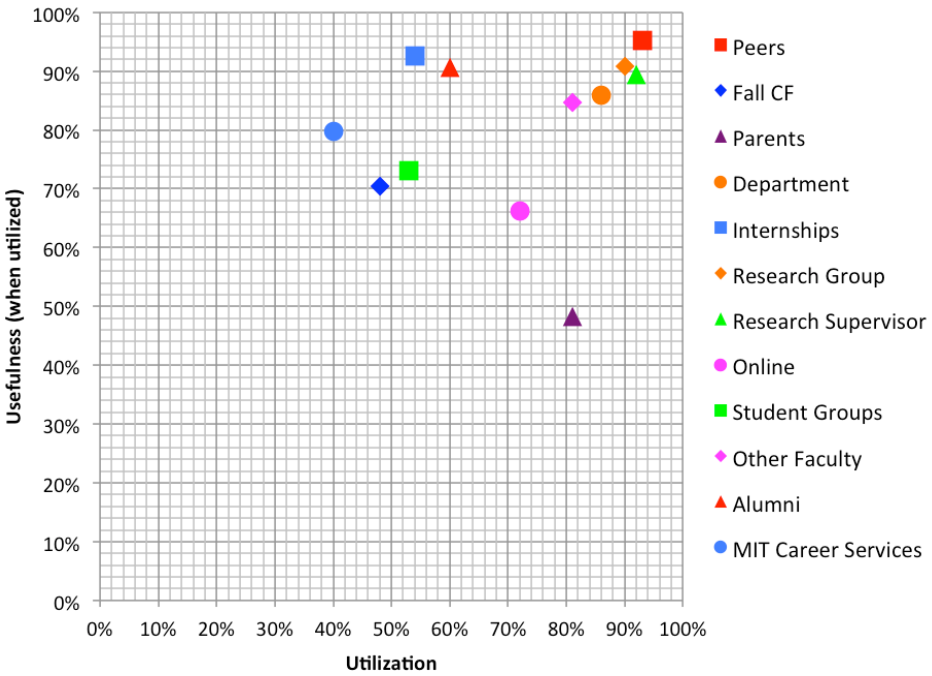


Figure Doctoral-Usefulness_v_utilization: Response of doctoral students to "How useful do you find the following sources of information about career opportunities?". Utilization is the percentage of respondents that utilized that source (utilizers). Usefulness is percentage of utilizers that found the source either Very or Somewhat useful. 2017 MIT Career Exploration Survey (January 2017).

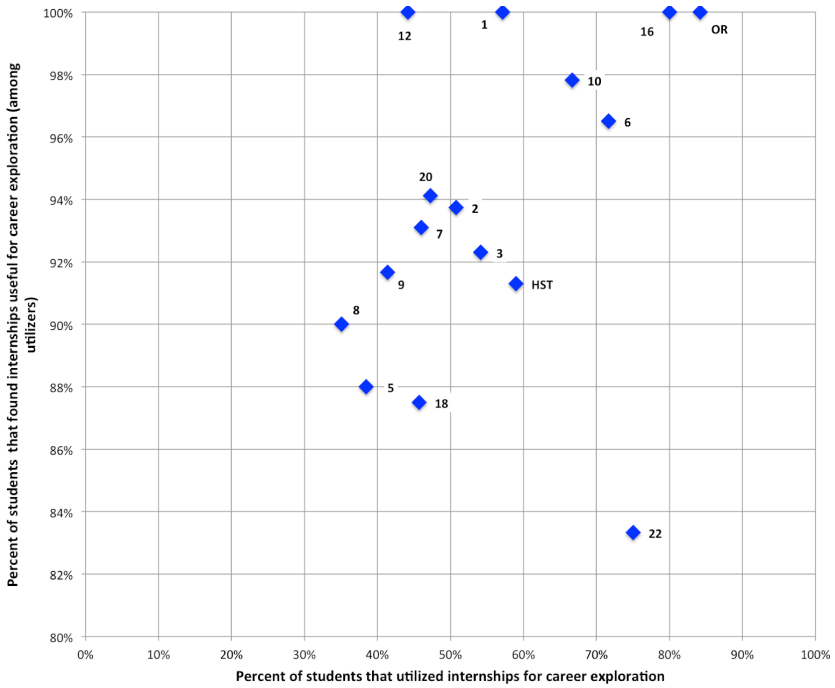


Figure Doctoral-Intern-UtilUse-Dept: Departmental mean percentage of doctoral respondents that utilized internships for career exploration and the percentage of those utilizers that found the internship useful for career exploration. MIT Career Exploration Survey (January 2017).

We have also considered how perceptions of career exploration for doctoral students varied among gender as well as ethnicity. In general, we found little evidence of differences among ethnicity. With respect to gender, no statistically significant differences exist across the all doctoral students that responded (Figure Doctoral-Gender). However, gender differences did occur within specific programs (see Appendix: Analysis of Gendered Differences).

		Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree and Strongly Agree
All doctoral	Female	7%	13%	13%	67%
	Male	4%	9%	16%	71%
	p				

Figure Doctoral-Gender: Doctoral student agreement by gender with ability "to explore career-related opportunities of interest to me at MIT." 2017 MIT Career Exploration Survey (January 2017). The gender difference are not statistically significant (p>0.05). Note: significant gender differences exist within programs (see Appendix: Analysis of Gendered Differences).

3. Advocate on behalf of all students for equity in career exploration and career opportunities through engagement with external stakeholders such as employers, professional schools, graduate programs, fellowships and more.

As a leading Institution, MIT has the opportunity and responsibility to serve as a leader and advocate on diversity, as described in the principles, and equity issues. Engaging students, employers, MIT administrators and our peers nationwide to remove barriers are endeavors that will improve and increase career exploration opportunities.

CAPD staff members have been engaged in numerous external boards, committees and professional organizations to advocate for MIT students, and college students in general, on a wide breadth of topics ranging from equity, diversity, ethics, first year students, graduate students and more. Activities include:

- *The National Association of Colleges and Employers (NACE)*: Various CAPD staff are active members of various sub-groups and working committees such as the NACE STEM Intensive College and Universities, Principles for Ethical Professional Practice Committee, First Destination Committee to help lead in the development of policies, case studies and professional standards.

- *Consortium of Financing Higher Education (COFHE)*: MIT CAPD co-leads with Harvard University Office of Career Services on advocacy for changes on the senior survey so that it better aligns with career center needs.
- *Committees and Consortiums*: CAPD staff are members and presenters on topics for groups such as the Northeast Career Center Directors, Northeast Higher Ed Consortium, Employer Relations Consortium, The Graduate Career Consortium (GCC), the First and Second Year Career Advising Consortium and the Career Counselors Consortium (CCC). In regard to the CCC, staff have served on the CCC Steering committee and board to lead in the development of career counselor resources and trainings to address current trends in the field of career counseling.
- *Ivy Plus*: As a member of the Ivy Plus groups for Directors, Associate Directors for Career Services, CAPD participates in helpful benchmarking and policy review to advocate on behalf of all the university member students in a collective manner to effect change and elevate issues that need to be addressed.
- *Employer Symposium*: CAPD has hosted several all-day symposiums engaging employers, alumni, peer universities and MIT administrators to talk about key recruiting trends and issues. These events have been used to educate employers on academics and recruiting at MIT and as an opportunity for advocacy on gender equity, offer deadlines, recruiting conflicts with academics, and more.
- *American Association of University Women (AAUW)*: One CAPD staff member has been trained on Salary Negotiation Start Smart Workshops and serves as the Institute liaison to the AAUW, coordinating training opportunities for staff and groups on campus and facilitating workshops for students.

The recent efforts in examining the Graduate Student Survey and identifying gender salary inequity are examples of good practices in data collection and advocacy. The elevation of the findings to administrators and employers through educational events, such as the Employer Symposium, and campus-wide group discussions are critical for exposing these unfair practices and effecting change.

Increasing opportunities for MIT administrators and faculty to gather and share the experiences of the students in their departments and programs helps CAPD and MIT be less siloed and more effective in advocating for MIT students and serving as a leader amongst its peers on topics related to recruiting, gender equity, diversity and more. In addition, increasing opportunities for student engagement, collaboration and feedback on trends and challenges is recommended. CAPD's recent creation of a First Year Undergraduate Advisory Board, the development of a new Peer Career Advisor program and hiring of the twelve Fall Career Fair student directors, are great steps towards fostering strong collaborations with students to enhance our efforts to serve MIT student career exploration and development needs.

4. Employ a continuous improvement process that includes assessment of measurable outcomes for career exploration and career services that reflect our principles and objectives.

CAPD strives for continuous improvement through staff engagement and leadership in national and regional conferences and professional committees in order to be more knowledgeable about current trends and new initiatives elsewhere that can be of use to our career exploration efforts and growth. Examples include: Northeast Career Center Directors, Northeast Higher Ed Consortium, the NACE STEM Intensive College and Universities, co-leading the COFHE Career Center Group with Harvard and more. Using the knowledge and expertise gained, the following are efforts made with the goal of continuous improvement for the services and support provided for all stakeholders - undergraduate, graduate and PhD students, Post-Docs, recent Alumni, employers and the Institute as a whole.

Needs Identification

- Office-wide SWOT analysis of CAPD services, resources, and support to aid in the creation of a strategic plan to guide the office over a five-year span in an effort to address key areas of improvement, develop new innovative services, expand our reach on MIT's campus.
- Focus groups with students and employers on specific topics such as our facilities, recruiting conflicts with academic responsibilities, evaluating our career management system, developing our website to better meet student needs and more.
- Employer surveys to assess needs and employer experience with on-campus recruiting, student engagement, career fairs, etc.
- Special topic conference and educational seminars to gain advanced knowledge on critical students groups such a first year undergraduates, graduate students, underrepresented minorities and more.

Participation and Engagement Tracking

- Conduct targeted outreach to academic department and student organization
- Registration and check-in of student attendees for events and services used to track engagement levels
- Compile mid-year and year-end data on event and service users to identify trends and missed opportunities for specific cohorts of students.

Assessing Satisfaction

- Event surveys to gather feedback on all aspects of the event from logistics, marketing and how well the event met the student needs and expectations
- Counseling assessments provided at random to student participating in one-one-appointments and quick queries with staff to monitor staff ability and knowledge to serve students
- Gathering feedback from academic administrators through our liaison model to learn of each department's need and what more CAPD can do to support unique department needs.

Measuring Outcomes

- Critical analysis of CAPD services and support offered to students against the national standards and expectations as outlined by the National Association of Colleges and Employers (NACE).
- Collection of first destination data through the Graduating Student Survey and Doctoral Exit Survey to determine where MIT students go and how we are developing services and support to align with their career interests.
- Benchmarking with relevant schools (not just the Ivy Plus) on specific targeted topics such as first year engagement, career fairs, office facilities, staffing levels, etc. to better understand our progress in serving students and identifying where we need to do more.
- Participating in external reviews provided by visiting committees to give an unbiased understanding of our strengths and shortcomings within CAPD and MIT in general in regard to career development and exploration.
- Service delivery surveys with questions that go beyond the level of satisfaction, but that rather prompt students to share what they learned through participation to help us assess the impact of our work toward meeting our intended goals.

While CAPD does have a variety of continuous improvement activities in place, the hybrid structure of our career services suggests that a more inclusive continuous improvement process should be developed. Specifically, In order to have a greater impact on career exploration at MIT, a continuous improvement strategy should be implemented across all career exploration services and resources at the Institute. In particular, we believe that the creation of a committee focused on student career exploration would be a key mechanism for implementing and maintaining an Institute-wide continuous improvement process. This recommendation is described further in other parts of this report.

3. Career-related Fairs

Career fairs form an important component in a career exploration plan. They offer a centralized venue that makes publicizing and highlighting the event for a broad range of students much easier than smaller activities. Employers value them because they provide a clear mechanism to come to campus and engage with students. They can be a powerful anchor event when done well, offering students an opportunity to engage with a wide range of sectors and professionals, as well as provide a high profile event to orient a campus conversation about career exploration. Without care, however, they can be overwhelming to students, not offer meaningful engagement opportunities with potential employers, and offer overly narrow exploration.

Peer institution comparison

Most of MIT's peer institutions (with large science and engineering programs) host a large career fair in the early Fall within the first month of the start of classes. These career fairs may be student-run, student-managed, or managed by the university central career office. A large, job-focused fair, though not ideal for career exploration, presents a logistically efficient way for companies and students to pursue employment opportunities. For companies (see Appendix: Employer Engagement Survey), the Fall fair aligns with their preferred hiring timelines and delivers the largest critical mass of students for hiring and brand awareness. For students, a Fall fair aligns with their need to evaluate and decide on return offers from their summer internships and to participate in competitive recruiting processes.

Varying revenue models exist for fairs at both MIT and our peers. MIT's career office, as well as Princeton and Yale, do not rely on career events to fund their operating budget. At Stanford, the excess revenues (i.e. revenue not earmarked for the next year's fairs) fund the operational, programming budget for the career office. At other institutions (Purdue, Michigan, Texas A&M) with fairs run by student organizations, the funds are used for student scholarships and student professional and career development programming, run either by the student club, the department the student group is affiliated with, or the school/university career center.

Annually, MIT runs a variety of other career fairs and similar events throughout the year hosted by departments, student groups, and CAPD. CAPD provides review, advisement, and guidance to the independently-run student career fairs. Career fairs offered at MIT have included:

- Fall Career Fair (CAPD and MIT student leaders)
- Biological Engineering Career Expo (Biological Engineering Department),
- Industrial Connection Program (ICP) Fair (EECS Department)
- MIT Analytics Fair (Masters in Business Analytics program)
- Engineering Career Fair Collaborative (CAPD in collaboration with BU, Harvard, Olin, Tufts and Yale)

- Asian Career Fair (MIT Asian Club)
- xFair (TechX and The MIT Chapter of Tau Beta Pi)
- European Career Fair (European Club)
- Civil & Environmental Engineering Career Fair (CEE Student Association)
- Energy Career Fair (The Energy Club)
- Polymer Day (Polymer Graduate Student Association)
- Spring Career Fair (CAPD)

MIT's largest fair, the Fall Career Fair, has been an outlier amongst most universities in three ways: revenue directly supports the student activities fund, student organizations are prohibited from offering other career fairs in the fall semester with the Fall Career Fair, and a student holiday is provided to facilitate student attendance. With respect to revenues, except for the Fall Career Fair, the revenues for other fairs are returned to the sponsoring organizations for their discretion in its use.

Shortcomings of Current MIT Fairs

As is well known around MIT, the hiring interests of employers at the Fall Career Fair has a heavy emphasis on computer science, finance, and consulting. Using the 2018 Fall Career Fair data, we have estimated the number of conversations that an undergraduate student in a major could have had with employers interested in hiring that major. For example, as shown in Figure FCF-Conversations, a Course 9 undergraduate would have been able to have about 1/10th of the conversations that a Course 6-3 major would have had. While this estimate assumes that a student has the stamina to have all of the conversations available to them, the inequality of the current Fall Career Fair employer make-up is clear. Not all of our students are being served with the quality we would hope. Further, we have significant concerns that this unbalanced employer hiring demographic could also contribute to career funneling at MIT by drawing more students into a small set of professions, and, by association, majors (Binder et al, 2015).

Beyond the inequality of opportunity across majors, the current format of the Fall Career Fair has other potential negative effects:

- The early Fall date could contribute to students making unnecessarily accelerated decisions with respect to career exploration, cutting short the time to consider a wide range of options e.g. UROP vs. internship; graduate school vs full-time employment.
- While events during Fall Career Week include some opportunities for career exploration without a focus on hiring, the Fall Career Fair is a jobs-focused event at which employers are seeking full-time and internship candidates.
- The Fall Career Fair has almost no opportunity to explore further education (i.e. graduate or professional school). Closely related, undergraduate research opportunities (both MIT's UROP as well as similar programs at other universities) are largely not represented. This

correlates with the earlier finding that undergraduate students seeking advanced degrees are less satisfied with career exploration at MIT.

