

# MIT Faculty Newsletter

<http://web.mit.edu/fnl>

**in this issue** we offer “A Letter to the Class of 2016” and an editorial addressing several issues of concern (below); “What I Learned as a Department Head,” (page 4); Chair of the Faculty Krishna Rajagopal on “Innovations in the Educational Opportunities for MIT Students,” (page 8); and some results from the 2016 Senior Survey (back page).



Dr. Cecilia Stuopis

## MIT’s Environmental Solutions Initiative Seeks Diverse Perspectives for the Near and Long Term

John E. Fernández

**IN MARCH 2014, PRESIDENT REIF** announced the launch of the Environmental Solutions Initiative (ESI) with Prof. Susan Solomon as its founding Director. In little more than a year and a half Prof. Solomon set in motion the first round of research seed grants and the structure for an Environment and Sustainability minor. On October 19, 2015, Provost Marty Schmidt and Vice President for Research Maria Zuber jointly announced my appointment to succeed Prof. Solomon as Director of the ESI. I am charged with the expansion of the ESI as a central element of MIT’s engagement in the environment.

Within a few days of my appointment, Executive Director Dr. Amanda Graham and I embarked on a wide ranging listening and learning tour and I read through 400+ pages of white papers, proposals,

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## Interview with New MIT Medical Director Dr. Cecilia Stuopis

**THE FOLLOWING INTERVIEW BY** the *Faculty Newsletter* (FNL) with MIT Medical Director Dr. Cecilia Stuopis (CS) was held on April 11 of this year.

**FNL:** *What do you see as the major challenges at MIT Medical over the next five years in your role as the new director?*

**CS:** What I understand to be the challenges for MIT Medical are the same challenges that face health care organizations anywhere. They’re around making sure that our department can provide the highest quality care, with the best patient experience, at the lowest possible cost, so we can provide high-value health care to our community. Health care ceases to be of high value when it’s either of low quality or of high cost. There’s a sweet spot, somewhere in the middle, where you can get to both of those places.

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Editorial

## A Letter to the Class of 2016; Diversity; Campus Planning; Thanks

**Greetings to you the graduates – and to your families!**

**WE JOIN WITH THE THOUSANDS** of family members and friends gathered for Commencement, in sharing the excitement of your graduation. MIT’s faculty both respect and take pride in your accomplishments as MIT’s new class of 2016. Teaching and mentoring you has been a source of deep satisfaction for us, and we have also learned and grown and received new insights in the process. As you take the next steps along career paths, your contributions to your communities and to humanity will be among the most gratifying outcomes of our academic labors.

We hope you will look back on your years at the Institute with a positive feeling, and sense that your presence contributed to enhancing the MIT environ-

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**Photo credits:** *Page 1:* Christopher Harting

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**A Letter to the Class of 2016**  
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ment and experience for the coming classes. Note that by remaining active as alumni you can continue to influence the MIT environment. As you move on to other opportunities and challenges, MIT and other universities are in the midst of a vigorous and healthy reexamination of how and what and when we teach.

You will be entering a world where new forms of social communication, new needs for research and scholarship, and global interconnectedness and interactions are the norm. Issues such as climate change, nuclear disarmament, and reducing global poverty, once in the distance, have now established themselves as requiring the urgent attention of us all. Instabilities in nations that may have once seemed very far away now emerge as problems that the world – and this nation – cannot ignore.

During your years with us, we on the faculty have watched the unfolding of your many talents and ambitions, your resilience in the face of setbacks, your thoughtful and quirky self-expression, your creative and entrepreneurial energy, and your myriad achievements. We hope that as your various individual paths unfold, you will put your powers to work on solving some of the problems that confront us, and on making our society more responsibly productive and more supportive to those in need. On behalf of the entire faculty, we wish you vision, strength, commitment, success and much happiness in addressing these challenges.

**The Editorial Board  
of the MIT Faculty Newsletter**

### **Campus Diversity**

The diversity of our community continues to be a matter of great importance. It has been 12 years since the passing of a resolution that called for doubling the percentage of URM (Underrepresented Minority) faculty and tripling the percentage of URM graduate students. We applaud the members of our community

as well as the leaders for their persistent hard work in reaching MIT's diversity goals. The report delivered at the November Institute faculty meeting "Update on Faculty Diversity" by Provost Martin Schmidt notes that MIT has reached its initial goal in doubling the percentage of URM faculty. However, this has not been uniform across departments and some have a ways to go. Women and underrepresented minorities remain underrepresented on our faculty, and we support the call from, for example, MIT's black student groups [from "Report on the Initiative for Faculty Race and Diversity"; [web.mit.edu/provost/raceinitiative/report.pdf](http://web.mit.edu/provost/raceinitiative/report.pdf)], to continue to press forward on these fronts. The detailed proposals of the ICEO report ["Advancing a Respectful and Caring Community"; [iceoreport.mit.edu/wp-content/uploads/ARCC\\_Feb13.pdf](http://iceoreport.mit.edu/wp-content/uploads/ARCC_Feb13.pdf)] provide a template for action.

The effort to triple the percentage of URM graduate students still remains an issue. Why is the recruitment of URM graduate students more challenging than the recruitment and retention of URM faculty? One answer may derive from the manner in which the definition of URM excludes non-U.S. citizens. International students usually do not have U.S. citizenship and do not fall into a category of URM, whereas faculty often gain citizenship upon becoming employed and automatically gain the status of URM. Hence there is a disconnect in defining and measuring URM. MIT might be doing more successfully in practice than it reports by using official (U.S. census) measurements. Furthermore, the category of "whites" and "Asians" includes more diversity than at any time since the end of the Cold War and collapse of socialism. There are the "other" "whites" from Ukraine and Siberia, and "other" Asians from Cambodian refugee camps, who would not fall into typical "whites" and Asians. In this context, the U.S. census' definitions are outdated, whereas in practice, MIT's inclusion of people of various backgrounds may make it more diverse than is evident from the numbers.

### **Faculty Committee on Campus Planning**

We were encouraged to receive the first report from the new Faculty Committee on Campus Planning. Both the Principles and Goals articulated in the report [[web.mit.edu/fnl/volume/285/planning\\_report.pdf](http://web.mit.edu/fnl/volume/285/planning_report.pdf)] appear sound and comprehensive. As the Committee continues its work, we trust that the other entities driving campus development will become attentive to their work and priorities.

We remain anxious that plans, initially developed by MITIMCo, with inadequate faculty input, are proceeding in roller coaster fashion, without coming to the Committee on Campus Planning for their advice and consent. We note that among the most consistent concerns of graduate students, postdoctoral fellows, and junior faculty during the past decade, has been an acute shortage of affordable housing. The proposed lead use of the irreplaceable East Campus site for commercial office buildings fails to respond to these concerns. The latest plan builds even less graduate student housing than was called for by the Clay Committee report. Hopefully it is not too late to request that the administration hearken to the call to focus the East Campus on strengthening the educational and research missions of the Institute, rather than on MITIMCo's return on real estate investments.

### **Thanks to Mail Services**

The sorting, labeling, and mailing of the *Faculty Newsletter* can often be a complicated and cumbersome job, replete with requests for unrealistic turnaround time. We would like to take this opportunity to offer our sincere thanks to MIT Mail Services, and in particular to Mail Specialist Debbie Puleo, for the outstanding service and assistance they give us each and every issue. Thanks for all your help, always.

**Editorial Subcommittee**

## What I Learned as a Department Head

Edmund Bertschinger

**DURING 2007–2013 I WAS** Head of the Physics Department at MIT. What I learned can be summarized by a quote from the 2015 Commencement address of Megan Smith '86 '88 SM: “Kindness is as important as knowledge.” Knowledge is important because understanding the work of my colleagues gives me their respect. Kindness, and its origin in caring, is necessary to give them – the department’s faculty, staff, postdocs, and students, as well as alumni, donors, and visitors – the respect they deserve. Respect and caring are, in my view, the two most important attributes a department head brings to leadership. But how does one go beyond platitudes? What does it mean for a department head to advance respect and caring?

Some background is needed before these questions can be answered. At MIT, academic departments and programs are the fundamental organizational unit for nearly all faculty and graduate students. When we say that MIT is decentralized, what we really mean is that academic departments and other work units are largely independent and have their own distinct cultures and climates.

I inherited the leadership of an excellent department. We were tied for the number one ranking in the *US News and World Report* Graduate School Rankings with a 4.9/5 rating. Faculty morale was generally good, especially among the senior male faculty. The department had initiated a highly effective fundraising effort and had just completed a major building project. Interactions were largely collegial and effective management structures were in place. Faculty valued education and educational innovation, the

department regularly graduated the largest numbers of Bachelors and Doctoral degrees in physics of any U.S. institution, and we had a good track record mentoring junior faculty to

graduate students as if they are their employees. The distinction is striking when senior undergraduates and equally mature and prepared first-year graduate students are working in the same research group. The women were telling me what research confirms: graduate students succeed better when they are mentored with empathy.

success. When I took the job, some people told me it could only go downhill!

I took the job because I cared deeply about the success of my colleagues and saw ways that it might be improved. In particular, our department had long struggled with efforts to increase the diversity of its students and faculty. Before assuming the leadership I met with a group that set my course in the role and beyond: female graduate students. They were recruited more effectively by our competitors, their morale was lower than that of other groups, and they were leaving the program at higher rates than men, despite being equally prepared on entry. The Graduate Women in Physics group gave me a focus on solving these problems by advising me, “You have to create a culture of caring in the department.”

