# MIT Washington Office

## Mission

The MIT Washington DC Office (DC Office) was established within the Office of the President in 1991. The office reports to MIT's president; the staff includes director William Bonvillian, assistant director Alison Fox, senior legislative assistant Kari McCarron, project assistant Helen Haislmaier, and administrative assistant Michelle Ashitomi, who joined the office in October

The mission of the DC Office is to support the advocacy activities of MIT president Susan Hockfield in Washington, DC, and to support MIT's historic role in Washington as one of the nation's premier research universities in providing leadership on national science and technology issues. The DC Office contributes to a steady flow of information between MIT and Washington institutions, including executive branch offices, departments and agencies, Congress, and other national organizations.

## Summary of the MIT Washington Office's Four-Front Focus

From July 2008 to July 2009, the DC Office spent a great deal of time contributing to MIT's role in four main focus areas: connecting with the new administration, legislative issues around the innovation and competitiveness agenda, expanding MIT's engagement with our major federal research and development (R&D) agencies, and supporting the MIT Energy Initiative (MITEI).

### Connecting with the New Administration

A major focus of the DC Office this past summer and fall was providing information to the US presidential candidates to encourage support for R&D, higher education, immigration, and other issues of importance to both the nation and to institutions of higher learning in their agendas and platforms. For example, the DC Office, cooperating with other universities, provided data to the candidates on increased R&D funding and other provisions of the America Creating Opportunities to Meaningfully Promote Excellence In Technology, Education, And Science Act (America COMPETES), which was passed in 2007, and on new national energy initiatives.

Since the presidential election, the DC Office has worked to support MIT's president and others at MIT in connecting with the new administration on these policy issues. President Hockfield participated in an energy innovation event with President Obama on March 23, 2009, at the White House. A video of the event can be found at http://www.youtube.com/watch?v=0Z7_A-rkOjA&feature=channel. In addition, numerous administration officials have visited campus to discuss issues of interest to members of the higher education research community, and extensive ongoing discussions have occurred in Washington between President Hockfield and other MIT officials and member of the new administration, as described below.

## Legislative Issues Around the Innovation and Competitiveness Agenda

The DC Office has supported full funding for the America COMPETES Act, which authorizes major increases in federal physical science R&D spending at three important federal R&D agencies (the Department of Energy [DOE], National Science Foundation [NSF], and National Institute of Standards and Technology [NIST]), and support for science, technology, engineering, and mathematics (STEM) education. The DC Office has also advocated on behalf of MIT a significant R&D component in the stimulus package, the American Recovery and Reinvestment Act (ARRA) signed into law in February 2009, which provided some $22 billion in new federal R&D support, a $39 billion energy technology program which included $5.5 billion in energy R&D, and investments in university infrastructure. Efforts also included support for the other key science agencies during the regular appropriations process and in related policy programs.

This past year was certainly one of the most active legislative years in recent history for universities and for science issues. In addition to the aforementioned science funding, significant legislation is now pending in many other areas, including energy, intellectual property, and higher education.

## Expanding MIT's Engagement with Major Federal Research and Development Agencies

In the previous year, working closely with MIT's vice president for research and associate provost, the office helped to initiate campus faculty groups to focus on priorities emerging at three key science agencies—the National Institutes of Health (NIH), Department of Defense (DOD), and DOE. This year, an additional group was formed to work with the National Aeronautics and Space Administration (NASA), and significant efforts, detailed below, were undertaken involving each these four agencies. This effort aimed to better connect MIT with the policy world of the science agencies; to both contribute thought direction to our key agencies as well as to better understand their new policy directions. Efforts of the DC Office also included "reverse engagement," to bring better understanding of the Washington policy world to MIT students and faculty.

## Supporting the MIT Energy Policy Initiative

The Washington office has helped bring the growing MIT Energy Initiative (MITEI) to Washington. Our efforts this year have included educating Washington policy makers on the outcomes of MIT energy research and policy reports, such as this year's update to MIT's 2003 The Future of Nuclear Power report, Retrofitting of Coal-Fired Power Plants For CO2 Emissions Reductions, and Cap-and-Trade: Contributions to the Design of a U.S. Greenhouse Gas Program, produced by the MIT Center for Energy and Environmental Policy Research. Individual faculty and staff members participated in energy policy discussions at the National Academies, in the Senate and House, and other venues. In addition, faculty members continued to testify on energy issues before congressional committees and held individual meetings with members and committee staff. As part of this outreach, numerous administration officials and members of Congress and their staff also attended meetings and conferences on campus.

Developments in each of these four focus areas are set forth below in more detail.

## Focus One: Connecting with the New Administration

From the outset of his term, President Obama has made science—including funding for basic R&D—an important component of his administration. In April, President Obama addressed the 146th annual meeting of the National Academy of Sciences (NAS), outlining major initiatives to boost research funding and bolster math and science education. Highlights of the speech and the related White House fact sheet included:

- A commitment to finish the America COMPETES Act's seven- to ten-year doubling the budgets of NIH, DOD, and DOE. Between 2009 and 2016, the administration's enacted and proposed budgets would add $42.6 billion to the 2008 budgets for these basic research agencies, with a special emphasis on encouraging high-risk, high-return research and supporting researchers at the beginning of their careers.
- The launch of a new DOE agency, the Advanced Research Projects Agency–Energy (ARPA-E), and a new energy research effort, the Energy Frontier Research Centers (EFRCs).
- A joint initiative by DOE and NSF to encourage American students to pursue careers in science, engineering, and entrepreneurship related to clean energy, with education programs (Regaining our Energy Science and Engineering Edge [RE-ENERGYSE]) and scholarships from grade school to graduate school.
- A national imperative to improve student achievement in STEM and move US students from the middle to the top of the pack on international benchmarks over the next decade by challenging all Americans to dramatically increase support for STEM education.
- An intention to return the U.S. to an annual R&D expenditure level of 3% of GDP (including public and private components).

Although particular issues have arisen, President Obama has since continued to publicly support both funding and key policy initiatives favorable to spurring the innovation economy and advancing STEM education.

The DC Office also communicated with both the Obama and McCain campaigns on these questions during the summer and fall of 2008, providing, for example, the Obama campaign with information on R&D and related policy that became part of his agenda. President Hockfield connected directly on these innovation issues with President Obama on two major occasions, as noted above. On June 26, 2008, she participated in a discussion with him and 11 other innovation leaders at Carnegie Mellon University on these questions (her remarks can be found at http://web.mit.edu/hockfield/speeches/2009-clean-energy.html) and on March 23, 2009, as a prelude to his NAS speech, she helped the president lead an event at the White House on energy technology innovation (her remarks can be found at http://web.mit.edu/hockfield/speeches/2009-clean-energy.html). The DC Office supported those efforts and has worked with the higher education community, business, and MIT faculty and staff to provide the Obama administration with information and ideas on R&D, innovation policy, and education programs throughout the transition and the first months of the new administration.

MIT officials, led by President Hockfield and supported by the DC Office, also urged the administration to make R&D and innovation a part of its major economic stimulus legislation; her thoughts were published in a February 13, 2009 op-ed in the Boston Globe (http://web.mit.edu/hockfield/speeches/2009-globe-1.html). Approximately $22 billion was included in that legislation for R&D, apart from major funding for energy technology implementation and for university research infrastructure.

The DC Office also supported efforts to bring senior officials from the new administration to MIT in its opening months. These officials included presidential science advisor John Holdren (who visited twice), energy and environment advisor Carol Browner, and energy secretary Stephen Chu. In addition, President Hockfield and other MIT faculty met with senior officials from the Departments of Defense (undersecretary for acquisition, technology, and logistics Ashton Carter) and Energy (Secretary Chu, undersecretaries Kristina Johnson and Steven Koonin, and chief financial officer Steven Isakowitz), and from the White House (John Holdren and Carol Browner), among others.

By the end of the first half-year of the new administration, MIT officials had completed a major outreach effort on the science and technology issues important to the nation's well-being.

## Focus Two: 2008–2009 Legislative Initiatives Around Innovation and Competiveness

The DC Office continued to work with colleagues at MIT, other universities, higher-education national organizations, and industry to strengthen the partnership between research universities and the federal government. A primary concern during the past year has been the engagement of the Institute's leadership and its DC Office in the issues of support for science and engineering research, the general competitiveness of the US R&D infrastructure, and support for life science research. In addition, there have been a series of related legislative concerns in areas such as intellectual property, access to immigrant talent, and higher education. This Congress has been unusually active in these fields this year compared to previous Congresses, providing, in particular, major new R&D funding. Unlike the pattern of recent years, Congress provided full funding for the America COMPETES Act in the FY2009 Omnibus Appropriations bill and in the ARRA stimulus legislation. This required a significant increase in the level of MIT's legislative engagement on these issues this past year, which must be sustained in future years. Efforts on and the status of particular legislation are summarized below.

### Funding the America COMPETES Act

After nearly two years of limited success in obtaining full funding for the R&D initiatives in the America COMPETES Act, the higher education, business, and science communities, with the strong support of the new administration, succeeded in achieving and exceeding the authorized R&D funding for America COMPETES through both the FY2009 Omnibus Appropriations Act and ARRA.

