Improving People Flow between MIT Campus and MIT Lincoln Laboratory

December 2016

Prepared by members of the Leader to Leader Class of 2016

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Mission Statement

MIT and LL will overcome the physical distance that separates them in order to collaborate more meaningfully and effectively, to the benefit of the nation and the world. By working together to identify scientific and engineering problems of mutual interest, and to increase the flow of talent between campus and LL, colleagues on both sides will inspire a sense of shared community and enable it to foster new discoveries and their real-world applications.

Introduction

This L2L project team worked to understand where there might be opportunities to improve the flow of talent between the MIT campus (Campus) and MIT Lincoln Laboratory (Lincoln or LL), and to list those opportunities as simply and directly as possible. It is the team's aim to offer a report that suggests viable actions.

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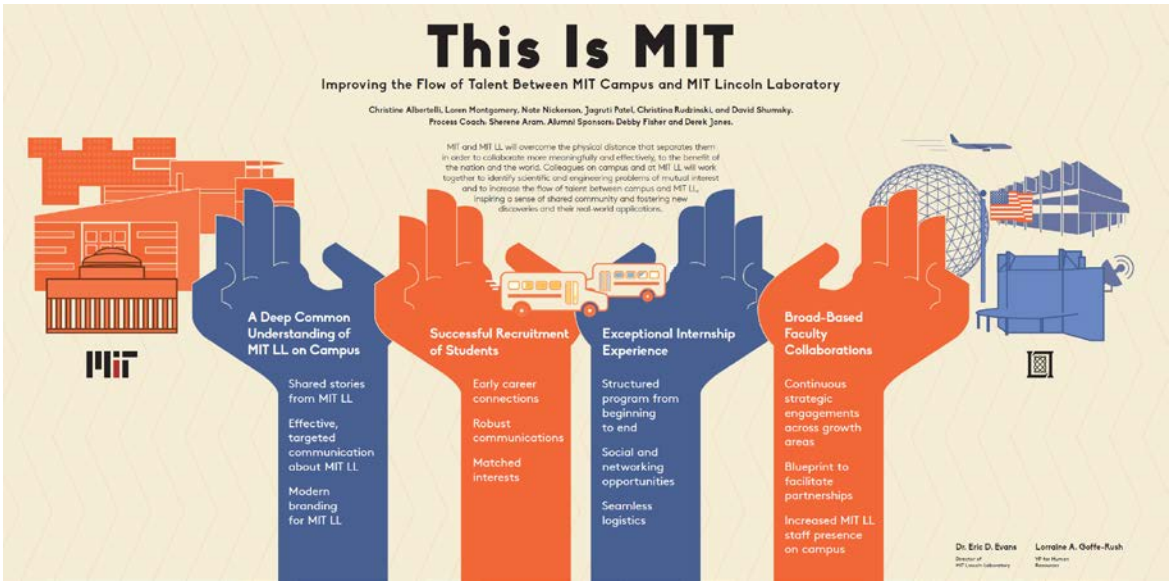
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The team began its work by meeting with people it felt were well positioned to help us see where things are working well and where we might make changes. At Lincoln, we spoke with LL leadership, Human Resources leadership, current MIT-student interns, and others. On Campus, we spoke with Research leadership, EVPT leadership, HR leadership, admissions, faculty, and students. In all cases, we asked general questions about the relationship between Lincoln and Campus as well as specific questions around people's experience of the relationship.

The team came to see the relationship between Lincoln and Campus as strong and productive. The team also came to see relatively straightforward ways to make things even better, in terms both of current activity and prospective new activity.

We chose to frame our four recommendations as vital supports for the figurative bridge between Lincoln and Campus as represented in the project poster below. One note: while we believe enthusiastically that the bridge must serve two-way traffic, we paid special attention to the flow of talent from Campus to Lincoln in the form of students coming to intern or work for Lincoln, for the simple reason that this is what is of highest value in the relationship. Like Campus, Lincoln believes profoundly in the idea that attracting talent is of foundational importance to the successful pursuit of its mission.