Faculty are recruited and promoted on the basis of research accomplishments, and there is little direct reward for empathy. Faculty are generally solicitous of undergraduates but sometimes treat

graduate students as if they are their employees. The distinction is striking when senior undergraduates and equally mature and prepared first-year graduate students are working in the same research

group. The women were telling me what research confirms: graduate students succeed better when they are mentored with empathy.

Changing a department culture is not easy. The graduate women provided encouragement and help. Their determination showed me that I would be held accountable. I believe the combination of encouragement, help, and accountability are necessary for leaders to shift a departmental culture.

I will describe some of our efforts and the impact on the Physics Department shortly. First, this is why it matters today: all MIT departments are now being asked to make similar efforts. In December 2015, the Black Students’ Union asked every department head to make a statement valuing students’ well-being, and to commit to improvements in graduate student and faculty diversity. Since then, other groups have assembled recommendations, and Academic Council appointed a working group to make progress on

them. MIT's five School Deans requested a one-page set of best practices for department heads around diversity and inclusion. Here is my contribution:

### Recommendations for Department Heads

*Developing/supporting colleagues in your department may be one of your highest priorities: 3 Rs*

- Recruitment
- Retention
- Respectful Work Environment

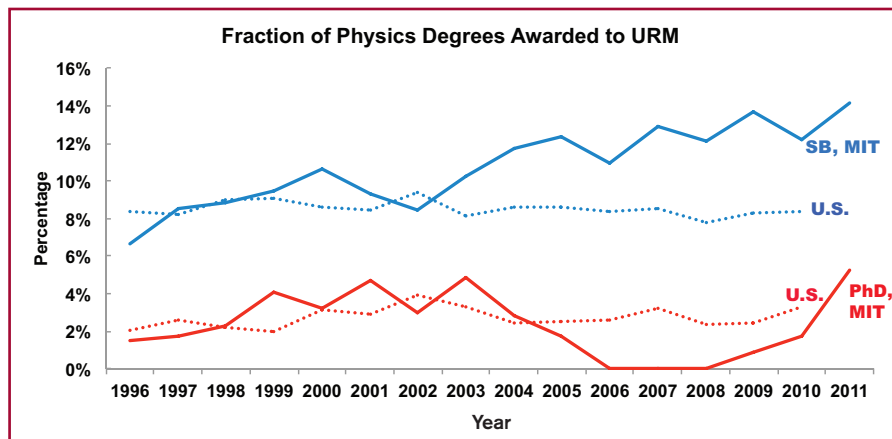
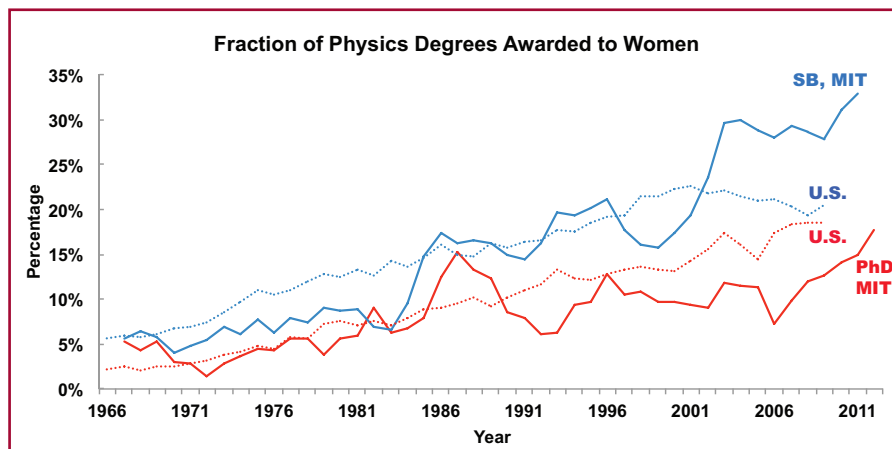
1. **Recruitment** – Build a strong, diverse organization.

*Prepare:* Join search/admissions chairs in at least one diversity/inclusion event/year, including an unconscious bias workshop, an ICEO event, the MIT Diversity Forum/Summit, or an event at your professional society. Become familiar with the terminology and issues. All search committee members (not just chairs) and all faculty involved in graduate student and postdoc selection should participate in an unconscious bias workshop.

*Execute:* Appoint a faculty or staff member, reporting to you, to advance diversity and inclusion within the department at all levels. Share expectations with untenured faculty (e.g., [web.mit.edu/physics/policies/dept/AdviceForNewFaculty.pdf](http://web.mit.edu/physics/policies/dept/AdviceForNewFaculty.pdf)). Undertake at least one departmental initiative to increase underrepresented groups entering the profession (e.g., participation in the MIT Summer Research Program, MSRP). Request faculty members to include their efforts in their Electronic Professional Record (ePR). Include them in your annual review process.

2. **Retention** – Continue your success in recruitment by furthering a positive work environment.

*Prepare:* Develop informal and formal listening opportunities (meetings, lunches, walk the hallways). Meet individually with every faculty member initially, and with groups at least annually (junior faculty, senior faculty, undergraduates,



**Undergraduate (blue, upper pair) and PhD (red, lower) physics degree statistics from MIT (solid, computed with a three-year boxcar average) and U.S. national averages (dotted). URM = U.S. citizens or permanent residents who are not White or Asian-American. The denominator is all students, including international. Data from the American Physical Society, IPEDS Completion Survey, and MIT Office of the Provost/Institutional Research.**

graduate students, postdocs, women students, minority students, administrative and support staff, research staff, lecturers). Ask the groups what they need.

*Execute:* Deliver on requests as best you can and/or be transparent with your plans. Accountability is essential. Meet with mentors of junior faculty to support their work; credit their work as departmental service; list a junior faculty's mentors in your promotion/tenure cases; add mentors/mentees to the ePR.

3. **Respectful work environment** – Help your people thrive.

*Prepare:* Join other leaders in your department (associate head, graduate and

undergraduate officers, division heads, etc.) in relevant workshops. Suggestions: MIT Conflict Management series, Crucial Conversations two-day workshop, and a department chair workshop offered by your professional society. Support graduate student REFS. Read the ICEO Report, the Women Faculty report for your school, and the Report on the Initiative for Faculty Race and Diversity (see: [web.mit.edu/Faculty/reports](http://web.mit.edu/Faculty/reports)).

*Execute:* Implement recommendations from a brochure available from the ICEO, *Enhancing Department Climate: A Guide for Department Chairs*. Cultivate respect

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**What I Learned as a Department Head**  
Bertschinger, from preceding page

and caring. State your department’s vision and values at your Website and in your talks to faculty, staff, and students. This may include a diversity statement similar to the one adopted by History, [history.mit.edu/about/statement-diversity](http://history.mit.edu/about/statement-diversity). Consistently communicate respect for others, even when it is difficult to do so. Praise others.

*Assistance:* Bring in MIT resources to help when needed – you can’t do it all. Become familiar with, and recommend as needed, MyLife Services (a network of experts to help with life concerns), the ODGE/GSC Best Practices in Advising guide, and <https://myconciierge.mit.edu>.

*Assessment:* Request from Institutional Research data similar to what is assembled on these pages. Share it with your Visiting Committee.

These recommendations are only a few of the things I did or would do now as a Department Head. One may choose to go beyond them, for example, by creating a Diversity and Inclusion Strategic Plan, by training and assessing mentors, by organizing community events, etc. Much more has been elsewhere about outreach and mentoring efforts. In Physics, it was helpful for all junior faculty to take MIT’s two-day workshop in Leadership Skills for Science and Engineering Faculty. Once the basics of empathy, community, and culture are in place, MIT faculty will come up with endless good ideas to advance respect and caring.

Do these efforts work? Do they add value? The set of physics departments nationwide provides evidence that they do.

First, our *US News and World Report* ranking improved: in 2014, MIT Physics took sole possession of the #1 position, with a 5/5 reputational ranking. No other department in the country has this distinction, in any area of Engineering, Health, Science, or Social Science. (MIT Chemistry,

Computer Science, Economics, and Mathematics are tied with others for #1 with 5/5 rankings.) Conversations with colleagues across the discipline suggest that our reputation improved because of our efforts to advance a respectful and caring community.

ating Black and Hispanic PhD students. We had declined following a long history of success; deceased astronaut Ronald McNair, RPI President Shirley Ann Jackson, and National Medal of Science winner S. James Gates are among the many black scientists who received their

Efforts to improve the climate for one group helps others. In the Physics Department, although the relative gains were most dramatic for graduate students, our undergraduate student diversity increased as well.

Second, the ability to recruit, retain, and graduate or promote talent can readily be measured. Indeed, the Provost annually reports to the faculty on these matters, as called for by a 2004 faculty resolution. However, MIT-wide data do not help departments to assess themselves. Each department can and should assemble data similar to what is shown in the two figures on the preceding page.

