

MASSACHUSETTS INSTITUTE OF TECHNOLOGY



MIT in Transition

**Student Perspectives on MIT's Legacy Strengths,
Emerging Challenges, and Future Directions**

**Global Connections, Long-Term, and Strategic Planning
Briefing Paper**

of the

Student Advisory Board to MIT's 16th President

15 February 2005

This document is the third of three specialized documents prepared by members of the Student Advisory Board (SAB) for MIT's 16th President, Dr. Susan Hockfield. It is intended to support the February 18th luncheon to be held with the President. The documents in this series, as well as input from open forum discussions and the luncheons, will culminate in a more comprehensive report by the SAB to the President.



3rd Topic-Based Lunch Meeting: Global Connections, Long-Term, and Strategic Planning

“The Institute is committed to generating, disseminating, and preserving knowledge, and to working with others to bring this knowledge to bear on the world's great challenges... We seek to develop in each member of the MIT community the ability and passion to work wisely, creatively, and effectively for the betterment of humankind.”

- MIT's Mission Statement

Students care deeply about the Institute's long term future, our sustained viability and the enduring pursuit of our founder's inspirational MIT Mission. Specifically, we are concerned by and seek to address the following domains:

1. **Bold Institute Actions** – At key junctures in our past, Institute faculty and leadership have pursued transformative grand pursuits. What are the grand aspirations which will inspire future generations of students?
2. **Expansion and Growth** – For most of our 145 year history, the Institute has been in growth mode, expanding to accommodate emerging disciplines and future frontiers. How can we deal with the limitations on and consequences of similar policies into the future?
3. **Connecting Strategy and Operations** – When everyday administrator action is at odds with overarching Institute strategy, confusion reigns in the student ranks. Students desire transparency, accountability, and competence.
4. **Institute Economics** – The Institute's cost-structure, tuition duties, deployment of endowment income, and capacity to deal with sponsor volatility all directly affect student life.
5. **Positioning Locally and Globally** – As global inter-connectedness becomes the new world order, how ought the Institute seize the opportunity, seek out tomorrow's talent and moneys, embody viable economic practices, and position ourselves for lasting success?

1. Bold Institute Actions

The following topics will be covered in this section:

- Grand Pursuits
- Inspirational Leadership

Grand Pursuits

The Institute has a rich legacy of Grand Pursuits, endeavors which not only benefit our direct constituencies today but reach out like a beacon of innovation to influence the world for the better and accomplish our larger mission. Current examples include MIT's hosting the W3C Web Consortium, the unifying standard-bearer for global internet and information connectivity, and MIT's commitment to OpenCourseWare, sharing our curriculum freely such that individuals and institutions worldwide can learn. In earlier years, MIT leadership and faculty co-founded such influential efforts as WGBH, the basis for public and educational broadcasting in the US, and Project Athena, a revolutionary campus-wide computing and communication system that helped define a new paradigm in the world of computing. Sputnik-era MIT efforts to advance children's science and math education were ultimately spun-out to form Educational Development Corporation, currently an independent, six hundred person, non-profit K-12 educational materials and support organization.

What then are the Grand Pursuits and bold experiments of the next MIT generation? Might we take scientific publication back to its open, non-profit roots and spearhead a worldwide online Opensource Knowledge Initiative? Could K-12 education benefit from a parallel OpenCourseWare revolution in OpenKidsWare or even a School of Education at MIT? Might the Institute embark on a Global Development Initiative in pursuit of economic viability and environmental sustainability, bringing the fruits of innovation and entrepreneurship to the three-quarters of humanity beyond first-world borders? Such endeavors would be sources of moral inspiration to students, something we could take tremendous pride in being part of and helping bring to reality. We must be vigilant and attentive in the search for other projects that might innovate in such inspiring ways on a grand scale.