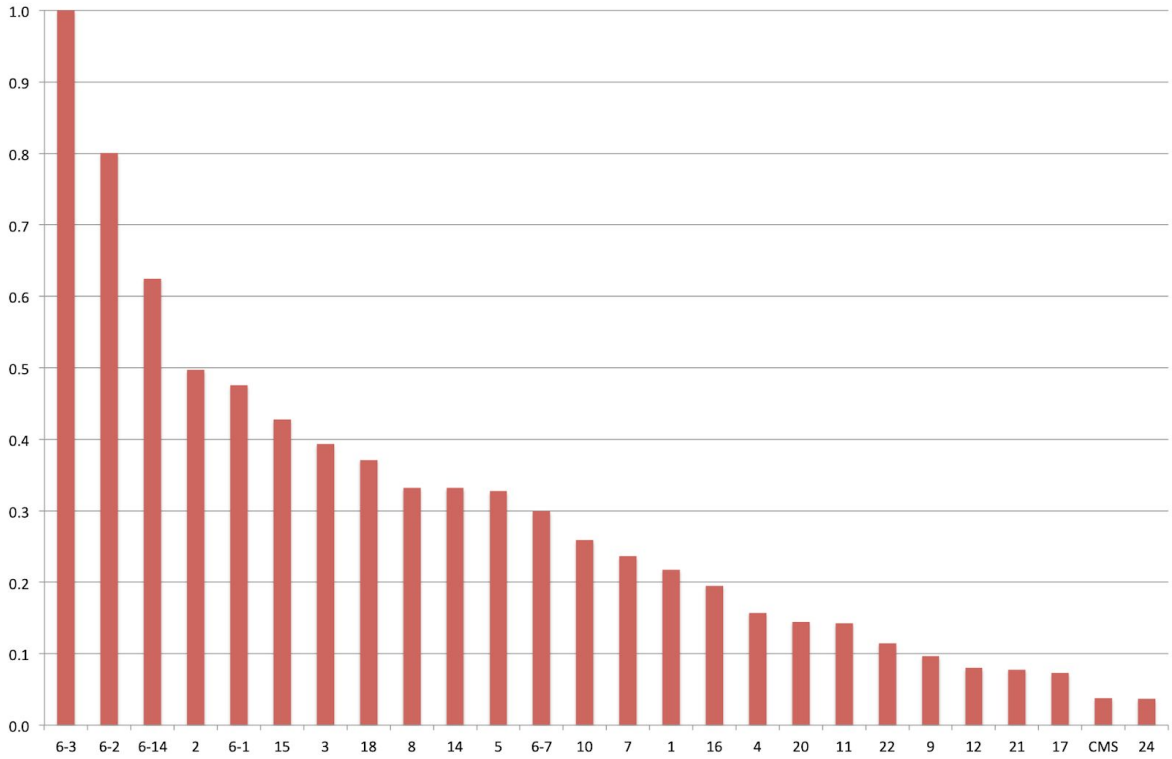


Figure FCF-Conversations: The estimated number of conversations with employers that an undergraduate student could have had at the 2018 Fall Career (as a fraction of the number of conversations an undergraduate student in Course 6-3 could have had). Note: this assumes at students have the stamina to have all of the conversations available to them.

The revenue model for each career fair event at MIT varies in fees for participation, activities included, expectations for employers and how the fees are used. The lack of guiding principles for fair-generated fees forgoes an opportunity to have fairs support career exploration and development beyond the one event. In the specific case of the Fall Career Fair, historically the excess revenues generated have been directly tied to the support of student activities. In recent years, MIT student organizations have received about $1.5M of support from MIT of which $800-900K has come from the Fall Career Fair excess revenues. This reliance upon Fall Career Fair revenues for providing about two-thirds of student activity funding has led to a strong profit focus. This in turn affects the fees charged. Specifically, over the past few years, MIT Fall Career Fair fees have had various sponsorship tiers at increasing fees which provide increasing benefits. These sponsorship fees range from $1250 to $18,000. For Fall 2019, the average fee paid was $2800. Non-profits and start-ups are eligible to apply for financial assistance to participate in the fair at the lowest sponsorship level ($1250). The range of fees at MIT's Fall Career Fair are much

higher than for peer institution's Fall fairs. For example, the next highest fee is Stanford, which has a single fee level of $1100 for all employers except non-profits ($270).

Last year, the administration committed to transitioning student activity funding away from Fall Career Fair revenues (phased in over the next few years) and then utilizing these revenues to support career exploration and related activities. We strongly support this decision and believe it will improve career exploration both by providing additional funding and also by reducing the profit focus of the Fall fair.

Recommendations

We considered recommending elimination of the Fall Career Fair and replacing it with a series of alternative career events. However, a large fair (even one solely focused on internship and full-time hiring) in the Fall has numerous advantages as described earlier. Instead, we recommend making changes that can enhance the Fall Career Fair, as well as other Career Fairs.

1. *Coordination and Oversight*: Career fair events should have greater coordination and oversight. We recommend the formation of a Committee for Student Career Exploration and Development composed of faculty, CAPD and other staff, students, and alumni charged with ensuring a holistic oversight of career exploration, including, critically, career fairs. With respect to career fairs, this committee would be able to set standards, avoid duplication of objectives and target audience, and ensure that revenues generated through career exploration events are utilized to support career exploration. CAPD staff are a critical component of this proposed committee providing the professional expertise around career exploration and career services.

2. *Revenue Model*: To further ensure that career fairs are designed and run so as to make career exploration a main objective, our committee recommends that all revenue generated by career events be earmarked towards support of career exploration. Our intention is to be quite inclusive of what constitutes support of career exploration. Some examples would be:
    - future career-related programming i.e. alumni panels or career treks.
    - individual exploration activities i.e. scholarships for attending conferences; stipends for internships, research opportunities, or other experiential learning for which suitable funding may not be fully available.
    - staffing to provide added career exploration support

    A direct corollary of this recommendation is that the Fall Career Fair revenue should not be used for general student activities as it has in the past. As mentioned previously, we strongly support the administration's plan to phase out the use of Fall Career Fair revenues for student activities.

3. *Expand Fall Career Fair Scope*: Incorporate career exploration opportunities in the Fall Career Fair for students considering graduate education. This should include a significant UROP presence from both on-campus (e.g. have booths for departments, programs, or labs offering UROPs, in addition to the UROP Office) as well as off-campus (e.g. UROP program offices from peer institutions). Similarly, on-campus graduate programs could be included with the objective of providing information about graduate studies in related fields, in particular targeting undeclared undergraduates. However, the incorporation of graduate programs may be more effective as part of the proposed MIT Career Exploration Conference. In addition, representation of non-profits and civic organizations at the fair should grow, resulting in the need to consider reduced rates for organization participation. Note: based on the past two Fall Career Fairs, we estimate there are about 50 booths of unused space that can accommodate attendance growth in UROP, graduate school, non-profit and civic organizations.

4. *Resetting the Career Exploration Timeline*: Push back the date of the Fall Career Fair towards the end of October to allow additional time for career exploration programming (see Chapter 4: Career Exploration Events).

   Work with peer institutions to enhance offer deadline requirements of employers that allow students more time for exploration prior to decision-making around an internship or full-time employment. Specific items to consider:
   a. Moving deadlines for full-time and internship employment to nominally four months prior to start date
   b. Mandatory extensions for employment offers until April 15 for any student considering further education.
   c. Require students to carry no more than 3 employment offers at any one time.

5. *Clarity of Purpose*: For both existing and new fairs, it is imperative that the students and organizations are aligned about their purpose in offering the event. If the primary objective for the companies attending a career-related event is to actively recruit, interview, and hire students for employment and internship positions, then the event should be considered a "job fair" and labeled as such. We do our students a disservice by using the label "career fair" when the event is focused on employment and does little to support career exploration broadly. On the other hand, if a goal of an event is to support career exploration, then companies attending the event must be prepared to have meaningful conversations with students eager to learn about a specific industry or company, without the need to discuss potential employment. A middle ground for a career fair which seeks to support both employment as well as more general career exploration is to allow organizations to indicate their purpose in some manner which students have easy access to (both at the physical booth as well as through any electronic information).

Changes Instituted since 2019

Many of the recommendations above have already been worked on during the time of this committee's work, especially those related to the Fall Career Fair. A careful review of the Fall Career Fair and how it serves the MIT community began when Ian Waitz assumed the role of the Vice Chancellor in 2017. The Vice Chancellor and the Vice President for Student life, Suzy Nelson, gathered key partners on campus to examine the Fall Career Fair's purpose, structure and revenue model. Based on declining employer participation, decline in revenue, dissatisfaction of students in the fair serving all areas of interest, steps were taken to provide the fair with more oversight by CAPD and to decouple the fair responsibility for funding student activities at MIT.

Since then, the Fall Career Fair oversight and student leadership supervision have become the full responsibility of CAPD, made possible by the creation of a new Assistant Director for Career Exploration Events and Fairs, and a Faculty Advisor was appointed to the Fall Career Fair. This change in Fall Career Fair oversight was developed in collaboration with the 2018 Fall Career Fair student directors, CAPD, and the Office of the Vice Chancellor including this Committee. All parties involved believe that this change will improve the Fall Career Fair's impact on career exploration for all students by providing sustained, professional assistance to the student leadership. In addition, CAPD oversight will enable a stronger connection with academic departments, offices, and programs to help diversity employer recruitment and create complementary career exploration opportunities and events offered around the Fall Career Fair.

References

Binder, A.J., Davis, D.B., & Bloom, N. (2015). Career funneling: How elite students learn to define and desire "prestigious" jobs. Sociology of Education. Vol. 89, Issue 1, pp. 20 – 39.

4. Career Exploration Events

Our analysis in Chapter 2: Current State suggests career exploration is lacking support for:

- Undergraduate students that are undecided about their plans following their SB degree
- Undergraduate students that are considering graduate school following their SB degree
- Graduate students interested in internship experiences (see Chapter 6: Graduate Student Internships).

In general, we believe that MIT must be more strategic in its career exploration offerings to target students who may be early in their studies or who have uncertainty about their current career trajectories. Key aspects of this strategy are to:

- Create opportunities to learn about a range of careers
- Foster career development skills
- Offer low commitment opportunities to "prototype" different paths

We suggest that a holistic approach to career exploration involves not only thinking along the chain with regard to individuals (learning, fostering skills, trying out different things) but programmatically. This means making sure we are offering a range of activities across a student's trajectory, in a variety of formats, and involving people from faculty, peers, and alumni to prospective employers.

Examples of Career Exploration Opportunities

The following exploration events and activities are examples of low commitment opportunities for career exploration. Most of these opportunities already exist at MIT though frequently within specific departments. Thus, what is also needed is an effective manner to ensure students are aware of them (see Chapter 5: Career Exploration Hub).

Orientations
First Year Pre-Orientation Programs (FPOPs) currently offer are broad range of topics, from discovering various careers to learning about academic pathways. In the current model, students are unable to participate in more than one. Offering shorter FPOP opportunities or providing FPOP topics more than once a year (i.e. IAP or spring break) could be a way to leverage existing efforts while providing greater career and major exploration for first year undergraduate students. Furthermore, this model should also be offered to graduate students to help them explore potential pathways beyond academia.

Internships & Fellowships

Internships provide real, practical, professional experience that also allows students to explore different opportunities first-hand. In this way, students can "prototype" different careers--testing their assumptions of a career in a practical setting that can help inform their future decision making. Several offices, departments, centers, and programs help connect students to internship opportunities. For example, SHASS supports the MIT DC Summer Program, SAP/DUSP supports internships over IAP, as well as during the semester through the Planning in Practice course, and SOE supports summer internships through CEE. The PKG center also provides fellowships for undergraduate students working over the summer.

Panel Discussions
Comprised of alumni, employers, or peers, panel discussions allow for multiple perspectives to be shared with an audience. Panels can target different student levels (e.g. 1st-year undergraduate, seniors, post-Docs, etc.), affinity groups (e.g. minority students, international students, students considering careers in academia, etc.), or industries/sectors/occupational groups. Topics can range from the tangible (i.e. different careers/courses, industries) to the more abstract (i.e. future of work, trends). Panel events can be recorded and archived so that students can benefit from the information even if they are unable to attend the panel.

Networking Events
Through allowing students to informally mix with others, they might start to learn about different opportunities that they are interested in and expand their network. Networking events could feature employers, alumni, faculty, or peers, depending on the topic. For example, first year students interested in learning about different majors might appreciate an opportunity to meet with faculty and upperclassmen in that major. Students preparing to enter the job market, might benefit from connecting with employers and alumni. These events could follow panels or lightning talks, or stand alone. Graduate students could also provide an excellent networking opportunity for undergraduate students.

Site-Visits & Excursions
Site-visits and excursions allow the student to immerser themself into different environments for purposes of exploration. Several departments, programs, and offices support career exploration outside of campus as well. CAPD provides employer site visits, typically over IAP, that allow students to visit a wide breadth of employers from varying industries in the Boston / Cambridge vicinity. DUSP organizes annual Career Treks to NYC alum employers. AeroAstro sponsors an IAP trip for its sophomores to major aerospace companies on the West Coast.

Externships & Job Shadows
Job shadows are an opportunity for students to observe work being done first-hand. MIT Alumni provide an opportunity during IAP for students to complete an externship. In addition to this program, similar programs around spring break and summer can also provide opportunities for students to explore through shadowing. Employers can help facilitate job shadow opportunities to allow students to gain insight into their business or organization. Faculty and graduate students could provide opportunities for undergraduate students to shadow their laboratory work.

Other schools provide different opportunities for students to explore careers. Similar to FPOP, the University of Chicago offers "Career Exploration Week," a four-day intensive for new students to explore one of nine different areas of interest, including business, digital media, law, and public policy prior to the start of their time at the University of Chicago. This program takes place in different parts of the world in an immersive way, and there is an additional cost associated with participation.

Mentorship Programs
Mentoring can take several forms, and MIT provides a variety of existing programs to support mentorship, including the MIT Alumni Advisors Hub, Pre-Health Advising's HMS/MIT MD-PhD Mentoring Program, and the MechE Alliance, among others. Mentorship programs can be either formal or informal, structured or unstructured.

Groups
Another way for students to explore interests is to connect with similar-minded students, such as the Consulting Club at MIT, the Water Club, and the Premedical Society. These organizations can help students start to explore their interests, learn about their values, and make life-long connections with others. Clubs and student organizations organize conferences (MIT FinTech Conference), participate in competitions (Design/Build/Fly at the AIAA), or run campus-wide recruiting events (the Fall Career Fair Committee). The MIT Engage platform lists 564 organizations and the Association of Student Activities oversees the application to form new groups on campus.

Classes and Seminars
Though somewhat more of a commitment, courses and seminars are effective for career exploration, for not only undergraduate students but graduate students as well. The Office of the First Year maintains a current listing of Exploration and Discovery subjects that are designed for first year undergraduate students to consider a variety of majors prior to declaring. Examples include Biological Engineering 20.S90: A 3-unit subject that introduces students to Courses 2, 3, 5, 6, 7, 9, 10, and 20, and the First-year Advising Seminar, "Designing your Life" (16.A01), focused on career development skills based on the Stanford d.school subjects "Designing your Life" and "Designing your Stanford".

One concern with offering full subjects dedicated to career exploration was raised through the Freshmen / Alumni Summer Internship Program (F/ASIP): A 3-unit career development seminar organized by CAPD between 1997-2017. Although the program garnered student interest with registration being as high as 123 students, F/ASIP struggled with student retention, with the lowest being 43%. Students cited prioritizing academics over the career development and exploration. Therefore, perhaps the approach should be incorporating the above career exploration opportunities into existing subjects in support of the principle that career exploration should be a shared and collective responsibility.

Career Exploration Conference

Several of the above events could be combined into a conference-format. Offered in a single day, the conference provides separate "tracks" whereby undergraduate and graduate students can attend a series of events specific to their interests, selected/intended course, and/or target industry/occupational group. By providing students with a choice on what they can attend, a potential side-effect of their autonomy may increase their commitment to participate in the full day.

One function of a Career Exploration Conference would be for conversation, information collection, and building knowledge about industries, professions, and academic pathways. The pressure of knowing what you want already (common with the typical Career Fair experience) would be removed, lowering the bar for engaging in conversation and information sharing. All too often traditional career fairs amount to job fairs and leave little room for rich conversation, self-discovery, and exploration.

Some possibilities which we have discussed around timing of this event, but have not reached a conclusion include:

- Holding the Career Exploration Conference on the September student holiday and move the Career Fair to the Tuesday following Columbus Day (which is also a student holiday).
- Starting a Career Exploration Conference on the evening before the Career Fair and hold Career Exploration sessions overlapping with the Career Fair for the morning. This could also include pushing the start time for the Career Fair back an hour or so.
- Offering a Career Exploration Conference targeting first-year students and new-to-campus graduate students during orientation.

Regardless of the timing of events, if career exploration is a primary goal for our students, it is important for the Institute to prioritize and incentivize access to these events for students. Anecdotally, students have limited time to attend events outside of their curriculum responsibilities, so in addition to subjects incorporating additional exploration activities, the Institute may need to take steps to ensure that participation in career exploration events is encouraged and with a minimal barrier to participation. With respect to undergraduate students, the combination of Exploratory and Discovery subjects may be a good mechanism for that.

Recommendations

1. *Expand Career Exploration Opportunities*: Develop new and continue to support existing effective career exploration opportunities emphasis on: creating opportunities to learn about a range of careers, in particular those careers for which graduate education is needed; fostering career development skills; and providing low commitment opportunities to "prototype" different paths. Four specific recommendations are:

a. Expand FPOP opportunities beyond orientation (e.g. IAP) and/or shorten format to allow first year undergraduate students to engage in more than one.
b. Develop and/or continue micro/short opportunities for career exploration such as informational interviews, externships, and job shadowing that could occur during evenings, weekends, and breaks.
c. Provide additional funding to support student participation in exploratory activities such as conferences, internships, treks, research opportunities and more.
d. Collaborate more closely with career-exploration focused student clubs and organizations such as the Society of Women Engineers and the Consulting Club in the offering of career related programming.

2. *Career Exploration Conference:* Consider the development of a focal point event for career exploration at MIT, i.e. a Career Exploration Conference. This conference would serve all students across levels (undergraduate, masters, and doctorates), interests, disciplines, backgrounds, etc.

