Measuring Safety Culture in an Academic Environment:

Thoughts on the Next Phase of the MIT Environmental Health and Safety Program

2014 MIT Leader-to-Leader Program
Project Team Final Report

Dec. 12, 2014

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Project Scope Statement

Over the past decade, MIT has developed an extensive, Institute-wide system to manage the policies, processes, and procedures that ensure lab safety. Today, the Office of Environmental Health and Safety (EHS) oversees a program that is well-regarded among peer institutions and that is very effective at meeting the fundamental requirements for safety management at a research university. An essential question, however, remains: has this effort had a meaningful influence on the culture of safety in our research centers and labs?

EHS’s desire to help build a positive “safety culture” for MIT encompasses many factors. But at its heart is the notion that while safe practices are bounded by rules and regulations, the safety system will be most effective if its goals are internalized, carried out, and reinforced by the researchers, students, and staff themselves.

To assist EHS as it plans the next phase of its organizational development, the Leader-to-Leader Safety Culture Project Group conducted an investigation to provide insight into three questions:

1. What are the attitudes, assumptions, and behaviors around safety in a selected sample of MIT research groups?
2. What are the safety expectations and priorities of MIT’s senior leadership?
3. What key issues or practices could EHS focus on to build a stronger culture of safety, from leadership to lab, at MIT?

This report:

- Distills our observations of strengths and challenges in the labs we visited;
- Summarizes the attitudes and perspectives of members of the community, from senior leadership to lab staff; and
- Offers our recommendations on key issues and practices for EHS to consider as it looks to the future.

Process

To launch the project, the team met with the project sponsors to better understand their expectations and to refine the project scope. This refinement happened over a period of weeks and was informed by further discussion among the team and with the project sponsors. In parallel, the team spent time to understand and determine an appropriate approach for gathering information and data.

Our first meeting was with Susan Silbey, the Leon and Anne Goldberg Professor of Humanities, Professor of Sociology and Anthropology, Professor of Behavioral and Policy Sciences, Sloan School of Management, and Head of Anthropology at MIT. Dr. Silbey met with us and offered her perspective on studying culture, survey techniques, and the interview process.

The team reviewed recent fatal accidents at the University of California, Los Angeles, (UCLA) and Yale University. The UCLA incident resulted in a research assistant’s death, for which the principal investigator (PI) was held criminally responsible. The Yale
incident involved the death of a student who was working alone in a machine shop. Both resulted in significant changes to the safety systems at both universities. We also interviewed EHS personnel at Lincoln Laboratory and peer institutions.

To learn about safety culture at MIT, we conducted interviews across MIT’s research enterprise at three levels: research lab, department/school, and Institute. At the lab level, we met with PIs, undergraduates, graduate students, post-docs, and lab staff. The department/school level included meetings with department heads, peer faculty, and EHS coordinators. And at the Institute level, our interviews targeted executives from the Academic Council, including the Vice President for Research, the Provost, the Deputy Executive Vice President, and the Dean of the School of Engineering.

Most of the labs on campus sit within the Schools of Engineering and Science, and we attempted to maintain a balance of interviews between the two. We also sought to hear from individuals with varying levels of responsibility and authority, from principal investigators and research scientists to lab managers to graduate and undergraduate students. In all, we conducted 43 interviews; the full list of participants can be found in Appendix A.
Findings

1. The EHS Safety Management System is highly regarded and has improved MIT safety culture.

The principal investigators and executive leaders we interviewed consistently praised the professionalism, expertise and collaborative attitude of EHS staff. We repeatedly heard appreciation for EHS personnel’s willingness to work with researchers to figure out how to safely accomplish whatever is needed. “Rather than just saying ‘no – you can’t do that,’ EHS says ‘okay, let’s figure out a way to do that in a safe manner,’” was a common refrain. “At MIT, EHS reps are not punitive – they are viewed as partners,” noted one PI. “I love the way they approach problems,” said an Institute leader. “They are great partners who work one on one with individuals in the labs.”

We specifically asked PIs and Institute leaders who had been at MIT for 15 or more years about the difference in safety culture before and after the implementation of the current EHS management system. Across the board, interviewees noted a significant change for the better. The EHS Management System’s impact on the safety culture was inevitable due to its layered design, explained one Institute leader, who praised the rollout of the management system for its effective use of embedded individuals who were already a part of the lab team to serve as safety coordinators. “Rather than being seen as a foreign body or a zealot imposing new rules, the safety coordinator was one of our own,” said the leader. “We hired him and EHS trained him – he was accountable to both EHS and the lab.”