America COMPETES doubles funding for the DOE Office of Science and NSF over a seven-year period, and for NIST over a 10-year period. (DOD basic research, NASA

science, and NIH were not included in this legislation.) America COMPETES also authorized major science education efforts and funds the new ARPA-E initiative at DOE, which is modeled on the successful Defense Advanced Research Projects Agency (DARPA) model for translational research in DOD.

Funding for America COMPETES was achieved in the FY2009 Omnibus Appropriations bill. Congress, through the Commerce, Justice, and Science bill (which funds both NSF and NIST) and the Energy and Water bill (which funds the DOE Office of Science), included increased funding for these agencies. In addition, ARRA provided an additional major boost for the three science agencies covered in America COMPETES. These results are summarized in the Table 1, below (prepared by Chris Mustain for the industry-university group, the Task Force on American Innovation, which MIT participates in):

**Table 1. Analysis of FY2010 funding for key agencies (dollars in millions, excluding earmarks, July 9, 2009).**

| | FY2008 | FY2009 (final) | | FY2010 (pending) | | |
|---|---|---|---|---|---|---|
| **Key agencies** | **Final** | **Omnibus** | **ARRA[a]** | **Budget** | **House** | **Senate** |
| National Science Foundation (NSF) | 6,084 | 6,490 | 3,002 | 7,045 | 6,937 | 6,917 |
| Department of Energy (DOE) Office of Science | 3,959[b] | 4,679[c] | 1,600 | 4,942 | 4,906[d] | 4,858[e] |
| National Institute of Standards and Technology (NIST)[f] | 549[g] | 597[h] | 580 | 652 | 587 | 637[i] |
| **Total** | **$10,592** | **$11,766** | **$5,182** | **$12,639** | **$12,430** | **$12,412** |

*Source*: Innovation Advocates, for the Task Force on American Innovation

NOTE:

Status of FY2010 Appropriations:
—President released budget May 7
—House passed CJS Appropriations measure that includes NSF and NIST June 18
—Senate Appropriations Committee reported CJS measure including NSF and NIST June 25
—House Appropriations Committee reported E&W measure including DOE Science July 7
—Senate Appropriations Committee reported E&W measure including DOE Science July 9

[a] ARRA—American Recovery and Reinvestment Act (Note: Some ARRA funding will be obligated in FY2010)

[b] Total FY2008 funding for DOE Science was $4,083 million; the chart reflects a subtraction of $124 million in earmarks

[c] Total FY2009 funding (non-ARRA) for DOE Science was $4,773 million; the chart reflects a subtraction of $94 million in earmarks

[d] Total proposed FY2010 House funding for DOE Science is $4,944 million; the chart reflects a subtraction of $38 million in earmarks

[e] Total proposed FY2010 Senate funding for DOE Science is $4,899 million; the chart reflects a subtraction of $41 million in earmarks

[f] Refers to NIST core accounts—Scientific and Technical Research and Services (STRS) plus the Construction of Research Facilities (CRF)

[g] Total FY2008 funding for NIST core was $601 million; the chart reflects a subtraction of $52 million in earmarks

[h] Total FY2009 funding (non-ARRA) for NIST core was $644 million; the chart reflects a subtraction of $47 million in earmarks

[i] Total proposed FY2010 Senate funding for NIST core is $684 million; the chart reflects a subtraction of $47 million in earmarks.

In summary, after several years of uncertainty, the America COMPETES Act R&D funding appears to have solidified at levels exceeding the 2007 authorized ramp-up rate. The DC Office will continue efforts to support adequate follow-on funding to continue this trend.

## American Recovery and Reinvestment Act Stimulus Funding

ARRA provided a further burst of support for science funding. President Hockfield, in her appearance with President Obama on March 23, 2009, referred to this funding as "the largest and most important investment in science and technology since Sputnik launched the Apollo program." Overall, ARRA provided some $22 billion in R&D for FY2009 and FY2010, in addition to the regularly appropriated FY2009 funds. More specifically, ARRA included $10 billion for NIH (particularly noteworthy given NIH's funding stagnation for the previous five years); $5.5 billion in energy R&D, including $400 million for the new ARPA-E and full five-year funding for additional EFRCs; as well as significant funding increases for NASA ($400 million for science and $150 million for aeronautics), NIST ($580 million), and NSF ($3 billion). The details of this funding for R&D and related areas at key agencies, including research infrastructure, are listed for each major science agency in the Appendix at the end of this report.

## Pending FY2010 Appropriations

The pattern of increasing R&D support has continued with FY2010 appropriations to date. While this legislation is not yet completed this session, further modest progress is being made. Funding for FY2010 for America COMPETES agencies is detailed in Table 1, with NSF, DOE Office of Science, and NIST more than meeting their COMPETES goals. Non–America COMPETES science agencies funding progress to date is summarized in Table 2.

**Table 2. Summary of funding for the major non-COMPETES agencies, FY2008–FY2010.**

| Agency | FY2008 Appropriations | FY2009 Omnibus | ARRA FY2010 | FY2010 Pending House | FY2010 Pending Senate |
|---|---|---|---|---|---|
| NASA–total science | $4.8 billion* | $4.5 billion | $325 million | $4.5 billion | $4.5 billion |
| DOD–basic research (category 6.1)** | $1.4 billion | N/A | $350,000 | $1.7 billion | — |
| NIH | $29.6 billion* | $30.3 billion | $10 billion | $31.3 billion | $30.8 billion |

* Includes FY2008 supplemental appropriations funding
** Does not include congressional appropriations earmarks

## Related Legislative Issues

### *Department of Energy Funding*

The Obama administration, consistent with its campaign pledges, provided a major boost to R&D in general and energy R&D in particular in the ARRA stimulus legislation. DOE obtained in the bill some $5.5 billion in R&D funding, as part of its $39 billion energy stimulus programs, as summarized in the Appendix. Universities were strong proponents of including a research component in the stimulus effort, with President Hockfield a leading advocate of the need for a mid- to longer-term growth element in stimulus legislation.

As a follow-on to the energy investments in ARRA, the administration also proposed in its FY2010 budget a major $15 billion annual RD&D Clean Energy Technology Fund for 10 years commencing in FY2012, to be funded through the revenue stream available in climate change legislation. In testimony before the House Select Committee on Energy Independence and Global Warming in September 2008, President Hockfield offered strong testimony in favor of energy R&D as a key component to achieving US energy goals, and continued to urge this position in meetings with leaders of the new administration.

The administration, however, stopped advocating for its fund proposal as the House developed H.R.2454, American Clean Energy and Security Act of 2009, a combined energy and climate cap-and-trade bill. H.R.2454, as passed by the House, does not include this fund. It provided only approximately $1.5 billion (1.5% of cap-and-trade allocations) for R&D (1% for ARPA-E and 0.5% for applied development-focused innovation centers). Rep. Rush Holt (D-NJ) protested the R&D level during floor debate on the energy-climate bill on June 26, 2009, and subsequently, on July 16, 2009, a group of 34 Nobel prizewinners sent a letter to the president, asserting that,

> The stable support this [Clean Energy Technology] Fund would provide is essential to pay for the research and development needed if the U.S., as well as the developing world, are to achieve their goals in reducing greenhouse gases at an affordable cost.
>
> This stable R&D spending is not a luxury. It is in fact necessary because rapid scientific and technical progress is crucial to achieving these goals, and to making the cost affordable.

However, the administration appears reluctant to press for its fund as the Senate begins consideration of the climate legislation. The research community accordingly is facing a "falling off the cliff" energy R&D funding scenario, since the $5.5 billion in energy R&D in the ARRA stimulus package runs out after FY2010 and there is no anticipated follow-on program. While the ARRA marked a major advance for energy R&D needs, the lack of a follow-on energy R&D program signals the need for further work in this area.

ARRA also funded the ARPA-E program at $400 million for FY2010, and DOE is now working to implement it. ARPA-E fills a gap and makes connections between DOE's basic research and applied programs. DOE imposed a 20% "cost-share" requirement on the program that limits the ability of universities to participate. The Association of American Universities (AAU), the Association of Public and Land Grant Universities (APLU), and individual universities—including MIT—are now reviewing this cost-share requirement with DOE. DOE issued a first solicitation for grants in June for $150 million and a number of MIT projects (10 out of 30 submitted) were selected to go to the next stage of review, although cost-sharing remains an issue for those researchers not able to obtain industry collaborators to absorb the cost-share.

From an energy innovation organization perspective, DOE did advocate, and include in its FY2009 budget, funding for new important programs, including the Basic Energy Sciences' (BES) EFRCs. MIT's dean of science Marc Kastner was a strong advocate during

the year for this program, coauthoring a BES Advisory Committee report on the need for these centers, and briefing Capitol Hill staff and speaking at a Center for Strategic and International Studies (CSIS) forum on the potentially important role they could play. The DC Office supported his efforts. This advocacy effort helped achieve strong initial funding for these EFRCs that will focus on basic research in fundamental areas critical to energy science advancement. Congress provided $100 million for the EFRCs in the FY2009 Omnibus Appropriations and added additional $277 million in funding in ARRA. MIT later won two EFRC awards (one through ARRA and one through FY2009 funding) as lead institution and MIT faculty are participating in several more EFRCs.