Our four recommendations can be thought of as "one + three": we begin with the notion that the relationship between Lincoln and MIT will benefit greatly from some attention to communications. The group thinks of this in a specific way (one that echoes the general approach being pursued by the MIT Office of Communications): we wish to put ourselves in the shoes of the most important audience in this relationship—MIT students—and ask, "How is Lincoln perceived by that audience, and what will be the most effective ways to engage it?"

The three further recommendations consider the most important discrete instances of Lincoln and MIT coming together: in the recruitment of MIT students; in internships; and in research collaborations between Lincoln and MIT researchers/faculty. It is in these areas where we feel small but meaningful changes can have great impact.

Three themes emerged in our work.

First, Lincoln and MIT will do well to consider how data ought to play in addressing opportunities. We found instances where we saw patently useful data not being used (for instance, the expressed interests of students, as revealed in Admissions and other data); we also found instances where easily gotten data of obvious use (simple polling of students to gauge awareness of and interest in Lincoln) was nowhere to be found.

Second, Lincoln and MIT will do well to better understand this issue of awareness and familiarity. The group felt that by better understanding how MIT students see Lincoln, and their own careers, and the possibility of a career like that offered by Lincoln, we can better determine what actions will mean the most to them.

Third, everywhere we looked, we saw the issue of culture. In many ways, Lincoln and MIT could not be more different: one has security guards and bathroom escorts for visitors, while the other has unlocked doors; one has requirements around US citizenship; while the other is packed with foreign nationals; one is heavy on Dockers and golf shirts; the other is decidedly informal; one works in secrecy, the other in the public sphere.

Seen that way, culture can be as much a barrier between Lincoln and MIT as the distance and traffic that separate them. To overcome it, Lincoln, we feel, needs to knock down some of the cultural walls (think about hipper places to do meetings with students, ditching the conventional use of PowerPoint, emphasizing the deeply personal issues of national service in an intimate setting) to expose what is in fact shared: an uncommon interest in, and talent for, using science and technology toward vitally important ends.

We need to diminish, through well-considered in-person engagements, the two sides' smaller cultural differences while amplifying the larger mission they share.

What follows, then, are four basic recommendations for improving and increasing the flow of talent between Lincoln and MIT. Each of them includes suggested actions.

Bridging MIT Campus and Lincoln Laboratory

Pillar 1: A Deep Common Understanding of Lincoln Laboratory on Campus

Overview

We quickly learned that Lincoln already has excellent methods of engagement with campus today:

- Beaver Works: "A joint venture between Lincoln Laboratory and the MIT School of Engineering, was established as an incubator for research and innovation. The center facilitates project-based learning, a hallmark of an MIT education, and leverages the expertise of MIT faculty, students and researchers, and Lincoln Laboratory staff to broaden research and educational partnerships."

- Regular invitations for MIT Faculty to visit Lincoln, including a day-long event at Lincoln in May 2016 to meet Lincoln technical staff, see demonstrations, and encourage collaboration.

- On-campus recruiting for interns and technical staff, with Lincoln representation at the career fairs.

- Articles about innovative Lincoln research, awards, and events in MIT News.

These few examples represent solid building blocks of a foundation to increase the awareness of Lincoln on campus, and promote the flow of talent between the two sites. Through conversations we had with Lincoln interns, staff, and faculty, we learned we could create an understanding of Lincoln on campus that exposes the heart of Lincoln's mission and technical expertise in a way that is more in tune with the audience.

Methods for creating that understanding include:

Shared Stories from MIT LL

Greater and creative promotion of the exciting work Lincoln does in a wide variety of advanced technologies, applying the work to real world security problems. Some recent examples that could be shared in compelling talks, case studies or news stories on main campus:

- Providing soldiers overseas explosives detectors;
- Trying to identify and disrupt terrorist networks;
- Making the homeland more resilient to potential attacks

Effective Targeted Communication about MIT LL

Build up the Lincoln network of staff, interns, and students who participated in Beaver Works, and communicate with that network. While hundreds of students have had an experience with Beaver Works, those individuals are not automatically added to a "Lincoln alumni" list for ongoing outreach from Lincoln. We learned from younger staff that many heard about areas of research and opportunities at Lincoln through chance conversations with someone who had awareness of Lincoln. By building up the network and pushing Lincoln news to them, we increase the opportunity for more word-of-mouth connections.