2. Principal Investigators set the tone for each lab’s safety culture and are responsible for their group’s safety.

Principal investigators, graduate students, and most of the leaders we spoke with considered strong safety culture to derive within the labs by PIs, rather than driven from the top down by Institute leaders or imposed from outside the lab by EHS. Only one of the leaders we interviewed stressed that safety culture must start at the top. (This view was based on experience in the aerospace industry where safety was topic number one at every corporate meeting.)

Several PIs acknowledged the role of EHS representatives, trainings and inspections, but emphasized that what matters most is the tone set by the PI in the lab. “We have the scheduled ‘hoop-jumping’, but it’s the weekly group meeting where we keep beating [safety] into the students, in a positive way,” explained a PI. “I tell the students, ‘if you make a mistake, I want to know about it. You will not be fired. It will not jeopardize your position. But it may help others learn.’ I don’t scream and holler. I fire people if they consciously, repeatedly break the rules.”

Even the general attitude and demeanor of a PI can have an impact on safety. As one graduate student observed, “A stressful PI who is more competitive has a [negative]
impact on the environment.” “The attitude of the head of the lab is critical,” explained an Institute leader; the PI “cannot be perceived as simply ‘checking the box’.”

3. Overall, PIs effectively reinforce safe practices in their labs. Some PIs, however, are not as committed, thorough, or as effective as their peers.

From everything we saw and heard, it appears that the majority of PIs have internalized a positive safety culture and are committed to reinforcing safety practices in their labs. The level of PI commitment to lab safety is generally strong, but there are always going to be exceptions. One Institute leader observed that “there are a handful of people who don’t run a tight ship,” but saw “no cases of disregard” for safety protocols. Another leader with many years at the Institute had encountered faculty with a dismissive attitude toward lab safety. “There is not much you can do to change those individuals;” instead, we “need to build processes around them” to ensure safety.

A PI’s ability or willingness to communicate safety practices and ensure that they are followed can be negatively impacted by several factors. For example, safety training and enforcement takes time and effort; some PIs may see the investment in safety training and processes as time taken away from their research, rather than as an investment in their research. As experts in their own fields, they may also believe there is little scientific or discipline-specific evidence to support the value of or need for particular safety requirements. The combination of these attitudes may lead to an emphasis on speed in obtaining results over safety.

PIs who lack a strong focus on safe and effective practices—in other words, those who do not actively work to create a strong safety culture—open the door for students and researchers to create exceptions to the rules; for example, when they are working in the lab but are not directly handling dangerous materials. As one Institute leader said, “ambiguity leads to local decisions and to variability in compliance.”

4. Lab safety issues and concerns rarely rise to the level of school deans and executive leaders.

While safety is a daily concern of PI’s, Institute leaders typically address safety issues far less frequently, and often as one agenda item among many at a meeting (as opposed to the sole focus on the meeting). Deans and executive leadership do not seem to be aware of many safety incidents or “near misses” that occur in MIT labs. One Institute leader noted that a department head’s attention to safety is not likely to go beyond assigning a safety officer. Only one of the Institute leaders we spoke with recalled having a meeting or reading a report on the subject of lab safety at MIT within the past few years.

We found that Institute leaders care deeply about safety at MIT and would take action to correct a situation if they knew about it. However, once these researchers move from the lab to the executive office, safety is no longer part of their day-to-day concerns. Part of this is a practical matter: few incidents are serious enough to reach higher levels in
the organization chart. Another reason is that other concerns take precedence. For example, one Institute leader pointed out that he has three large priority buckets: people (talent), education, and innovation, and that currently, safety doesn’t play a primary role in any of these. (The individual was quick to note, however, that this could be an oversight that needs correcting.)

5. MIT leaders believe that EHS has safety well in hand, and that there is no need for concern or engagement on their part.

We heard a consistent message from MIT leaders: they have no reason to believe that MIT has anything but a strong safety culture. From their perspective, reportable lab safety incidents are rare, and are properly handled. When unsafe conditions are discovered, they are quickly corrected. Lab workers are properly trained, and EHS ensures that protocols are followed.

When asked whether MIT’s senior leadership should be more engaged in discussions about safety, a typical response was “If there are risks that are not being appropriately addressed, then absolutely. But I do not see that the current work is anything but satisfactory.” Adding safety discussions to executive meeting agendas or raising community awareness about safety was viewed as simply unnecessary.

One Institute leader beautifully summarized what we heard from so many others: “The reason the president does not write a letter [about safety] every fall is not because it wouldn’t be effective, but because we don’t have a problem that needs to be addressed. It’s not that senior administration does not care; it does. It’s not that their hands are tied; they are not. It’s because they are satisfied that EHS is doing the job.”

6. MIT leaders, lab staff and students want information from EHS that will help them to anticipate, avoid and respond to safety incidents.