3. *Resetting the Career Exploration Timeline:* Independent of the development of a Career Exploration Conference, advocate for longer timelines for employment (internship and full time) offer decisions as described previously in the report.

5. Career Exploration Hub

In Fall 2018, a Career Exploration Opportunities survey was sent to faculty, administrators and student organizations in an effort to review aspects and activities associated with student career exploration and to identify changes that would enhance exploration of, and access to, a broad range of careers. Administering and collecting survey data was challenging. The committee struggled to identify survey recipients and gather thorough information on all career related opportunities. The lack of a composite website or list resulted in an inefficient use of time conducting web research, time most students cannot afford.

The committee's challenges in cataloging career exploration opportunities at MIT made it apparent that the lack of an aggregate resource on career related opportunities contributes to the barriers students experience in participating in career exploration. This barrier will be felt most acutely by first-year undergraduates that are trying to find career-related information to help in deciding their major. In addition, employers experience the very same challenge when trying to understand the recruiting environment at MIT and in developing their recruitment strategy.

Goals for Centralization Resources
To better enable student career exploration, the committee recommends the creation of a central resource for key stakeholders (students, administrators, faculty, employers and student organizations) to provide:

- an easy method of finding and sorting career related opportunities for undergraduates, graduate students, faculty and staff.
- a single portal for posting career related opportunities for administrators, employers and student organizations.

Furthermore, the development of a central career exploration hub is critical to supporting the principle that career exploration is a shared responsibility among the following key stakeholders: Career Advising & Professional Development (CAPD), Academic Departments, Faculty, Administrative Offices (ex. UPOP, GEL, Conference Services), Student Organizations, and the Alumni Association. Each of these stakeholders organize their own individual events, job boards, websites, calendars, seminars, employer engagement and more that could benefit from a centralized platform or portal for promoting their opportunities to students.

Key Functionality
A central resource is a simple concept but can be complex to achieve at MIT. The ecosystem of the Institute is one of innovation, autonomy, creativity and decentralization. While these are MIT's strengths, in this case it creates a challenging environment for herding all offerings and for students to know where to look for career exploration opportunities, particularly if they are seeking to look outside of "traditional" or more common paths for MIT students. The following key

features and functionality are needed for stakeholders to invest time in a central system and find it beneficial to helping them achieve their goals.

- General User Interface: Desktop and mobile-friendly system, allowing users to filter content by interests, sign up for notifications, RSVP to events/postings and receive automatic reminders for them.
- Access levels: Different levels of administrative access and customization permissions should be available for key stakeholders to have autonomy on the offerings they provide for specific student cohorts.
- Employer Engagement: Integration of all job boards / postings and interview opportunities, including scheduling and payment, employer events in one platform for use by appropriate stakeholders.
- Data Reporting: Track user engagement in events, programs, services and on-campus recruiting activities.
- Calendar: Increase communication between and/or unify the following calendars for consistency and ease of access: MIT events, CareerBridge, Engage and other calendars.

We recommend the use of Handshake to serve as the new central career exploration hub for MIT with CAPD as the central administrator providing oversight and organization. Handshake has the potential to serve as an enterprise wide system supporting events, career fairs, appointments, data collection, on campus recruiting activities, job postings, and more. CAPD launched Handshake in July 2019 as the new platform for CareerBridge which was formerly powered by GradLeaders.

While there are numerous off the shelf products available for consideration, some already tested at MIT, it is recommended that Handshake be developed to serve our central hub needs as it shows the most capability to meet numerous stakeholder needs. CAPD is already under contract with Handshake, working closely with IS&T, and piloting the use of the system with the Chemistry department for PhD interviews and Conference Services for posting company presentations.

The following are systems that have already been used at MIT by varying offices and for varying individualized office purposes such as: GradLeaders, CampusLabs, Airtable, Engage, and Purple Briefcase. Each of these have varying capabilities and have not been proven to be able to meet all identified needs for a centralized career exploration hub. Outside of Handshake, Symplicity, Orbis, and 12Twenty have some potential to meet varying degrees of stakeholder needs.

Implementation Process

To aid CAPD in the development and oversight of this central resource, we recommend the creation of an advisory users' group with representation from academic administrators, programs like UPOP, conference services, and student organizers of career fairs. The implementation process could be split into 5 different stages

1. Overview: Provide an overview of system features and training
2. Discovery: Identifying the goals, desired timelines, and expectations of the system to supplement the stakeholder needs already identified (see Figure HUB-Stakeholder-Needs).

3. Technical Implementation: Working with IS&T, the system vendor and stakeholders on the development of technical aspects including: authentication, accounts, configuration, and integration to other systems.
4. Customization and Consultation: Learning the ins and outs of the product. Application to goals, changes and adjustments, moving towards implementation / launch.
5. Launch and User Adoption: Connection to stakeholders and resources across the institute. Marketing plan, students/staff trainings, collateral development and branding.

Prioritization should be aimed at the promotion of career exploration activities and events in 2019-20, laying the foundation for a robust system utilized across the Institute to organize, promote, and track career exploration opportunities in subsequent years.

Stakeholder Needs

	Academic Departs	Administrators	Employers	Faculty	Student Organizations	Students / Alumni
Calendar (including syncing and filter function)	X	X	X	X	X	X
Employer Engagement	X	X		X	X	
Engagement Database	X	X	X	X	X	X
Event Mgmt (fairs, workshops, registration, etc.)	X	X			X	
Advertising	X	X	X		X	
Site Analytics	X	X				
Data Reporting	X	X			X	
Notes (employers, events, etc.)	X	X			X	
Access Levels	X	X			X	
Job Board	X	X	X		X	X
Room requests (interviews, info sessions, etc.)	X	X	X		X	
Fee Collection	X	X			X	

Figure HUB-Stakeholder-Needs: Breakdown of stakeholder needs for proposed Career Exploration Hub.

Recommendations

Our specific recommendations with respect to a career exploration hub are:

1. Empower CAPD with the task of curating all Career Exploration Opportunities in one central location for the MIT community, i.e. the MIT Career Exploration Hub.

2. Develop Handshake (for the Career Exploration Hub) so that it can be used by all departments, offices, programs, employers, and students organizations to promote career exploration events, fairs, and resources in one location.

3. Create a Handshake Usergroup that gathers administrators, faculty, and students in the development and expansion of the resource to support career exploration

4. Require all student organizations that run employer engagement opportunities (career fairs, sponsorships, hackathons, etc.) to have events reviewed and approved by CAPD and promoted through the new central Career Exploration Hub (Handshake)

5. Require all departments, offices, programs and administrators that run employer engagement opportunities (career fairs, sponsorships, hackathons, etc.) to promote their opportunities through the new central Career Exploration Hub (Handshake).

6. Organize a central database, maintained by CAPD, to house recruiter or employer recruiting statuses, such as suspensions or violations of MIT policies, that is accessible to all administrators and faculty who engage with employers for recruiting or sponsorship activities.

6. Graduate Student Internships

In this chapter, we study the culture at MIT around graduate students participating in internships, compare the demand for graduate student internships against the current level of engagement to identify unmet needs, understand the barriers that graduate students face while pursuing internships at an institute as well as department level, and propose recommendations to lower these barriers.

For this purpose, we define an internship as a period of work experience offered by an employer to give students exposure to the working environment typically related to their field of study. Internships can be as short as a week or as long as 12 months. They can be paid or voluntary.

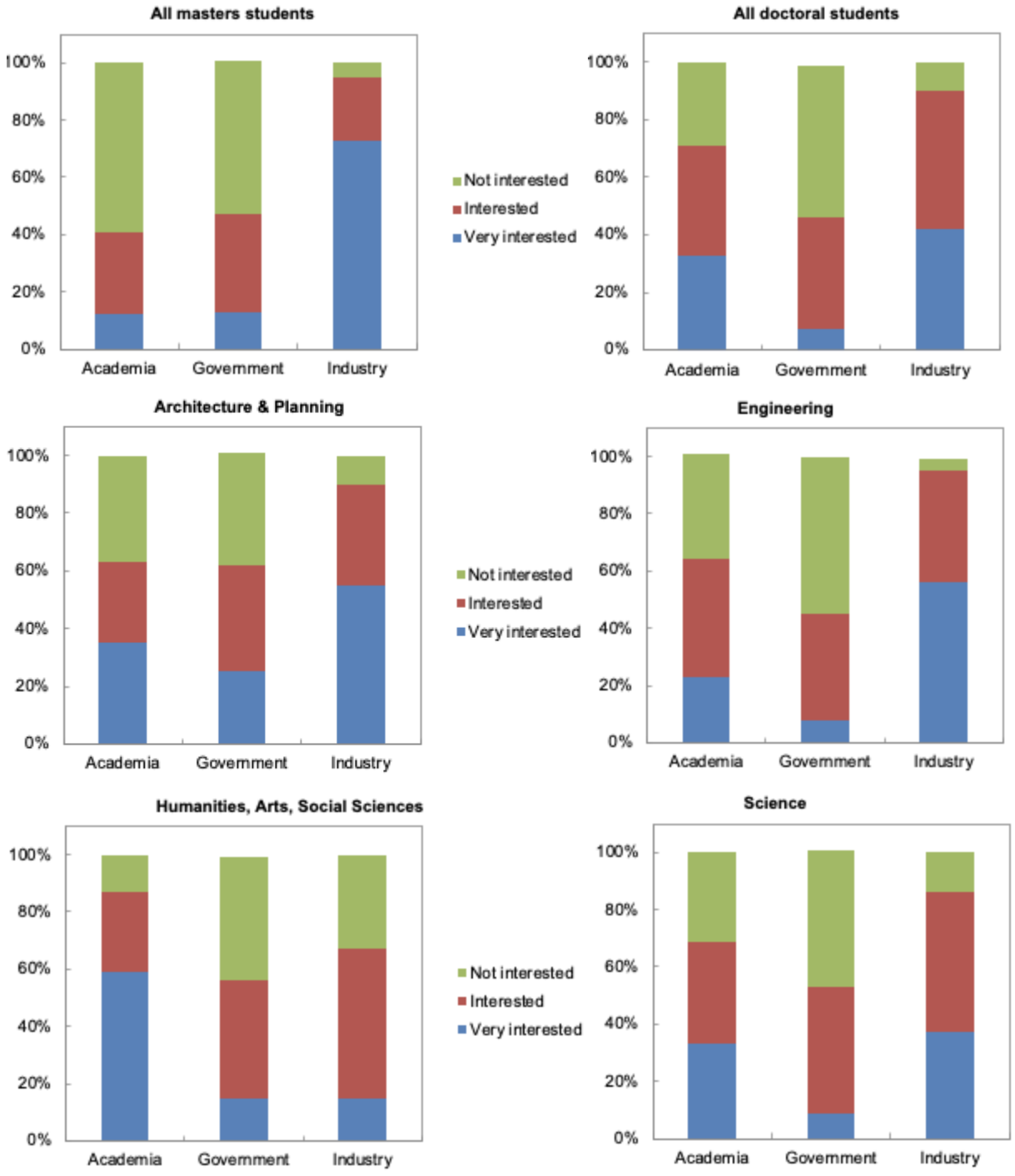
Studies demonstrate that graduate students completing internships improve work-related skills, grow their networks, and are more attractive to prospective employers[1-4]. Internships also provide students with career development skills, while increasing students' confidence in career exploration and decision making. This is particularly important in the context of doctoral students who wish to pursue non-academic careers, as there is evidence that such students have lower confidence in their ability to make career decisions[4].

Key Findings

To better understand graduate student internships at MIT, we developed the Graduate Internship Survey that was administered in 2019. The survey received 1400 responses from graduates across MIT. Key findings from the survey are reported here. These findings are illustrated both quantitatively (using response rate statistics) as well as qualitatively (based on statements given in an open response question). More detailed information is available in the full results of the survey, including breakdowns by schools and departments. If interested, please request access to the 2019 Grad Internship Survey through Institutional Research.

Students are interested in a wide range of different career paths

As part of the survey, we asked student interest in careers in academia, government, and industry. Students could select any level of interest for these career paths (e.g. a student could select Very Interested for all three paths). The results are shown in Figure GSI-Career-Paths. Comparing first responses by level, industrial career paths are the largest interest for both masters and doctoral students, though interest in academic careers is nearly as high as industry for doctoral students. School-to-school variations exist, though Architecture & Planning, Engineering and Science graduate students have similar interests (industry being most interested and government being least interested). Humanities, Arts, and Social Sciences are most interested in academic careers. Sloan, not surprisingly, is significantly interested in industrial career paths.


All masters students
All doctoral students
Architecture & Planning
Engineering
Humanities, Arts, Social Sciences
Science
100%
80%
60%
40%
20%
0%
Academia
Government
Industry
Not interested
Interested
Very interested

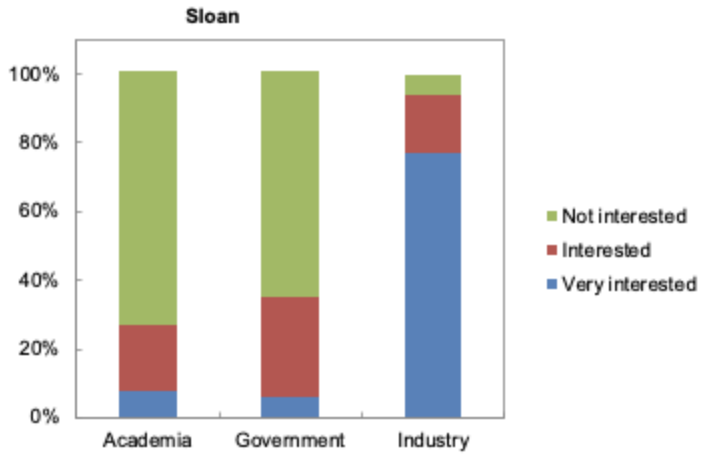
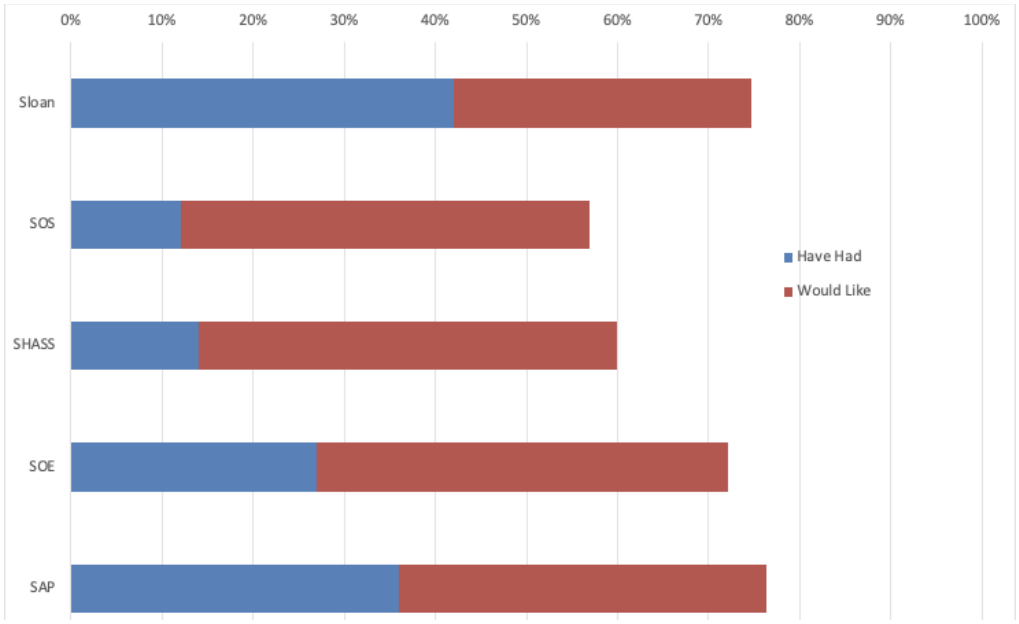


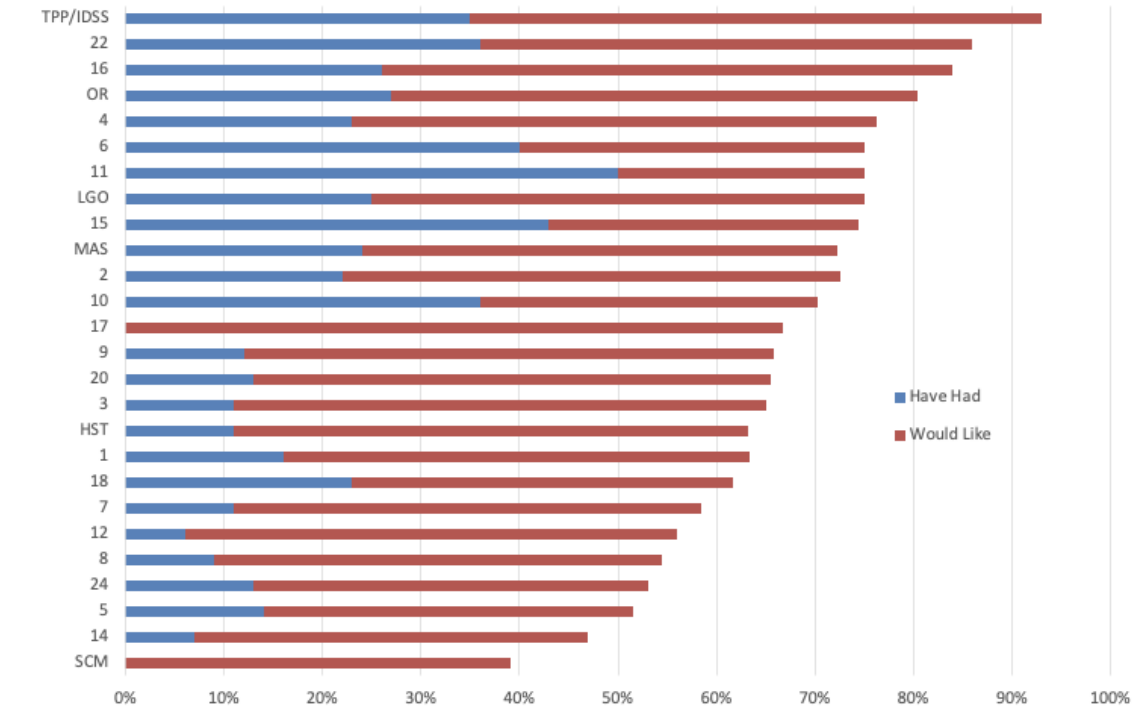
Figure GSI-Career-Paths: Responses to interest in Industry, Government, and Academic career paths. Responses broken out by level (Masters and Doctoral) and School. 2019 MIT Graduate Student Internship Survey.