Modern Branding for MIT LL

The communications team at Lincoln does a lot of good work already, and could be better positioned to help with external promotion and communication if they could create more modern branding for Lincoln. Some examples for modern branding include a more compelling online presence, and a refresh of the materials (much less dense) used in the career fairs to recruit students for internship and jobs.

Bridging MIT Campus and Lincoln Laboratory

Pillar 2: Successful Recruitment of Students

Overview

A meaningful number of MIT students have successfully joined Lincoln in both internship and full-time employee roles, with a recent peak of 290 alumni in technical, fellow, group leader or assistant division head positions at Lincoln in 2015 and 27 interns from MIT at Lincoln in summer 2016. However, as a percentage of overall staff and interns, respectively, representation from MIT has declined slightly.

MIT Alums at Lincoln Lab			
	Number of Staff in Technical, Fellow, Group Leader or Asst. Division Head Positions	**Total of those from MIT**	**% from MIT**
2010	1,603	271	16.9%
2011	1,705	269	15.8%
2012	1,754	286	16.3%
2013	1,751	286	16.3%
2014	1,740	276	15.9%
2015	1,866	290	15.5%

LL Summer Research Program: % from MIT vs other universities			
	Total Summer Interns	**Total of those from MIT**	**% from MIT**
2010	139	26	18.7%
2011	145	24	16.6%
2012	163	33	20.2%
2013	174	24	13.8%
2014	182	27	14.8%
2015	239	41	17.2%
2016	219	27	12.3%

Once MIT students are onboard and fully engaged in professional activities at Lincoln, we heard that they perform very well, consistently representing a larger portion of top performers than their overall numbers would indicate they would. Given the intellectually challenging work that stretches the boundaries of existing research applications being done at Lincoln, solidifying a steady stream of MIT students to Lincoln will help assure the staff's continuing excellence and accomplishments.

The primary sources for our recommendations in this area come from interviews with current students participating in this summer's internship program, recent MIT graduates currently employed at Lincoln, Lincoln human resource professionals and members of MIT's undergraduate admissions office. The current students or recent graduates at Lincoln spoke very highly about their work experiences, reflecting that the work has been very fulfilling, exceeding even their high expectations. Our primary sources also provided insights into a few areas which could easily facilitate Lincoln's objective to continue, or even expand, the flow of talented MIT students to Lincoln. We've centered our recommendations in this area around three main themes: make early career connections; utilize robust communications; and leverage matched interest.

Early Career Connections

MIT students are highly sought after by leading organizations across the globe. Many organizations, like Google and Boeing, have highly effective recruiting practices with deep tentacles at MIT. Lincoln would be best served to reach students early, before competing recruiters do or before students formulate opinions about the "best" companies to work for. Being part of the MIT community already, Lincoln is uniquely positioned to make connections with students early in their tenure at MIT.

- Mine application data.
  MIT's undergraduate admissions office can query the treasure trove of data they accumulate from incoming student applications. They have worked with selective departments at MIT in the past to develop appropriate querying terms. There is a field in MIT's undergraduate application, for example, that inquires if prospective students have an interest in ROTC. This is a field that can easily be queried. Other terms that may appear elsewhere in a submitted application such as "national service," "national defense," "prototyping," etc. could also be investigated. The results of these queries can then be used to develop a target list for potential communications and other outreach.

- Increase targeted presence at IAP.
  IAP is very popular and Lincoln has had a long-term presence at the event. We now understand that by undergraduate junior year, students take a narrower view of IAP activities that they will pursue. First-year students and sophomores, however, are much

more open to try new activities and are frequently looking for additional events to pursue during the period. We recommend that Lincoln take a strategic view of its offerings at IAP and review if they optimize connections with MIT students and general awareness about Lincoln on campus. Recent alumni working at Lincoln could provide insight in this analysis.

Robust Communications

Succinct, impactful communications are required to get this group's attention. The number of opportunities marketed to MIT students can be overwhelming so pointed communications to high-potential students will be more likely to make a meaningful connection. "Communications" as we reference it here is not limited to printed or electronic media, but encompasses any interaction Lincoln may have with students. To enhance Lincoln's communication impact on campus, we offer the following considerations.