Throughout our interviews, we encountered an eagerness to know more about the safety system from participants at all levels. From students to faculty to Institute leaders, most interviewees said they would welcome accounts of specific incidents, data, metrics, and other kinds of information on a regular basis that offered a window into the operation of the system and the community’s performance. Does leadership need to pay more attention to safety? “Show me the data,” exclaimed an Institute leader.

“We like data at MIT, and we look at a lot of metrics,” said another Institute leader. “I get reports on staff performance, hiring, institutional rankings, financials, etc., but I don’t get any safety data.” This individual added that a periodic report on safety incidents would motivate department heads and PIs to take more notice.

One leader did caution EHS to consider the format and frequency, suggesting that an annual report might be appropriate. “If you don’t have ‘reportable’ incidents, do you really want to burden people with them?” However, several of the PIs and graduate student we spoke with expressed a keen interest in hearing more—and more often—
about incidents, including what risks and dangers were involved, what went well, and what needed improvement. They suggested that more communications of this sort might help the development of stronger safety culture.

**Recommendations**

Based upon our interviews, we have two primary recommendations. In addition, we offer several potential areas for EHS to focus on in the future; these areas may be somewhat outside the current purview of EHS, but they were common themes we thought were worth highlighting.

1. **Reexamine EHS Communications**

   A common theme we heard across our interviews was a desire for more information about safety incidents. Administrators wanted data on number of incidents and type of incidents by lab and/or department. One way to meet this need would be through a dashboard format that could provide quick access to the key metrics in an executive-level summary, provided on a predictable basis. We could imagine them reviewing this information on a regular basis with their leadership teams, much as they do with data on research volume and, more recently, on sexual assault.

   Lab workers (staff and students) wanted descriptive information about incidents from which they could learn what not to do in the future. In general, respondents felt that the information they received had more of a training/compliance focus. They would like to see this augmented to include information that better educated them about the actual safety incidents on campus. One lab manager stated “If I knew of incidents at other labs, I could talk to the lab and understand what went wrong so I could avoid that situation in my lab.” Ideally this information sharing could become standard practice as part of the post-incident procedures. For example, developing a standard case study format that could be discussed among the EHS coordinators and disseminated through the labs could help build a culture of learning from mistakes and make it more likely that people would share their experiences with others.

   The feedback points to a clear need for a comprehensive communications program. To make progress on this recommendation, we anticipate EHS would need to engage with a communications professional, someone who could help them map out their key stakeholder groups, consider the main messages for each group, and develop meaningful communication vehicles that would uniquely appeal to each group. We would encourage EHS to be strategic in considering how to best engage the various stakeholders. What information are they seeking? How will they best hear the information? At what points during the year do they need the information? How can the newly created communications vehicles have the most impact?

   To jump start this effort, and as a proof of concept, EHS could engage with an outside consultant and/or “borrow” a resource from an MIT communications group. Without significant financial outlay or long-term commitment, such a project could get things started and help EHS determine their ongoing needs for communications support. Ultimately, we imagine the need for a more permanent communications plan and
staffing, including someone embedded within EHS but who has ties to the broader communications community and who can advise and support EHS as their communications challenges evolve. Our understanding is that a local communications resource is common in MIT's decentralized environment and certainly would not be unique to EHS. We would also suggest collecting dashboards/metrics from peers – several we talked to said they were experimenting with the same concepts.

2. Focus on the Principle Investigator

Interviewees uniformly cited the PI as the party responsible for setting and maintaining a strong safety culture. The question then becomes how to determine whether PIs are in fact doing this, and who is in the best position to hold PIs accountable when this is not happening. Our discussions led us to consider a more active role for department heads and deans in monitoring the safety orientation of each PI.

One possibility is to place responsibility with the department heads to rate or rank each PI on the safety culture of their lab. This perspective could be informed by personal observation, feedback from department administrative officers and/or safety coordinators, and even 360 feedback from the lab participants. Deans could then be responsible for asking for these ratings or rankings, and working with the department heads to determine what supports are needed in cases where the safety orientation is not where it needs to be. To be clear, the intent of the process would not be to punish, but to better support PIs who may have less of a safety orientation.

It is our sense that only a small fraction of PIs are not performing at an acceptable level as it relates to safety culture. As such, these PIs should be identified and resources should be directed to them. Some faculty may benefit from working with a peer ambassador, someone who has demonstrated the ability to build a strong safety culture and could share best practices on a peer-to-peer basis. For those labs that have codified their procedures beyond the standard training materials and that are applying them in creative ways that build strong safety culture, it may help to share these effective practices.

Additional Areas for Future Focus

Several areas of concern arose during our interviews that we thought were worth highlighting.