Student participation rate in internships

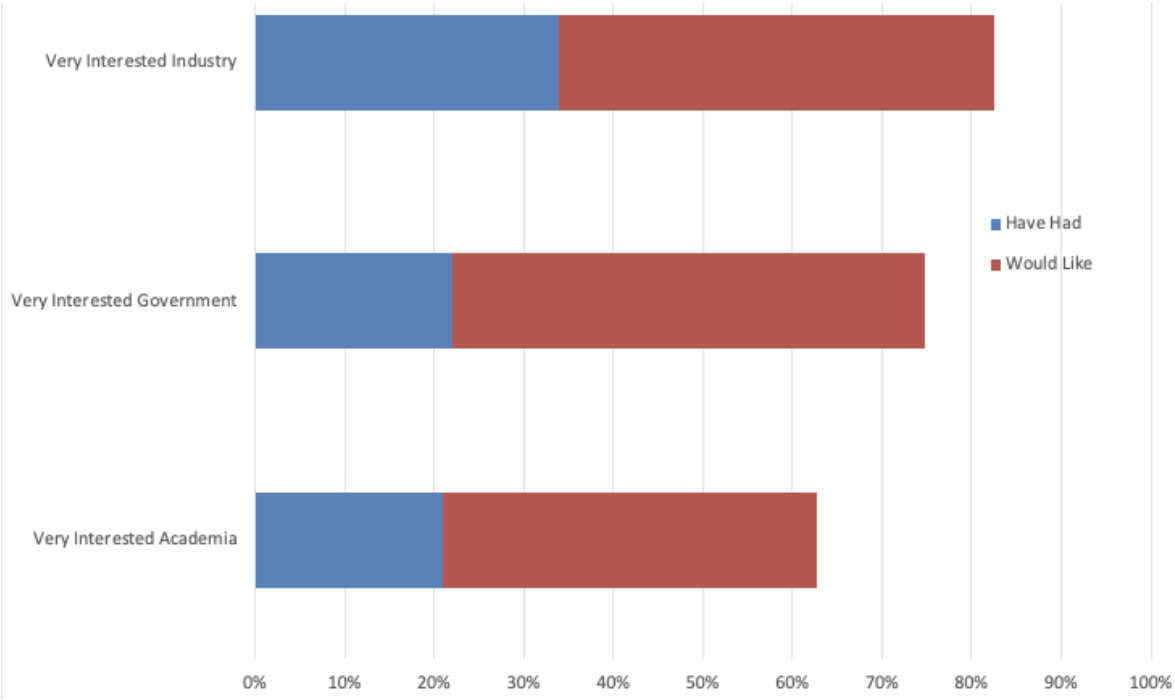
While variation exists among schools, departments, and career path interests, in any of these categories over 50% of respondents have had or are interested in having internships as graduate students. In particular we note that over 60% of students that are very interested in an academic career path indicate they would like or have had an internship as a graduate student.



(a) Responses by School



(b) Responses by Department/Program



(c) Responses by career path very interested

Figure GSI-Interest: Responses to whether students have had or are interested in an internship experience. 2019 MIT Graduate Student Internship Survey.

Benefits of a graduate student internship experience

71% of those who had an internship experience found it useful. Interestingly, a higher percentage of PhD students found the internship useful in comparison to Masters students (75% versus 66%), underscoring that benefit of internships for students focused on research. The bar charts below shows the different ways in which internships benefit students, with similar results for PhD and Masters students.

The following are illustrative comments from students about benefits of a graduate internship:

- *Working in an intensely focused industry research lab with 100s of experts in the topic propelled my knowledge forward much more quickly than a year in the PhD program here.* (Doctoral student, Architecture & Planning)
- *I felt my internship was extremely empowering. I was not very confident in my abilities at MIT but I was an expert at my internship.* (Doctoral student, Engineering)
- *My internship was very useful for me in terms of networking outside of academia and helping me to solidify career goals... the techniques and knowledge gained by a student during an internship can go a long way to making a student more productive in their PhD pursuits.* (Doctoral student, Science)
- *The internship I participated in was set up through the class 20.930/7.930: Research Experience in Biopharma. This class was probably the closest thing to the PERFECT internship experience for me. The internship requirements are only 10 hr per week for one semester. This allowed just enough time to get a taste for lab work in pharma, and to network with a ton of people, but did not cut into my personal research time too much. It was an amazing opportunity and I would definitely look to them as a model for setting up accessible internship programs in different departments.* (Doctoral student, Science)
- *I ultimately decided that academia was the career path I wanted to pursue, but I would not have been able to make that informed decision without an internship experience in industry.* (Doctoral student, Science)
- *Internships have been a very helpful way for me to stay grounded in the rest of the world while I pursue my degree. I find myself applying lessons from the internship in class and lessons from class in the internship. It's good to learn about more organizations and if I would want to work there* (Masters student, Architecture & Planning)
- *Doing a government internship was one of the most helpful experiences that I've had here at MIT. It helped me clarify what career paths I was interested in and helped me expand my network.* (Masters student, Engineering)
- *My internship experience was very valuable since it better shaped my future goals and understand what I am interested in and made me aware of the interesting problems that companies are trying to solve.* (Doctoral student, Science)

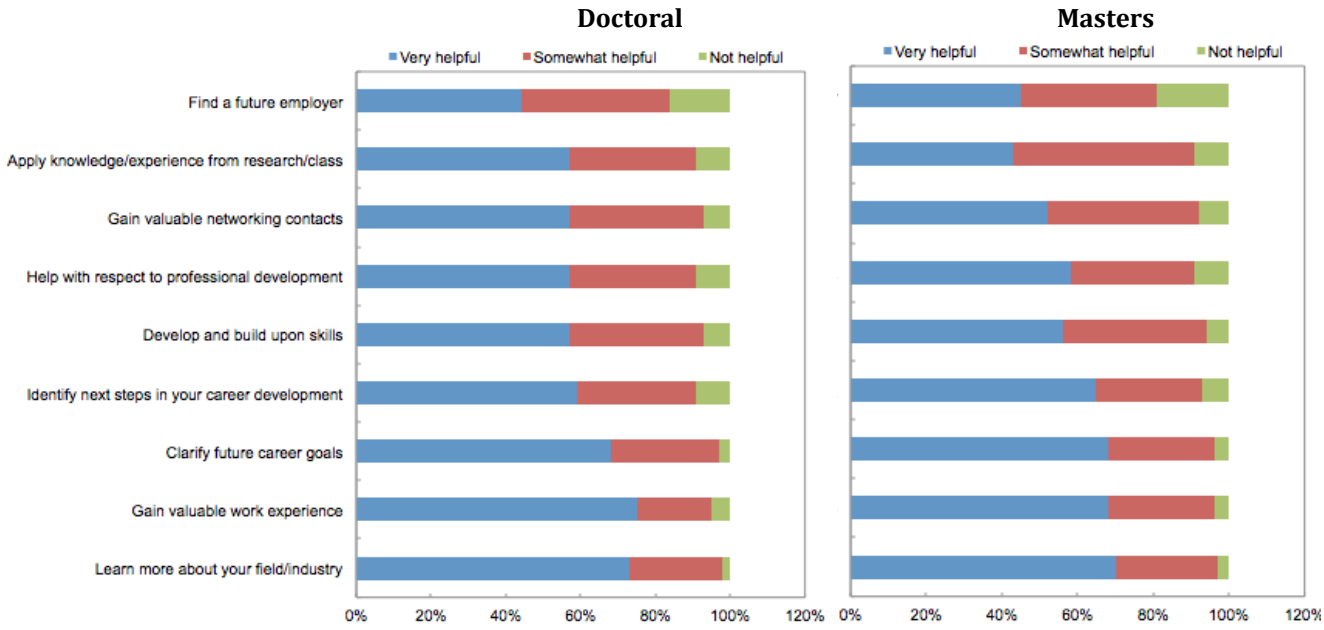


Figure GSI-Benefits: Responses to benefits offered by internships for Doctoral and Masters students. 2019 MIT Graduate Student Internship Survey.

Barriers for pursuing an internship

The bar chart below shows the major barriers reported by students who have not had an internship experience (the percentages for immigration/legal issues have been reported for international students only). In general, the barriers are perceived to be more severe by doctoral students. The major barriers include on-campus research/academic/work requirements, program structure, immigration/legal issues, and lack of knowledge about internship opportunities, and lack of faculty support.

The following are illustrative comments from students about barriers of pursuing an internship:

- *The research work needs to get done, one way or another. Sponsors need the work done in order to continue sponsoring research. Sponsors/grant timelines don't magically go on hold when you leave to go to an internship, but I wish I could just put it on hold in order to leave for an internship with my PI's blessing.* (Doctoral student, Engineering)
- *In my experience, the limiting factor on taking an internship would be the way that my research and project obligations were structured make it nearly impossible to take time away.* (Doctoral student, Science)
- *I found it hard to tell my PI that I want to do an internship, I think it would only work if my department required one before graduating. It all depends on funding, I was funded from my PI grants so felt pressure to contribute to research, also there is never a good time to go and leave for 2-3mo maybe in the beginning of the program but then you feel like you want to get started with research and not as much thinking what you want to do next after the PhD.* (Doctoral student, Engineering)

- *PI is not supportive of spending time doing fellowships bc she thinks that it's not worth my time to think about the future while I am doing my thesis. This is very frustrating b/c I tend to be a proactive person and I like the idea of exploring some career options on the side especially since I don't want to do academia and I have told her this before in person.* (Doctoral student, Engineering)
- *Internships are heavily discouraged. We call them the "i word".* (Doctoral student, Engineering)
- *I feel that I will be letting my advisor down if I lose a summer of research for an internship, but I am also worried about my job prospects if I don't get one.* (Doctoral student, Engineering)
- *It is difficult to justify to professors the time away from lab on an internship. But, I think this is an extremely important way to gain professional experience and potentially gain employment. Making this an official part of the program would improve employment prospects for graduate students.* (Doctoral student, Engineering)
- *Apart from wanting to save up my OPT until after I graduate, the biggest barrier to me doing an internship during my time at MIT has been my research advisor's dislike for his students showing interest in anything apart from academia.* (Doctoral student, Science)
- *… the internship was unpaid and I was luckily able to get internship funding [from my program] to cover my expenses. This is not a possibility for all students at MIT, though, but it should be. Funding for unpaid government/nonprofit/public service internships should be something provided by the Institute.* (Masters student, Engineering)
- *I jumped straight into graduate school after undergrad with the intention of being a career academic. I greatly enjoy my program, but sometimes I wonder if I should sample some other opportunities outside of academia before committing myself to that path. Non-academic jobs are a taboo subject in my academic community at MIT and in my field more broadly, though, and so I don't feel comfortable raising these interests to my advisor, for fear I will be deemed unserious or uncommitted to my academics.* (Doctoral student, Architecture & Planning)
- *Having to apply for work authorization from the government (OPT) was the biggest pain point. It usually takes 3.5 months and $410 to obtain, and eats time from my post graduation work time. Usually internships are advertised for immediate start or few months out. Having the restriction to be able to start only after 3.5 months of accepting an offer made me lose countless high value internship opportunities. The problem could be easily fixed if MIT offered CPT work authorization. Also, having departments be open to students doing part time internships would be a huge help when dealing with advisers or department administrators.* (Doctoral student, Science)
- *The greatest barrier to doing an internship is the removal of CPT. The fact that OPT will get used up discourages international students from pursuing an internship.* (Doctoral student, Engineering)

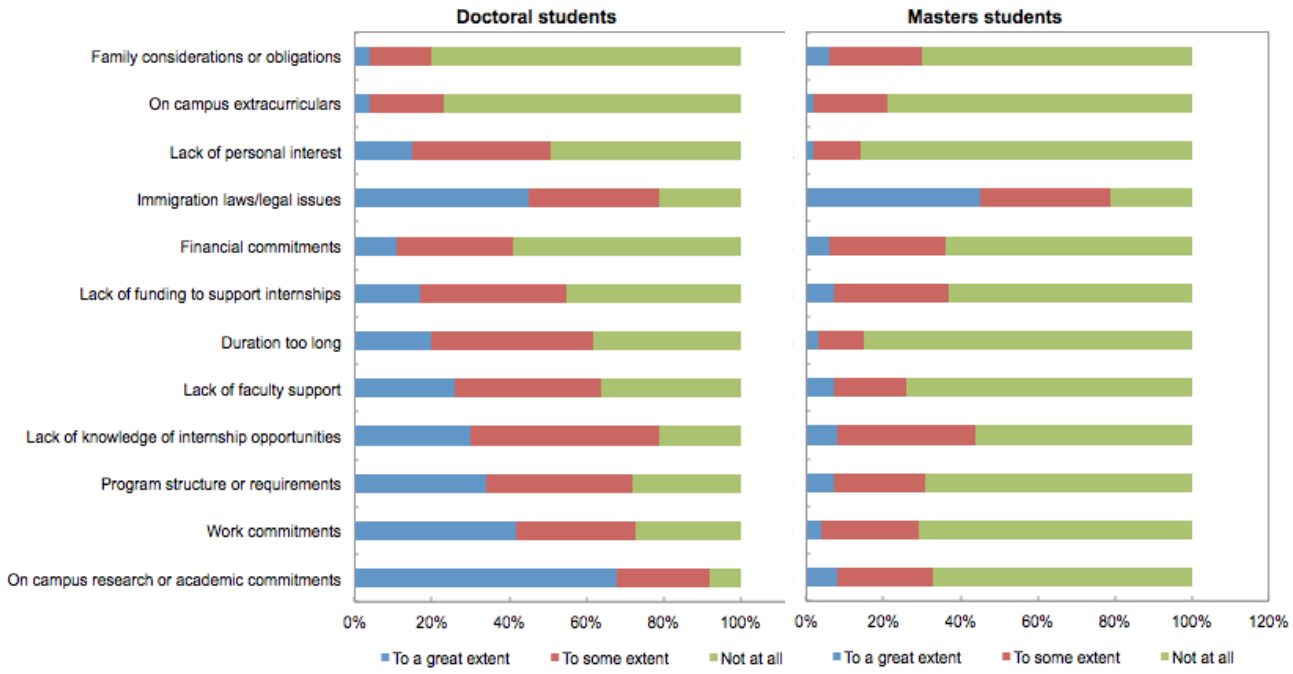


Figure GSI-Barriers: Responses to barriers for internships for Doctoral and Masters students. 2018 MIT Graduate Student Internship Survey.

The issues surrounding immigration can be significant for international students. Specifically, international students will require authorization to pursue off-campus employment. For students on a F-1 visa, this authorization could be obtained in two ways:

Curriculum Practical Training (CPT): Under Curricular Practical Training, all activity pursued must be "directly related to the student's major area of study" and an integral part of the student's established curriculum [8 CFR 214.2(f)(10)(i)]. Students pursuing an MIT degree have the option of using CPT only BEFORE completion of their studies. CPT can be authorized full-time during the annual vacation (summer and during IAP) and part-time (20 hours a week or less) during the academic year in the following cases in which working off campus with a company must be either:

- a required component of the curriculum, which all students (including domestic students) in the program must complete
- OR an internship that is evaluated by an MIT Professor, meets the criteria specified below, and is granted academic credit under a specific course number in the student's major degree requirement
- AND the course and academic credit must count towards completion of the degree (must fulfill an elective or mandatory credit that counts towards degree requirements)
- AND be enrolled in the specific internship/experiential learning course during the academic term in which the experience is conducted and CPT is authorized (note: some exceptions apply)

The challenges associated with a CPT include the following:

- As CPT has to count towards course/academic requirements for degree completion in order to be authorized, students can exercise this option only if CPT is offered as an elective or a mandatory course in their academic department. Only a small number of academic programs at MIT provide an elective subject that meets the requirements for CPT and almost none have it as a mandatory course.