- Baseline study. From our limited interaction with students, we surmised that most students, who ultimately did intern or join Lincoln, didn't know about Lincoln until late in their MIT career. Further, for many that did find a connection to Lincoln, those appeared to be more happenstance than anything else (e.g., "my friend's father worked at Lincoln"). To get a better sense of how well, or not, understood Lincoln is on campus, awareness could be queried in a survey to understand the current baseline; this which would then inform a communications action plan. Institutional Research can offer helpful insight to surveying.

- Further leverage Beaver Works. Beaver Works has a great reputation on campus for those who know something about it, but it currently touches only a very few. Its expansion to a centrally located building on Campus should generate more awareness. Significant potential opportunity exists to market this new location aggressively (e.g., open house receptions, lecture series, tours, etc.).

- Elevate Lincoln's position at MIT career fairs. There is significant opportunity to make Lincoln's presence at MIT career fairs more memorable and to make potential career options more aspirational. Recent alumni are very eager to be more involved in the recruiting process and utilizing their presence would greatly help. They know this audience and, as recent graduates, can readily connect with students. Communication materials should also be revisited, with recent alumni input, to make sure they resonate with current students. Finally, swag matters!

- Expand presence at affinity events and seminars. Many recent alumni expressed fondness for seminars they attended within their academic or special-interest groups while students on campus. Ample opportunities exist for Lincoln to take more expansive roles at these events which are sponsored by such organizations as SWE, Graduate Association of Aero/Astro, Society of Physics and Graduate Women on Campus, among

many others. This is another area recent alumni are eager to participate in. Providing food always engenders goodwill and note that some events can be purely social.

Matched Interests

There is quite good news in the fact that there is already significant intersection of interests between Lincoln and MIT students, not only limited to shared history with New England winters. For student who participate in summer or full-time employment at Lincoln, they universally spoke of the work experience as exceeding their expectations. They reflected that they are far happier at Lincoln than they thought they would be. Common themes supporting their high satisfaction centered on a few items that should be the focus of interaction between Lincoln and potential candidates. Interestingly, themes related to service or national defense didn't resonate as much.

- MIT students are geared toward hands-on experience. This cannot be stressed enough. Interns and recent alumni spoke very highly about the types of projects they were engaged in, their level of responsibility on those projects and the amount of hands-on research they were exposed to. The fact that this is a "surprise" to most incoming employees reflects a missed opportunity in promoting the work experience during the recruiting process.

- They want programmatic internship opportunities. Students have increasing interest in internship opportunities. The type of opportunities that resonate the best are those that seem very "programmatic." They are structured in a way that a logical pre- and post-internship path, or track, is fairly well defined. There should also be some level of prestige associated with the program. Consulting and financial services firms' programs can provide a roadmap to do this successfully. Those firms, generally, do this exceedingly well and in our next section we offer suggestions to further move Lincoln's program in this direction.

- They greatly value the social aspects, work-life balance and lifetime career benefits found at Lincoln. They spoke favorably about relishing relatively stable job security while also having numerous career options within Lincoln to work on different projects or to even transfer divisions. They all appreciate the benefits package including maternity leave policies and retirement benefits.

Bridging MIT Campus and Lincoln Laboratory

Pillar 3: Exceptional Internship Experience

Overview

Our research highlighted the importance of raising awareness on MIT's campus about Lincoln Laboratory and our internship program. It grew from the desire to increase the number of interns at Lincoln who are students at MIT. Summer interns currently partner with Lincoln staff, working together to provide solutions to vital national science and technology problems. In addition, the internship program provides a good source for staff recruitment after graduation.

The program started in 1975 and has grown to 219 students this past summer from 80 universities and colleges. We focused our interviews/research on the 27 students from MIT. Students came from diverse backgrounds and education disciplines-- Aerospace Engineering, Physics, Electrical Engineering and Computer Sciences. Students were excited to work at Lincoln this past summer and appreciated the opportunity to work on interesting projects and to work with many talented staff members.