When I became Department Head, I learned that we were doing poorly gradu-

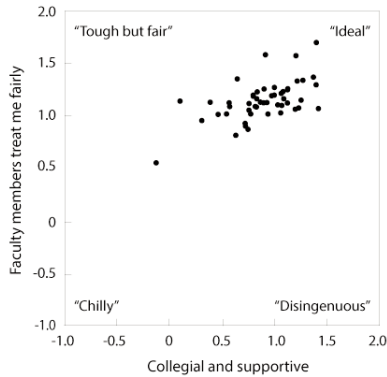
physics PhDs from MIT. The concerns raised by graduate women were urgent for minority women and men. Response to their concerns reversed the trends so that the Physics Department met the goals of the 2004 faculty resolution to triple the number of underrepresented minority graduate students in fewer than 10 years.

Similar data for faculty show a longer timescale for change. When I began, Physics had the smallest percentage of women faculty of any department. Nine

**Peer Comparison of Physics Bachelors Degrees 2007-2011 (IPEDS data)**

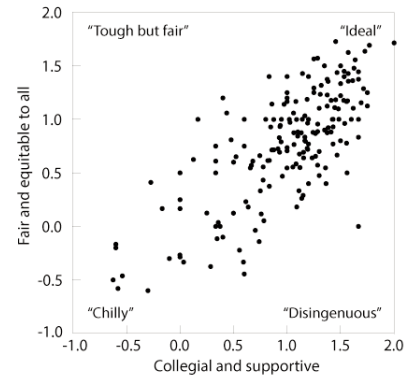
Physics Department	% Women	Physics Department	% URM
Yale	31.8%	MIT	12.8%
MIT	30.5%	UCSB	12.2%
Cornell	25.8%	UC Berkeley	8.1%
Harvard	23.6%	Princeton	6.7%
UPenn	23.5%	Harvard	6.7%
UMichigan	22.5%	Caltech	6.4%
UC Berkeley	21.9%	Stanford	6.3%
U Chicago	20.2%	UPenn	5.9%
UIUC	19.1%	U Chicago	4.7%
Stanford	19.0%	Yale	4.5%
Caltech	18.5%	UMichigan	4.5%
Princeton	16.0%	UIUC	3.3%
UCSB	9.0%	Cornell	1.6%

**Figure 5a. Students' responses to questions regarding community and equity at MIT, averaged into academic majors or programs with five or more responses.**



Source: 2013 Student Quality of Life Survey, Institutional Research, Office of the Provost.  
 Note: Descriptive labels are shown for each of the extremes.

**Figure 5b. Faculty, staff, and postdocs' responses to questions regarding community and equity at MIT, averaged into departments, labs and centers with five or more responses.**



Source: 2012 Faculty and Staff Quality of Life Survey, Institutional Research, Office of the Provost.  
 Note: Descriptive labels are shown for each of the extremes.

years later, the number and percentage of female physics faculty have doubled.

Efforts to improve the climate for one group help others. In the Physics Department, although the relative gains were most dramatic for graduate students, our undergraduate student diversity increased as well. The best way to interpret the numbers is to compare with peer departments. The table (preceding page) shows Bachelors degree data for the top physics departments, averaged over a five-year period.

Such a comparison avoids the "pipeline" problem: all physics departments are recruiting from the same pool. The large variation across departments nationally is surprising and reinforces the perspective that academic departments have distinctive cultures that affect student outcomes. Is there a similar variation across MIT departments? I believe so, but until we have tabulations like these, we will not be sure.

We do have some data concerning departmental climate at MIT. The figures above are from the ICEO Report. After

poring over data from the 2012 and 2013 Quality of Life surveys, I constructed measures of collegiality (community) and fairness (equity) that correlated with what I had learned speaking with community members during 2013 and 2014,

MIT staff, postdocs, and faculty have recently completed a new Quality of Life survey. Next year our students will take a similarly detailed survey. Efforts have been underway in many work units, including academic departments, to improve the climate so that more people thrive. New data will provide feedback to these efforts.

and which were significant in that the differences between departments were larger than could be accounted for by random sampling from a single population. In short, some departments have welcoming climates, many are tough but fair, while some are regarded by staff, postdocs, or faculty themselves as being rather chilly.

MIT staff, postdocs, and faculty have recently completed a new Quality of Life survey. Next year our students will take a

similarly detailed survey. Efforts have been underway in many work units, including academic departments, to improve the climate so that more people thrive. New data will provide feedback to these efforts.

What did I learn as a Department Head? I learned that being #1 in the rankings is not enough; that it is possible for a Department Head to advance a respectful and caring community; and that doing so yields benefits for everyone. If we learned that caring is as important as knowledge, so will our competitors. Will MIT Department Heads be ahead of them? ■

**Edmund Bertschinger** is Institute Community and Equity Officer ([edbert@mit.edu](mailto:edbert@mit.edu)).

## From The Faculty Chair

# Innovations in the Educational Opportunities for MIT Students

Krishna Rajagopal

**IN THIS LAST FACULTY NEWSLETTER** of the academic year, I will take the opportunity to update you about recent and ongoing developments on three fronts – fronts that are distinct but that all relate to innovation in the educational opportunities that we offer to MIT students.

### Curricular Innovation

The MIT Faculty are in the midst of an extraordinary wave of curricular innovation. This academic year has seen the creation of one new PhD program, one new Masters degree, four new SBs, and seven new undergraduate minors, offering our students many new educational pathways through MIT. By a large factor, this is more new programs than in any previous year in memory. In addition, there are a number of departments making substantial changes to their curricula. For example, this fall Course 6 (Electrical Engineering and Computer Science) will be rolling out new versions of their 6-1, 6-2, and 6-3 majors, redesigned to offer students greater flexibility.

Looking at the varied new offerings across MIT, there is no single driver for this wave of innovation. Many respond to student interests and demand. Some have grown from departmental processes of assessment and improvement. Some are new products created by faculty who are launching new MIT initiatives. Some are interdisciplinary in new ways, offering students new paths through MIT that cut across departments. But, although giving students the flexibility and opportunities to adapt their degrees to their interests and anticipated careers are common themes, many of the new offerings fit

squarely within a discipline while reflecting the evolution and diversity of their departments. All have in common that each represents a substantial effort by a large group of faculty members, both in the planning and in the execution to come. I thought it appropriate to conclude the academic year by celebrating these innovations from so many MIT faculty in sum by enumerating the new programs.

### PhD Program in Social and Engineering Systems

This new Doctoral program, launched by MIT's Institute for Data, Systems, and Society, focuses on addressing concrete and societally significant problems by combining methods from engineering and the social sciences.

### Master of Business Analytics

MIT Sloan, with the Operations Research Center, introduced a new one-year Masters program tailored for recent college graduates who will pursue a career in the data science industry, applying data science to solve business analytics challenges.

#### 15-1: SB in Management

#### 15-2: SB in Business Analytics

#### 15-3: SB in Finance

The new Course 15 curriculum provides more choice, flexibility, and the opportunity for greater breadth or greater depth of study in business and management topics including, in particular, preparation for careers in data analytics or finance.

#### 14-2: SB in Mathematical Economics

This new major is designed for students

interested in mastering technically and theoretically oriented topics in economics, including game theory, microeconomic theory, and formal econometrics. 14-2 majors will gain the mathematical and theoretical preparation needed for subsequent graduate study in economics.

### Minor in Computer Science, offered by Course 6

The computer science minor provides a strong background in the fundamentals of programming, algorithms, and discrete mathematics, giving students the knowledge and skills needed to make effective use of computer science concepts and computing technology in their future careers.

### Minor in Design, offered by Course 4

The design minor provides a hub at MIT where students who see the value of design as an approach to problems within their major can learn the conceptual foundations, core principles, and skills of design in dynamic studio settings, develop a sensibility for visual and physical form, and contribute to new ways of designing that are applicable across a spectrum of areas.

### Minor in Entrepreneurship and Innovation, jointly offered by the School of Engineering and MIT Sloan School of Management

The E&I minor will prepare students to serve as leaders in the innovation economy, providing them with the knowledge, skills, and confidence to develop, scale, and deliver breakthrough solutions to real-world problems.



**Minor in Statistics and Data Science, offered by the Institute for Data, Systems, and Society**

The minor in statistics and data science focuses on providing students with a working knowledge base in statistics, probability, and computation, along with an ability to perform data analysis.

**Minors in Management, Business Analytics, and Finance, offered by Course 15**

These new minors correspond to the new Course 15 majors above.

**Sub-Term Subjects**

Over the past academic year, a subcommittee of the Faculty Policy Committee (FPC) chaired by Prof. John Fernández has been analyzing the emergence of undergraduate and graduate sub-term-length subjects across the Institute, looking at overall trends and understanding the motivating aspirations and goals as well as the pedagogical value of such offerings and their effects on student learning and student life.

I am very grateful to the members of the subcommittee, listed below, for the considerable effort they have put into collecting data: conducting surveys, focus groups and interviews; and distilling, analyzing, and synthesizing their findings. They have produced a draft report describing what they have learned about the current scope of sub-term curricular offerings and the motivations behind them, as well as overall trends regarding sub-term subjects, their intended and potential growth, and their impacts on students, faculty, and the curriculum.

The draft report is available here: [web.mit.edu/faculty/reports/FPC\\_SBTSSubComm\\_FINAL\\_Report\\_20APR2016.pdf](http://web.mit.edu/faculty/reports/FPC_SBTSSubComm_FINAL_Report_20APR2016.pdf).

I urge all of you to have a look. If you have comments, please send them to: [subterm-subjects-reply@mit.edu](mailto:subterm-subjects-reply@mit.edu). If you wish to help the subcommittee in shaping the final version of its report, please email them by mid-June.