- Even in departments where CPT is offered as an elective, students who have completed their credit requirements for their degree are unable to exercise the option of using CPT because it is no longer required to fulfill their degree requirements. In such cases, students who wish to use CPT to complete an internship in the later years of their doctoral program should plan in advance and reserve units for that purpose.

Optional Practical Training (OPT): OPT is a benefit authorized by U.S. Citizenship and Immigration Services (USCIS) that extends the F-1 student status to allow international students to work in the U.S.A. in order to gain practical training in their major field of study. Students who have been in lawful, full-time student status for at least one full academic year are eligible for a total of 12 months of OPT. Students may be authorized for 12 months of OPT and become eligible for another 12 months of OPT when they change to higher education level (i.e., from Bachelors to Masters; from Masters to PhD). The 12-month total limit of OPT applies to each educational level (Bachelors, Masters, and Doctoral degree programs). Any period of OPT used before the completion of the program is subtracted from the 12-month total limit.

Setting up an OPT is associated with the following disadvantages:

- Using OPT for an internship reduces the OPT time available to students post degree completion. This is particularly of consequence when students wish to continue working in the US and need to transition to H-1B visa status. H-1B visas are allocated using a lottery system and every candidate is allowed a maximum of three attempts. Hence, there is a preference to preserve OPT such that the lottery attempts can be maximized.

- To obtain OPT authorization, students have to file an application with the USCIS 90 days before the internship, along with a fee (currently $410). Once an OPT application is submitted, the start date and the end date of the internship cannot be changed and the fee is non-refundable, which poses challenges to accommodate any changes in the work contract.

- Students wanting to do an internship under OPT have to find an employer well in advance, which could deter their access to internship opportunities that might be offered close to start dates. For example, openings at startups might appear even closer to the start of the internship.

- While OPT applications can be submitted only 90 days before the start of the internship, the applications could take 90-120 days for processing. The uncertainty associated with the

timelines and government delays in processing these applications induces tensions in the student-employer relation and heightened levels of stress amongst students. In cases of extreme delays in processing OPT applications, employers could also rescind their internship offers.

Recommendation

Adopt a Career and Professional Development Requirement for Graduate Students. We believe graduate students should be encouraged to consider a wide range of career exploration and professional development opportunities during their studies. To do this, we recommend that all programs adopt a flexible career and professional development requirement for graduate students with an approximate load of 1 unit for masters and 2 units for doctoral students. While we envision one option to satisfy this requirement is to perform an industry, government or academic internship, many other options are possible depending on the interests of the individual student. Regardless of the specific option, we would encourage that a short self-reflective report be a part of the requirement. An example of such a requirement may be found in the *Professional Perspective Graduate Requirement in EECS*, which is mandatory for all graduate students in EECS. In addition to internship experiences, the EECS requirement can be satisfied by: attending multiple industry colloquia; pursuing a joint project with the industry; delivering research seminars in industry; or engaging in an activity focused on training for academia. Introducing such a requirement could encourage students to think about their careers early in the course of their graduate studies and adopt a more holistic approach towards career planning. Further, it would also allow international students to obtain CPT authorization for doing an internship significantly reducing the barriers associated with immigration/legal issues.

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7. Alumni Engagement

MIT alumni/ae represent a significant resource to students and each other in the area of career exploration and career/professional development. Integrating alumni/ae into this process aligns well with the principles underpinning our overall approach and increases the likelihood of success in reaching the objectives outlined at the start of this report. Engaging alum in this important component of a student's educational experience potentially extends, deepens and enhances the reach and impact of the student's curricular experience.

Methods employed by peer institutions and efforts already underway at MIT provide guidance and a foundation on which to build. Future success in engaging alumni/ae in this important endeavor is dependent upon actualizing a shared commitment among faculty, staff and alumni/ae.

Alumni Engagement at Peer Institutions

A survey of peer institutions was conducted to determine the nature and extent of alumni/ae engagement in their career development activities. Responses are included in Appendix X. Responses were received from Princeton, Columbia, Harvard, Yale and Duke, which showed that alumni/ae are engaged in student career development to varying degrees, in a range of formal and informal ways through a variety of channels. Such activities include internships, mentoring programs, career development events and online platforms, as well as shadowing, meet-ups, informational interviews, and a number of other programs and events. Duke represents a model in terms of approach, in that '*depending upon the student degree level and the engagement methodology, alumni are involved both formally and informally in virtually all expressions of professional development both within several career centers and through academic departments, interdisciplinary centers, cultural programs/centers, student organizations, the alumni association and on and on…. Alumni are a critical asset in many/most dimensions of education at Duke. There is no way to describe the range and structure easily as this is both a centralized and a decentralized institutional asset.'* (Duke Survey Response).

Alumni Engagement at MIT Today

Alumni/ae are currently engaged in student career development in a variety of ways at the Institute. Programs and resources are offered centrally by the MIT Alumni Association and the CAPD, as well as locally by departments and other groups. As noted earlier, this dispersed nature of the provision of services not only is a challenge for students and administrators, but also for our efforts in documenting the situation.

MIT Alumni Association staff presented their programs to the committee. Individual follow-up meetings were conducted with them as well as with key staff involved in other relevant programs. Meetings were conducted with:

- Ellen Stahl of MIT AA, regarding Advisor Hub
- Danielle Reddy, re: alum engagement with students (eg Infinite Careers)
- Tianna Ransom, re: career-related alum engagement with students
- Elena Byrne, re: Externship Program
- Hyun-A Park, former President of MITAA

The MIT Alumni Association currently sponsors a number of programs aimed at engaging alumni/ae in support of student career exploration and career development, most notably the Externship program and the relatively recently introduced online platform, Advisor Hub.

Externship Program

Twenty years in, this is an opportune time to re-assess the value of the Externship Program. Offered over IAP, the program provides students with the opportunity to connect with an alumnus/a for experiences as brief as 'shadowing' to a month-long internship. Last year there were 724 opportunities offered, about 262 of which did not get 'taken.' There were 1249 student applicants, thus 787 students go 'unplaced.' Program administrators are trying to address the fact that the offerings are heavily oriented toward Course 6. Another criticism is that many opportunities are unpaid. Moreover, while the intent may be career exploration, many employers, particular large employers, use the program for recruiting and see it as a *pipeline*, with the alumnus/a as a sponsor in name only. Many employers have gone as far as to want students to sign non-disclosure, non-compete agreements and to commit to a summer internship. Staff proactively works to mitigate this. Staff identified the biggest challenges to this being a career exploration opportunity are: the 'pipeline problem;' inadequate funding; and the perception that this is an Alumni Association program removed from central career support for students. Significant barriers to improvement are capacity – to run such a program successfully requires higher touch and consequently more staff - and lack of funding.

Advisor Hub

Advisor Hub is an online platform that connects students with alumni/ae and alumni/ae with each other for career advice, including general conversations, resume reviews, mock interviews, etc. In its first year, 1800 alumni had signed up and 350 connections/conversations had taken place – all with positive ratings.

Other Relevant MIT Alumni Association activities include:

- Medical mentorship program with Pre-health Advising
- Infinite Careers Program collaboration with CAPD
- Fall Career Fair collaboration with CAPD to increase diversity of opportunities
- X-terms collaboration: MIT AA staff have met with student organizers to develop ways to engage more alumni in as hosts
- Alumni Leadership Conference

- OGE dinner series – *Dinner with 12 Strangers*. (i.e. an alum can host a dinner with 12 graduate students)
- *Community Catalyst Leadership Program* (leadership coaching program in which alum and students meet individually on a monthly basis and discuss a variety of topics as well as quarterly in more formal workshops organized by DSL focused on such topics as ethics, networking, difficult conversations, etc.

Alumni Engagement at MIT Tomorrow

We propose an approach to career exploration and services that is characterized by complete integration of alumni/ae engagement – an approach to student career exploration and development in which alumni/ae engagement is 'baked in,' rather than a set of discrete programs. These co-curricular activities and relationships would be managed in the hybrid structure of central and regional/local levels. One can imagine a single MIT community of students, faculty and alumni/ae in a variety of dynamic relationships. We argue that alumni are critical to any *'..changes that would enhance exploration of, and access to, a broad range of careers …'*as stated in our charge.

Engaging alumni/ae in this meaningful effort will strengthen the MIT community of students and alumni/ae, and will also serve to strengthen, extend and enhance MIT's connections with the world beyond MIT and thus by extension promote MIT's visibility and impact. It can support student career exploration as well as alumni/ae career and professional development by increasing exposure to career options and the world of work; facilitating meaningful and potentially mutually beneficial connections among students and alumni/ae; and providing opportunities for engagement in professional settings.

Recommendations:
1. Facilitate alumni/ae engagement in all career exploration and career development activities.
2. Involve alumni in leadership of MIT student career exploration.

Facilitate alumni/ae engagement in all career exploration and career development activities

Alum clearly have a valuable role to play in the career exploration activities described elsewhere in this report. Alum can return to campus to give talks and participate in panels, sharing lessons learned from their own experiences as students and professionals. They can collaborate in applied research projects, participate in experiential learning classes and programs, and overall help to ground academic learning through a professional lens. Students can also leave campus joining alum in professional settings for informational interviews, shadowing opportunities, internships and career treks (visits to alum employers.) These experiences can be an especially useful tools for learning from the first-hand experiences of alum and investigating career options.
The potential for alumni/ae to make a serious contribution to experiential learning is significant. Alumni/ae can be tapped to connect students to a variety of professional experiences and applied

learning opportunities – whether it's through D-Lab, MISTI, Global Education or the PKG Center. Full-time and part-time internships, fellowships, applied coursework and client-driven research projects all can provide opportunities to explore practical applications of topics discussed in class, and allow students to build professional skillsets while exploring career pathways.

In addition to field-specific knowledge, alumni/ae, as former students themselves, have a unique understanding of what it means to be a student at MIT. Efforts to include alum in supporting students in these ways, brings the added benefit of engaging them as active members of a vibrant MIT community.

Online platforms represent a significant opportunity for expanding the reach and deepening connections among alum and between alum and students. The MIT Alumni Association platform currently sponsors Advisor Hub, *'an online platform that facilitates one to one career conversations with alumni volunteers who are willing to chat and share career and professional advice.'*

Finally, the alumni/ae place in MIT's new Kendall Square space could be used to support alumni engagement in student career exploration. The alumni/ae place can be used to increase the visibility of alumni/ae activities and facilitate face-to-face engagement on an individual basis or with groups. Having a specific physical place associated with alumni presence can serve to heighten awareness, visibility and impact of alumni/ae engagement, and serve as a material resource, which also has symbolic impact.

Involve alumni in leadership for MIT student career exploration

Alumni members (likely through MIT AA) should be included in the proposed Student Career Exploration and Development Committee. This will encourage coordination and increase the impact alumni can have on the MIT community.

Appendix A: Committee Charge and Membership

The goals of the MIT Committee on Student Career Exploration and Services are to review aspects and activities associated with student career exploration and services, and to identify changes that would enhance exploration of, and access to, a broad range of careers in a manner that best serves student needs. Specifically, the committee is charged with:

1. Reviewing how MIT students currently explore careers and prepare themselves for the process of seeking a career, and their level of access to a diverse range of internships, full-time employment, and graduate and professional degree opportunities;
2. Evaluating student needs (by year, degree type, and academic program);
3. Evaluating employer needs;
4. Evaluating current career events and activities, including the fall Career Fair and those offered by other student organizations, departments and MIT offices;
5. Recommending a set of principles, objectives and measurable outcomes for career exploration and services at MIT;
6. Recommending options to enhance career exploration and services and increase access to a diverse range of internships, full-time employment, and graduate and professional degree opportunities.

Committee members:
Scott Alessandro (Sloan)
Margaret Bertoni (Career Fair)
Isaiah Borne (Career Fair: departed committee in June 2018)
Gustavo Burkett (DSL)
Alkiviadis Chatzivasileiou (GSC: joined committee in September 2018)
Mary Jane Daly (SA+P)
David Darmofal (SOE, Chair)
Linda Griffith (SOE)
Lisa Guay (GSC)
Kathryn Jiang (UA)
Chris Kaiser (SOS)
Tamara Menghi (GECD)
Simantini Mitra-Behura (UA)
Melanie Parker (GECD)
Krithika Ramchander (GSC)
Vaibhavi Shah (Career Fair: joined committee in July 2018)
T.L. Taylor (SHASS)
Drew Weibel (Career Fair: departed committee in June 2018)

Appendix B: Catalog of Career Exploration Committee Recommendations

The committee has identified seven key recommendations with accompanying action steps that aim to address each of the four outlined career exploration objectives in this report.

Recommendation 1: Create a Committee on Student Career Exploration and Development

A. Compose a committee of faculty, CAPD, and other staff, students, alumni to discuss career exploration and development issues, challenges, and advocate for change and new opportunities.
B. Implement an Institute-wide continuous improvement process for career exploration.
C. Charge with ensuring a holistic oversight of career exploration and development, including, critically, career fairs
D. Develop holistic career fair strategy that includes standards, clarity of purpose, and objectives to serve all students at MIT and a wide range of career interests.
E. Advocate for the use of revenue from all career fairs to be used for the purpose of funding career exploration and development opportunities
F. Advocate for change around gender salary inequality and unfair recruiting practices

Recommendation 2: Support Exploration for Graduate School

A. Increase the representation of (MIT and non-MIT) UROPs and graduate schools at the Fall Career Fair and other fairs.
B. Develop funding to assist students pursuing research-related summer experiences
C. Incentivize career exploration opportunities that are graduate school focused within academic departments and domains.

Recommendation 3: Reset the Career Exploration Timeline

A. Move the Fall Career Fair to end of October
B. Increase events, including breadth of scope, leading up to the Fall Career Fair that support career exploration for first year students and others still exploring.
C. Stand as a leader and mobilize peer universities to push back on the aggressive and early student hiring practices.
D. Create policy that employers automatic offer extension if they are considering pursuing graduate school or non-profit/civic sector work
E. Advocate for longer timelines for employment (internship and full time) offer decisions

Recommendation 4: Expand Career Exploration Opportunities

A. Expand FPOP opportunities beyond orientation (e.g. IAP) and/or shorten format to allow first year undergraduate students to engage in more than one. In addition, incorporate Graduate Student pre-orientation programs.
B. Develop and/or continue micro / short opportunities for career exploration such as informational interviews, externships, and job shadowing that could occur during evenings, weekends, and breaks.

C. Provide additional funding to support student participation in exploratory activities such as conferences, internships, treks, research opportunities and more.
D. Collaborate more closely with career-exploration focused student clubs and organizations such as the Society of Women Engineers and the Consulting Club in the offering of career related programming.
E. Create a Career Exploration Conference, separate of any recruiting activities, allowing students to learn about different career paths as well as general career development concepts

Recommendation 5: Create a Career Exploration Hub

A. Empower CAPD with the task of curating all Career Exploration Opportunities in one central location for the MIT community
B. Develop Handshake so that it can be used by all departments, offices, programs, employers, and students organizations to promote career exploration events, fairs, and resources in one location.
C. Create a Handshake User Group that gathers administrators, faculty, and students in the development and expansion of the resource to support career exploration.
D. Require all student organizations that run employer engagement opportunities (career fairs, sponsorships, hackathons, etc.) to have events reviewed and approved by CAPD and promoted through the new central Career Exploration Hub (Handshake).
E. Require all departments, offices, programs and administrators that run employer engagement opportunities (career fairs, sponsorships, hackathons, etc.) to promote their opportunities through the new central Career Exploration Hub (Handshake).
F. Organize a central database, maintained by CAPD, to house recruiter or employer recruiting statuses, such as suspensions or violations of MIT policies, that is accessible to all administrators and faculty who engage with employers for recruiting or sponsorship activities.

Recommendation 6: Adopt a Career & Professional Development Requirement for Graduate Students

A. Seek to have all graduate programs at MIT adopt a flexible career and professional development requirement for all graduate students with an approximate load of 1 unit for masters and 2 units for doctoral students. One option to satisfy this requirement should be an industry, government or academic internship, however, other options should be possible and supported. A short self-reflective report should be a part of the requirement.

Recommendation 7: Increase Alumni Engagement

A. Involve alumni in leadership of MIT student career exploration through the proposed Committee on Student Career Exploration
B. Increase alumni/ae engagement in all career exploration and development activities
C. Leverage the Alumni Advisors Hub in new ways to expand the reach and connections made between alum and students.
D. Utilize the new alumni/ae place in MIT's new Kendall Square space to support alumni engagement in student career exploration through individual student opportunities and group programming.

Appendix C: Undergraduate Career Exploration and Service Needs Literature Review

Programs and services offered by peer institutions were reviewed, along with a review of articles, journals, and relevant professional organizations for gathering insight on best practices and models for serving undergraduate student career exploration. There were three general findings about the influences on a student's career exploration that were noteworthy for this report to consider when making recommendations.