Inspirational Leadership

MIT's commitment to advancing knowledge and education in order to serve the nation and world at large has forged a plethora of inspiring leaders ranging from master entrepreneurs like Alfred P. Sloan to Nobel Prize winners such as H. Robert Horvitz. In all departments and fields of MIT, we find talent and leadership that motivate students and members of the MIT community, as well as many others around the world. For example, in just a single issue of the periodical *Architectural Design (AD)* in 2002, MIT Media Lab Affiliate Michael Schrage and MIT Professor of Mechanical Engineering Dr. Seth Lloyd were quoted in the preface and introduction, while the featured article was co-written by MIT Visiting Professor of Architecture Nader Tehrani. This is an incredible representation of MIT, and such is the reputation of the Institute. Consequently, students and society look and come to MIT expecting to be inspired by extraordinary leaders.

To meet and maintain this expectation, MIT needs strong, rousing leaders on all levels: administration, faculty, student, and alumni. We need leaders who can be ambassadors of this Institute; leaders who really go out and shape the world, as well as leaders who can continually inspire and hone one another. It might be useful to incorporate this quality into the selection criteria for hiring faculty and administrators and even in the admission of students. In addition, MIT can promote inspirational leadership by highlighting its existing leaders. For instance, one way this can be done is by giving Deans a more public face. Ultimately, by producing strong leaders, MIT can attract strong leaders (and vice versa).

Finally, MIT faculty and senior administrators seem reluctant to actually lead, that is, to take more time to be visible in public, to voice inspiring words, to rally students and other Institute community members towards bold goals and lofty aspirations, and to share an aggregate institutional vision. By “vision” what people really seek is a coherent description which synthesizes the most exciting and emergent themes at MIT articulated by those who really have Institute-wide perspective. Far from being “cornball”, such exhortations can indeed move people to action and raise our aspirations. President Killian’s Commencement phrase became a signature of his era, evoking MIT as a “university polarized around science, engineering and the arts” which while limited in objectives is unlimited in the intensity and degree to which those goals are pursued. Can we learn lessons from our earlier Presidents – Rogers, Walker, Maclaurin, and Compton for instance – who were compelling orators and writers and who were disproportionately more visible and influential both on campus and in the eye of the general public.

2. Expansion and Growth

The following topics will be covered in this section:

- Emerging Research Fields
- The MIT Innovation Pipeline
- New Schools
- International Programs
- Interdisciplinary Initiatives
- Physical Campus Planning

Emerging Research Fields

MIT has committed significant resources to expanding and developing new and emerging areas of research over the last two decades, most visibly in biological engineering, materials technologies, the mind sciences, information technologies, and more. The emergence of these fields has both inspired and driven new collaborative enterprises within and beyond MIT's institutional boundaries, requiring greater sponsor volume, placing increased stress on common infrastructure, demanding building renewal and construction, and squeezing older, more classic fields. Furthermore, most students are unaware of the broad spectrum of emerging fields and their transformative implications. While MIT has core classes in the classic foundation disciplines, we no longer have a survey class for all MIT students which considers the emerging issues and opportunities of the day and places our current work into larger societal context.¹

The MIT Innovation Pipeline

MIT's Mens et Manus mission demands a balanced approach to the disciplines combining both theory and practice, and embracing the full spectrum of technological endeavor, ranging from exploratory fundamental science through application to commerce and real-world impact. A few students have benefited tremendously from exposure to all phases of the Innovation Pipeline at MIT, from work as UROP or RA on sponsored research, through class participation on a Deshpande Center Innovation Team, through extracurricular company-founding via the MIT \$50K Entrepreneurship Competition and advising from alums in the Venture Mentoring Service. And yet the totality of these 'pipeline' experiences are neither scaled-up enough to be available to most students nor are most students properly aware of the overall innovation ecosystem at and around the Institute.

New Schools & Program Renewal

President Compton created the Schools structure at MIT in the 1930s as a mechanism to both provide depth of administrative leadership, and to place the Sciences on a par with Engineering while recognizing the distinct strengths of the Arts disciplines of Architecture & Planning. After WWII, during President Killian's tenure, Humanities and Management were formalized, leading to the Five Schools structure we know today.

¹ According to his biography, MIT President Walker ran just such a class for all students during his tenure. Perhaps the time constraints and responsibilities of today preclude Presidential action, but Walker's Institute-Wide Elective served an enduring need and, alas, has no parallel in the modern curriculum.