The subcommittee has heard from both faculty and students that sub-term subjects enable students to take more subjects, including subjects with specialized

or focused content and electives that were seen as well-suited to a sub-term length, with consequent flexibility and opportunities for adaptation as students find their pathways through MIT. Sub-term subjects are largely neither notably more nor less stressful for students than full-term subjects, but there is less time to learn the

The subcommittee found that most sub-term subjects are essentially half a term in length. So, for the specific case of half-term subjects, the subcommittee also includes an initial proposal for new rules concerning start and end dates, Add and Drop dates, and final exam periods.

content and it is more difficult to recover from a poor test or problem set result. There is also less time for students to get to know faculty and TAs, and vice versa.

The subcommittee report is only the beginning.

The subcommittee has provided us with a list of best practices and a list of recommendations. Best practices include clear communication between instructors and students on the rules governing sub-term subjects, especially Add and Drop dates, department vigilance in providing the necessary resources for successful teaching and learning through sub-term subjects, and novel ways via which to offer some flexibility to students in the weighting of grades between assignments and exams so as to mitigate the “less time to recover” downside of subjects of short duration. Recommendations include giving students a clear understanding of the grading policy for the class and ensuring that at least 30% of a student’s grade is recorded and communicated to the student by Drop Date.

After hearing feedback, the members of the subcommittee will finalize their recommendations and suggested best practices. I hope that as faculty and departments consider teaching and introducing sub-term subjects, in their planning over the coming summer and then in

the coming years, we will all consult these sections of the report.

The subcommittee found that most sub-term subjects are essentially half a term in length. So, for the specific case of half-term subjects, the subcommittee also includes an initial proposal for new rules concerning start and end dates, Add and

Drop dates, and final exam periods. The subcommittee has concluded that rules of this nature are needed for half-term subjects, so that all of us – faculty and students teaching/taking full-term subjects and half-term subjects – have a common and clear set of expectations regarding these matters.

The goal of the subcommittee in making proposals for new rules is to provide an initial template for discussion and refinement, which will happen in the fall. Rules of this nature intersect the domains of five faculty committees: the Committee on Academic Performance, Committee on the Undergraduate Program, Committee on Curricula, Committee on Graduate Programs, and Faculty Policy Committee. Consequently, the subcommittee membership includes at least one member from each of these committees. It will be these committees in full that will formulate any proposed new rules, likely in the fall, before bringing them to an Institute Faculty meeting if their discussions converge. These committees will see the subcommittee proposals, once finalized after the comment period between now and mid-June, as a starting point. They and I look forward to your input as this process begins.

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**Innovations in the Educational Opportunities**  
Rajagopal, from preceding page

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After you read the report, I believe that you will join me in thanking the subcommittee for going the extra mile to gather many and varied data, both quantitative and qualitative, to formulate a comprehensive analysis. All the while, the subcommittee has kept a clear-eyed focus on the pedagogical value of sub-term subjects at MIT and on efforts to enhance and support the emergence of sub-term subjects in ways that maximize the benefits to undergraduate and graduate students, faculty, and teaching assistants.

Subcommittee membership: John E. Fernández, FPC Member, Course 4, Chair; George Barbastathis, FPC Member, Course 2; Zoya Bylinskii, CGP Member, Graduate Student, Course 6; Brian Canavan, Office of the Registrar; Scott Hughes, CAP Member, Course 8; Joseff Kolman, FPC Member, Class of 2017, Course 17; Anne McCants, CUP Chair, Course 21H; Roy Welsch, CoC Member, Course 15. Tami Kaplan, Faculty Governance Administrator, Staff to the Subcommittee; Jagruti Patel, Director, Special Projects, Office of the Chancellor; Kate Doria, Research Analyst, Office of the Provost.

**Study Group on Algorithmic Reasoning and Computational Thinking for MIT Undergraduates**

For many years, at least since the 2004-2006 Task Force on the Undergraduate Educational Commons chaired by Prof. Robert Silbey, various MIT faculty members have asked whether – and if so, how – MIT should ensure that all its undergraduates learn algorithmic reasoning and computational thinking. Dean for Undergraduate Education Prof. Denny Freeman and I have charged a small group of faculty members to conduct an in-depth study of this topic, beginning by asking what the phrases “algorithmic reasoning” and “computational thinking” mean in the context of the education of MIT’s undergraduates across all five

Schools, including how they encompass an intellectual framework in addition to skills. We have asked them what, if any, is the common framework that people across MIT mean when they speak of computational thinking and algorithmic reasoning, as well as in what ways the diversity among the meanings of such phrases in different disciplinary contexts is important. We have asked them to determine the extent to which algorithmic reasoning and computational thinking are already being taught, and whether they see a rationale for making this an explicit expectation of all our graduates – and, if so, with what learning objectives and measurable outcomes.

The members of the study group are Profs. Eric Grimson (EECS; Chair of the study group), Deepto Chakrabarty (Physics), Michael Cuthbert (Music and Theater Arts), Peko Hosoi (Mechanical Engineering), Caitlin Mueller (Architecture), Jim Orlin (Sloan), and Troy van Voorhis (Chemistry). The charge can be found here: [due.mit.edu/sites/default/files/AlgorithmicComputationalCharge-rev2.pdf](http://due.mit.edu/sites/default/files/AlgorithmicComputationalCharge-rev2.pdf).

As you will see from the charge, this is a study group, not an implementation group. Nevertheless, depending on what this group finds, their analysis may provide the foundation for subsequent advances in how MIT students are educated. The charge provides examples of several kinds of potentially actionable next steps in curriculum development that the work of the study group could prompt, after they have done the analysis requested by the questions in the charge. Examples of options they may consider include modules that could be incorporated in existing GIR subjects, new subjects or modules intended to be accessible to any MIT undergraduate, and a model in which departments make discipline-specific choices for how to achieve overarching MIT-wide goals via more advanced subjects or modules designed for students in a particular major. Dean Freeman and I hope that the answers provided by this in-depth study, together with any subsequent

curriculum development that it prompts, will serve as valuable input to any future discussions of our GIRs.

Dean Freeman and I have set up an email address, [computation-study-group@mit.edu](mailto:computation-study-group@mit.edu), via which you can send your thoughts and advice to the study group. We invite you to read their charge and share your input by mid-June. Please focus your feedback on the specific questions that the study group will be considering. If their work prompts further discussion by faculty committees and/or by an implementation group of some form, there will be further opportunities for broader input.

Dean Freeman and I are pleased that all of the members of the study group either volunteered or responded with enthusiasm when contacted. This leads us to think that there may be other topics related to undergraduate education where an in-depth study by a five-School group could provide valuable input to future advances in the education of MIT undergraduates – topics that are focused in scope but at the same time cut across all five Schools. As we see the work of this study group unfold, we are open to discussions of charges for other potential study groups with potential volunteers.

I am very grateful to the members of this study group for committing their time and energy to this work. I look forward to learning from their collaborative efforts.

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As this academic year rich with new beginnings reaches its conclusion, I wish all of you a happy, invigorating, and productive summer. Looking ahead to next year, we can all anticipate seeing MIT’s newest educational initiatives taking flight, and to continuing our discussion of these innovations and more, as MIT faculty continue to explore and develop new pathways for MIT students. ■

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**MIT's Environmental Solutions Initiative**  
Fernández, from page 1

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memos, and other material produced during the long discourse to launch an Institute-wide environmental initiative at MIT. Both the listening and learning tour and the archive review confirmed my early intuition about the essential attributes of an environmental initiative at MIT. These attributes are embodied in its name.

*Environmental* encompasses understanding of atmosphere, ocean, ice, and biosphere as well as land use and human settlements, material and energy resources, and social, political, and economic systems and structures. Our scope captures the human-nature interface, the interplay between society and natural geophysical dynamics, biogeochemical cycles, and ecological systems. This understanding will provide guidance for improving the possibility of creating a sustainable future for us and other species.

Environmental understanding is one part of the ESI's whole, solutions the other. Science and engineering are fundamental contributors to *solutions*, yet I have been struck by the sustained call by faculty and students alike for deeply multidisciplinary perspectives. I could not agree more with Kerry Emanuel and his co-authors in a March/April 2016 Faculty Newsletter article that we should support a multifaceted approach of technology in tandem with "... policy steps, the societal dimension ... ." Our agenda, described below, takes this approach.

For example, the ESI is committed to finding ways to support and enlist the enormous expertise in philosophy, cultural studies, literature, music, linguistics, anthropology, and other fields in the School of Humanities, Arts and Social Sciences. Disciplined thought in the humanities offers critical pathways toward agency and action in the environment just as it does in the sciences and engineering, though in a very different way.

MIT's aspiration to lead toward a healthier human-environment future faces sobering challenges. Yet we are fortun-

nate to be living through what I believe to be an historic cultural, political, and institutional inflection point.

With the U.S.-China Joint Announcement on Climate Change of November 12, 2014, the recent agreement in Paris at COP21, the announcement of the Mission Innovation Initiative, the vast increase in the deployment of renewable energy, and the adoption of the UN Sustainable Development Goals, we are

Science is the basis for understanding the environment and climate science and earth systems are at the center. Today, there is an unfortunate sense in some quarters nationally and internationally that we know enough to act effectively to mitigate carbon emissions and adapt to climate change. In fact, there is still significant fundamental work to accomplish.

witnessing an international commitment to addressing the complex development and environmental challenges that define our reality and our new future.