The FY2010 budget included two additional proposals for major programs of significant interest to universities that the DC Office and MIT faculty continue to support. Energy secretary Chu proposed $115 million for RE-ENERGYSE, a program focused on energy education at all levels. MIT signed on to an AAU and APLU joint letter in support of this program, and President Hockfield provided ideas on this program to DOE officials, at their request. The Senate Appropriations Committee did not provide any funding for this program in its FY2010 bill. The House Appropriations Committee provided $7 million to conduct a pilot program. Despite the House support, it is not anticipated that any funding for RE-ENERGYSE will make it into the final bill, so the issue is deferred to FY2011.

Secretary Chu also made a proposal for research centers he called "Energy Innovation Hubs." He spoke of this hubs proposal when he delivered his Compton Lecture at MIT in April 2009, indicating that they would perform a role comparable to that of the historic Bell Labs. The DOE FY2010 budget proposed $280 billion for funding eight hubs, located at DOE national labs or at universities, to focus on various key fields of energy research and incorporate basic and applied research. The House FY2010 Appropriations bill funds one hub, while the Senate Appropriations bill funds three hubs, with contingencies. The House and Senate Appropriations Energy and Water Subcommittees, however, have asked for further programmatic details on the two programs, as well as a longer-term funding plan. Because the ARRA funds run out in FY2010, this will place pressure on DOE R&D programs generally and the administration has not offered a follow-on funding program.

### *Department of Defense Basic Research*

Secretary of defense Robert Gates, while president of Texas A&M University, was on the panel for the NAS Gathering Storm report, which recommended a major increase in defense basic research, in addition to support to the other leading physical science agencies. When Gates came to DOD he addressed this gap, advocating a significant increase in basic research funding at the Pentagon in the FY2009 budget, and calling for a total of a billion dollar increase over the following five years. His proposed DOD budget was consistent with this proposal and called for an increase in the overall basic research budget (category 6.1) for FY2009. In FY2010, the Obama administration continued his initiative, and if the Senate Defense Appropriations Subcommittee follows the House, the DOD basic research category will reach $1.7 billion for FY2010 (not including earmarks).

### *Intellectual Property*

This Congress has attempted, via multiple legislative vehicles, to modify intellectual property laws. Major patent reform legislation, which has been pending for over three years in Congress, continues to remain a major focus of the debate. While the bill in the House continues to pit large information technology firms (software and hard technology engineering) against life science/pharma/biotechs and smaller, entrepreneurial firms, the Senate Judiciary Committee passed a compromise bill, S.515, that gained support of some previous opponents (i.e., biotech firms). AAU and APLU sent a letter supporting the compromise Senate bill despite concerns from a group of major research universities with strong patent portfolios. The Senate bill, while significantly improved from the introduced version, still contains objectionable provisions from a university perspective, especially as related to post-grant review; these provisions could leave approved patents subject to ongoing challenges. The House bill also still contains objectionable (from the university perspective) damages provisions as well as other provisions that could dampen innovation and entrepreneurship.

The two sides have very different perspectives on this legislation and universities, because there are numerous start-ups coming out of their campus research efforts, have concerns that the legislation will make the patent process significantly more expensive and reduce the value of patents due to increased uncertainty over patent rights. Discussions on the patent bill continue and the DC Office will continue to work with other universities for the passage of a patent reform bill that also fosters innovation.

During the past year, the DC Office continued to monitor additional intellectual property legislation, including legislation to address the patent and regulatory issues relating to generic biologic materials, and orphan works legislation that would allow use of copyrighted material when the copyright owner cannot be identified. Recent health care legislation included provisions on follow-on biologics that provides 12 years of Food and Drug Administration (FDA) data exclusivity for the approved biologic, which is supported by universities. The DC Office will continue to monitor this legislation.

### *National Institutes of Health*

NIH's budget had a small increase in baseline annual appropriations funding for FY2009, to $30.3 billion from $29.6 billion, but also experienced a dramatic influx of $10 billion from ARRA funds, as noted above. This major new support reverses five years of stagnating funding for the agency.

There was increasing concern in Congress this year over conflict-of-interest policies that cover externally funded researchers and their relations with drug companies. Language was included in the NIH appropriations bill for FY2009 for an examination of those policies. The DC Office continues to monitor the conflict-of-interest issues.

Last year, NIH implemented a policy that requires all federally supported scientists to submit electronic copies of their final, peer-reviewed manuscripts to PubMed Central, a free digital archive of biomedical and life sciences journal literature, within 12 months of publication. This mandate for free public electronic access to research articles derived from federally funded research was a requirement attached to last year's omnibus appropriations bill, which MIT supported. Now, at the behest of the publishing industry,

the House Judiciary Committee has become concerned that this rider overstepped their jurisdiction over copyright issues. House Judiciary Committee chairman John Conyers (D-MI) introduced H.R.801, the Fair Copyright in Research Works Act, to overturn the submission requirement. The DC Office will continue to monitor the legislation and advocate for continuation of the publication requirement.

NIH is also set to publish the final Guidelines for Human Stem Cell Research in July 2009. NIH received 49,000 public comments from organizations and individuals, including some from members of Congress, to the draft human embryonic stem cell research guidelines issued in April 2009. The research community, including MIT, provided comments encouraging NIH to recognize preexisting stem cell lines, as well as other actions to maximize the use of stem cells in research.

There is a possibility that Congress with take up legislation to reauthorize NIH this year. If so, this will provide an opportunity to reshape NIH to incorporate the theme of convergence of life sciences, physical sciences, and engineering.

### *Immigration*

Overall, an impasse continued in Congress on broad issues of immigration reform legislation. This blocked further progress on H1-B and related legislation supported by universities to allow higher numbers of foreign-born science talent to remain and work in the U.S. Employment verification continues to be a main focus of Congress and the administration in this area. The Senate FY2010 Homeland Security Appropriations bill makes the E-Verify program, an online tool that checks a worker's Social Security number and immigration status, permanent. The House FY2010 Homeland Security Appropriations bill includes a two-year extension of E-verify. According to the Department of Homeland Security, companies that contract with the federal government will have to begin verifying that their employees are legally allowed to work in the country starting September 8, 2009.

The president has said he will push for comprehensive immigration legislation this Congress. In addition, the new administration, with the help of the secretary of state and leadership from Office of Science and Technology Policy (OSTP) director John Holdren, is working to expedite processing of visa applicants (through the Visa Mantis program) to reduce the delays encountered by many foreign students, postdocs, and faculty in entering the U.S.

Congress, led by Senator Schumer (D-NY) of the Judiciary Committee, intends to work on comprehensive immigration reform legislation this coming session. The higher education community is hopeful that the legislation will provide increased access to green cards for foreign graduates of US universities with STEM degrees. The DC Office will continue to monitor immigration legislation as it is considered by Congress.

### *NASA*

Congress passed a one-year reauthorization bill for NASA (for $20.2 billion) that was designed to serve as an advisory document for the new administration as it took office. It would continue the agency's plan to eventually send astronauts to the moon in preparation for future missions to Mars, and would set aside $1 billion to accelerate

development of a spacecraft to replace the current shuttle fleet. The bill funding level, however, significantly exceeds the appropriated amounts for NASA, so was generally considered unrealistic.

A gap in America's spaceflight capability between 2010, when the shuttles are retired, and 2015, when the new craft is operational, has been a sore point on Capitol Hill for years. After the new administration assumed office, former Lockheed-Martin chief executive officer Norman Augustine was named to head a panel of experts to examine NASA's manned space agenda and funding needs. MIT professor Edward Crawley was also named to the panel and has been an active participant. The panel's report is expected this fall.

The DC Office will remain engaged with Congress as they begin working on new reauthorization legislation for NASA to help ensure that adequate funding and policy are included to support basic science and engineering research and education.

### *Higher Education Legislation*

During this past year, Congress passed a Senate-House compromise Higher Education Act reauthorization bill (The Higher Education Opportunity Act of 2008), last authorized a decade ago. It was passed by the House by a vote of 380–49 on July 31, 2008, and by the Senate by a vote of 83–8, with one senator voting "present." The 1,100-page bill, which reauthorizes the Higher Education Act for five years, expired in 2003 and had been repeatedly temporarily extended. President Bush, although unhappy with the addition of 64 new programs in the bill, subsequently signed it into law.

Overall, the bill contained a number of positives, particularly for students; however, there were several provisions that are problematic for higher education institutions. On the positive side, it provided for year-round Pell grant eligibility and a simplified version of the Free Application for Federal Student Aid (FAFSA) form, directed the National Research Council to conduct a study of all federal regulations affecting universities, and limited the authority of the Department of Education to regulate standards in the accreditation process.