- An emphasis on the Career Service Center (CSC) as the sole contributor toward students' career development is misplaced, given that other factors, such as social capital and family influences, have been documented as influencing college students' career-related outcomes. In general, students participating in focus groups felt that CSC programs, tools, and services were useful and beneficial. However, for students needing support related to an individual disciplinary focus and/or with choosing or changing a career path, services missed the mark. In particular, international students and first-generation college students were more likely to find their needs unmet. (see "Table 2. Themes of Students' Positive and Negative Experiences with CSC" in Appendix I) (Chin, Blackburn Cohen, & Hora, 2018)
- Students participating in focus groups identified three main sources contributing to their enhanced willingness to explore: family advice and support, career advising, and their work supervisors. (Chin, Blackburn Cohen, & Hora, 2018)
- The results of the latest student workforce readiness survey from McGraw-Hill Education show that career service centers are a relatively underused campus resource: About 1/4 of college students say they have never used career services and just 14% say they use career services frequently. Less than 1/3 of students believe that the career offices are effective. (Katz, 2015)

In addition to the general findings about influence on career development, four themes were identified that can help MIT develop specific strategies and goals for improving the career exploration experience for undergraduate students.

Theme #1: Undergraduate students benefit from exploring careers and building professional skills as early as possible.

- During informal conversations with undergraduate students, some common themes emerged: More career exploration is needed even before college, and students were less concerned with picking the right major than they were with choosing classes that would expose them to new subjects or help them connect ideas across disciplines. (Selingo, 2012)
- Career advising is not as structured or proactive as many students need. A benefit to both the student and the college would be to intertwine career exploration and academic advising within a defined curriculum no later than the first semester of the student's sophomore year. (Ragan, 2018)

- Career service centers should provide a space for students to reflect and explore the influences and events that led them to where they are, including creating opportunities for students to engage with consistent career professionals over time. Narrative exercises enable students to better understand their own life themes and their vocational interests, and generate further exploration of career options. (Chin, Blackburn Cohen, & Hora, 2018)
- While groups have long been used for career counseling, more contemporary perspectives on the career exploration process, in which a complex interplay among multiple internal and external factors affect career development, indicate the characteristic strengths of group work make it a good fit for career exploration and decision-making. Sample group activities could include: career research skills, forming a working relationship with another group member, Holland codes, values assessments, awareness of internal and external factors influencing academic and career decision-making, occupational family trees, and development of a career flow chart. (Campbell, Champe, & Pimpleton-Gray, 2017)
- Some employers felt that career services spend too much time on the mechanics of how to get a job, and not enough on how to do a job, and feel that a Sophomore year "What is a Professional?" seminar would be useful. (CERI Research Brief, 2013)

Theme #2: Undergraduate career exploration trends can vary by degree program and career focus.

<u>Arts and Sciences/Liberal Arts students</u>

- Students are being recruited for marketing sales, and human resources positions as well as finance and purchasing/inventory functions, positions that assume the domain of business departments. (CERI Research Brief, 2013)
- Arts & Sciences students stumble during the recruiting process in three areas: expressing career interests clearly, having appropriate and sufficient pre-professional experiences, and expressing realistic expectations for their first job. (see "Table 6. Employer Expectations During the Recruiting Process" in Appendix I) (CERI Research Brief, 2013)
- Many academic leaders and some public observers worry about the adverse effects of too much emphasis on pre-professional studies and employability instead of a focus on the liberal arts and general education. (Katz, 2015)

<u>Business students</u>

- A 2015 study found that business students choose majors that align well with their abilities and skills, and tend to be sensitive to the issue of job availability. Social influences (parents, teachers, counselors, and friends) appear to be important as well. Male business students in particular seem to base career decisions on the future salary potential. The study also found that the presence of other women in business did not impact female students' decision to major in the field. However, this could be because female students have not been exposed to particularly successful businesswomen. The authors believe that both high schools and colleges should focus on getting prominent female business leaders to speak and offer workshops. (Geyfman, Force, & Davis, 2015)
- Marketing in particular tends to be viewed through a very narrow lens. To the extent that students hold negative perceptions, such as lack of quantitative analysis or rigor, of the major, marketing will have difficulty attracting strong students. Shadowing opportunities with marketing professionals, invitations for marketing practitioners to speak, and more marketing career and advice is needed. (Cobb-Walgren, Pilling, & Barksdale, 2017)

<u>Information Technology/Information Systems students</u>

- Top motivators for students choosing the field of information systems included love of technology, job security, gratifying work, and level of income. It is important that students have an accurate view of the profession and that they're aware of the opportunities the profession affords them. Potential avenues for accomplishing this include: appropriately marketing the major and profession, highlighting current trends in the job market, honestly discussing opportunities in the field, fostering a connection with technology at many levels (not just programming), expanding the general perception of what an information system major or professional is, and building a solid foundation and reputation by successfully working with industry and placing students in beneficial roles. (Brooks, Korzaan, & Ceccucci, 2014)

Theme #3: Many institutions are developing and/or implementing a career exploration curriculum that spans all four years of a student's time as an undergraduate.

- To successfully revive the liberal arts, professional preparation activities and the staff that lead them must be integrated into the developmental process from the beginning of a student's course of study, not relegated to the eight or nine months prior to graduation. (CERI Research Brief, 2013)
- College students are well-served by a mandatory, credit-bearing, four-year course of study that synthesizes key aspects of academic and career counseling into one setting, ideally led by a mentor, and focuses on things such as the freshman experience, and personal and professional development. (Ragan, 2018)
- In Fall 2014, Manhattanville College created a replacement for its 40+ year old Portfolio System using a design thinking process. The goal was to increase students' active participation in becoming career-ready in a quickly changing workforce, given that employers need graduates who know how to learn new things. Reflection is a key component of the program, as students develop greater awareness and understanding of their own preparedness and can use this information to develop new skills and knowledge. (Carson, Hannum, & Dehne, 2018)
- Albion College introduced the Albion Advantage in 2011, an intentional, four-year educational model blending a liberal arts foundation with career readiness. All students are matched with a faculty mentor and an alumni mentor, encouraged to pursue multi-year academic research projects with real-world applications as well as off-campus experiences with a clear connection to their majors and complete a four-year career plan with guidance from the campus Career and Internship Center and faculty mentors. (Katz, 2015)
- Mount Holyoke College developed an initiative called the Lynk, a program comprising four developmental stages: goal setting, professional development, practical experience, and launch. The last stage includes a series of public symposia for students to showcase what they've learned both in the classroom and out of it, and to demonstrate the connection between those worlds. There is no single prescribed path through the four stages. Instead, students work closely with multiple mentors and advisors drawn from the faculty, the career development center, and specialized academic centers on campus. (Katz, 2015)
- University of Minnesota developed a constructivist career course that integrates trait/factor, developmental, and postmodern perspectives. The course draws from three major perspectives of career development: career as self-realization, career as growing experiences, and career as context conceptualization. (Grier-Reed & Conkel-Ziebell, 2009)

    a. The course begins with contemplation rather than action and the curriculum takes into account the five-stage transtheoretical model of change. Module 1 explores the past and present, Module 2 constructs the future, and Module 3 focuses on planning, action, and integration. All modules include the constructivist tools of narrative, action, construction, and interpretation.
    b. Outcome studies of the course have found significant increases in students' career decision self-efficacy and significant decreases in students' dysfunctional, self-defeating thoughts. Authors believe that developing students' self-concepts and subjective careers are integral to the success of the course.
- Faculty within the Computer Information Systems (CIS) Department at Cal Poly Pomona (CPP) instituted a new course to introduce incoming freshman and transfer students into the major. The class design is based on research about attracting students to CIS (particularly members of under-represented groups such as females and minorities), retaining females in the profession, and the positive effects of pair programming (students working together to produce a single product and alternating between the roles of coding and research/review). The course plan includes: an overview of student support resources, exposure to widely varied types of IT work, a focus on networking, visits from alumni, professional organizations, and the career center. (Soe, Guthrie, Yakura, & Hwang, 2012)

Theme #4: Employers are seeking a combination of "soft" skills with technical skills among the pool of undergraduate students entering the job market.

- Frequently mentioned strategies to increase Arts & Sciences students' value: gain relevant experience, adjust curriculum, and ensure student development in non-disciplinary based skills such as teamwork, leadership, and initiative as well as appropriate work behaviors such as patience, persistence and accountability. (CERI Research Brief, 2013)
- Career-focused college programs must provide students with a strong base from which to secure employment, but they should also help students learn skills and behaviors necessary for success. Students need to have a broader understanding of how their work fits into their sector and know how to adapt quickly to changes so they can continue to succeed in their field, or change fields, if necessary. They should learn how to work collaboratively with peers to solve problems, to communicate their ideas, and to negotiate on their own behalf. (American Academy of Arts & Sciences, 2017)
- College graduates in every field need to master a blend of technical training as well as socio-emotional, problem-solving, and critical thinking skills so they can perform effectively at work, participate meaningfully in community and civic affairs, and pursue lifelong learning. (American Academy of Arts & Sciences, 2017)

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Appendix D: Graduate Student Career Exploration and Service Needs Literature Review

The graduate working group conducted a study of current literature regarding career exploration and services needs for graduate students. The following represents a summary of key findings by themes, based upon 13 articles, reports, and book selections, with a list of references provided after the summary.

Theme #1: The career development support needs of graduate students is more complex than undergraduate students. Additionally, doctoral and research master's students typically need more help with career exploration than specialized/professional master's program.

- Graduate students represent a greater diversity of backgrounds, nationalities, and life experiences than undergraduates and require unique support services. Doctoral students in particular face the challenge of working closely with a single academic advisor, a relationship that heavily impacts students' futures (Geraci & Kircher 2011).
- Students in professional master's programs are less likely to need non-academic advising student services, because their programs are typically of shorter duration and they are naturally surrounded by a greater variety of peers and mentors (Geraci & Kircher 2011).
- Researchers noted that doctoral students report stronger perceptions of becoming a competent professional in their field of choice than those pursuing master's degrees and they were less likely to identify "career change" as an important reason for graduate studies. However, both groups experienced a decline in satisfaction with career preparation at the midway through their programs of study, which may suggest a need for greater faculty and career professional engagement and support to students at this point. Both groups cited achieving professional goals as their top reason for attending graduate school. (Hardré, & Hackett, 2015).

Theme #2: Graduate students in research or academic fields of study need advising and support in exploring a wide range of career options. The timing of these services is important.

- Although graduate students are in an academic field of study specialized beyond the bachelor's degree, many enter their graduate studies as a way to explore career options and would benefit from services designed to help them identify and explore their career interests (Woolston, 2015).
- There is a disconnect between the doctoral market and career interests/needs. Students often lack knowledge of the skills needed for particular jobs and were unable to self-assess their fit (Laursen, Thiry, & Loshbaugh H., 2012).
- Supporting the enhancement of graduate student agency is important, including encouraging multiple career paths, facilitating networking and offering mentoring and guidance. (Meara, Jaeger, Eliason, Grantham, Cowdery, Mitchall, & Zhang, 2017)

- Students who engage in broad career exploration experience greater career satisfaction, motivation, persistence, organizational and occupational commitment. (Stumpf, Calarelli, & Hartman, 1983)
- Those enrolled in research master's and doctoral programs need:
    - Increased exposure to a wider range of career options
    - Preparation for the labor market
    - Help connecting with non-academic careers and feeling comfortable with nonlinear career paths
    - Job search support
    - Help with career-related emotional issues. (Hardré & Hackett, 2015)
- Students should engage in career planning from the beginning of their degree program. Too often, doctoral students focus all of their efforts on completing their dissertation, waiting until their final year to start thinking about the job search. Researchers found that the most successful students, are the ones who think about the job search from the first year of their graduate studies (Albert and Attis, 2010).
- These stages of doctoral student development/milestones are noted, with significant differences in satisfaction with overall graduate experience; satisfaction with program of study; and perception of career preparation. All of these characteristics are the lowest at the midpoint stage.
    - Entry-Main goals are to maintain motivation, manage academic demands, and develop a clear sense of purpose and direction. May lack direction, experience self-doubt, lose professional self-esteem, and international students add cultural adjustment issues.
    - Engagement-Main goals are self-preservation and achievement. Often roles are established, responsibilities become routine, and confidence is restored. Challenges may include procrastination, fear of failure, changing career goals, lack of mentors, and balancing roles.
    - Exit-Main goals are disengagement and reintegration. Challenges may include lack of control of timeline, managing others' expectations, searching for career alternatives, disillusionment with job market, and fear. (Lehker & Furlong, 2006), (Geraci & Kircher, 2011)
- The life of a doctoral student can be very isolating. It is important for students to have contacts outside of the department setting. Students with satisfying graduate experiences may be better able to market themselves to future employers and maintain a strong connection to the university (Geraci & Kircher, 2011).
- A career exploration best practice is support for internships or summer jobs. Few doctoral students attempt them and few universities actively support them, a number of contacts suggested that giving students an opportunity to gain experience outside of academia could help them decide if that path is of interest to them while at the same time improving their resume. (Albert & Attis, 2010).

Theme #3: Science and engineering doctorate recipients report the lowest rates of employment in academia among all doctorate recipients.

- The highest rates of academic employment commitments were reported by doctorate recipients in humanities and arts (76%) and in other non-science and engineering fields (76%) while the lowest rates were reported in engineering (14%) and in physical sciences and earth sciences (20%).
- Since 2006, the rate of academic employment commitments by doctorate recipients in S&E fields has declined by 7 percentage points, whereas the academic employment rate of doctorates in non-science and engineering fields has risen. (National Science Foundation, National Center for Science and Engineering Statistics Directorate for Social, Behavioral and Economic Sciences, 2018)

Theme #4: Many graduate students enrolled in research programs do not feel supported in their exploration or pursuit of careers outside of academia. Many faculty want to help, but expect students to establish clear career goals.

- Only half of respondents to a survey of global graduate students believed that their supervisor is open to a career outside academia, 41% felt encouraged to attend career-promoting events, and 33% reported getting useful advice for careers beyond academia. Most respondents obtained career advice through online resources. (Woolston, 2015)
- According to a study of career development needs of doctoral students and faculty in Chemistry departments, faculty felt most prepared to offer advice about academic career paths but most were open to assisting doctoral students in pursuing non-academic career paths, if the students had clear career goals. However, most students did not have a well-developed understanding of their career options, which creates a gap between well-meaning faculty and students who need help with career planning. The researchers concluded that these students lacked professional socialization. (Laursen, Thiry, & Loshbaugh H., 2012).
- It is important to support exploration of alternatives to positions at research universities. The number of new PhDs produced annually far exceeds the number of open tenure-track positions at research universities, yet many doctoral students at research universities are hesitant to consider other career options, such as teaching at community colleges or independent schools or non-academic careers (Albert & Attis, 2010).

Theme #5: International graduate students have unique and varying characteristics and motivations that impact their career development needs.

- Regardless of their country of origin, genders or fields of study, most international students found that their academic department or lab was more supportive than their career center in pursuit of their career goals, for a number of reasons.
- Many students come from countries that lack career counseling services and do not seek these services as part of their graduate studies. Other barriers included lower

acculturation levels and language barriers, belief that the most services aren't relevant, only for undergraduates or U.S. students, or a perception that they didn't need the services.
- Because of these barriers, International student career needs are often hidden (i.e. they don't know what to ask for) and they lack motivation to seek professional services.
- International students were actually found to have greater need for career counseling services, help in understanding their "rights" related to career search and work experiences than U.S. students.
- In many cases, international students' outstanding academic performance, faculty support, and/or reputation of their academic department would appear to guarantee good jobs, so they perceived that they did not need career counseling support.
- If information made it clear that the center would help international students to find a good job, study participants expressed strong interest in pursuing centralized career help.
- Researchers recommended that career centers take these actions to enhance their support of international students:
    - Collaborate with international student services, graduate student services, and academic departments to develop an advisory handbook for faculty, including cultural differences, and ideas and resources to broaden international student skills and experiences, to enhance departmental support.
    - Work to provide international students with greater access to internships, increase outreach to companies who support international students' work authorizations as well as to companies operating in students' home countries. Ensure good representation of these companies at career fairs and on-campus interviews.
    - Collaborate with alumni services to increase international student access to international alumni networks.
    - Provide a rich array of diverse content targeted to international student populations and subpopulations, including online services, links to legislation affecting international student employment and to job banks in home countries.
    - Track international student employment outcomes and make the results visible to increase international student confidence in the center.
    - All career counselors should examine their views regarding working with diverse clients, globalization, immigration, and foreign workers' competition in the U.S. job market and ensure all counselors receive training on cultural sensitivity and understand the factors that influence international students' career plans, both as individuals and as a group. (Shen, Y. & Herr, E. L., 2004)

Theme #6: Access to mentoring and professional networks can provide significant gains in graduate student career development.

- A study of mentoring interactions for Black STEM students noted that "meaningful relationships with faculty led to exposure to important experiences that helped [Black STEM students] prepare for careers in academia." These mentoring interactions produced the strongest outcomes and we noted that this may be applicable more broadly (Alston, Guy, & Campbell, 2017).