In addition, I believe that we, as an institution, are also at an inflection point that defines a new future for MIT. The Institute has committed to ESI, as it has to MITEI and more recently to the Office of Sustainability, J-WAFS, and the Climate Action Plan. The Chair of the Corporation, Bob Millard, told me that he believes MIT has a special role in helping to "... steward the Earth." The upcoming launch of MIT's Campaign for a Better World features *Environment* prominently. Just as importantly, our community has converged on the need for actions even while we may not all agree on the best pathway forward.

My own efforts, in partnership with Dr. Graham, are focused on acting as the steward of the ESI and we have begun with the development of an agenda that includes three elements: research, education, and convening.

### Research

As an initiative bridging across the entire Institute, ESI envisions a research agenda that is inclusive of MIT's enormous and diverse expertise and capacity. The three

domain areas below map out disciplinary and intellectual territories that are crucial if we are to understand how our species interacts with the environment, ameliorating and adapting to climate change as well as many other environmental challenges.

- Climate science and earth systems
- Cities and infrastructure
- Sustainable society and economy

Science is the basis for understanding the environment and climate science and earth systems are at the center. Today, there is an unfortunate sense in some quarters nationally and internationally that we know enough to act effectively to mitigate carbon emissions and adapt to climate change. In fact, there is still significant fundamental work to accomplish. Effective engineering solutions and policy recommendations – there is great need for both – demand basic science to inform us about, for example, the mechanics of ice shelf calving, the role of aerosols and clouds in the atmosphere, and the rates at which the ocean takes up heat and carbon. Models of climate consequences are only as good as the underlying science, and we would be wise to invest heavily in supporting the unique capacity in science of the climate and earth systems here at MIT.

However, studies of past and present-day climate and earth and planetary systems generally, should not be relegated *solely* to inquiry in the service of practical solutions. A motivation behind every kind of scientific pursuit is the search for truth, pure and simple, and discovery itself is a triumph of the human spirit.

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**MIT's Environmental Solutions Initiative**  
Fernández, from preceding page

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The recent grand scientific detection of gravitational waves resulted from inquiry about nature independent of the need for practical justification.

The same holds for Earth and planetary sciences, paleoclimatology, the search for life on habitable planets, and exploration of other worlds. And yes, as we learn more, science will increasingly contribute to our ability to act effectively to address our critical needs. MIT has a special role in these endeavors, embracing engineering ingenuity alongside the desire for holistic knowledge of how to manage our engagement in the world borne out of understanding and a moral code.

A major human-nature interface is that between human settlements and natural systems. Cities and the water, power, transportation, building, and food systems that support them are particularly vulnerable to changing climate, rising seas, and the increasing frequency of severe storms. Architectural, urban and planning perspectives on the future of a resilient and adaptive built environment are critical. And of course, any kind of action must consider the changing business conditions, pressures on investment decisions, and emerging corporate and industrial commitments to a decarbonized world. The central role of economic and political science expertise in these research domains cannot be overstated.

Finally, any hope for a sustainable society and economy includes the fundamental need to investigate the cultural and historic contexts within which we seek change. Our natural capital forms the physical basis of our society and culture; our social capital provides leverage to change the trajectory of our environmental impacts. Decarbonization and dematerialization are important pathways toward a sustainable society but need to be considered within the historic breadth of our relation to nature and our emerging notions of a just and equitable society.

### Education

Our aspirations in education align with Barton Rogers' belief that education should be, ". . . both broad and useful, enabling students to participate in 'the humane culture of the community' and to discover and apply knowledge for the benefit of society." (Mission of the Massachusetts Institute of Technology; [web.mit.edu/mission.html](http://web.mit.edu/mission.html), accessed April 15, 2016.) This belief is coupled to a commitment to explore the multidimensional and complex relations between human and natural systems.

Chief among our current educational activities is the development of an undergraduate Environment and Sustainability minor structured into four pillars; Earth Systems and Environmental Science, Environmental History and Culture, Environmental Governance, and Engineering for Sustainability. These four are linked through integrative knowledge building intended to bring together diverse disciplines in addressing the multifaceted complexity of real-world environmental challenges. Profs. Susan Solomon, Amy Glasmeier, and Executive Director Amanda Graham are leading this effort. Our current target date to have this minor available is the fall of 2017.

In addition, the ESI and a group of GIR instructors were just awarded a 2016 Alumni Class Funds grant to develop problem sets, lecture material, and other course content that can be incorporated into a number of existing GIRs. I was happy to read Alex Slocum's letter in the recent March/April *Faculty Newsletter* suggesting more or less the same idea. The development of problem sets and other material will begin soon and the first batch of ESI-sponsored material will be introduced this coming fall term.

These projects and more will serve to build a community of environmentally interested, informed, and passionate students, faculty, staff, and others. Convening this community is the third major priority of the ESI.

### Convening

During IAP 2016 the ESI and the Climate CoLab co-sponsored the Hackathon for Climate. Students, alumni, and staff, alongside faculty representing all five Schools, attended the one-day event and engaged in creating and quickly developing inventions for contributing to progress in the environment.

This past Earth Day, the ESI held a community gathering that included presentations on each of our nine inaugural Research Seed Grants, an overview of our activities in research and education, an update on the Plan for Action on Climate Change from Tom Kiley, Senior Advisor to the Vice President for Research, and a well-attended poster session of our partners across the Institute.

This coming year we are planning several regular and special events; including an ESI lecture series, student lunch talks, a large-scale Earth Day celebration and symposium, an expanded IAP Hackathon, and an Environmental War Games event. More on these in the coming weeks and months.

The full agenda can be found on the ESI Website ([environmentalsolutions.mit.edu](http://environmentalsolutions.mit.edu)).

Finally, imagine a near future at MIT; we exceed our current carbon emissions reduction goals and add several net zero energy buildings to our campus; research breakthroughs proliferate in low carbon technologies and, just as importantly, in carbon capture and storage; student groups regularly brief Congress and routinely participate in international climate conferences; and MIT becomes an important partner in supporting industries and nations in achieving national carbon reduction commitments around the world. This is not only a wonderful picture of the future but also a necessary one – and one we can create. ■

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**Interview with Dr. Cecilia Stuopis**  
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**FNL:** *I know you attended MIT as an undergraduate. Do you see significant changes since you were last here?*

**CS:** I was in the class of 1990, and I didn't really have much of an interaction with MIT Medical. I was maybe in here once or twice during my entire four years at MIT. I did, however, get my pre-professional advising through MIT Medical, and that was very helpful in launching me on my current path.

**FNL:** *Back to our first question: So getting great medical care at low cost is the challenge. Getting great medical care, we can understand where that comes from. What's the pressure on you to keep the cost down?*

**CS:** There isn't actual external pressure, in terms of somebody saying you have to keep the cost below a certain level. It's really more around a stewardship question. There are a lot of resources that MIT invests in health care provided here, the health plans in general and the options they provide to us for benefits. All medical providers are facing all kinds of pressure to keep their costs down because the costs of health care are just growing astronomically and we know it's unsustainable. So this is sustainability and a stewardship question for me more than anything else; it's more about being a good steward of the resources that we've been given.

**FNL:** *Anybody who has looked objectively at MIT Medical over a long period of time has said that we don't live in the real world; that we're getting an extremely good deal here for our money. Still we've had cutbacks over the years in certain areas that can be seen as problematic. We were without a Dermatologist for a long time and Women's Health Care was without services. The Urgent Care Facility has been cut back and we lost our infirmary, which was a most important and appreciated facility by many faculty. So there's the question of that pressure and how you can meet it, and how we,*

*as the faculty, can help you meet it, in the sense of keeping the quality high, which of course takes money. So are you saying that there's no administrative concern about the MIT Medical budget?*

**CS:** Oh, I'm certain there's administrative concern because there's no employer in America of any sort that is not concerned about their health care costs.

**FNL:** *Has the administration had that discussion with you?*

**CS:** We have, at a more general sort of concept, I would say. Not down to the level of specific targets or things like that.

**FNL:** *Have you had to have a budget approved yet?*

**CS:** We did just have a budget approved, but I was not really involved in the development, as it was submitted pretty much just as I was getting started.

**FNL:** *Who are the people in the administration that have direct oversight over MIT Medical and to whom you would ultimately need to go to get the budget approved?*

**CS:** Our budgetary reporting line is up through the Executive Vice President and Treasurer, Israel Ruiz.

**FNL:** *And isn't there also a committee or a board that oversees all of MIT Medical?*

**CS:** Yes, it's the Medical Management Board, which statutorily we are required to have, but they do not have financial oversight over the Medical Department. It's really more on the administrative side of the Medical Department, things like being the ultimate authority on final credentialing of providers, other policy issues, but not on the financial management side of it. A traditional hospital or clinic board would have both administrative and financial oversight. We also have the Medical Consumers Advisory Council (MCAC), comprised of a number of students, faculty, staff, and retirees. They

advise us, share feedback from the community, and help keep the MIT community informed about our services. The MCAC reports annually to the Medical Management Board.