Environments beyond traditional labs: Several interviewees cited other environments (beyond traditional wet labs, for example) as areas for potential safety concerns. For example, labs or environments in which interdisciplinary research is happening may present a case where there is a melding of different safety cultures. There was also concern about establishing a strong safety culture in some of the new maker spaces imagined across campus, particularly those primarily serving students. When the safety culture is not uniform, approaches to certain procedures or activities may create exposure areas. A heightened awareness about safety is needed in these environments.
“Unfunded mandates”: A number of PIs remarked that safety requirements can sometimes be seen as “unfunded mandates”—particularly when investments in safety protocols are vying for scarce research dollars. EHS could be helpful in quantifying the cost of implementing safety procedures more broadly across the Institute and advocate for additional funds as needed. We were unclear about the role of the Institute in supporting safety-related investments: when is it the responsibility of the lab versus an Institute-wide priority?

There are clearly issues of moral hazard to be avoided but it seems important to explore cases in which funding challenges are getting in the way of important and necessary safety investments. Figuring out how to advocate for more resources on behalf of labs may be part of the communications plan discussed above, quantifying instances where additional funding is needed and would make a meaningful difference on safety—not just on the margins—with a focus on concerns that are aligned with broader Institute interests (e.g., where the safety of students is at risk).

Variable implementation of safety procedures: We heard that some within labs at MIT consider themselves “experts” as it relates to certain safety regulations and at times disagree with the validity and reasonableness of mandated safety rules. This can lead to variable implementation of the rules, when certain rules are deemed unnecessary and therefore are ignored. This can be especially confusing for those around the “experts” who are less qualified to make judgment calls about the efficacy of certain practices. It seems important to incorporate these experts into the safety process, both to benefit from their knowledge (and potentially influence the structure of the rules) but also to try wherever possible to engage them in setting the right example for others around them.

A question for further consideration: Some of the graduate students we interviewed wondered whether stronger social connections within and across labs would enhance the safety culture. The more people know each other and care about each other, the more likely they will adopt safe practices and watch out for each other. As we think about creating a more caring community at MIT, the link to safety culture seems worth exploring.

Lessons Learned
This investigation served as our capstone project for the 2014 Leader to Leader program. Throughout the past year, we participated in a monthly series of intensive sessions dedicated to learning about leadership, organizational culture, and change. The combination of readings, lectures, activities, discussions, and assignments not only taught us a lot about ourselves and our leadership styles and capabilities, but also served to provide us with a useful toolkit for tackling this project.

Virtually every month offered us relevant concepts and strategies that were essential to our ability to work together and to make meaningful progress on behalf of our sponsors. For example, an early session introduced the concept of three lenses—Strategic, Political, and Cultural—through which a leader may view any conflict, decision, or
change. We found ourselves referring to this approach throughout our project as we considered the strategic basis for improving the system, the political ramifications of navigating between faculty, staff, and Institute leadership, and the assumptions and attitudes that help to shape MIT’s safety culture today.

Other sessions provided frameworks for considering organizational change as a process: a “force field analysis,” which compares the forces that are promoting and restraining change; visioning exercises that help define and implement goals for the future; and simulations that accurately portrayed the challenges, complexity, and obstacles to leading successful change inside a complex organization.

We also found ourselves referring to instructive moments that turned up outside of any formal lesson plan or assignment. When Anant Agarwal spoke to us about founding edX, he referred to the differences between leading start-up versus mature cultures—certainly something to consider for EHS as it seeks to evolve from a strong, decade-long foundation. And Lincoln Laboratory’s Director Eric Evans could have been talking about our project when he told thoughtful, personal, and MIT-specific stories about how a leader may understand—and help promote—change within the established culture of an organization.

As the culmination of our year in Leader to Leader, our assignment gave us a meaningful opportunity to work together to put what we learned into action. On this basis alone, the project has been a very gratifying endeavor for the entire team. But we learned as much about MIT and leadership from our EHS sponsors: Bill VanSchalkwyk, Mitch Galanek, and Pam Greenley.

We were impressed throughout by their dedication to supporting the work of the MIT community and their commitment to keeping our students, faculty, and staff safe. As we discovered, in the past decade MIT has accomplish a great deal to establish the processes and procedures to maintain safety in the labs; today the EHS program enjoys broad respect and appreciation. The willingness of our sponsors to look beyond these successes and to consider how they could change their perspectives, their programs, and MIT for the better is an inspiration—and a lesson—for us all. We admire their spirit. We were grateful for the opportunity to work with and learn from them, and we hope that our efforts contribute in some small way to their desire to build a strong and safer culture in MIT’s laboratories.