- A best practice is to bring in graduate alumni (from both academic and non-academic settings) as experts, mentors, potential employers and donors. Many institutions engage a broader range of graduate alumni in a more proactive way, including those teaching outside of universities or those who have pursued non-academic careers (Albert & Attis, 2010).
- Mentoring and networking programs help graduate students develop greater "agency" in their own career development (Meara, Jaeger, Eliason, Grantham, Cowdery, Mitchall, & Zhang, 2017).

Theme #7: Collaborative service delivery models between departmental and centralized offices may offer the most effective career outcomes for graduate students and advisory committee comprised of faculty, students, career services and ancillary offices is an effective best practice. Academic departments play an important role in the career development of graduate students studying in their programs.

- In one study of six universities with very high research activity, researchers found that most schools designate at least one advisor to graduate students in each academic department in addition to their academic advisor to advise students on key resources, including career options and research and fellowship opportunities. However, students can be reluctant to be open about their needs and goals to individuals closely linked to their academic success (Geraci & Kircher, 2011).
- Support should be tailored to the needs of different disciplines. Students in different fields tend to follow different career paths and face different challenges. (Albert & Attis, 2010).
- A lack of coordination between Career Services offices and academic department career activities as well as a lack of centralized career center visibility were cited as an issue at many campuses. Department-based career services may have greater expertise on discipline-specific career paths than centralized career services has (Kim, 2005).
- Many campuses offer hybrid career services models with collaboration across multiple offices, including Graduate Education office, Career Services, Teaching and Learning, individual departments. Many departments have faculty or administrative departmental to let them know about resources, including career, research and fellowship opportunities (Albert & Attis, 2010).
- Student access to qualified career counselors, which are typically housed in centralized career services, is important as research indicates that individual career counseling is the most efficient intervention for career gains, particularly for students of color and other special groups (Feller, 1992).
- Institutions should build tight relationships between the central career services office and academic departments. While faculty mentors and the broader departmental staff remain the primary advisors to PhD students, increasingly Career Services offices are supplementing their efforts with information, training, and tools relating to common aspects of the job search process (Albert & Attis, 2010).
- Forming a career advisory committee with faculty, students, and career services is recommended to ensure greater collaboration (Kim, 2005).

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Appendix E: Analysis of Gendered Differences

We have analyzed gendered differences in student perception of the opportunities they have had for career exploration. Specifically, we consider the responses from the 2017 Career Exploration Survey to the question: "*To what extent do you agree with the following statement: I have been able to explore career-related opportunities of interest to me at MIT*". The responses for all departments and programs which had at least 5 female and 5 male respondents are shown in the tables below. When a statistically significant difference was observed at a $p<0.05$, the percentages are highlighted in red or blue font and the corresponding p values are given.

Undergraduate Departments						
Dept.	Gender	Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat + Strongly Agree	p values
1	Female	9%	9%	0%	82%	
	Male	0%	0%	20%	80%	
2	Female	5%	14%	8%	73%	
	Male	4%	7%	7%	82%	
3	Female	0%	0%	11%	89%	
	Male	0%	17%	0%	83%	
5	Female	0%	29%	14%	57%	
	Male	0%	25%	0%	75%	
6	Female	2%	6%	5%	87%	
	Male	0%	2%	8%	90%	
8	Female	15%	19%	12%	54%	
	Male	0%	14%	20%	66%	
10	Female	2%	2%	4%	91%	
	Male	8%	0%	8%	83%	
15	Female	0%	10%	0%	90%	
	Male	0%	0%	0%	100%	
16	Female	7%	7%	0%	86%	
	Male	4%	0%	7%	89%	
18	Female	4%	12%	**24%**	**60%**	**p = 0.019**
	Male	0%	12%	**5%**	**83%**	**p = 0.034**
20	Female	0%	12%	6%	82%	
	Male	0%	11%	0%	89%	

Masters Programs						
Program	Gender	Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat + Strongly Agree	p values
1	Female	0%	0%	33%	67%	
	Male	6%	13%	13%	69%	
2	Female	12%	12%	8%	69%	
	Male	3%	0%	14%	84%	
3	Female	0%	0%	20%	80%	
	Male	0%	8%	8%	85%	
4	Female	0%	33%	33%	**33%**	**p = 0.046**
	Male	17%	0%	0%	**83%**	
6	Female	4%	12%	4%	81%	
	Male	0%	3%	3%	94%	
11	Female	0%	20%	20%	**60%**	**p = 0.020**
	Male	0%	0%	6%	**94%**	
15	Female	3%	5%	13%	78%	
	Male	6%	6%	9%	80%	
16	Female	0%	0%	33%	67%	
	Male	5%	5%	0%	90%	
MAS	Female	0%	0%	0%	100%	
	Male	0%	0%	0%	100%	
RED	Female	0%	20%	0%	80%	
	Male	0%	20%	20%	60%	
SCM	Female	0%	0%	11%	89%	
	Male	0%	0%	0%	100%	
SDM	Female	**25%**	8%	8%	58%	**p = 0.031**
	Male	**3%**	17%	10%	70%	
TPP	Female	0%	17%	17%	67%	
	Male	0%	7%	7%	87%	

Doctoral Programs						
Dept.	Gender	Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat + Strongly Agree	p values
1	Female	13%	38%	13%	**38%**	**p = 0.020**
	Male	0%	9%	9%	**82%**	
2	Female	0%	11%	11%	79%	
	Male	6%	9%	15%	70%	
3	Female	14%	29%	29%	**29%**	**p = 0.001**
	Male	7%	0%	0%	**93%**	
5	Female	0%	10%	20%	70%	
	Male	3%	16%	9%	72%	
6	Female	7%	7%	0%	86%	
	Male	3%	8%	15%	74%	
7	Female	11%	11%	14%	64%	
	Male	0%	9%	13%	78%	
8	Female	0%	25%	13%	63%	
	Male	3%	13%	27%	57%	
9	Female	0%	14%	29%	57%	
	Male	0%	20%	10%	70%	
10	Female	0%	11%	6%	83%	
	Male	0%	7%	10%	83%	
12	Female	5%	15%	20%	60%	
	Male	22%	11%	11%	56%	
14	Female	13%	38%	25%	**25%**	**p = 0.012**
	Male	6%	11%	17%	**67%**	
18	Female	0%	13%	0%	88%	
	Male	6%	11%	17%	67%	
20	Female	0%	0%	8%	92%	
	Male	0%	6%	6%	88%	
24	Female	0%	57%	14%	29%	
	Male	17%	0%	33%	50%	
HST	Female	0%	7%	14%	79%	
	Male	0%	6%	19%	75%	

Appendix F: Measurable Outcomes for Career Exploration and Career Services at MIT

An example set of measurable outcomes were developed based upon the objectives for career exploration and career careers at MIT (described in 1. A Vision for Career Exploration at MIT). However, we believe that the proposed Committee on Student Career Exploration and Development should develop measurable outcomes that they would then track. Furthermore, we found the development of these measurable outcomes to be quite difficult and imagine that they would evolve and improve over time as that proposed committee uses them.

We organize the example measurable outcomes under the objectives they are most closely aligned with. However, some of the outcomes in fact likely measure achievement of more than one of the objectives.

Objective #1: Foster in all students the career development skills to support a lifelong ability to work wisely, creatively, and effectively for the betterment of humankind.

- **Outcome 1.1:** Increase collaborations between CAPD and academic departments to offer career development skills opportunities.
- **Outcome 1.2:** Increase by 10% the usage of alumni for career exploration as measured by the 2022 Career Exploration Survey.

Objective #2: Enable effective career exploration for all students.

- **Outcome 2.1:** Accomplish a 10% improvement in responses in 2022 for the undergraduate, masters and doctoral students whose majors were least satisfied in the 2017 Career Explorations Survey for the question "How satisfied are you with the career exploration offerings of the following types in your field(s) of interest?" Specific majors include:
    - Undergraduate: 8, 7, 12
    - Masters: 1, 4
    - Doctoral: 8, 14, 24, 15
- **Outcome 2.2:** Allocation of all revenue, minus costs, generated by career fairs to support students seeking short career exploration opportunities such as internships or micro-internships, to help remove financial barriers and increase greater access to career exploration in a wide array of industries.
- **Outcome 2.3:** Increase the number of academic programs at MIT that have adopted a career exploration and professional development requirement for graduate students.
- **Outcome 2.4:** Increase events that support career exploration for first year students early on in their experience at MIT.
- **Outcome 2.5:** Increase the access and use of MIT's central career management system (presently Handshake) by academic departments, programs, and students.
- **Outcome 2.6:** Implementation of a holistic career fair strategy adopted by MIT that includes standards, clarity of purpose, and objectives to serve all students and a wide range of career interests.

- **Outcome 2.7:** Increase career exploration opportunities that are focused on helping undergraduates consider graduate school options.

Objective #3: Advocate on behalf of all students for equity in career exploration and career opportunities through engagement with external stakeholders such as employers, professional schools, graduate programs, fellowships and more.

- **Outcome 3.1:** Create a pay equity webpage by 2021 for MIT that educates, supports and enables students to more effectively negotiate for equitable compensation.
- **Outcome 3.2:** Establish a working group with external stakeholders to tackle recruitment timelines

Objective #4: Employ a continuous improvement process that includes assessment of measurable outcomes for career exploration and career services that reflect our principles and objectives

- **Outcome 4.1:** Conduct a Career Exploration Survey every 5 years to identify new target majors and student cohorts that are underserved.
- **Outcome 4.2:** Develop a tool to assess the effectiveness of micro opportunities for career exploration for use across MIT academic departments, offices and programs.
- **Outcome 4.3:** Establish a Committee on Student Career Exploration and Development that is supported by the Office of the Vice Chancellor and the Academic Deans.
- **Outcome 4.4:** Develop a process to assess the effectiveness of collaborations between CAPD, academic departments, and student organizations in supporting student career exploration needs.
- **Outcome 4.5:** Report annually by the Committee on Student Career Exploration and Development that catalogues career exploration events and opportunities, including breadth of opportunities offered and impact.
- **Outcome 4.6:** Develop an approach to assess the career development skills students acquire in their time at MIT.

Appendix G: 2017 Career Exploration Survey Analysis

The figure below shows (for each information source asked about), the percentage of respondents that utilized a particular information source, and among those utilizers the percentage that found it Very or Somewhat useful. Observations from this figure are:

- Peers were the most utilized as well as most useful information source. The high utilization (98%) is not surprising given the large number of peers students can interact with, compared to the other information sources. And, the high usefulness (96%) clearly indicates that students find peer information reliable.
- The second most utilized information source is the Fall Career Fair (92%), however, the usefulness is much lower (77%).
- The second most useful information source are internships (95%), though the utilization is somewhat lower at 83%.

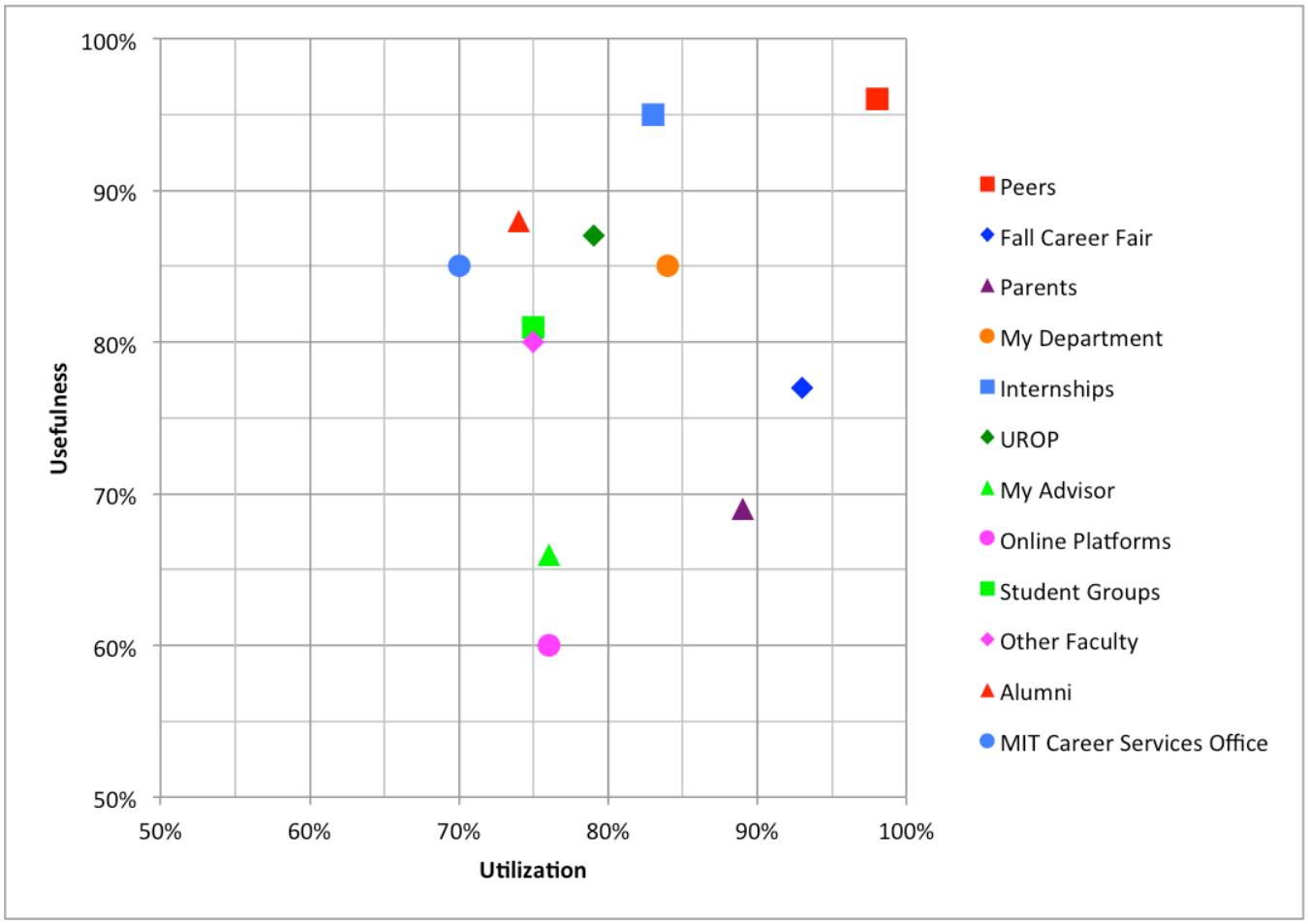

Figure UG-Usefulness_v_utilization: Response of undergraduates excluding first-years to "How useful do you find the following sources of information about career opportunities?". Utilization is the percentage of respondents that utilized that source (utilizers). Usefulness is percentage of utilizers that found the source either Very or Somewhat useful. 2017 MIT Career Exploration Survey (January 2017).

	Advisor	Alumni	Department	Fall CF	Internships	MIT Career Services	Online	Other Faculty	Parents	Research Group	Student Groups	UROP	Agree with Exploration
Alumni	**-0.54** 0.06		R *p*										
Department	**0.59** 0.03	**0.18** 0.56											
Fall CF	**-0.41** 0.16	**0.7** 0.01	**0.39** 0.19										
Internships	**-0.26** 0.4	**0.83** 0.	**0.51** 0.07	**0.7** 0.01									
MIT Career Services	**-0.54** 0.05	**0.51** 0.08	**-0.22** 0.46	**0.09** 0.76	**0.54** 0.06								
Online	**-0.32** 0.28	**0.73** 0.	**0.1** 0.74	**0.54** 0.06	**0.63** 0.02	**0.49** 0.09							
Other Faculty	**0.86** 0.	**-0.32** 0.28	**0.59** 0.03	**-0.4** 0.18	**-0.05** 0.87	**-0.23** 0.45	**-0.25** 0.42						
Parents	**0.19** 0.54	**0.33** 0.26	**0.49** 0.09	**0.16** 0.61	**0.71** 0.01	**0.54** 0.06	**0.39** 0.19	**0.42** 0.15					
Research Group	**0.44** 0.13	**-0.53** 0.06	**-0.08** 0.81	**-0.68** 0.01	**-0.66** 0.01	**-0.31** 0.31	**-0.4** 0.18	**0.4** 0.18	**-0.4** 0.18				
Student Groups	**-0.44** 0.13	**0.44** 0.13	**-0.1** 0.74	**0.25** 0.41	**0.46** 0.11	**0.61** 0.03	**0.38** 0.2	**-0.21** 0.48	**0.33** 0.27	**-0.39** 0.19			
UROP	**0.63** 0.02	**-0.53** 0.06	**0.24** 0.43	**-0.64** 0.02	**-0.39** 0.19	**-0.24** 0.43	**-0.47** 0.11	**0.59** 0.03	**-0.09** 0.76	**0.79** 0.	**-0.17** 0.58		
Agree with Exploration	**-0.08** 0.79	**0.5** 0.08	**0.64** 0.02	**0.76** 0.	**0.74** 0.	**0.15** 0.62	**0.47** 0.11	**-0.08** 0.79	**0.35** 0.24	**-0.52** 0.07	**0.2** 0.51	**-0.21** 0.5	
Pursuing another degree	**0.34** 0.26	**-0.7** 0.01	**-0.41** 0.16	**-0.79** 0.	**-0.88** 0.	**-0.42** 0.15	**-0.58** 0.04	**0.23** 0.46	**-0.61** 0.03	**0.77** 0.	**-0.56** 0.04	**0.54** 0.06	**-0.71** 0.01

Table UG-Correlation: Correlation coefficients (R) among career information sources (measured by the percentage of students in a department that found the source useful), percentage of students that have strongly or somewhat agreed that they have been able to explore career opportunities, and percentage of students interested in pursuing another degree immediately after graduating. Also shown are the p-level of the null hypothesis that items are not correlated. Green/red shaded entries indicate that positive/negative correlation likely exists (at 95% confidence).