**FNL:** *Is the financial reporting unusual, that you report to a Vice President, as opposed to a board?*

**CS:** I think it's kind of an apple and orange comparison. MIT Medical has a very unique structure because here we have a good-sized health care organization within a non-health care organization. By that initial construct, it's not easy to compare. Most health care organizations have full governance structures with complete oversight. My prior organization [Dartmouth-Hitchcock, in New Hampshire] was only a health care organization. Dartmouth-Hitchcock wasn't even under Dartmouth College. It's sort of a sideline, kind of affiliated with Dartmouth College in terms of educating students and residents, but not underneath the larger governing body of the College. Dartmouth-Hitchcock had its own Board of Trustees.

**FNL:** *In terms of the faculty we've talked to, some of whom serve on the Medical Management Board, that's what we would like to avoid at all costs; to become managed by something like MIT-Hitchcock, a separate outsourced operation which is not responsible to the MIT Corporation. There is significant concern among the faculty that this might be where we're heading.*

**CS:** I guess I'm too new here to know whether that's ever been on the table or even how they would do that. But to get back to the original question, I think demonstrating value is the best thing that we can do to preserve the current organizational structure that we now have.

**FNL:** *So this whole thing is fairly unique within academia.*

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**Interview with Dr. Cecilia Stuopis**  
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CS: Yes it is. I think when you look at our peer academic institutions, most all of them have a medical school, which then puts a whole other layer of organizational structure in place. So I think we can't really compare. We are, I believe, virtually the only one that does not have that medical school piece.

FNL: Princeton, however, does have a similar structure to ours.

CS: Yes. But most of the others have medical schools, and that drives what their organizational structure is and how they deliver clinical services. They also have the need to deliver medical education that way, but we are really a freestanding unit.

FNL: On a somewhat more mundane issue, we recently went from Crosby Benefits to WageWorks, and there was a big issue for many months about WageWorks not accepting MIT as a medical facility and individuals having to get reimbursed rather than directly using the WageWorks credit card. My understanding was that it was complicated for WageWorks because we aren't a hospital or specifically a medical facility. Do you see any other issues, either positive or negative, because of our unique kind of structure?

CS: Well, because of our unique structure, we have issues around our technological infrastructure – our IT systems. That plays into the Crosby/WageWorks question. We have to be different with our IT in some ways because of HIPAA, the privacy rules that we have to live under, because we are a medical facility. But, when it comes down to the nuts and bolts of it, at the end of the day our Tax ID number is not that of a medical facility, it's that of a research university, so that does complicate things to a degree. And my sense is that our structure does lead to a way things are done that you would not necessarily proceed with if you were in a free-stand-

ing medical group or medical practice somewhere else.

FNL: *So maybe to tie this area up: FollowMyHealth® is a piece of software that the Institute now uses to contact your doctor and theoretically to make appointments – and I really mean theoretically – and to get everything electronically online. And is it true that we have no control over the software because it is not ours? It's similar to downloading an app from Google, for example, if you don't like the app, well you deal with Google. You can't change it, and MIT can't change FollowMyHealth. And there are significant problems with it. It's really embarrassing compared to those used by other medical organizations.*

CS: Could you give me an example?

FNL: *I use a AliveCor to monitor arrhythmia. Last week, I sent my contact information from my Website to my cardiologist at MGH. Overnight, he responded with a long email. His staff contacted me while I was on the road, and this morning I got a monitor installed. I tried to set up this appointment through FollowMyHealth last fall. Over three months after I sent that in, I got an email saying can we talk about this. And there are more general issues in addition to FollowMyHealth.*

CS: Will you share some of them?

FNL: *We've gotten feedback from many faculty regarding difficulty in setting up appointments; rude and abusive behavior by the outer office staff; being bounced around from one physician to another; and things like that. And it just seems that the quality of human interaction has gone downhill over the years. And it's also amazing to me that MIT has conferences on digital medical record technology and people come and pay big fees to attend those conferences and we have FollowMyHealth, where you can't even do an email enclosure.*

CS: Because I am new, I haven't had a lot of direct interaction with FollowMyHealth, but if you were my patient I

would want FollowMyHealth to be functional for you to interact with me clinically. But from the Medical Director side of my job, FollowMyHealth is not really designed to be part of the administrative piece of what I do. That part would have to come through email or a phone call. I do have a background in medical informatics and EMR [Electronic Medical Records] implementations, and so that is an area of focus for me. And over the next couple of years, the electronic medical record, which we call TouchWorks, and its companion piece FollowMyHealth as the patient portal side of things, is an area that we need to focus on. But as I'm sure you are aware, EMR initiatives come with a big price tag. It's going to be a matter of understanding and analyzing the system that we have versus what's available, and asking does it make sense to make a switch to something different or do we invest our resources in trying to optimize these two products that we already have. I don't think we're in a position to go into a build-our-own homegrown system. That is not our area of expertise, nor would I want to manage that. And when you look at the fact that our patients, faculty, staff, students, all get hospitalized at or get some care at non-MIT facilities, we really have to look with an eye on the interoperability, which is a challenge just in general for medicine and for EMRs in particular. Having the ability to more directly interface with some of these other organizations that we interact with is going to be one of our challenges.

FNL: *It seems like you are suggesting that it could very well be a financial question, and if it is a financial question does that just go right to the VP of Finance to make that decision?*

CS: I think the first question is a clinical question. The clinical question is, does our current set of systems meet the clinical needs of our patients and of our providers to do excellent medical care? If the answer is no, then we have to ask what is our next step, and with whatever the next step is there is definitely a substantial

price tag that comes along with it. It can't truly be just one or the other though. You'd need to have a compelling clinical reason to make a change in the first place, and then in the second place you'd have to figure out the financing of that change. So part of what I have to do in this next year with my team is to figure out if there are compelling clinical reasons to make a change. I have already identified what I think are quite a few reasons and part of my ability to do that is that I have the perspective of coming from a place with a completely different set of clinical records that were much more functional than what I've observed here. One of the issues here – and at the same time it's a wonderful thing – is that most of the people in our group have been here a long time and they haven't really had exposure to what's out there now in the world of record-keeping and portals. We have to get exposure and insight into what other products are available that might actually lend themselves to providing better care here.

*FNL: So could we include that as part of your answer to the major challenges question?*

CS: Oh yes. I think it's hard to move the clinical systems along without the right kind of recordkeeping and the ability to collect data that comes with a really highly functional system, and that includes patient-entered data. Patients want to be able to enter data at home and have it land in their medical record. Or as they are sitting in the waiting room, a provider may want to hand them a tablet so that they can fill out a questionnaire at the time of the visit and then it goes to their medical record automatically.

*FNL: I'd like to return for a minute to the 18-bed infirmary that used to be upstairs. To many faculty the loss of that wonderful benefit seemed to be strictly a financial decision.*

CS: My understanding is that it was largely a financial decision, but it could probably be supported as well on the clinical side. It's not like we're some college in the boondocks where there is no other

hospital. We have world-class medical facilities in the area that you can literally see out of numerous windows. And there is good literature that says when you look at low-volume hospitals their outcomes aren't as good. Now, we had good outcomes for the kinds of things that we were doing here, but we want to provide the highest level of care that the patient needs, which might have been limited by the size of our facility.

*FNL: Still there are many instances of excellent care here because of the small population and thus the ability of the medical staff to offer more personalized care.*

CS: I'm sure that's true. And I would like to talk about the customer service aspects that you've mentioned. There is definitely work that goes on within the Medical Department to improve customer service and there are some good initiatives that are under way. I expect the highest level of customer service and caring towards patients that walk in the door, or call, or send a message, for whatever reason they are engaging us. I think outside of this environment, a medical group could never afford not to have their best foot forward, because patients vote with *their* feet. But MIT Medical has essentially been a closed model HMO for many years, until quite recently when other options or choice of health plan have become available through the Benefits Office. So patients didn't really have the opportunity to vote with their feet, as they do now. Providing excellent patient service throughout MIT Medical is extremely important, and will be an area where we focus our efforts in the upcoming year.

*FNL: So is there now a feedback mechanism?*

CS: There is, and I've gotten some feedback from faculty through the Press-Ganey survey that we administer, which is one that 40% of health care facilities in America use, and it allows us to compare ourselves to other organizations. That is one mechanism. Within the survey there is a very generous comment box where

you can put in any kind of level of detail or comment – and we look at those comments, both good and bad. In all honesty, we have received negative feedback about the survey itself in terms of the language and questions that are asked. But because it's a nationally administered survey, it's geared to patients that are at the fifth or sixth grade reading level. We have to be mindful that not every patient we care for at MIT Medical has extremely high literacy levels.

*FNL: It's also sent through the mail, through the snail mail.*

CS: Now it's electronically available. Patients get an email with a link to the survey. Of course, completing the survey is always optional. The other feedback we've had is around the length of the survey. So we're working to shorten that up, trying to figure out what do we really want to get at, as well as maintaining the comment box.

*FNL: What are some of the other areas that you'd like to focus on – again given that you've only been here half a year, roughly.*

CS: Three months.

*FNL: Oh! Still are there other areas, such as concerns about outsourcing, temporary physicians, etcetera?*

CS: Let's start with the concept of outsourcing. We have to always look at the services we provide within the building and decide if we can provide them at a high level of quality and good access. One place this comes into play is every time we renew contracts with whatever specialists with whom we interact. We must ask, does this make sense? One issue is that there is some difficulty finding doctors who want to practice here if we only need them, for example, for half a day, every other week. So there's that practical consideration in the sub-specialty areas, when you're thinking about G.I. or Cardiology or what

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**Interview with Dr. Cecilia Stuopis**  
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have you. We have to understand if we want and need that service, but also can we find somebody who could fill the limited slots that we need, because we do not have the patient volume to support full-time specialists. And I'd prefer not to use the word outsourcing, but I would rather think about it in terms of finding appropriate clinical partners who we can collaborate with to provide the care that our patients need, either in our building or outside of our building. So, it's really more of a collaborative effort to develop relationships with particular specialists that we need to provide care to our patients in a way that has great communication, great quality care, and great outcomes for patients.