Finally, we would like to acknowledge the tremendous support we received from our L2L process coach, Kathryn Liede. Her encouragement and engagement were critical to the success of our team and our enjoyment of the process. And her insights into team dynamics and personal goal fulfillment ensured that we each learned some important individual lessons as well.
# Appendix A: Interview List

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<th>Name</th>
<th>Title</th>
<th>Department</th>
<th>School</th>
<th>Level</th>
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<tr>
<td>Jimmy Letendre</td>
<td>Lab Manager</td>
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<td>Engineering</td>
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<td>Michael Bove</td>
<td>Principal Research Scientist</td>
<td>Media Lab</td>
<td>Architecture and Planning</td>
<td>Department/Lab</td>
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<td>Zoltan Spakovszky</td>
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<td>Tania Baker</td>
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<td>Peer</td>
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Lab Safety Culture

Project Scope

Provide insight into: Attitudes, assumptions and behaviors around safety in a sampling of MIT research groups; Safety expectations and priorities of MIT's senior leadership; Key issues or practices to build a stronger culture of safety, from leadership to lab, at MIT.

Based on 43 interviews across:

1. Laboratory Level
   - Staff, Researchers, Students, EHS Representative
   - EHS is highly regarded and trusted
   - Principal Investigators set the tone for each lab's safety culture

2. Department Level
   - Peer Faculty, Department Head, EHS Coordinator
   - Overall, PIs effectively reinforce safe practices in their labs
   - Some individual PIs are not as committed or as effective

3. Institute Level
   - EHS, Dean, Institute Leadership
   - Senior leaders are not always aware of safety incidents or “near misses” in MIT labs
   - MIT leaders would take action to correct a situation if they knew about it

Findings

Recommendations

- Communicate more broadly about safety issues to sustain stakeholder focus on safety culture
- Reconsider how often and to whom you communicate
- Develop quantitative data for deans and department heads
- Share case studies as part of post-incident process
- The PI determines safety culture, so focus on the PIs
  - Formally monitor the safety orientation of all PIs
  - Focus energies on the few PIs who need it most
  - Use peer ambassadors to communicate best practices
- Additional areas of focus
  - Labs/workshops with variable usage (teaching labs, inter-disciplinary research, maker spaces, etc.)
  - Safety is sometimes seen as an “unfunded mandate”
  - Lab “experts” sometimes disagree with mandated safety rules, leading to variable implementation

Lessons Learned

- The Three Lenses: Political, cultural, & strategic
- Anant Agarwal: Start-up versus mature culture
- Force Field Analysis: Factors promoting & restraining change
- Visioning: Implementing a vision
- Eric Evans: Organizational culture
- John Van Mansan: Navigating change
Appendix C: Sample Interview Questionnaires

PI QUESTIONNAIRE

L2L Safety Culture

Interviewee name: ____________________ Date: ___________________
Interviewee Title: ____________________ School/Dept/Lab: ___________________
Primary Interviewer: ____________________ Note Taker: ___________________

__________________________________________________________________________________________________

Pre-actions:

- Map out team interview schedule (2 members per interview). One person common to all interviews within a particular area/lab
- Send out request email to schedule interview (interview preferably take place in lab space)
- Conduct brief research on lab and any previous incidents (may help focus questions)
- Ask interviewee if we can record the conversation

General Considerations:

- Interviews should take place in the lab environment if possible or maybe include a brief tour of space. This will allow us to focus on the “artifacts” (what do we see, hear, feel, etc.).
- Observation is a key component since some of what we learn may not come in the form of an answer to a specific question.
- Stories and examples are rich. Can lead to better understanding of culture- “why was that a problem and what did you do about it”?
- Interview questions are designed to focus on policies (written documents that set expectations related to institute goals), management (actions or non-actions from management related to development and discipline), and behavior. Need to identify patterns of thinking, feeling and behaving that emphasis safety with particular focus on how conflict situations are handled.

Interview Questions:

Introduction:

1. How long have you been at MIT? How long have you led your current laboratory?
2. Can you briefly share with us the type of research your lab does? [CAUTION – this can eat up a lot of time. You may want to just say that we’ve reviewed the lab website and have a sense or the work. ]
3. What are your main responsibilities as PI?
4. How often are you in the lab either performing experiments or observing/helping students with their experiments?
5. How many researchers/students work in your lab? Please describe your typical personal interactions with them.

General Lab Environment Questions:

1. How do you manage the day to day operation of the lab? (e.g. Do you have a lab manager or someone else helping you?)
2. Who is in charge of the lab when you are not there?
3. How would you describe communication in the laboratory among peers? Management?
4. What kind of concerns would you or others voice about working in the lab? What do you do to ensure that students and researchers feel comfortable expressing any concerns?
5. What’s one thing you would change about your lab, if you could?