While appreciating the strengths of the current Schools and Departments, many students wonder why MIT has not embraced additional Schools, especially the areas of Law, Medicine, Policy, and Education. MIT does have a variety of programs in all of these domains, for instance, Health Science & Technology (HST) is a collaboration between Harvard Medical and several Engineering disciplines at MIT. Furthermore, MIT has several offerings for students interested in pre-law or pre-medical or civil service or K-12 teaching. And yet none of these programs is a bold commitment on the Institute's part to building deep-strength in these areas, especially in a uniquely MIT-style. In fact, recent Presidents have seemed to shy away from further School-building². For instance, which institution would be better positioned than MIT to specialize in legal implications of new technologies, of intellectual property and intangibles, of environmental risks and externalities, and so forth. Such an MIT-style Law School would tackle some of the most challenging issues of our age. Similarly, we all know that improving K-12 education is crucial, but through what formal mechanism is MIT actually demonstrating a real commitment to creating educational solutions?

In MIT's matrix structure, the Departments and disciplines change rarely – perhaps one or two recombinations or new entities per decade – whereas Groups, Labs, Centers, and other research vehicles come and go ten times as frequently. Perhaps, then, the School structure is itself becoming antiquated with the classic distinctions between science and engineering blurring and the differences between pure and applied social science slipping. Are new cross-disciplinary Divisions such as Biological Engineering or Engineering Systems indicators of things to come? Will we see further growth of virtual Divisions such as the Computational & Systems Biology Initiative (CSBi)? Perhaps these less heavyweight structures are, in fact, excellent mechanisms to explore emerging areas while avoiding formal, structural and hard-to-change Institutional commitments.

International Programs

MIT currently coordinates programs of international intellectual exchange such as MISTI and the Knight Fellows, programs which help convey MIT ideals and culture to a multi-national audience. MISTI exports MIT's training through individual students sent as interns to labs and offices in Europe and Asia. The Knight Fellows Program immerses science journalists, active world citizens by birth and by occupation, within MIT's unique social and academic context. Both programs are successful integrations of perspective between MIT and the international community and merit ongoing nurturing, if not scaling-up and increased support.

Despite globalization and increased international interaction, global breadth and sophistication appears systemically undervalued in the general MIT education both for undergraduate and graduate students. The formal curriculum allows relatively few opportunities for study abroad or student-generated short term international research projects. The Institute stands to benefit as a whole by instilling opportunities for global

² For instance MIT President Weisner not only turned down a proposal to create an MIT Medical School – fearing overwhelming financial burden and instead creating the joint-HST program – but also turned down Professor Rines' proposal to create a Law School. Undaunted, Rines went on to found and build the Franklin Pierce Law Center, for many years now a top-ranked technology law institution in the US -- http://www.aas-world.org/intellectual_property/fplc/fplawcenter.html How much stronger might this program have been today had this effort begun in the 1970s under the MIT umbrella instead of independently? Is a merger possible?

awareness and social responsibility within its curriculum, which assist with the global positioning goals discussed later in this report.

Interdisciplinary Initiatives

MIT might gain enduring competitive advantage by tackling key 21st century challenges that demand rigorous system-level interdisciplinary approaches, such as global sustainability, life science solutions, offshore outsourcing, global access to pharmaceuticals, and economic development. MIT has demonstrated a keen ability to promote focused horizontal integration through research efforts such as the Media Lab, the Earth Systems Initiative, - and Deshpande Center innovation programs, and the Broad Institute. Furthermore, the Institute has encouraged cross-disciplinary programs run by students on an extracurricular basis, for example the MIT \$50K Entrepreneurship Competition. Despite these successes, there still remains a strong sense among students that integration of our five Schools has not reached full potential. Perhaps a focused approach that defines new multi-disciplinary centers of excellence will place the Institute in a position to build on our key strengths in engineering, physical sciences, life sciences, management, arts and humanities.