*FNL: Would you say that it's unlikely that Urgent Care or the infirmary would go back to what they were before? Do you think any of what's been cut over the last decade or more are likely to return?*

*CS: I would say it's pretty unlikely. Let me talk about Urgent Care for a minute since we haven't talked too much about that. Urgent Care is one of those things that we are looking at closely because it appears that there's a lot of waiting going on down there that I'm not sure is the best thing for people who want to use an urgent service. So we are trying to understand what is driving those wait times. I walk down the stairs and I see people waiting there – and I don't like seeing patients waiting.*

*FNL: Part of it, a good part of it, is the moving from the hand-written recordkeeping to the computer.*

*CS: That's an example of where I think the way our EMR system is set up might not be the most efficient for patient care. When we look at the staffing in Urgent Care, it has increased in terms of nurses and nurse practitioners. We have the Emergency Attending, the EA, who is one of our primary care doctors who is the*

*backup care doctor during the week. I think parts of that system work pretty well, but I also think that we have doctors and nurse practitioners doing things they needn't be doing if you really want to provide good urgent care. They shouldn't be calling in prescriptions themselves or doing a prior authorization themselves, because they should be spending their time in a room with a patient. Right? We want them in front of patients, attending to the needs of patients. We should expand the role of the medical assistant, who can do a lot of those intermediary tasks on behalf of the provider. I think if we staffed Urgent Care with the right team of caregivers, we could actually decrease wait times and provide a higher level of service.*

*FNL: And part of that will be a financial decision?*

*CS: Yes, any changes of these types have to be informed by clinical, operational, and financial data. We always have to make sure any changes that are made are clinically appropriate. Another issue around Urgent Care is thinking about whether we are open at the right times. When we are open do we have the right amount of people there to provide for the demand that we have? We know that we have peak demand in the afternoon. How do we staff for that? I know that students don't want to come here when we open at seven o'clock in the morning, but I do know that a Facilities employee getting off the night shift may want to come at seven o'clock in the morning. So we have to figure out those needs. I know that somebody who works in an office on campus probably isn't going to come to Urgent Care at ten o'clock at night here in downtown Cambridge if they live in the suburbs.*

*FNL: Right.*

*CS: So, it's trying to figure out the patterns of demand, and staffing to meet the demand. That should elevate the level of service.*

*FNL: So to broaden the question: There appears to be great trepidation among many of the faculty, especially people who have been here for quite a while and have seen the cut in medical services, that the Institute seems to be heading toward deciding that the whole thing is unaffordable and that down the road it will all be outsourced. That if you get below a certain critical size it all goes away.*

*CS: So, I will tell you, I just left a perfectly good job that I didn't have to leave, at a perfectly wonderful organization where I could have continued my career. But I left that job to come here, and I certainly don't want this place to go away either. I am committed to making MIT Medical of such great value to the community and to MIT that it couldn't possibly be closed or outsourced.*

*FNL: Great. So, you took this job because you saw a future here.*

*CS: Yes. But I think the future is an actuality. We have what every health care organization wants. All health care organizations out there want to control as much of the delivery system as they can. The only part of the delivery system that we don't really have is a hospital, and I'm actually quite good with that. I think the hospital is the Wild West of health care cost. What we want to do is make sure that the hospitals we use have our same aspirations towards providing high quality, low cost care; high value health care. I'm confident that the hospitals that we partner most with, which are Mt. Auburn and Mass. General, are on that path.*

*FNL: And Martha's Vineyard Hospital.*

*CS: Right. The only critical access hospital in Massachusetts, I believe.*

*FNL: Right.*

*CS: So it's all about finding the balance. We have this health care delivery system. We have a health plan. We have patients. We have doctors. We have enough ancil-*



lary services to do most of everything you'd need for excellent primary care. So, we actually do have the ability to provide that high value care from soup to nuts, right?

**FNL:** *Do we still do infusions here?*

**CS:** Yes we do, and that's a perfect example of keeping a service in-house. We want to do that. In fact, we want to drive more business in-house. And the other thing is, in terms of sustainability of this facility, we want to grow patient volumes. If we can show that we are a high value provider, not just to MIT, but to the patients who have the opportunity to pick us for their primary care, that's what we want to do. We want people to pick us because we're a great place to get care, and that's going to become more evident as time goes on. For example, I believe that MIT is considering adding a high deductible health plan.

**FNL:** *So that would bring in non-MIT people?*

**CS:** No. It would be offered as a third option, along with the Traditional and Choice plans. It's great for healthy people, younger people, people who don't use a lot of health care services. But when they do use it, it's coming out of their pocket, until they meet the high deductible. And the Choice plan has given people the opportunity to go to some place maybe closer to home, but it has pulled them out of our facility. If we are a high quality, low cost provider, my hope is that more MIT employees will choose MIT Medical for their primary care.

**FNL:** *As opposed to choosing doctors in Boston. If they live in Cambridge, they'd rather be with a doctor in Boston than somebody here.*

**CS:** Perhaps. But at the end of the day we want to be the primary care provider of choice. I do not want to have a building full of primary care doctors who don't have patients to see.

**FNL:** *Access to primary care doctors is an issue. Long wait times and other things we've discussed.*

**CS:** Yes. So the direction I'd like to go here I experienced when I practiced at Dartmouth-Hitchcock. They have a long history of many physician assistants and nurse practitioners as part of the team. I think this is one area where we have to start evolving the model of care to more of a team approach, because we have a looming physician shortage, and in particular it shows up in primary care.

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**FNL:** *I can see that.*

**CS:** It's becoming increasingly hard to replace them. I spoke with our HR professional here in the department and it took over a year to fill our last two primary care openings. It's very difficult to find primary care physicians and it's even hard to fill on the nurse practitioner side, and I think at the end of the day we are going to have access to fewer primary care physicians than we have had previously.

**FNL:** *So back to the question of wait times to see primary care physicians. It's hard to cut into that unless you cut the amount of time the primary care physician sees the patient, which you don't want to do.*

**CS:** Correct. There are ways you can decrease wait times. One is to make sure that people are seeking primary care services for things they need. I think you mentioned regular checkups. A lot of the

medical literature says that for most people the regular checkup is not really useful. So, for instance, a healthy 30-year-old does not necessarily need to have an annual primary care checkup or a physical, because they're healthy. They may however need pregnancy care, or care for things like strep throat. We want to use evidence-based practices, so that we're providing services for people who need those services, but not providing unneeded services to healthy people who don't need them. That's part of it. What that does is align your resources with where your needs are.

**FNL:** *That's it. My experience has become that you get what you ask for after a while, but there's no proactive part of the MIT Medical system that helps take care of you, and it used to be more proactive.*

**CS:** So again, this gets back to the team concept. Nationwide there's something called the patient-centered medical home concept that's been put into place. That is using the team, which is made up of doctors and nurse practitioners or physician assistants, so you have several providers. You also have RNs and medical assistants on the team. You might have a non-clinical person whose entire job is to just look at the panel of patients that are assigned to that team and figure out who needs what and facilitate getting that done.

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**Interview with Dr. Cecilia Stuopis**

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**FNL:** *There's also the issue of a negative experience inhibiting someone from seeking care when they need it.*

**CS:** There is so much literature on that particular issue. We know that if we don't communicate well, if we don't provide adequate access, if we make you feel uncomfortable or unwelcome, that it can lead to poorer health outcomes.

**FNL:** *That you know that is helpful. Whether you can do something about it is another issue.*

**CS:** We can and will do something about it, but it's going to be hard and it will take time. We have to do a full assessment of the situation. Then we have to decide what are our customer service standards. We have to make sure everyone who works at MIT Medical knows what the standards are, and that they are acting professionally. This is your job. Your job is to be kind to patients, and to make them feel welcome and cared for. That's the job of everyone here. It's not just the job of the secretary or the physician or nurse practitioner. It could be the lab tech, it could be the X-ray technician, it could be the billing office. Our job is to care for patients in a caring manner.

**FNL:** *Have you addressed the entire medical community yourself along these lines?*

**CS:** Not yet. I've been doing a lot of observation and listening. We're going to have a group meeting of all the provider staff sometime probably in early June, and ongoing meetings with the rest of the staff thereafter. It's a busy time right now to do that, to pull everyone out and to sit down and talk about that. Our demand decreases in the summer, and I think that will be a great time for us to start laying this groundwork.

**FNL:** *It's nothing but the sum of the individual operations that happen every day by individuals. So, making that happen, getting people to follow true north, at least for a significant part of the day, is the big challenge for you. It has almost nothing to do with medicine.*

**CS:** But it does. It has everything to do with medicine. One of the wonderful things that I am very fortunate to have in my new role here is that I have good doctors and nurse practitioners. They are doing the right thing for the patients when the patient is in front of them. Some places have doctors who are getting malpractice suits all the time and they're not practicing evidence-based high quality medicine. That's another whole set of issues that thankfully we do not have to worry about here. But what I do have to worry about is getting everyone to understand the expectations of our three core values: Patients First; Working Together; and Striving to Be Our Best.