Safety Questions:

1. Who has overall responsibility for laboratory safety? What is your role with respect to ensuring lab safety? [If it hasn’t been addressed already.]
2. How is safety information communicated within your lab group? How often do you interact with your departmental EHS Coordinator? How do you show support for your EHS Representative?
3. Explain how safety rules are enforced (or not enforced)? Are some rules more important than others? Which do you consider most important and less important?
4. Describe an example where an individual was not following the safety rules of the lab (i.e. not wearing lab coat, goggles, eating etc.). What happened? What did you do?
5. What are the hazards that might not be evident? What materials or equipment in the lab that could be dangerous if not used properly?
6. What, if any, instances of personal safety in your lab or other MIT labs concern you?
7. How would you compare overall safety in MIT labs with other labs you may have worked in?
8. Name one thing you would change or do to increase overall personal safety?

Wrap-up:

1. Is there anything else about the lab that we should know to better understand the work environment
2. Thank you for taking the time to talk with us.

Post Actions:

- Finalize notes with your partner while interview information and observations are fresh
- Conduct brief +/-delta and bring back to team meeting
- Rate lab on each of the 9 traits that define a positive safety culture per the Nuclear Regulatory Commission (separate matrix)
- Rating: Unsatisfactory, Marginal, Satisfactory, Commendable, Superior
- Send thank you email
EXECUTIVE QUESTIONNAIRE

L2L Safety Culture Project
22 May 2014

Interviewee name: ____________________ Date:  ___________________
Interviewee Title: ____________________ School/Dept/Lab:  ___________________
Primary Interviewer: ____________________ Note Taker: ___________________

Pre-actions:

- Map out team interview schedule (2 members per interview). Depending on interviewee all may attend.
- Send out request email to schedule interview
- Conduct brief research on interviewee
- Ask interviewee if we can record the conversation

General Considerations:

- Observation is a key component since some of what we learn may not come in the form of an answer to a specific question.
- Stories and examples are rich. Can lead to better understanding of culture- “why was that a problem and what did you do about it”?
- Interview questions are designed to focus on policies (written documents that set expectations related to institute goals), management (actions or non-actions from management related to development and discipline), and behavior. Need to identify patterns of thinking, feeling and behaving that emphasis safety with particular focus on how conflict situations are handled.

Draft approach for interviews with MIT senior leadership:

Introduction:

Thank you for taking some time out of your busy schedule to meet with us. As Leader-to-Leader Fellows we are working on a project assessing laboratory safety and culture. The Environment, Health, and Safety Management System (EHS-MS) has been in place for approximately 12 years and our project is attempting to assess its effectiveness and get input on how the system may be improved in version EHS-MS 2.0. We are interviewing senior management, faculty, post-docs, and students. MIT’s Senior Officers include the President, Provost, Chancellor, Executive Vice President, Vice Presidents, and Deans. This executive staff provides resources, including human resources, specialized skills, technology, and financial resources, essential to the implementation and control of the EHS-MS.

DLC Head: The head of each MIT DLC has final-line responsibility for EHS-related compliance and good practices within his or her DLC. The DLC Head supervises the DLC’s EHS Coordinator. Upon implementation of MIT’s EMS Manual, one of the responsibilities of the DLC Head will be to include in the DLC’s annual report to the President of MIT a section discussing the performance of the DLC in implementing MIT’s EHS-MS and performing DLC’s EHS requirements.

As part of implementing MIT’s EMS Manual, the EPO and Institute Council on EHS will be responsible for writing an annual report to MIT’s President and Senior Officers on MIT’s EHS performance.

Interview Questions:

1. What interaction do you have with labs in your current role? EHS staff?
2. How would you describe the communication channels between labs, departments, senior leadership?
3. Are you familiar with the EHS Management System? Is it working for MIT? Do Department Heads or the Institute Council on EHS ever report to you on EHS matters?
5. In previous roles, did you work in or lead a lab? If yes, which lab? What was the best part of working in a lab? Worst part? What could have been improved?

6. What observations do you have about the culture of safety at MIT? Does anything concern you? What are we doing well?

7. How does leadership play into a healthy safety culture?

8. As you think about your goals and priorities for the coming year, does safety play into them?

9. We can ask executives to respond to specific observations we have made in our interviews with labs.

Post Actions:

• Finalize notes with your partner while interview information and observations are fresh
• Conduct brief +/-delta and bring back to team meeting
• Send thank you email
Appendix D: Interview Methods

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Qualitative Research Methods
For EHS Staff

Difference between surveys and interviews

Surveys are designed to collect varied responses from constant stimuli, tracking the variations correlated with some other supposed explanation for the observed variation (e.g. gender, social class, organizational position/role, age).