Physical Campus Planning

MIT's physical campus is a fundamental driver in the experience of all MIT stakeholders and ultimately the success of the Institute. It is a physical manifestation of MIT's commitment to pursuing innovation and building global leaders. Not only does a well-planned campus provide the space and resources for cutting-edge research and comfortable student housing, but it also greatly impacts the perceptions and experience of our key external stakeholders, ranging from recruiters to prospective students and faculty to industrial and academic partners.

MIT has undergone significant expansion and reorganization of its academic and research facilities in the past few years. While recent projects such as the Z-Center, new graduate housing, the Stata Center, and the McGovern Institute are viewed as substantial improvements, many students feel that the current facilities remain insufficient for optimizing the innovative environment and quality of life goals for MIT. In short, the campus is unnecessarily ugly, under-capitalized, and inadequate. Students at the Sloan School feel very constrained in their workspace and ability to provide a professional, comfortable environment for recruiters and visiting colleagues. The Mass Ave. entrance to MIT is not very "inviting", large portions of older facilities are sorely in need of renovation, and the campus as a whole still lacks flexible, welcoming spaces outside of the lab. MIT should also consider opportunities for other satellite campuses such as the Wood's Hole Institute.

The constant tension is between functional lab space and alluring community space. MIT needs to conduct an assessment of how the recent investments have impacted our research productivity, faculty satisfaction, student quality of life and stakeholder perceptions of MIT. Above all, the students feel that a more robust physical campus planning board and process with formal, integrated student involvement would be a most useful initiative in helping to answer these questions.

3. Connecting Strategy and Operations

The following topics will be covered in this section:

- Local Optimization
- Strategic Planning, Operational Synthesis
- Crafting the Total Student Experience

Local Optimization

Perhaps the most frustrating thing from a student's perspective on the Administration is when one part of the Institute takes a decision whose consequences – direct and indirect, short term or long – are detrimental to the operations and effectiveness of another part of the Institute. Too often locally optimal decisions which have “unintended consequences” elsewhere should probably have been better thought through in the first place. Examples abound and range from the size of Master's programs relative to physical and faculty capacity in certain Schools, through extraordinary and repeated cost overruns in numerous building programs, to short-sighted decisions about food service requirements, campus beautification efforts (or lack thereof), departmental spending growth, operational over-commitments, and many more.

Strategic Planning & Operational Synthesis

Pervasive local optimization leads students to wonder who in the MIT administration is charged with overall Strategic Planning and ensuring that overarching strategies are actually practiced in and connected to day-to-day operations? We wonder whether it's wise that MIT no longer has a unified Planning Office, for instance. Who today is responsible for stepping back, considering the grand sweep of causal implications of various local and often urgent decisions, and advocating for the synthesis of short, medium, and long-term benefits, not just in one departmental or operational silo, but for the Institute as a whole?

Crafting the Total Student Experience

Similarly, we wonder which senior administrator formally takes responsibility for, and has the depth of interest and capabilities to actually optimize our Total Student Experience. The Total Student Experience – ranging from before matriculation through orientation, first-year, growth years, final semester, commencement, and beyond – is fundamental to the Institute's mission of educating and inspiring the next generation of innovators. We clearly understand that many administrators are responsible for isolated elements of our experience at MIT. We struggle, however, to see who, in practice, weaves it all together.

4. Institute Economics

The following topics will be covered in this section:

- Tuition & Transparency
- Financial Overhead & Transparency
- Inconsistent Scaling of Student Populations

Tuition & Transparency

Not only are tuition costs continuing to out-pace inflation, but an increasing number of extra fees are being levied (e.g. Student Life Fee, course materials and space rentals.) We applaud the Institute's Need-Blind admissions policy, but worry that the high-price / high-aid system disproportionately pinches families in the middle while not sufficiently developing those who are more financially able. We further wonder if top applicants will continue to see an MIT degree as really worth the growing tuition cost, especially when their alternatives include premier state schools who subsidize them heavily. Furthermore, many students do not understand why their tuition is so high when they see cost overruns and dubious expenditures all around the Institute. We would appreciate greater transparency to bolster our confidence that money is well-spent at the Institute. For graduate students, many specific concerns dominate. For instance, MIT is the only university which requires full tuition for graduate students when they are not taking classes and are ABD status. We fully appreciate the high costs associated with running a research university. However, we are concerned that MIT's tuition and aid policies may worsen our competitive position both versus state-subsidized schools and our private peers worldwide.