**FNL:** *So all this stuff we've talked about in terms of the electronics and the kinds of doctors or quality of the personnel – all of this is going to cost money.*

**CS:** Yes.

**FNL:** *So you anticipate, I hope and assume, that that money will be available, given that you will make cogent arguments for the need.*

**CS:** What we have to do is assess our situation and come up with a plan for how we want to get to where we want to get on a road map and then start figuring out how and when we can ask for needed resources. But, you know, it's going to be a process. It's not going to be any kind of an overnight thing. And the priorities for the Medical Department are going to be in a list of other priorities for the Institute – maintaining the Institute's educational mission and research, and there are infrastructure issues.

**FNL:** *How about fundraising. Do you have a fundraising arm?*

**CS:** I'd love to have a fundraising arm.

**FNL:** *One of the reasons medical schools are independent of the universities that they typically associate with is because of the fundraising. Have you been part of the next campaign discussion?*

**CS:** Not as of yet, but I'm talking to somebody from the Development Office.

**FNL:** *Any other changes you're anticipating?*

**CS:** I think we need some infrastructure changes to our building. It's not set up to do team-based care. There's no place for a team to sit. Another resource we have is the Community Wellness Department, and they're doing a lot of great work. We'd like to expand the scope of services they provide, to a broader range of community members.

**FNL:** *Any other things?*

**CS:** Well this Saturday, for instance, is National Advanced Care Planning Day. Have you had any education around Advanced Directives and planning for your future health care needs if you are unable to speak for yourself? That is a service that we, as the Medical Department, should be working on together with all the members of our community, be they old or be they young. It's not just an issue for geriatric folks. It's an issue for 50-year-olds who have a brain aneurysm or a bike accident, to have their wishes for their healthcare choices documented so that if they are not able to speak for themselves, they can have their wishes followed. That's a huge one on my mind. There are people that have worked at MIT their entire career and maybe their wife has passed away, or their husband. Maybe they never married at all. Maybe they were an only child. They don't have a brother or a sister or nieces or nephews. How do we make sure that those members of our community, if something happens, have somebody or something (like an Advanced Directive) that can speak for them? End of life decisions are

very personal and sensitive, and I think we can do a much better job of helping our patients have these conversations with their loved ones and getting their wishes documented.

*FNL: And even if they retire, they often remain with the medical program.*

*CS: And they're at the polar end opposite of the spectrum from students. We need to have some core capabilities of how to care for elderly folks who maybe are having more medical problems than they had when they were younger and are going in and out of the hospital, or a nursing home, or a rehab facility.*

*FNL: So, this is another area you've got to expand and develop resources within MIT Medical.*

*CS: Yes, and we're actively working on it right now.*

*FNL: Let's address the whole mental health issue. MIT Medical has expanded those resources over the last few years. Are there plans to continue that?*

*CS: I think we have a very strong Mental Health and Counseling Service here and they do an excellent job with the patients that they see. But we have increased demand and the increased demand is coming through, I think, because of MIT's excellent efforts to publicize the availability of Mental Health and Counseling, and to de-stigmatize those issues that members of our community face. So our students are seeking the services. Then we have the*

*behavioral health needs of the rest of our community, our faculty, staff, dependents, and retirees. How do we address those needs? The Mental Health and Counseling Service is really oriented towards caring for all of our students. We have to understand what is the best way to care for the rest of the group, and to provide opportunity for some care within our facility. It may not happen in a freestanding mental health center. Again, in the medical home team concept that most organizations have put into place, many have put behavioral health clinicians right there in the primary care team, to work together with the primary care doctor. A lot of depression, a lot of anxiety – a lot of it is a primary care problem, but those primary care doctors need support and assistance with managing that, and how can we best do that? We're not talking about complicated schizophrenia or complicated bipolar disorder. Those patients clearly are best served at other places where that's their specialty. Just as your primary care doctor would send you to a specialist if you needed one for a complex cardiology problem, the same thing goes for behavioral health. Part of it is connecting the head to the body. You can't look at just the head, and you can't look at just the body. You have to look at the whole person, and I think we have to move towards a more integrated model that way.*

*FNL: Speaking about integrating the whole body, what about dental care?*

*CS: We have a dental clinic here, and we just did some major renovations. But it's kind of a little known fact. I got here and I*

*didn't even know there were dentists that were in the Department. But it's just what we were talking about earlier. We have this service that we provide. We want people to use it because it's a fixed cost. We want people to use the things that we have here. That's one of the things that I would say - if you have a choice, we'd like you to choose us. I want you to choose us because you want to, not because you have to! But also, when you get here, I want you to have an excellent experience, like you would have at any other place that you might choose. I want you to choose us for our quality, our caring, our convenience.*

*FNL: When you start recruiting for positions to join this group, does the fact that they could potentially get involved with the rest of MIT and the MIT faculty, and genetics research, etcetera, attract people or do they not have time to do that?*

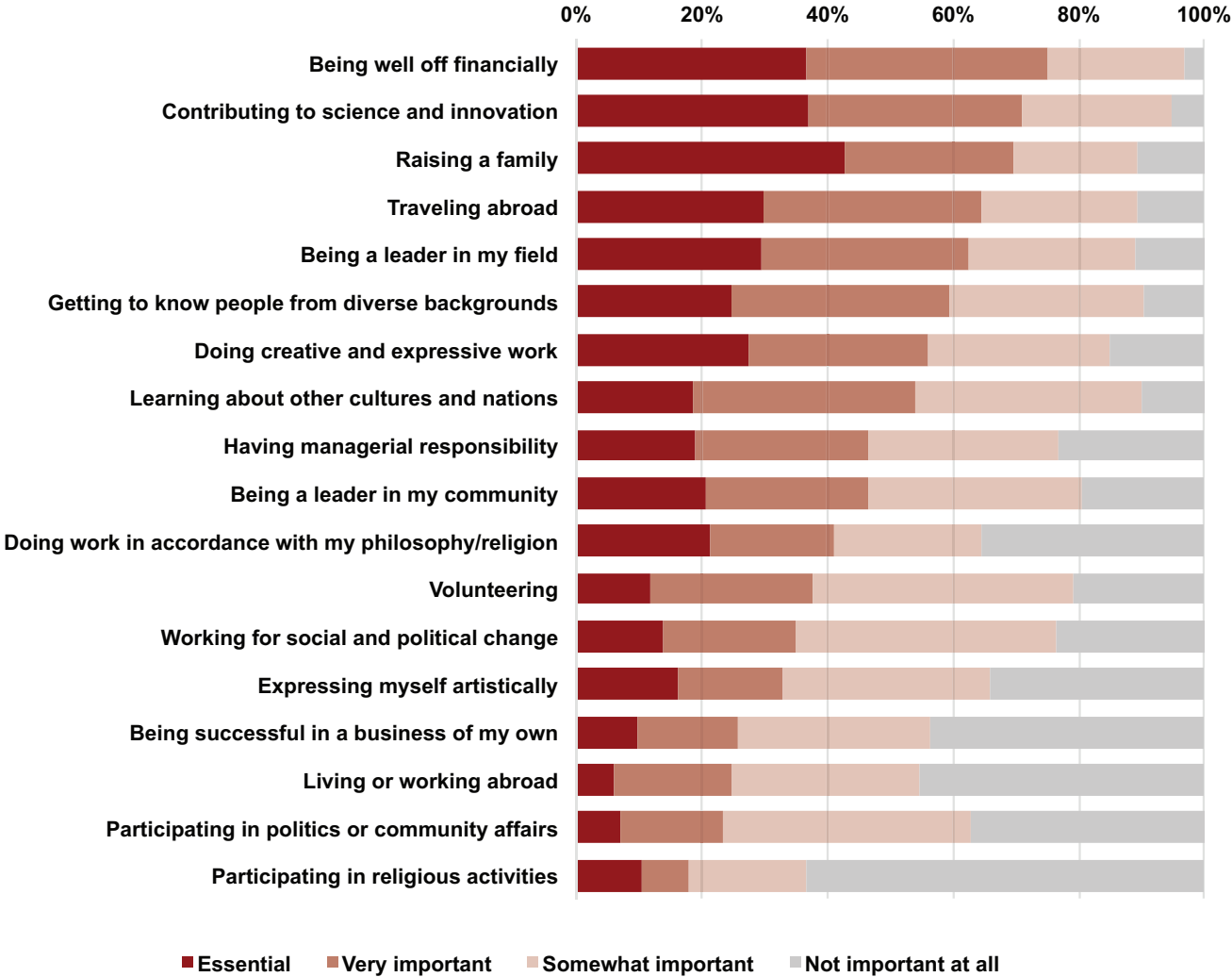
*CS: My understanding from my group is that they just did a new brochure for recruiting physicians before I came and one of the things they highlight is the connection with MIT and the things that happen on campus. I think one of the things I'd like to see is for MIT Medical to be more engaged in the educational and research enterprise of the Institute, in whatever ways we can be helpful, without being disruptive to patients.*

*FNL: Dr. Stuopis, thank you very much for meeting with us. You have shared many important ideas with the MIT community.*

*CS: Thank you very much. It was really my pleasure. ■*

# M.I.T. Numbers from the 2016 Senior Survey

As you think about your future, how important is each of the following to you?



Source: Office of the Provost/Institutional Research