Surveys are best when short, with clear unambiguous questions and possible answers, requiring little or no interpretation.

Analyzed quantitatively with statistical methods, surveys require large samples of respondents to achieve reliability and validity.

Surveys can be conducted via any mode of communication but are most efficient when not done face to face, where it is almost impossible to achieve the size samples needed for quantitative analysis.

Some general thoughts on interviewing

Conversational interviewing is most useful when you wish to capture the experiences, interpretations, thoughts of persons, with the least amount of shaping as possible by the interviewer. Interviews can provide access to the native categories and thought processes (indicators of culture) of the actors.

To develop an interview protocol (set of questions), consider:

Who am I going to interview?

What do I want to learn from this person?

How am I going to collect this information?

Develop a brief interview guide.

a. List your conceptual baggage:
   what do I know about the topic?
   what do I want to find out?
   what theoretical issues guide this?

b. Why am I asking this question? How important is this question to my research? What answers am I likely to get to this question?

   Everything you ask should be relevant to your research design or to the method of collecting the data (e.g. establishing rapport). Are you trying to
collect reliable and valid information? Or, are you trying to collect interpretations, personal reflections, assessments etc.?

c. Open-ended vs. closed ended questions.

If you are asking a series of closed ended questions, might not this information be more easily and efficiently collected via a survey? Why take face to face time to collect information that can be collected through other means?

Consider the following questions: Which of these questions invites a conversation?

What were the first few weeks of college like?
Did you like the first few weeks of college?

What do you think you will be doing five years from now?
What work do you think you will be doing five years from now?

d. Do not shine the spotlight on your topic. Let it emerge through general questions about work, life. To identify the place of e.g. safety, or law, in the respondents’ life/work, you cannot ask about it. It must emerge (or not emerge) through conversation about the situation/scene/work. If you ask directly, you get formulaic answers, trying to please the interviewer.

e. Ask respondents to make comparisons, to draw distinctions, invite their opinions.

What do you like about your job? What do you not like?
What kinds of problems arise that frustrate you?
What kinds of situations are most easily handled?
What would you like to change?
What do you think should be done more?

f. The interview as guided conversation.

welcome the respondent
introduce self and topic (have this written out so you say the right things and do not seem ill at ease or unsure; do not announce your ‘hypotheses’ or ‘research questions;’ just the general area of your interest: e.g. how laboratories are organized, how engineers careers develop over time; how your organize your work ... how people respond to architecture, what it is like being an immigrant in the U.S., explain what will be done with the information (confidentiality, security of information, permission to quote etc.) agree on length of time the interview will take.
g. Wrap up the interview:
make sure you have some general, interesting final questions
to engage the respondent and cover big issues
"anything you would like to add" "anything I should have asked
and did not"
THANK THE RESPONDENT PROFUSELY.

Interviewing Techniques -- good and less good protocols (go over student examples)
Review interviewing techniques

Conversation after the formal part. There is always an overflow of information.
the threshold comments are often the most interesting. Do not forget to
write these down after you leave.

Reflections on the interview.
Write your notes reflecting on the interview, what the person
was like, the scene, problems in gaining access, your role, how you
recorded or took notes, limits of your approach, mistakes you made, how
you might do it differently next time. Any insights on the research questions
that this interview added, provoked, challenged? (Handout, form for commenting
on each interview)

Revise the protocol on basis of the reflections and submit revised version with notes.

Look at sample protocols on stellar page, good and bad examples.

Review Instructions for Conducting Interview (handout)

What is culture? A system of circulating signs (communicated messages) and practices
(activities). It is like the air we breathe, what is often unnoticed it is so familiar and
comfortable (for most, not all members of a group). We are constantly enacting the
cultural messages and activities. For the most part, only formal analysis provides the
account of how the communications and practices constitute a system – how they relate
to each other and make sense in relationship to each other.
Interview techniques, instructions to interviewers

NOTE TO INTERVIEWER: All statements to interviewers are in smaller print, italicised. They are NOT to be read aloud to the respondent. Bolder, darker print is to be read, with feeling in a normal conversational tone to the respondent.

In conducting this interview, we would like you to engage the student as you would a person with whom you are interested in having a conversation and learning about them and their life. In listening to them and their stories, you want to be an engaged listener, interested in finding out as much as possible about who this person is and what they are thinking and feeling. Probe as you might if you were making a new friend.

Sometimes a person will have told you information in response to one question that is already an answer to a following question. You don’t want to be asking repeatedly for the same information. If you have an answer already, e.g. about a person who was particularly influential in younger life, and indeed influenced the decision to study engineering, if you ask the question again, it seems as if you were not listening. You need to listen carefully and sometimes skip a question. Some questions are included as probes in case it has not been answered already.