Structured program from beginning to end

MIT interns provided constructive feedback about how the internship program could be improved. More specifically, they suggested the following:

- Increasing student awareness of Lincoln Laboratory on Campus. One way would be to have a stronger Career Fair presence, as noted in Pillar 2. On Campus, departments could circulate intern position announcements (or job openings). We can also ask students or their faculty advisers to recommend the Lincoln program. We will need to advertise the wide range of research done (emphasize the unclassified work) and give more detailed examples. One way would be for Lincoln staff to give lectures on Campus. Another would be creating a Facebook page for the internship program.

- Guidance to interns on sharing classified and unclassified information. Student interns loved working on Lincoln projects, but were conflicted about what they could tell friends about their work. We need to give clear guidance on what they could include in a resume or on future job applications. What parts of their work are public?

- After completing their internships, use students as the sales force for the program. To help raise awareness of Lincoln on Campus, our summer interns could spread the word and act as “Lincoln Ambassadors” to future interns or employee prospects; with the long-term goal of increasing Lincoln’s employment recruitment from MIT students on Campus.

Social and networking opportunities

Students would love a chance to get together socially and get to know each other through planned activities. Activities could be held either in Lexington or on Campus. Activities might include a game night, city tours or sports events on campus. Students also enjoy “meet-ups” and sharing lunch or dessert.

Seamless logistics

In an effort to attract the best students the application timeline and post-internship follow up need to be as efficient and transparent as possible. We need to balance the needs of the students against the administrative burden.

- It was recommended that we streamline the application process because some students found it confusing. They also wanted to explore if returning interns could just update application form as opposed to reapplying from the start?

- Students currently receive their acceptance confirmation in February, March or April. Once the application was submitted, they felt they were in the dark regarding this status. They are looking for a quicker notification time. This would enable them to continue applying to or stop looking at other positions.

Bridging MIT Campus and Lincoln Laboratory

Pillar 4: Broad-Based Faculty Collaborations

Overview

It was evident early on in our research that numerous collaborations between Lincoln and Campus have organically been established over the years and are considered very successful endeavors that partner talents to solve National security problems. These collaborations, much like other areas of our research are solid, but still stand to be strengthened. Below are three focus areas to bridge this gap between Lincoln and Campus.

Continuous Strategic Engagements Across Growth Areas

Successful endeavors can continue to be strengthened by more regularly connecting faculty members from Lincoln to counterparts on Campus that are working on similar projects or in areas of similar interests. Making it easier for faculty members at Lincoln to connect to members on Campus is beneficial in many ways; below is a highlight of a few:

- Help solidify a bond between two entities of MIT working as one
- Help diminish the barrier that the two locations are separate and independent
- Relay a better feeling of "One MIT"
- Help in advancing the "word of mouth" of Lincoln on Campus

The more faculty members are collaborating, the more students will hear about the positives, that in turn give students on Campus another avenue of awareness in regards to what Lincoln's mission is all about.

The establishment of the new faculty orientation at Lincoln has also been a step in the right direction of bringing individuals on Campus to Lincoln. It is important to continue and increase these strategic engagements. One way to continue these engagements is to institute more Lincoln seminars on Campus. The more participation there is from Lincoln on Campus the easier it will be to bridge the existing gap, making these connections stronger and longer lasting.

Blueprint to Facilitate Engagements

It became obvious to us while speaking with people from Lincoln and Campus that Lincoln has plenty of areas of interest outside of the well-known Electrical Engineering and Computer Science domains. MIT would greatly benefit from working with these untapped areas in order to continue this momentum. One hurdle expressed by many interested parties was the lack of knowledge about who to contact, potential funding streams, how to recruit Lincoln speakers,

etc. Thus a high level blueprint that outlines the potential funded and unfunded collaborative opportunities and basic paths to establishment would be beneficial at eliminating this deterrent.

Increased MIT LL Staff Presence on Campus

The establishment of a "Point of Contact," or a more formalized network in each existing and new research area would help ensure a consistent presence and awareness between Lincoln and Campus and the ability to track and promote evolving interests in each technical area.

Formalizing this position may place additional burden on staff/divisions, however the benefit may be significant. Lastly, establishing a unified oversight across all *funded and non-funded* collaborations would also strengthen the bond between Lincoln and Campus and ensure a strategic approach to making and maintaining relevant technical connections.