Financial Overhead & Transparency

Overhead costs at MIT are too often used as an explanation for why student proposals are not feasible. The large-scale bureaucracy of MIT provides many services, but MIT seemingly only reduces the size of ineffective or inefficient organizations during times of extreme financial hardship. MIT's volatile endowment and funding sources have caused a cycle of boom-bust spending that has left groups with half-completed construction projects, and existing facilities under-maintained due to resulting budget cuts. Greater transparency in the overhead costs at MIT would help students understand the financial realities of MIT and help MIT understand where cost savings can be made in a more regular manner.

Inconsistent Scaling of Student Populations

Over the last few decades, faculty and undergraduate numbers have stayed constant but graduate student, post-doc and staff numbers have climbed substantially. MIT does not have a centralized strategy for the growth of the graduate student population, and the needs that graduate students have for appropriate faculty and undergraduate support. If MIT does not have the economic strength to support growing the entire population proportionately, a centralized strategy needs to be developed to limit the growth of graduate student populations to the point where the research experience is diluted.

5. Positioning Locally and Globally

The following topics will be covered in this section:

- Political Influence
- Competing Institutes
- Public Face
- Global Citizenship
- Systematic Global Outreach

Political Influence

As a leader in science and technology, MIT has a responsibility to invest time and energy in local, state, national and global representation of science and higher education interests. However, the time invested by the President and other officials at MIT must be balanced with the need to maintain MIT's reputation for world-class innovation by focusing on improving MIT internally as well. MIT Presidents have served in senior positions in the federal government, and have been responsible for major scientific efforts our nation has undertaken in periods such as World War II. MIT has also taken a bold stance on higher education issues such as affirmative action, and must continue to lead our peer institutions in this manner. Along with national influence, local influence in the city of Cambridge is important as well. Cambridge has shown itself willing to use its power to play a strong role on campus in terms of regulation. MIT should continue to leverage the many contributions that we have made to the city of Cambridge in building a stronger relationship. Perhaps one underutilized tool in fulfilling this goal is the student body – students are undoubtedly willing to take opportunities to get involved in all levels of government, and MIT's government relations office should incorporate student involvement into their strategy for political influence.

Competing Institutes

The EU recently announced plans to create “institutes of technology” in the MIT mold. Such announcements, though some may view them as threatening, nevertheless illustrate MIT's international recognition; our pivotal role in guiding and shaping the world of science and technology is admired worldwide. In a globalizing world, it is critical for MIT to constantly reinvent itself and maintain a valuable place through all our fields of science, technology, engineering, education, and research.

The Institute has long been an elite university where science and engineering education is world-class. However, as the top universities compete more and more fiercely for the best students and faculty, MIT has found itself in a world of competitors. For example, a university that has only a few “superstar” professors can likely offer higher salaries³. The Institute also competes with universities with larger endowments and on the basis of how much technological commercialization it can create.

An example of this competition on the admissions side is MIT's relationship with other technical schools such as CalTech and its relationship with Ivy League institutions. In the

³ <http://web.mit.edu/giving/why/why/growingcosts/talent.html>

former case, MIT competes with these schools directly in the science and engineering areas where MIT is strongest. In the past, MIT has won a large percentage of applicants who were admitted to both MIT and CalTech or another technical school. However, against the Ivy Leagues, it is more a question of attracting well-rounded students who are also interested in a rigorous science and engineering education.

A second example of this competition can be seen in the recent decision by another institution in Cambridge to develop a school of engineering. MIT competes with this other university in several academic areas, but engineering will be a relatively new one. As more and more emphasis is placed on innovation and practical education, it is not surprising that engineering disciplines are more and more attractive to all universities.