Following the details of the particular accounts - try to get as much descriptive and concrete detail as possible, and make sure you get the person’s interpretations of what happened. Don’t assume you know what they mean. For example, if the student says she heard something bad, get the details (student didn’t go to Cal Tech, heard something from a friend). Or, she wants to be a doctor because it is stable. What does she mean by stable? Say something like, "I am not sure what you mean, help me understand this." Or, applied to best schools? "How do you decide what are the best schools?"

Some suggested probes for eliciting further information:

<table>
<thead>
<tr>
<th>TECHNIQUE</th>
<th>EXAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Accepting</td>
<td>Yes&lt;br&gt;Uh-hmm&lt;br&gt;I follow that.&lt;br&gt;Nodding</td>
</tr>
<tr>
<td>2. Offering general leads exploring</td>
<td>Could you tell me more about that?&lt;br&gt;I am not sure I understand, help me, please?&lt;br&gt;Go on.&lt;br&gt;Then what happened.&lt;br&gt;Tell me (more) about ......&lt;br&gt;Would you say more about that?</td>
</tr>
<tr>
<td>3. Providing context</td>
<td>What seemed to lead up to...&lt;br&gt;Was this before or after ......&lt;br&gt;What else what happening...&lt;br&gt;Who else did you ......</td>
</tr>
</tbody>
</table>
4. Ask to make comparisons, drawing boundaries
   How are you like, similar to ……
   How are you different from ……
   How is this (group, place, work) different from ……
   What do you like about

5. Seeking validation
   Tell me whether I understand what you are saying...
   Are you using this word to mean ……
   Have I understood you to say ……

6. Engaging critically
   Is that unusual?
   Really?
   What do you think of ……
   I heard someone say that ……

7. If students say, "I don't know"
   Let's think about that a little more and come back later.

8. If students seem turned off, unwanted to e.g. politics
   You seem uninterested or turned off by this talk about an issue, topic. What turns you off about politics? Or,
   Are you turned off by politics? Why? What turned you off?
DEDUCTIVE, QUANTITATIVE, CAUSAL

What is being observed? What are the units of data collection/analysis? What is being described (persons, organizations, culture)?
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Field Research</th>
<th>Content Analysis</th>
<th>Interviewing and Surveys</th>
<th>Secondary Analysis</th>
</tr>
</thead>
</table>
| Topics                         | "Natural setting"  
Qualitative research  
In-depth analysis  
Processes over time | Communication  "WHO says WHAT to WHOM, HOW, and with WHAT EFFECT?" | Discourse  
Reports of actions  
Orientations              | Anything on which data have been collected                             |

2. Unit of analysis

|                                | Individuals  
Groups, organizations  
(Small numbers) | Artifacts--books, newspapers, TV shows, film, poems, etc. | Individuals  
Organizations | Individuals  
Aggregates |

3. Sampling

|                                | Non-probability | Probability | Probability  
Non-probability | N/A Sources:  
Government clearinghouses  
Public Agencies |

4. Observations

|                                | Note-taking  
Cross-reference files  
Val: selective interp.  
Rel: intersubjectivity | Manifest content  
(High rel.)  
Latent content  
(High val.) | Recording/transcript  
Questionnaires | N/A Problems:  
Variables inapp. to analysis (validity)  
Accuracy of data (reliability) |

5. Data analysis

|                                | Qualitative:  
similar/dissimilar typologies | Quan/Qualitative:  
counting "mentions" panel of judges | Qualitative/quantitative | Quantitative/statistical |

6. Generalizability

|                                | Difficult: sampling problems researcher problems | Possible: care to note approp. population | Possible: relative to population studied and quality of data | Possible: relative to population studied and quality of data |

7. STRENGTHS

|                                | 1. Validity/indepth understanding  
2. Flexibility (can modify design)  
3. Inexpensive  
4. Exploratory | 1. Inexpensive  
2. Flexible (can correct mistakes)  
3. Unobtrusive  
4. Historical | Interviews:  
1. Access to natural language  
2. Process, depth, short time frame  
3. Breadth  
Surveys:  
1. Anonymity for sensitive information  
2. Generalizability  
3. Breadth | 1. Inexpensive (no data collection)  
2. Unobtrusive  
3. Historical |

8. WEAKNESSES

|                                | 1. Possible participant bias  
2. Generalizability  
3. Interobjectivity  
4. Scarce quantitative data, descriptive measures | 1. Limited to avail.  
2. Validity problems | Interviews:  
1. Reliability  
Surveys:  
1. Lacks depth  
2. Costs  
3. Format narrows | 1. Limited to available data and its form  
2. Validity problems  
3. Potential ecological fallacy (group/ind.) |