In addition to an expansion of new reporting burdens, some of the more problematic provisions in the bill were:

- *Cost watch lists.* Institutions in the top 5% with respect to percentage increases in tuition and fees or net price would be required to file reports with the secretary of education explaining the causes and the steps they will take to address costs. There are also lists for the top 5% in highest tuition and fees and net price in actual dollar terms, which do not require a report to the Department of Education. The lowest 10% in tuition and fees or net price are included in another list.
- *Peer-to-peer (P2P)/illegal downloading provisions*. The final language required institutions to certify that they have a "plan" in place to combat illegal file sharing, but the bill text and accompanying report language allowed for some flexibility. In addition, while the bill directed institutions to offer alternative downloading services, the language included the qualifier "to the extent

practicable." Given the ongoing pressure from the recording industry, these provisions may become the basis for further federal intrusions in the future.

- *Textbook disclosure*. The bill also contains language regarding textbooks that placed new requirements on both publishers and institutions. Institutions were required, "to the extent practicable," to make available to the public via the internet information about course materials, such as International Standard Book Numbers (ISBNs), author(s), title, publisher, and copyright dates in a proactive manner.

While it was a major focus of the Senate Finance Committee in the previous year, the university endowment issue receded this year largely because endowments suffered major losses during the severe economic downturn that occurred from the summer 2008 through spring 2009. With endowments down, and university budgets under extreme financial pressure, there was much less of a basis for Congress to pressure universities on the use of endowments to reduce student tuition and fees. A roundtable session, discussed below, led by Finance Committee ranking Republican Charles Grassley (R-IA) was the high water mark for the issue this year, and despite university concerns the previous year, no legislation on endowments was seriously considered.

On September 8, 2008, Senator Grassley and Rep. Peter Welch (D-VT) hosted a roundtable discussion on college endowment funds. The discussion was divided into panels that focused on following issues: "Understanding College Costs," "What is an Endowment?," and "Are Mandatory Payouts Beneficial?" More than 20 policy experts, higher education association leaders, and college presidents participated in the roundtable.

Senator Grassley likened his scrutiny of university endowments to his prior examination of charitable abuses, which yielded some legislative reforms but also served as a catalyst for many in the nonprofit sector to heighten transparency, accountability, and governance standards. At the end of the three-hour roundtable, Senator Grassley urged representatives of institutions to work together to "self-correct" concerns. He said that cooperative efforts often mitigate or negate the need for Congress to pursue legislative reforms. He did ask Treasury and the Internal Revenue Service (IRS) to develop a Form 990 schedule (now issued by the IRS) for colleges and universities, similar to the one that was developed for hospitals. Form 990 provides information on the filing organization's mission, programs, and finances. Representative Welch, who presided over much of the roundtable, said there was a need to acknowledge that the federal government provides billions of dollars in resources aimed at higher education.

In the last panel of the roundtable, which focused on whether federally mandated payouts of endowments would be beneficial, several participants warned that a mandatory requirement could be difficult to administer and could have differing effects on universities and colleges given the size of their respective endowments.

The final act of the annual higher education drama this year was the most significant. It featured a major focus by the Obama administration on increasing access for poor and middle-income students to higher education opportunities. Education-related provisions

in the ARRA stimulus legislation included significant expansion of programs to assist students and their families with college tuition and costs (as well as other education programs). In particular, the provisions included:

- $15.6 billion for student aid Pell Grants, providing a $500 increase in the maximum Pell Grant award, for a maximum of $5,350 in 2009 and $5,550 in 2010
- A new $2,500 education tax credit, the American Opportunity tax credit, which replaces the Hope tax Credit, 40% of which would be refundable
- $200 million for the work-study program

Consistent with this access initiative, the annual Labor, Health, and Education Appropriations bill for FY2010, as passed by the House in July 2009, maintained the discretionary portion of the maximum Pell Grant award at $4,860, which combined with the mandatory supplement of $690, will support a $5,550 maximum Pell Grant award in FY2010 (an increase of $200 over the 2009 award level).

In summary, 2008–2009 marked perhaps the most active legislative year for universities in recent decades. It saw a major new commitment by the new president to science and technology initiatives, and a corresponding major dose of new R&D funding—$22 billion—to the key science agencies, with dramatic new funding to DOE, NSF, and NIH R&D, in particular. It witnessed major legislative activity in climate-energy legislation, in intellectual property legislation, and in higher education student funding. Key questions remain, particularly whether the administration will meet commitments to major energy research and technology investments when the stimulus funding is drawn down.

## Focus Three: Initiatives to Engage Our Major Federal R&D Agencies

### Engaging MIT in Washington

Despite the legislative efforts cited above for particular R&D agencies, overall federal physical science R&D funding had been stagnant for many years, and now federal life science funding, after a decade of major increases, has likewise leveled off. While the ARRA stimulus legislation signaled a change to this pattern, it remains to be seen whether it can continue even modest increases in science funding in the regular appropriations process. With the annual federal deficit approaching a projected $9 trillion between 2009–2019 due to the huge costs of the economic downturn of 2008–2009, and a major demographic shift looming at the end of the decade that will sharply increase entitlement spending, federal research universities—including MIT—face increasing competition for research funding.

Aware of this looming challenge, in 2007, MIT's president and vice president for research and associate provost concurred that a more systematic agency engagement at senior levels of science agency leadership would be a sound policy for the health of the national science endeavor, where MIT historically has played an important role. This engagement contemplated creating more of a two-way dialog with agency science leaders, both to better understand new directions and opportunities in federal research and to assist agencies by identifying and providing leadership for promising new science

breakthroughs. In 2007, the DC Office, working for the vice president for research and associate provost, began work on a new MIT strategy of engagement, looking initially at three of the five mission agencies that dominate MIT's sponsored R&D spending: NIH, DOD, and DOE. This past year, NASA, which faces major science program and engineering funding challenges, was added to the list. Efforts on innovation policy, as well as possibly on NSF, are expected to evolve over the coming year. Engagement efforts for NIH, NASA, and DOD are summarized below; DOE engagement is summarized in under Focus Four.

### *NIH Engagement*

The convergence of the life sciences with physical sciences and engineering has lead to major breakthroughs in life sciences. One example of this is the rapid progress of the Human Genome Project, which relied initially on major computing advances developed through DOE supercomputers. Working with key MIT faculty members led by Institute Professor Phillip Sharp, the DC Office developed this past year a white paper explaining the benefits of convergence for life sciences and other areas, including energy, agriculture, food supply, and human health. The DC Office has also, where appropriate, assisted Professor Sharp as he cochaired a National Academy of Sciences ad hoc committee charged to "examine the current state of biological research in the United States and recommend how best to capitalize on recent technological and scientific advances that have allowed biologists to integrate biological research findings, collect and interpret vastly increased amounts of data, and predict the behavior of complex biological systems upcoming report on the future of life science". This committee held a summit at the American Association for the Advancement of Science (AAAS) in Washington, DC, in December 2008 to solicit ideas for its report. Professor Sharp presided at the conference, which a "who's who" of life scientists attended, and President Hockfield participated as a leading speaker. The committee's report, A New Biology for the 21st Century, will be released in September 2009.

President Hockfield continued her role as a spokesperson on this issue, returning to the subject on April 30, 2009, as a keynote speaker at the annual AAAS Forum on Science and Technology Policy. She also wrote a guest editorial on convergence in the February 27, 2009, issue of Science magazine. The convergence idea has also been presented this year to key members of the new administration, including OSTP leaders, by President Hockfield and Professor Sharp. This year, the engagement group hopes to issue the MIT white paper on convergence, and to support the anticipated related findings of the NAS committee report that will be released in September. The group will continue to advocate the need for convergence support with members of the administration, particularly the new director or NIH, upon whom they wish to impress the benefits of broadly embracing convergence at NIH.

### *NASA Engagement*

The Space, Policy, and Society Research Group at MIT, led by professor David Mindell, director of the Program in Science, Technology, and Society, released a report outlining its recommendations for the future of the US human spaceflight program. The goal of the exercise was to present the incoming administration with a range of options for NASA, succinctly laying out the considerations the next administration must weigh

in making decisions related to human spaceflight. The DC Office worked with the group to present their findings in Washington, DC, including at a well-attended public presentation at CSIS, at meetings with the Obama administration space transition team, and with congressional committees and staffers. The report's recommendations served as at least one of the reasons for the administration to organize the US Human Spaceflight Plans Committee to evaluate the future of human space flight in the U.S.

As mentioned above, the US Human Spaceflight Plans Committee is chaired by Norman Augustine, former CEO of Lockheed Martin and a Presidential Medal of Technology winner, and includes Professor Crawley. The committee, established by OSTP at the president's request, was created (according to the NASA website) "to conduct an independent review of ongoing US human space flight plans and programs, as well as alternatives, to ensure the nation is pursuing the best trajectory for the future of human space flight—one that is safe, innovative, affordable and sustainable." Its report is expected this fall.