Conclusions

Throughout all conversations, it was clear that technical excellence is shared across the distinct cultures of MIT Campus and MIT Lincoln Laboratory; to that end, we are *all* MIT. It was apparent that there is a strong desire from both locations to foster additional collaboration and to ensure that superior technical skills are maintained at MIT. While the physical distance between Campus and LL in Lexington was designed purposefully to ensure proper handling of national security information, many technical exchanges can be referenced as success stories. It is especially important to emphasize the past and ongoing efforts to develop and maintain these relationships. Enhancements to strengthen and expand the "bridge," MIT will only improve its ability to solve challenging problems with global impact.

As a Project Team we aimed to accomplish several goals:

- Provide actionable recommendations that could be addressed both in the near and longer term,
- Represent priorities and gaps that were recurring themes among interviews across multiple perspectives (e.g. student interns, faculty, LL staff, new hires, and MIT leaders), and
- Consider the benefits of increasing the flow of talent between Campus and LL in both directions.

Each of the pillars provides a category within which we provided several specific recommendations for action or more detailed follow on study. We were able to highlight many perspectives however acknowledge there are surely additional sources of data, ideas that could be brought to further expand on each topic. While one primary objective was to identify ways to increase the number of MIT-graduate hires at LL, it should also be strongly noted that both parts of the organization benefit from shared technical expertise.

As a Leadership Project we were able to further develop our own personal skills by:

- Being exposed to a variety leadership styles and by pushing ourselves to try new approaches,
- Observing firsthand the influence of organizational culture even within different parts of the same organization, and
- Seeing the value in reassessing the status quo because even systems that work well can be improved for the benefit of many.

Lastly, one of the greatest benefits we observed was the ability to work with a group of Leaders that all brought different perspectives to the problem. Having colleagues embedded in both

cultures enabled the exploration of new, creative approaches and the examination of the problem from multiple viewpoints to ensure a more effective, yet relevant set of solutions.

Appendix

Original Program Objectives

Rationale

"MIT Lincoln Laboratory is a federally funded research and development center that applies advanced technology to problems of national security, both in defense and nondefense sectors. For 65 years, MIT has operated Lincoln Laboratory as part of its mission to serve the nation. Two hundred and sixty two MIT graduates presently work at Lincoln Laboratory and keep the Laboratory strongly connected to campus. The flow of people between MIT LL and Campus, however, could be much higher. How can Lincoln Laboratory better attract students, staff, and faculty on the MIT campus and further strengthen the connection. And how can we increase the flow of people between MIT LL and Campus?"

Initial Potential Objectives

- Assess why MIT students/staff/faculty do or don't decide to work at Lincoln Laboratory.
- Analyze the current population at Lincoln Laboratory. What motivates people to come to work at Lincoln and why do they stay? How do students find out about Lincoln Laboratory opportunities? How do MIT LL employees find out about opportunities on MIT's campus?
- Look at other university affiliated national laboratories (JHU/APL, Caltech/JPL, GT/GTRI) to determine how well they recruit from their respective campuses, and vice versa.
- Recommend strategies to increase both undergraduate and graduate student employees from MIT Campus.
- Benchmark against the current MIT LL recruiting program's.
- Identify existing best practices of other MIT laboratories

Defined Scope

Increase awareness, job acceptance and collaborations between the students, recent graduates, and new faculty of MIT Campus and LL.

Interview List

MIT Lincoln Laboratory

Israel Soibelman, Associate Director, Strategic Initiatives

Brian Donahue/Kerry Harrison, Human Resources

Gary Hackett, Human Resources, 6A and Internship Programs

Bill Kindred, Diversity and Inclusion

Bernadette Johnson/Beija Zhang, Technology Office

Dave Granchelli, Tech Comm Office

Bob Shin/John Vivilecchia, Beaver Works

2016 Summer Interns (27 interns)

2016 Recent MIT Hires (20 recent hires)

MIT Campus

Maria Zuber, Vice President for Research

Ian Waitz, Dean, School of Engineering

Tony Sharon, Deputy Executive Vice President

Matt McGann, Director of Undergraduate Admissions

Alyce Johnson, Human Resources Manager of Staff Diversity and Inclusion

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