In the realm of competition, MIT has clearly succeeded before as we are still rated number one in many engineering disciplines. However, MIT must continue to provide its students with the best opportunities and experiences in order to stay on top. Perhaps, one good example of this is making sure that graduate students receive competitive funding. There are of course many areas for improvement, as they would be at any institution. As long as we keep sight of the fact that MIT is, and should be, one of the premier, science and engineering education and research universities in the world, we can continue to successfully compete.

Public Face

The public face of MIT, i.e. our brand and reputation and tangible acts, as well as our visible institutional leadership, both serve a rallying community integration function as well as communicate what prospective members of the community should expect from MIT and our people. The MIT brand embodies our mission, values and community priorities while developing outsiders' expectations of how they will value the MIT experience, reputation and relationships. To this end, every major program and initiative should be evaluated against its ability to both defend and strengthen MIT's public face; admissions, sponsorships, recruiting and faculty retention depend on this.

A good example of MIT's sensitivity to its public face is the OpenCourseWare (OCW) program. This program clearly helps strengthen MIT's position as a global educator and distributor of knowledge. Two areas of weakness, however, are in the outside perception of MIT's people as somewhat unbalanced and poor recognition of the warmth of the MIT community as a whole. From a student perspective, this can be a substantial negative force in attracting the best new students as well as top-quality employers. Sloan students experience this disappointing perception regularly, often having to defend themselves to recruiters against the "techie" and "Sloan students are focused on IT and operations" stereotypes.

The challenge for the Institute is to proactively shape public perception that reinforces our strengths in technology and innovation while providing a more balanced view of the global MIT leaders that are developed here. Highlighting our Nobel Laureates and amazing technical achievements is imperative, but we suspect Kofi Annan, Amar Bose, Benjamin Netanyahu, Robin Chase, Bob Metcalfe, "Buzz" Aldrin, and John Reed would probably agree that there is more to MIT people than just technology. Shaping public perception along the desired dimensions must have a proactive, systematic, and continuous strategy

behind it supported by MIT students, faculty, administration and alumni. Perhaps a valuable interdisciplinary leadership opportunity would be for students in all five Schools to convene a joint task force focused on evaluating MIT's current public face and developing a comprehensive plan for filling the gaps. Although the Sloan School still struggles to decide between promoting its technology connections to MIT or its skill in training general managers, the branding program at Sloan might serve as a model for what is needed for the Institute as a whole.

Global Citizenship

MIT students are both drawn from a worldwide candidate pool and upon graduation disperse globally. Unfortunately, the importance of current events, cultural appreciation, and indeed global citizenship is often squeezed out or even forgotten by many students while here. The stereotypical MIT student is unfortunately all depth, no breadth. However, the world needs MIT to graduate students who combine tremendous skills in depth with worldly sophistication and breadth.

Although the Institute has already taken initiatives such as the Singapore-MIT Alliance (SMA) and the MIT Sloan Fellows Program in Innovation and Global Leadership to strengthen its global position, it still remains difficult for students to sustain a global perspective. Being physically and geographically removed from the rest of the world, while balancing rigorous academics inevitably restrains student perspective.

We urge that the Institute explore creative means of fostering global awareness and social responsibility. For example, strengthening collaborations like the SMA, incorporating study-abroad opportunities in the Institute curriculum, and exploring new international research opportunities (IROP?). On a less formal basis, organized forae or lecture series orient and expose students to global issues. For instance, this spring's colloquium on the Politics of Reconstructing Iraq explores an important topic not only of professional relevance (e.g. to the architect, urban planner, civil engineer, and ROTC student) but of tremendous political and social responsibility.

Systematic Global Outreach

Most of a student's time at MIT is necessarily local, in the lab or in the classroom. As a result, people graduate without having attended international symposia, visited foreign institutions, experienced truly different cultures, and engaged with larger professional and alumni networks. We urge that the Institute encourage and facilitate student travel to conferences, build upon exchange programs, such as CME and MISTI, as well as elective field classes, such as D-Lab and G-Lab, and generally consider embracing global experiences as a formal part of the curriculum for all students.