As part of the engagement efforts, presidential science advisor and OSTP director John Holdren attended and was the keynote speaker at MIT's Giant Leaps symposium on the anniversary of Apollo moon mission. In addition, Chris Scolese, then–acting administrator of NASA (and now associate administrator) participated as well.

The DC Office will continue to engage the administration on key NASA issues, especially as it develops policies affecting science and engineering funding.

### *DOD Engagement*

DOD engagement focused on two initiative areas. First, Lincoln Laboratory's chief technology officer (CTO) Zachary Lemnios and deputy CTO Randy Avent, who participated in the engagement group for Lincoln, worked on the creation of a detailed presentation on new dimensions for a defense technology strategy, which Lincoln widely briefed at DOD to foster new perspectives on defense technology needs. The DC Office advised on that presentation and helped arrange various congressional briefings for this presentation, both in Washington and at MIT.

The second initiative sought to improve MIT's Computer Science and Artificial Intelligence Laboratory's (CSAIL) connections with DOD research. Led by Zach Leminos and CSAIL director Victor Zue, presentations were made to leaders at Defense Research and Engineering (DDR&E) on a group of five CSAIL DOD technology proposals. After a number of exchanges, a multimillion-dollar R&D program was formed around one of those initiatives, with ongoing discussions continuing on others. CSAIL has long been anxious to reestablish a stronger working relationship with DOD and this initiative provided a constructive opportunity. It should also be noted that Zach Lemnios was nominated by President Obama in May 2009 and confirmed by the Senate in June as the new director of defense for research and engineering; he will assume his post in July. and Randy Avent became Chief Scientist at in the Basic Research Office at DDR&E.

The DC Office also helped organize visits to MIT by DOD technology leaders. DDR&E director for basic research Robin Staffin spent two full days at MIT in April 2009 in

discussions with leading researchers. In addition, the DC Office organized briefings for senior Senate Armed Services Committee R&D staffers Arun Seraphin and Church Hutton on October 28, 2008 for an extensive review of technology and related policy issues at both MIT and at Lincoln.

### *Summary of MIT in DC and DC at MIT*

As a result of all these engagement efforts, Table 3 indicates: (1) MIT faculty testimony before Congress between July 2008 and July 2009; (2) MIT faculty and officials who participated in meetings in Washington in that period; and (3) Agency and congressional officials who attended meetings on policy issues at MIT, in meetings and visits supported by the DC Office.

**Table 3. Summary of MIT engagements in Washington, DC, and congressional/executive branch visits to MIT.**

**FACULTY HEARING TESTIMONY**

| MIT Faculty/Staff Member | Date of Hearing | Topic | Committee |
|---|---|---|---|
| Barry Posen | 7/15/08 | Fundamentals of US grand strategy/a new strategic outlook for the U.S. (military and diplomatic) | House Armed Services Subcommittee on Oversight |
| Maria Zuber | 7/30/08 | NASA at 50: Past accomplishments and future opportunities and challenges | House Committee on Science and Technology |
| Susan Hockfield | 9/10/08 | Energy R&D needs | House Committee on Energy Independence and Global Warming |
| Ian Waitz | 9/11/08 | Aviation emissions and noise issues | House Committee on Science and Technology |
| John Deutch | 9/12/08 | Energy summit seeking to identify key underlying issues that should be placed on the menu for upcoming legislative action on energy | Senate Energy Committee |
| Marie Zuber | 7/7/09 | Economic recovery plan | House Democratic Steering Committee |
| Claude Canizares | 2/25/09 | Impact of US export control policies | House Science and Technology Committee |

**FACULTY/STAFF MEETINGS IN WASHINGTON, DC**

| MIT Faculty/Staff Member | Meeting Date | Topic | Meeting(s) |
|---|---|---|---|
| Robert Redwine (as chair of the American Physical Society Committee on Nuclear Energy Funding) | 7/15/08 | Future funding of nuclear energy in the U.S. | House and Senate Appropriations Committees, House and Senate Energy Committees, House Speaker Pelosi's office, House Majority Leader Hoyer's office |

| MIT Faculty/Staff Member | Meeting Date | Topic | Meeting(s) |
|---|---|---|---|
| Susan Hockfield | 7/23/08 | The need for universities to present their positive efforts to the public and Congress | Molly Broad, American Council on Education |
| Susan Hockfield | 7/23/08 | The problems that science funding faces in the FY2009 continuing resolution process | Chuck Kieffer, staff director, Senate Appropriations Committee |
| Susan Hockfield | 7/23/08 | Energy R&D funding in cap-and-trade legislation | Rep. Edward Markey, chair, House Global Warming Select Committee |
| Marc Kastner | 7/23/08–7/25/08 | Preparation of a report for the incoming administration and new Congress on energy R&D needs and progress, and advice in the design of future R&D legislation | Department of Energy Task Force |
| Sekazi Mtingwa | 7/31/08 | Participated in Evaluating the Business Case for Nuclear Power conference, focusing on workforce needs for the nuclear industry | Center for Strategic and International Studies |
| Susan Hockfield | 9/10/08 | Overall federal R&D funding | Senator Lamar Alexander |
| Susan Hockfield | 9/10/08 | Potential tax legislation | Rep. Richard Neal |
| Susan Hockfield | 9/17/08 | Participated in a panel discussion on the need for funding basic energy R&D | National Press Club |
| 10 Members of the MIT Energy Club Executive Committee | 9/15/08–9/16/08 | Meetings to exchange information, brief policy makers, and learn more about federal interactions with the energy industry | Senator Jeff Bingaman and staffers; Brookings Institute; Point Carbon; French Embassy; several officials at the Department of Energy; Rep. Jay Inslee |
| Steven Lerman | 9/22/08 | Science funding and graduate fellowships | Staff from Rep. Michael Capuano's office, staff from Rep. Michael Honda's office, and staff from the House Committee on Science and Technology |
| John Heywood | 9/29/08 | Briefings on the report, On the Road in 2035, which examines the technological options for light-duty vehicles and fuels that can be developed over the next 25 years | Key staff from the Senate Commerce, Energy and Natural Resources, and Environment and Public Works committees; staff from Senators Bingaman and Kerry's offices; staff from the House Science and Technology Committee, the Select Committee on Energy Security and Climate Change Committee; staff from the Department of Energy |
| Susan Hockfield | 11/12/08 | Participated in a discussion on a new national innovation and competitiveness agenda, convened by the Council on Competitiveness | National Press Club |

| MIT Faculty/Staff Member | Meeting Date | Topic | Meeting(s) |
|---|---|---|---|
| Susan Hockfield | 11/12/08 | Discussion about the energy and innovation agenda for the next Congress and the Obama administration, and a myriad of energy activities at MIT | Senator Jeff Bingaman, chair, Senate Committee on Energy and Natural Resources, and several key staffers. |
| Denny Ellerman and John Parsons | 11/17/08 | Briefing on their compilation report, "Cap-and-Trade: Contributions to The Design of a U.S. Greenhouse Gas Program" | Briefing for Senate-side staff and meetings with staff from the House Science and Technology and Energy Independence and Global Warming committees, Senate Environment and Public Works and Energy and Natural Resources committees. Also met with Department of Energy personnel working on climate change issues. |
| Susan Hockfield | 12/3/08 | The role of the life sciences in transforming America's future | National Academies Biology Summit |
| Phillip Sharp | 12/15/08 | Introduced a project being undertaken by the Board of Life Sciences, National Academy of Sciences, and sponsored by National Institutes of Health, National Science Foundation and Department of Energy | House Science and Technology Committee, Senate Health, Education, Labor, and Pensions Committee, and senior staffers from National Institutes of Health, National Science Foundation, and Department of Energy |
| Claude Canizares | 1/8/09 | Release of a National Academies report: "Beyond Fortress America: National Security Controls on Science and Technology in a Globalized World" | National Academy of Sciences |
| Lydia Snover | 1/29/09 | Faculty diversity, including a data collection element related to gender and ethnicity | House Science and Technology Committee |
| Claude Canizares | 2/9/09 | Possible MIT effort in developing ideas and concepts for new defense-related technologies | Department of Defense (Defense Research and Engineering), congressional staffers |
| Edward Roberts | 2/17/09 | Release of the Kauffman Foundation Report on MIT entrepreneurship | National Academy of Sciences, House Science and Technology Committee |
| Ernest Moniz and Melanie Kenderdine | 2/17/09 | Energy issues | Steve Isakowitz, chief financial officer, Department of Energy; Senate and House staffers |
| Daniel Nocera | 2/24/09 | His recent research of oxidation of water as a potential solar storage technology | House Science and Technology Committee members and Senate staffers |
| Raji Patel and Helen Halaris | 3/43/09 | The Massachusetts Space Grant Consortium | Massachusetts congressional delegation |
| Richard Temkin | 3/9/09 | Funding for and recent developments in fusion energy science | Massachusetts congressional delegation |