As noted, the differences in ability to explore careers were less varied by year and ethnicity:

- First-years and sophomores have approximately 10% lower percentage of Strongly Agree responses than juniors and seniors (Figure 2-3), though the combined Agree responses are statistically the same.

- Differences do exist among ethnicity (Figure 2-5) with Asian, Black/African-American, and Hispanic/Latino with 5-10% higher Agree response rates than Two or more races and White. However, the only statistically significant difference is between Asian and White.

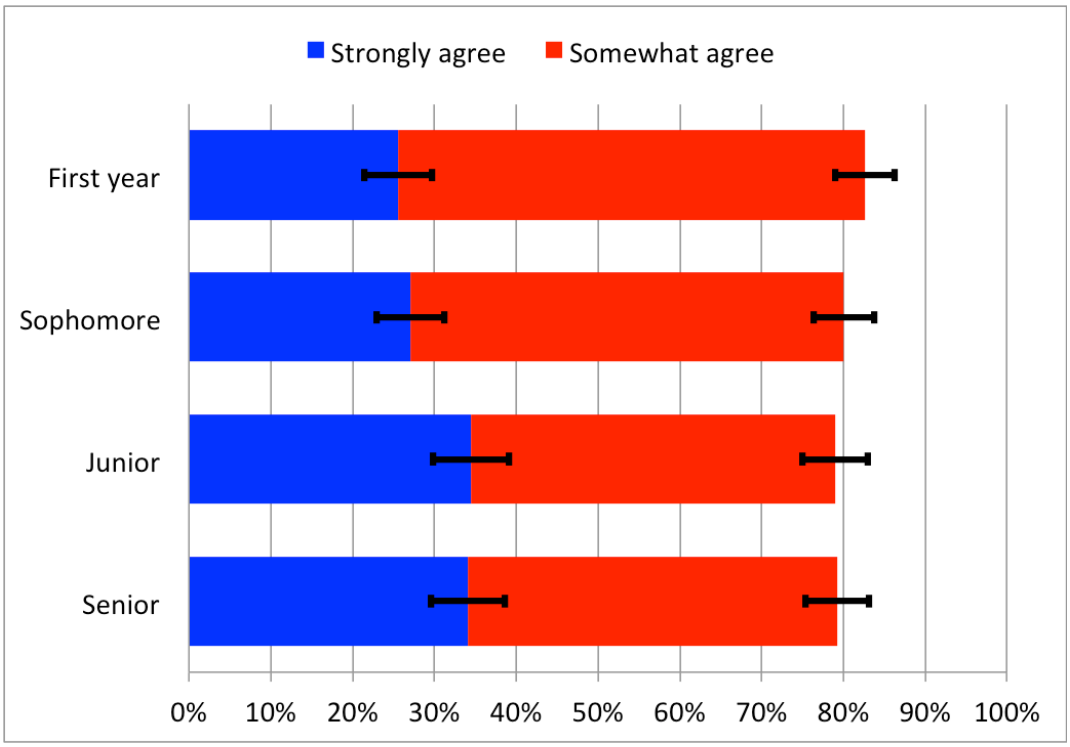

Figure 2-3: Undergraduate agreement by year with ability "to explore career-related opportunities of interest to me at MIT." 2017 MIT Career Exploration Survey (January 2017).

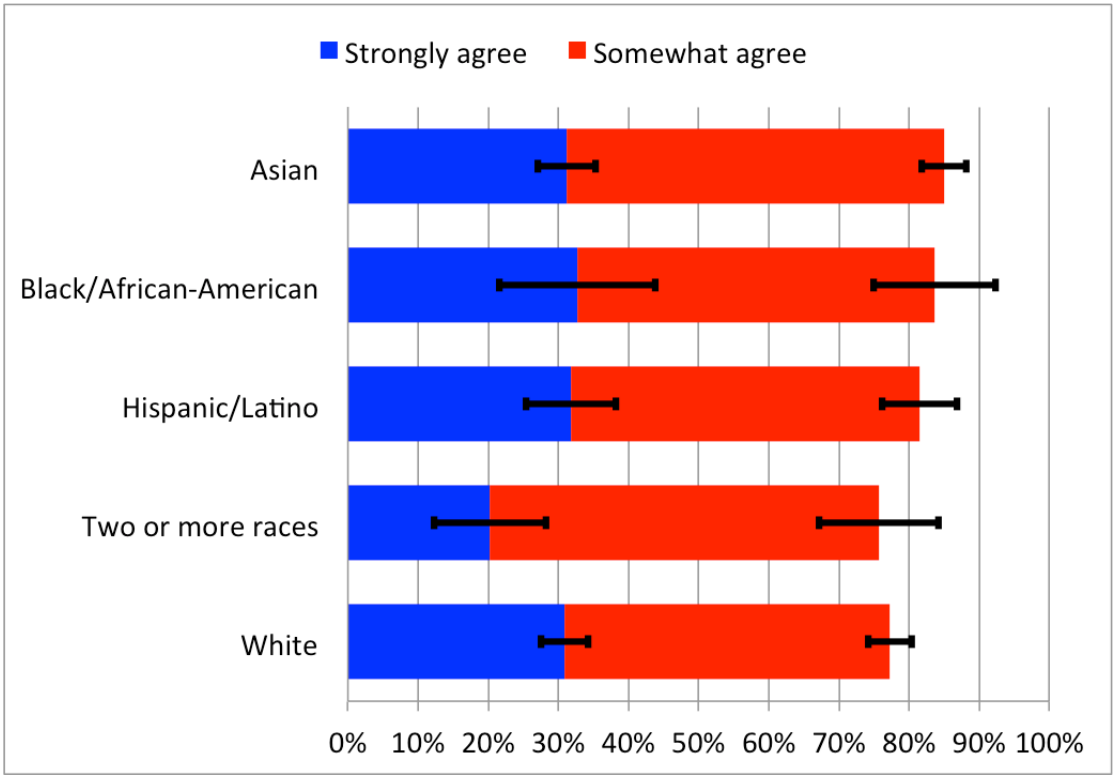

Figure 2-5: Undergraduate agreement by ethnicity with ability "to explore career-related opportunities of interest to me at MIT." 2017 MIT Career Exploration Survey (January 2017).

Appendix H: Ivy + Alumni/ae Engagement

Ivy+ Alumni/ae Engagement in Career Services

	Career Education	Networking Opportunities	Mentoring	Workplace Experience	Recruiting	Evaluation	Online Platforms (connection, mentoring)
Columbia	- career panels - mock interview nights	- alumni profile pages - LinkedIn group	- formal mentoring program* - infomal mentoring through online platforms encouraged	- multiple formal internship programs: (int'l; arts-, service- and startups-based); alumni especially involved in alum-funded summer internships program*	- job posting board	mentoring and some internship programs evaluated	- "Odyssey" mentoring platform† - online alumni community†
Duke	- multiple university- and schools-based programs* - alumni career coach program (alum-alum and alum-student)	- annual internship fair with networking - LinkedIn group	- formal mentoring program - infomal mentoring through online platforms encouraged	- formal internship program - internship posting board	- career fairs - job posting board	"many, though not all" programs evaluated	- alumni networking platform† - virtual career fairs
Harvard	- career panels - information sessions - coffee chats - virtual career chats - regional treks - resume critiques - mock interviews	- Global Networking Nights - LinkedIn group	- informal mentoring relationships through online alumni network encouraged	- winter break internships - internships posting board	- career fairs - job posting board - recruiting visits	"some" programs evaluated	- proprietary version of FirstHand Advisers - online alumni community - online career discussion forums - professional shared interest online groups (SIGs) - social media takeovers
U. Penn	- career panels	- LinkedIn group	- formal mentoring program* - Engineering mentoring program†	- externship program* - internship posting board - shadowing progr.	- recruiting visits - career fairs	mentoring, externship programs evaluated	- career services and alumni association both considering online platforms
Princeton	- career dinners - informational interviews - site visits and industry treks - "Young Alum Perspectives" program - virtual practice interviews (coming)	- networking events - regional networking sessions (coming) - alumni profile pages - LinkedIn group	- formal mentoring program	- shadowing program - winter break internship programs (undergrad & PhD) - internship postings board	- career fairs	"some" programs evaluated	- tried PeopleGrove, not planning to continue
Yale	- career panels - mock interviews - career path/life skills mini-conferences†	- online career network - LinkedIn group	- formal mentoring programs (alum-alum and alum-student)*	- internship posting board	- recruiting visits - job posting board	alumni association programs evaluated	- career services: online career network based on Symplicity - alumni association: considering PeopleGrove

*evaluated program

†offered by school's alumni association

Appendix I: Employer Engagement Survey

To help better understand employer engagement on campus, we conducted a survey during the beginning of 2019. The following are some highlights of that survey.

- **Overall:** There were responses from 160 companies with 152 unique companies represented.
- **Size:** The responses were fairly well distributed by size of company, with 21% of respondents with >10,000 employees, 20% had 11-50 employees, 13% each with 51-200 and 1001-5000 employees, except that only 6% of companies with 5001-10,000 employees.

Industry Distribution:

- Top industries represented include computer software (28%), engineering (21%), financial services (13%), computer hardware/electrical engineering (13%), consulting (12%), and pharmaceutics (12%). Organizations could select as many industries as applied.
- Other industries (selected by 14% of respondents) identified as telecommunications, contract research/manufacturing, proprietary trading, travel, IT services, R&D, mining, oil and gas, engineering for architecture, machine learning/AI, tech, robotics, internet, engineering and scientific consulting.

Targeted Populations:

- More respondents targeted undergraduates (75%) and master's (81%) students than doctoral students (45%). Employers could target more than one population.
- Master's students were highest in demand for the smallest and largest sized companies (≤200 and >5000) and they were tied with undergraduates for those with 501-1000 employees. Undergraduates were the most in demand for employers with 201-500 and 1001-5000 employees.
- Undergraduates, master's, and doctoral students were almost targeted by the same two industries: computer software and engineering. The computer hardware/electrical engineering industry was identified as the third highest industry in targeting undergraduates and master's students, whereas pharmaceutics was the third highest for doctoral students.

Objectives for Engagement with MIT:

- Overall, responding employers rated these objectives for engaging with the MIT community the highest (percentage rating the item as "somewhat" to "very important"): recruiting for full-time positions (93%), increasing brand recognition (78%), fostering relationships with student groups (76%), recruiting for internships (76%), fostering relationships with MIT career services (CAPD) (72%), and serving student needs for career exploration (72%). Among the lowest objectives overall was on-campus interviewing (45%) and increasing

awareness of MIT research and innovation (42%). The order of ratings did not vary significantly by target population.

- The ratings of objectives did vary in some areas based upon employer size, but all size categories, except for those with 501-1000 employees, ranked full-time recruiting as their top objective. Increasing awareness of MIT research and innovation, on-campus interviewing, and seeking expertise to solve specific problems were consistently among the lowest ranked objectives.

- There was also a great deal of variability in responses by industry, with some highlights provided below (note that some industries had small representation). This information could be useful for CAPD, as well as to better understand the needs of employers from underrepresented industries.
    - For academia, relationships with faculty and MIT departments were very important, as would be expected.
    - In applied research, seeking expertise to solve specific problems and serving students for career exploration were both noted as the second most important objectives, in a three-way tie with increasing brand recognition.
    - For automotive and transportation, fostering relationships with CAPD and serving student needs for career exploration were tied with internship recruiting for their second most important objectives.
    - For basic research, fostering relationships with faculty was among the top three objectives for MIT engagement.
    - All respondents representing chemicals and materials rated serving student needs for career exploration as "somewhat" or "very important," tied with increasing brand recognition as their most important objective.
    - For consulting, serving student needs for career exploration was identified as their third most important objective, tied with fostering relationships with student groups.
    - For energy and utilities, serving student needs for career exploration was identified as their third most important objective, tied with increasing brand recognition.
    - For the government, fostering relationships with faculty was identified as the third most important objective.
    - For health/medicine, fostering relationships with departments/labs was identified as the second most important objective.
    - Within investment banking, full time recruiting was rated below five other objectives in importance; however, recruiting interns was their top rated objective.
    - For non-profit agencies, recruiting for internships is rated most important and relationships with CAPD and increasing awareness of MIT research and innovation are tied for second most important objective.
    - Pharmaceutics indicated that fostering relationships with faculty and departments were tied for the second most important objective along with increasing brand recognition.

Participation with the MIT community:

- Employers were asked about their organization's participation with the MIT community and also able to indicate awareness and interest.
- Over half of the respondents indicate that they were aware of and participated in job boards, internship programs, and the MIT Fall Career Fair. Forty percent or more of respondents indicate that they were aware, but do not participate in other MIT career fairs, hackathons, employer mock interviews/resume critiques and the MIT Fall Career Fair.
- More than 30% of employer respondents indicated that they were unaware of, but would like to participate in panel events, company site visits, virtual career fairs, webinars, mentorship programs, and job shadowing. Over 30% of respondents indicated that although they were unaware of these programs, they would not participate in on-campus office hours, sponsorships, and job shadowing.
- The most popular participation opportunities (either participate in or would like to) were job boards, internship programs, company site visits, panel events, the MIT Fall Career Fair, networking events, and company presentations.
- The least popular participation opportunities (either don't participate in or would not like to) include hackathons, job shadowing, mock interviews/resume critiques, on-campus office hours, externship programs, and webinars.
- There was variability in participation based upon employer size. Smaller employers (≤200 employees) reported low participation rates in recruiting activities with no activity registering above 50%. The highest average rate of participation was with job boards and they were most likely to participate in panel events and company site visits, if they were aware of them. Their lowest participation rates were in sponsorships and webinars and they were less likely to participate in sponsorships or job shadowing, even if they were aware of these.
- Medium sized employers (201-1000 employees) report the highest average rates of participation for internship programs and job boards and they report that they were unaware of, but most likely to participate in, company site visits and panel events. Their lowest participation rates were in job shadowing programs and virtual career fairs and they were least likely to participate in externship programs or mentoring, even if they were aware of these.
- Larger employers (1001-10,000+ employees) report the highest average rates of participation for job boards and internship programs and they reported that they were unaware of, but most likely to participate in panel events and mentoring programs. Their lowest participation rates were in other career fairs and hackathons and they were least likely to participate in job shadowing or employer on-campus office hours, even if they were aware of these.

Offer Timelines

- Employers were asked when they would prefer to make offers of full-time and internship employment.
- In both full-time and internship offers, the most preferred timing was "as needed" with 64% favoring this timing for full-time positions and 42% favoring it for internships.

- For full-time positions the next preferred months were October (38%), November (28%), and September (27%).
- For internship offers, the next preferred months were October (34%), November (29%), December (24%) and January (23%).
- There were some differences noted between target populations and the overall timeline preferences.
    - For those targeting undergraduates, October was the most preferred offer month for internship offers, followed by a tie for November and "as needed." For undergraduate full-time offers, "as needed" still dominated, but there were stronger preferences to make offers in October, and a tie for September and November than in the overall results.
    - For those targeting master's students, preferences were similar to the overall preferences noted above.
    - For those targeting doctoral student interns, "as needed" was preferred slightly more than October and November and January were tied for third most preferred. For doctoral full-time recruiting the top preferences were the same as the overall results.
- There were also differences based upon employer size. Small (≤200 employees) employers strongly preferred "as needed" for both internship and full-time offers against any month, especially for full-time offers (77%). Medium (201-1000 employees) employers slightly preferred November (47%) over "as needed" (44%) for internship offers and strongly preferred "as needed" (74%) for full-time offers. Large (>1001) employers preferred November, October, and September, in that order, for internship offers and October, September, and "as needed" for full-time offers.

Participation in MIT Career Fairs

- Overall, respondents indicated that they would prefer to participate in on-campus MIT career fairs in September (49%), October (31%), and February (23%). The months that were least preferred included June (2%), July (4%), and May (5%). Other items to note were that all months generated some level interest, 30% of respondents indicated that this question was not applicable to them, and respondents could select multiple responses.
- There were some differences between career fair preferences based upon target populations. For employers targeting undergraduates, their preferences were very similar to the overall preferences, with a strong preference September (56%). For those targeted Master's students, their preferences were also similar to the overall preferences, except that those indicating that this item was not applicable to them (32%) was ranked second. The preferences for those targeting doctoral students was also similar overall, with a very strong preference for September (61%), except that November was the third most selected preference.
- There were also differences in preferences by company size. Small (≤200 employees) employers were more than more likely than other groups to say that this question was not applicable to their practice (48%) and 27% preferred September. Two-thirds of medium employers indicated September was their preferred month and 60% preferred October

(employers could select more than one preference). Just over 60% of large employers preferred September and 34% preferred October.