| MIT Faculty/Staff Member | Meeting Date | Topic | Meeting(s) |
|---|---|---|---|
| Denny Ellerman | 3/17/09 | Legislative approaches to climate change; focused on a comparison between cap-and-trade system and a carbon tax | Participated in a roundtable discussion sponsored by Reps. Jeff Flake and Bob Inglis. Also met with Rep. Jay Inslee and staffers from Senate Committee on Environment and Public Works |
| Susan Hockfield | 3/23/09 | Press briefing at the White House, "Investing in Our Clean Energy Future" | |
| Ian Hutchinson and John Bernard | 3/23/09 | Discussed funding for key nuclear science and engineering programs and infrastructure | Massachusetts congressional delegation |
| Claude Canizares | 3/23/09 | Met with leadership of the National Science Foundation to discuss the agency's upcoming agenda | Executive Office of Science and Technology Policy and House Appropriations staff |
| Susan Hockfield | 4/1/09 | Science policy and education issues, including the need for a stable funding source for energy R&D | Energy secretary Stephen Chu, environment advisor Carol Browner, Dr. John Holdren, Rep. Edward Markey, and Rep. Gabrielle Giffords |
| Claude Canizares | 4/24/09 | The Department of Energy's efforts to roll out the Advanced Research Projects Agency–Energy and further DOE's efforts to encourage energy education. Discussed ongoing concerns about US policies on export controls and International Traffic in Arms Regulations, as well as about NASA | Steve Isakowitz, chief financial officer, Department of Energy; House Science and Technology Committee |
| Miklos Porkolab | 4/23/09 | The current status of fusion research, and future fusion needs | Congressional energy appropriations staffers |
| Susan Hockfield | 4/30/09 | Addressed the American Association for the Advancement of Science Forum on Science and Technology Policy on "Converging Questions, Emerging Answers: The Next Innovation Revolution" | |
| David Mindell, Jeffrey Hoffman, and Dava Newman | 5/8/08 | Their newly published report, The Future of Human Spaceflight | Forum at Center for Strategic and International Studies, briefings on Capitol Hill for congressional staffers |
| Susan Hockfield | 5/14/08 | Acquisition technology reform, energy technology policy and export control and deemed export issues. The president's Clean Energy Technology Fund for energy R&D and technology. | Undersecretary of defense for acquisition, technology, and logistics Ashton Carter, Rep. Jay Inslee, and Rep. Daniel Lipinski |

| MIT Faculty/Staff Member | Meeting Date | Topic | Meeting(s) |
|---|---|---|---|
| Rodney Brooks | 5/21/09 | Lead speaker at the rollout of the National Robotics Roadmap with faculty from other leading universities | Forum held at US Capitol for congressional staff and others |
| Phillip Sharp | 6/1/09 | National Academies paper on the 2008 Biology summit, The Role of the Life Sciences in the Transforming America's Future | Dr. John Holdren; Ezekiel Emanuel, White House health policy advisor at the Office of Management and Budget; and Senate Health, Education, Labor, and Pensions Committee staffers |
| Claude Canizares | 6/2/09 | Attended National Academies release of their report, Gender Differences at Critical Transitions in the Careers of Science, Engineering and Mathematics Faculty | |
| Yet-Ming Chiang | 6/16/09 | Spoke at a Senate Science and Technology Caucus lunch event co-sponsored by the American Chemical Society and the American Association for the Advancement of Science on emerging battery technologies to support the grid. Also had briefings on battery advances with senior staff. | Senate Commerce and Armed Services committees, House Select Committee on Energy Independence, and the House Science and Technology Committee |
| Ernest Moniz and Melanie Kenderdine | 6/18/09–6/19/09 | Presented the rollout of a new MIT Energy Initiative report, Retrofitting of Coal Fired Power Plants for $CO_2$ Emissions Reductions, was joined by Wayne Leonard, chairman and CEO of Entergy on Capitol Hill. Also held separate meetings for House and Senate staffer | |

## CONGRESSIONAL/EXECUTIVE BRANCH VISITS TO MIT

| Government Staffer | Date of Visit | Topic | Meeting(s) |
|---|---|---|---|
| Arun Seraphin and Church Hutton, Senate Armed Services Committee | 11/28/08 | Defense technology and R&D issues | Meetings with Institute for Soldier Nanotechnologies, Research Laboratory of Electronics, Computer Science and Artificial Intelligence Laboratory, and other MIT faculty and Lincoln Laboratory officials |
| Dr. Patricia Dehmer, Department of Energy Office of Science | 11/5/08 | Research at the Department of Energy Office of Science | Meetings with President Hockfield, Assoc. Prov Canizares; Dean Suresh; Profs. Porkolab, Milner, Redwine, Moniz and MITEI's Melanie Kenderdine; Lunch with TPP students and campus-wide lecture on energy |

| Government Staffer | Date of Visit | Topic | Meeting(s) |
|---|---|---|---|
| Rep. Jay Inslee | 3/7/09 | | One of the keynote speakers at the annual MIT Energy Conference |
| Rep. Brian Baird | 4/3/09 | Met with Susan Hockfield, researcher Daniel Nocera on solar energy, and with MIT Energy Initiative leaders. Also spoke at MIT's Center for International Studies at the second annual Gaza symposium | |
| Steven Isakowitz, chief financial officer, Department of Energy | 4/6/09 | MIT internships and undergraduate education | |
| Dr. Robin Staffin, director for basic research, Office of the Director, Defense Research and Engineering | 4/8/09–4/9/09 | | Visited with researchers at Lincoln Laboratory, the Institute for Soldier Nanotechnologies, Computer Science and Artificial Intelligence Laboratory, Research Laboratory of Electronics, Center for Materials Science and Engineering, and researchers participating in MIT's newly funded Minerva grant |
| Rep. Edward Markey, Dr. John Holdren, and Carol Browner | 4/13/09 | Participated in the policy forum "Clean Power: Building a New Clean Energy Economy" | |
| Rep. Gerald McNerney | 5/8/09 | Fusion R&D | Miklos Porkolab and others at the Plasma Science and Fusion Center; Claude Canizares |
| Stephen Chu, secretary of energy | 5/12/09 | Delivered the Compton Lecture. Also met with a host of MIT energy researchers, conversing with them about their advances. Met with MIT Energy Initiative and student Energy Club leaders as well as President Hockfield. | |
| Senator Tom Carper | 5/18/09 | Hosted a nuclear recycling roundtable at MIT after a briefing with Susan Hockfield at which they discussed various energy issues | |
| Dr. John Holdren | 6/11/09 | Participated in the Giant Leaps Symposium honoring the 40th anniversary of NASA's Apollo Program achievements | |

## Reverse Engagement: Engaging Washington with MIT

The DC Office also helped organize a number of "reverse engagement" efforts to broaden the MIT base of students and faculty attuned to the policy process and how to work within it. The DC Office has begun a modest effort to offer opportunities to faculty and students in this territory. Eight program elements—some new, some expanded, and some ongoing—are summarized below.

### *MIT's Annual Congressional/Executive Branch Science and Technology Policy Seminar*

Each year for the past 15 years, the DC Office, working with an MIT faculty committee, has organized a seminar for senior congressional and, in recent years, executive branch staff focused on different areas of science and technology. This year's topic was "Innovation in Sustainable Energy: The Long View." A total of 33 staff, a near-record turnout, from a variety of congressional and executive branch offices participated in the program in May, which was supervised by professor Charles Stewart, head of the Department of Political Science, together with vice president for research and associate provost Claude Canizares, professor emeritus Eugene Skolnikoff, and MITEI director and professor Ernest Moniz. Helen Haislmaier is the DC Office lead in organizing the seminar. The Kauffman Foundation supported the program for the second year in a row.

Feedback from the staffers about this year's seminar was even more positive than is usually the case and one of the highlights focused on was the time spent touring the labs of and talking with professors Marc Baldo and Angela Belcher and their students. After the lab tours, many of the staffers commented on how refreshing it was to see so much enthusiasm and dedication in both the staff and students at MIT.

Following the success of a similar event last year, 21 MIT students (graduate and undergraduate) who participate in the MIT Science Policy Initiative (SPI) enjoyed an informal dinner with 13 of the visiting staffers. The dinner was followed by a lively hour of questions and answers about the staffers' public service careers in government working in science and technology policy.

### *Programming for MIT Summer Interns*

This summer, 24 students—supported through Undergraduate Research Opportunities Program funding or Pressman Awards—came to Washington as part of the MIT internship program to learn about science and technology policy. There were also 10 MIT student interns at DOE and five interns in Washington from MIT's Technology and Policy Program.

In an effort to increase the exposure of this large group of students to the policy-making process, the DC Office worked closely with James Turner of APLU to help organize meetings with science and policy leaders at the Senator John Kerry's office, the State Department, the directors' offices at NSF and NIH, the Supreme Court, the office of the commissioner of the Federal Energy Regulatory Commission, the National Economic Council, and with Dr. Charles Vest, president of the National Academy of Engineering and former president of MIT. The final event for the students was a well-attended

evening reception and discussion with President Hockfield, held at the DC Office. In addition, the MIT DC Office continued for the second year a four-session evening science public policy seminar for interns participating in the program,

### *Science and Technology Public Policy Boot Camp*

The DC Office director continued to work this year with a committee of graduate students who run the Science Policy Initiative to hold an intensive "boot camp", with 18 class hours over five days for 25 participating students during the Independent Activities Period (IAP) in January. This Boot Camp program included a session with a panel of MIT faculty experienced with Washington who spoke about their public policy experiences.

The SPI group also held during the year a series of lunch briefing sessions with MIT faculty who teach in the science policy and innovation fields. It also organized Global Entrepreneurship Week at MIT, cooperating with the Kauffman Foundation program at universities around the world. A series of well-attended events were held at MIT each day of the week. The DC Office is the "faculty" sponsor of the SPI program.

### *Congressional Visits Day in Washington*

Seventeen of the students who participated in the IAP boot camp came to Washington this spring for Congressional Visits Day, organized by the leading national science and engineering organizations, to learn about and discuss federal R&D issues. Participating MIT students attended AAAS briefings on agency R&D funding and pending congressional issues, and the DC Office taught an introductory background session on these issues. The DC office organized meetings with the offices of five members of the Massachusetts delegation, and the students themselves organized some 20 other meetings with other congressional offices. A highlight of the day was a briefing by Rep. Edward Markey (D-Mass) in the historic House Chamber in the Capitol, at which he described the development of the major climate-energy legislation subsequently approved by the Energy Committee and the House (H.R.2454).

### *The Innovation Group*

The Innovation Group, in Washington, DC—formed collaboratively by the DC Office and the Woodrow Wilson International Center for Scholars—has been holding a series of innovation policy presentations since 2006. The concept behind the group is to put a substantive policy foundation under the idea that there is a connection between research/talent capability, technological innovation, and economic growth. The Innovation Group has become a serious and ongoing discussion forum with participants drawn from government and industry, and with academic innovation policy thinkers in Washington. The group's monthly sessions regularly include approximately 20 members who are building a common innovation policy outlook. Leading policy theorists spoke to the group this year.

### *DC Office Summer Science Fellow*

The DC office again sponsored an MIT rising-senior student intern in the DC office to work on science and technology policy issues. This summer, Marta Milan '10, assisted in

preparing background papers on energy and climate legislation efforts, and helped the office follow congressional hearings and markups and executive branch developments. She also participated in the MIT summer intern program activities, including the aforementioned seminar on science and technology policy. She acquired a strong working knowledge of the public policy atmosphere in Washington.

### *MIT Compton Lecture and Other Visits from Government Leaders*

MIT had a record number of visits from government officials this year. These included a Compton Lecture from Secretary of Energy Chu; an energy-climate forum with Congressman Markey, John Holdren and Carol Browner; a Nuclear Energy Roundtable with Senator Thomas Carper (D-DE); visits by Rep. Brian Baird (D-WA) and Rep. Gerald "Jerry" McNerney (D-CA) and talks from other government leaders. At the MIT Energy Club's annual Energy Conference, Rep. Jay Inslee (D-WA) was a keynote speaker. The DC Office worked with Paul Parravano and MITEI in setting all these up.

All of these events furthered MIT's objective of educating and informing our nation's future scientist and engineers.

### *MIT Students in Government Service—Recruitment Efforts by Federal Agencies*

In response to outreach efforts by DOE, led by Steven Isakowitz, a special demonstration program to employ college students and recent graduates as interns and permanent employees at the agency began last year; numerous MIT students participated. This program continued this year, again with major MIT student participation,

### *Weekly Legislative Report*

To keep MIT's senior leadership informed about ongoing legislative and policy developments in areas important to MIT's future, the DC Office continued to prepare a weekly legislative status report. These reports, now in their third year, summarize developments in the executive and legislative branches each week that Congress is in session.

### *Newsletter to Congressional Offices*

In an effort to inform congressional staff about the benefits of congressional support for strong federal R&D funding, the DC Office began this year an electronic newsletter, Endless Frontier, highlighting significant advances by MIT researchers. The newsletter, edited by Michelle Ashitomi, features research stories drawn from MIT publications and other sources, noting in each the federal funding source for the research. MIT's Publishing Services Bureau assisted the office with strategy advice, production assistance, and training for the newsletter. It marks a major new outreach effort by the DC Office and reaches some 1,300 congressional staff working in areas related to science policy.

## Focus Four: Support of The MIT Energy Initiative

As previously mentioned, the DC Office, working with MIT faculty and administrators, has had an "engagement" effort with DOE. Part of that effort continued this year

through new DOE science and policy internship and employment programs. There have been three other energy efforts that the DC Office has been involved in more directly related to the MIT Energy Initiative. These include support for MIT's major energy policy studies and work on both energy R&D legislation and, more recently, R&D provisions in climate legislation. These legislative efforts are detailed in Focus Two but are also briefly summarized below.

### Support for Energy Policy Studies

The DC Office continued to work this year to build an outreach program to Congress for MITEI policy reports. Its past coal, geothermal, and nuclear power reports have enabled MIT to play a major policy role in the national energy policy field. While no major MITEI reports were forthcoming this year, the DC Office worked with MITEI on the rollout of its symposium report Retrofitting of Coal-Fired Power Plants For CO2 Emissions Reductions, on June 18–19, 2009. Congressional staff were among the participants in a workshop at MIT on the report subject, and the DC Office assisted in rollout events, including a press conference presided over by House Energy Subcommittee chair Representative Markey, and meetings with a series of administration officials and congressional committees. Other MIT energy-related reports this year included "Update of the MIT 2003 The Future of Nuclear Power" released in May, and "Cap-and-Trade Contributions to the Design of a U.S. Greenhouse Gas Program" authored by Denny Ellerman and John Parsons and others at the MIT Center for Energy and Environmental Policy Research. The MIT office assisted in the distribution to Congress this spring of the former report, and a November 2008 rollout, including a conference presentation and congressional briefings, for the latter.

Over the next two years, MITEI will release additional reports on solar energy, natural gas, and nuclear energy (and perhaps the electrical grid). In addition, another major energy-related study, on common policy elements to support new energy technology pathways (led by professor Richard Lester), is scheduled for release next summer. We will work to facilitate the Washington release, briefing, and presentation for these reports as we have for past reports.

### Energy and Climate Legislation

MIT legislative concerns—in addition to those detailed above, included supporting new energy R&D and technology programs in the ARRA stimulus legislation, which provided $5.5 billion in new energy R&D, and $34 billion in new energy technology programs. MIT officials actively advocated for the creation of the EFRC program through efforts led by dean Marc Kastner as cochair of the DOE Office of Science's Basic Energy Sciences Advisory Committee report on this issue. MIT was later awarded two such centers. MIT faculty and officials, led by President Hockfield, have also been involved in discussions with senior DOE officials of the organization of the proposed RE-ENERGYSE energy education program aimed at training a new generation of scientists, technicians, and policy makers in the energy field. They have also been involved in discussions of Secretary Chu's "Energy Innovation Hubs" proposal for Bell Labs–like basic research entities at universities or DOE labs funded at a level of $25 million per year, higher than EFRC funding.

During FY2009, Congress also worked on both energy and climate change legislation, with the House passing comprehensive climate-energy legislation in June, the American Clean Energy and Security Act of 2009, H.R.2454. The bill sponsored by Energy and Commerce Committee leaders congressmen Henry Waxman (D-CA) and Markey, passed on a largely partisan vote. The bill, as discussed in more detail in section IV, provides only limited funding for basic R&D, 1.5% (approximately $1.5 billion annually) of the total allocations, for two programs, ARPA-E and new "Innovation Hubs" that focus later-term development. As discussed in detail above, it is also significantly less than requested by the administration for its proposed Clean Energy Technology Fund of $15 billion annually for 10 years.

Consideration of this energy-climate legislation has now shifted to the Senate. The Senate Committee on Energy and Natural Resources recently approved comprehensive energy legislation. The legislation broadly addresses energy issues, but does not address allocation of credits and revenues under a climate change regulation system. The Senate Environment and Public Works Committee plans to address climate change through legislation this fall. The Senate Finance Committee has held a hearing on the allocation of emission credits and revenues and plans to play an integral role as the Senate works to combine energy and climate legislation this fall. The DC Office's work will focus on energy R&D issues in the Senate bill.

### Energy Events on Campus

The DC Office also worked with MITEI and others on campus on a major energy event, sponsored by Representative Markey. As noted in above, in conjunction with the release of the House Energy and Commerce Committee legislation on energy and climate change, H.R.2454, American Clean Energy and Security Act of 2009, Representative Markey held a forum at MIT. OSTP director John Holdren and energy and climate presidential advisor Carol Browner participated, as did President Hockfield and MITEI director Ernie Moniz. Energy secretary Chu delivered the Compton Lecture and spent the rest of that day in briefings with faculty on energy technologies.

In addition, Senator Carper, chair of the Clean Air and Nuclear Safety Subcommittee of the Committee on Environment and Public Works held a roundtable on nuclear fuel cycle issues that included Ernie Moniz and professors Andrew Kadak and Charles Forsberg. Representative Baird, chair of the House Science and Technology Committee's Energy and Environment Subcommittee and member of its Research and Science Education Subcommittee, and Representative Inslee, of the House Energy and Commerce Committee, who addressed the annual MIT Energy Conference also spent days at MIT, and the DC Office helped in organizing their visits. Representative McNerney also visited the Plasma Science and Fusion Center for full briefings. DOE CFO Steven Isakowitz and Office of Science deputy director Patricia Dehmer also visited MIT.

In summary, it was another active year in the center of the energy technology arena for MIT. While fewer MIT faculty testified this year before Congress on energy issues because only one workshop report was issued, congressional and executive branch leaders increasingly came to MIT to discuss energy issues. It was also an active and productive year for federal energy R&D funding, although challenges remain in assuring a long-term, sustained R&D funding stream.

## Representing MIT in Advocacy Coalitions and Working Groups

The director, assistant director, and senior legislative assistant are engaged on a constant and ongoing basis in the activities of major Washington-based organizations and coalitions, particularly the higher education organizations, that work in support of the federal investment in university research and education. These groups provide support for a common R&D, education, and science agenda supported by MIT, and require ongoing participation in frequent meetings and working sessions.

The MIT Washington Office has provided leadership this year on key committees in the AAU, APLU (formerly the National Association of State Universities and Land-Grant Colleges), and the Science Coalition on energy legislation, science policy, higher education, and medical research, as well as the Task Force on American Innovation, an alliance among business, research universities and scientific societies that advocates for strong, sustained budgets at key government agencies to support research in physical sciences and engineering. The groups with which the office has engaged include the following:

Ad Hoc Group for Medical Research
Ad Hoc Tax Group
American Council on Education
Association of American Universities and its Council on Federal Relations
Association of Public and Land-Grant Universities and its Council on Government Affairs
Council of Graduate Schools
Council on Competitiveness
Council on Government Relations
Coalition for National Science Funding
Coalition for National Security Research
Coalition for Plasma Science
Energy Sciences Coalition
Fusion Energy Sciences Day
National Association of Independent Colleges and Universities
New England Council
Science Coalition
Science, Engineering and Technology Working Group
Space Grant Day
STEM Education Coalition
Task Force on the Future of American Innovation

**William B. Bonvillian**
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**Michelle Ashitomi**
**Helen Haislmaier**

# APPENDIX A. American Recovery and Reinvestment Act (ARRA) Stimulus Funding for Key Research and Development (R&D) Agencies.

## Department of Energy (DOE) ARRA R&D Funding

House Passed: $5.0 billion
Senate Passed: $4.978 billion (Science research: $0)
Conference Report: $5.5 billion (Science research: $2.0 billion) [not including Carbon Capture and Sequestration implementation funding]

| RECOVERY BILL: DOE Programs | House passed | Senate passed | Conference report |
|---|---|---|---|
| Science | | | |
| Advanced Research Projects Agency–Energy (ARPA-E) | $0.4 billion | $0 | $0.4 billion |
| Advanced Scientific Computing | $0.1 billion | $0 | N/A |
| Unspecified | $1.5 billion | N/A | $1.6 billion |
| Lab Infrastructure and Construction (Report language) | N/A | $0.330 billion | N/A |
| **Total Science** | **$2.0 billion** | **$0.330 billion** | **$2.0 billion** |
| Energy Efficiency and Renewable Energy (EERE) | | | |
| Research, Development, Demonstration (RD&D)* | $0.8 billion | $3.648 billion | $1.3 billion |
| Biomass RD&D | $0.8 billion | N/A | $0.8 billion |
| Geothermal RD&D | $0.4 billion | N/A | $0.4 billion |
| Advanced Battery Manufacturing Grants (EISA)** | $1.0 billion | $2.0 billion | $2.0 billion |
| **Total EERE** | **$3.0 billion** | **$4.648 billion** | **$4.5 billion** |
| **TOTAL DOE** | **$5.0 billion** | **$4.978 billion** | **$5.5 billion†** |

* Unspecified except to include advanced batteries
** Energy Independence and Security Act of 2007
† Total does not include some $1 billion in Carbon Capture and Sequestration labeled as "research" but for implementation funding

## National Science Foundation (NSF) ARRA R&D Funding

House Passed: $3.0 billion
Senate Passed: $1.2 billion
Conference Report: $3.0 billion

| RECOVERY BILL: NSF Programs | House passed | Senate passed | Conference report |
|---|---|---|---|
| Research and Related Activities (R&RA) | | | |
| Major Research Instrumentation Program | $0.30 billion | ? | $0.30 billion |
| Institutional Facilities Program | $0.20 billion | ? | $0.20 billion |
| Supercomputer Technology* | N/A | ? | $0 |
| Unspecified | $2.0 billion | ? | $2.0 billion |
| **Total R&RA** | **$2.5 billion** | **$1.0 billion** | **$2.5 billion** |

| RECOVERY BILL: NSF Programs (cont.) | House passed | Senate passed | Conference report |
|---|---|---|---|
| Education and Human Resources (EHR) | | | |
| Robert Noyce Teacher Scholarship | $0.060 billion | N/A | $0.060 billion |
| Math and Science Partnership Program | $0.040 billion | $0.015 billion | $0.025 billion |
| Professional Science Master's Programs | N/A | N/A | $0.015 billion |
| **Total EHR** | **$0.10 billion** | **$0.050 billion** | **$0.10 billion** |
| Major Research Equipment and Facilities (MREF) | | | |
| Unspecified Approved Projects (Construction) | $0.40 billion | $0.150 billion | $0.40 billion |
| **Total MREF** | **$0.40 billion** | **$0.150 billion** | **$0.40 billion** |
| **TOTAL NSF** | **$3.0 billion** | **$1.2 billion** | **$3.0 billion** |

* Report language

## National Institutes of Health (NIH) ARRA R&D Funding

House Passed: $3.5 billion
Senate Passed: $10 billion
Conference Report: $10 billion

| RECOVERY BILL: NIH Programs | House passed | Senate passed | Conference report |
|---|---|---|---|
| National Center for Research Resources (NCRR) | | | |
| University Research Facilities Renovation/Repair | $1.5 billion | $0.30 billion | $1.0 billion |
| Shared Instrument Program | N/A | N/A | $0.30 billion |
| **Total NCRR** | **$1.5 billion** | **$0.30 billion** | **$1.3 billion** |
| Office of the Director | | | |
| Research Grants | $1.5 billion | $9.2 billion | $7.4 billion |
| Unspecified/Other | N/A | N/A | $0.8 billion |
| **Total Director** | **$1.5 billion** | **$9.2 billion** | **$8.2 billion** |
| Buildings and Facilities | | | |
| NIH Facilities Repair and Improvement | $0.50 billion | $0.50 billion | $0.50 billion |
| **Total Buildings and Facilities** | **$0.50 billion** | **$0.50 billion** | **$0.50 billion** |
| **TOTAL NIH** | **$3.5 billion** | **$10 billion** | **$10 billion** |

## National Institute of Standards and Technology (NIST) ARRA R&D Funding

House Passed: $0.50 billion
Senate Passed: $0.475 billion
Conference Report: $0.580 billion

| RECOVERY BILL: NIST Programs | House passed | Senate passed | Conference report |
|---|---|---|---|
| Scientific and Technical Research Services (STRS) | | | |
| Unspecified | $0.10 billion | $0.118 billion | $0.220 billion |
| **Total STRS** | **$0.10 billion** | **$0.118 billion** | **$0.220 billion** |
| Industrial Technology Services (ITS) | | | |
| Technology Innovation Program | $0.07 billion | $0 | N/A |
| Manufacturing Extension Program | $0.03 billion | $0 | N/A |
| **Total ITS** | **$0.10 billion** | **$0** | **N/A** |
| Construction of Research Facilities | | | |
| Research Building Grants | $0.30 billion | N/A | $0.180 billion |
| NIST Facilities Renovation and Construction | $0 | $0.357 billion | N/A |
| Unspecified | | | $0.180 billion |
| **Total Construction of Research Facilities** | **$0.30 billion** | **$0.357 billion** | **$0.360 billion** |
| **TOTAL NIST** | **$0.50 billion** | **$0.475 billion** | **$0.580 billion** |

## National Oceanic and Atmospheric Administration (NOAA) ARRA R&D Funding

House Passed: $1.0 billion
Conference Report: $0.830 billion

| RECOVERY BILL: NOAA Programs | House passed | Senate passed | Conference report |
|---|---|---|---|
| Operations, Research, and Facilities (ORF) | | | |
| Habitat Restoration and Mitigation | $0.40 billion | $0.227 billion | N/A |
| Unspecified | N/A | N/A | $0.230 billion |
| **Total ORF** | **$0.40 billion** | **$0.227 billion** | **$0.230 billion** |
| Procurement, Acquisition, and Construction (PAC) | | | |
| Climate Data Modeling | $0.14 billion | $0.070 billion | N/A |
| Other Climate Modeling, Data Records, and Satellites | $0.46 billion | N/A | $0.170 billion |
| Unspecified | N/A | $0.725 billion | $0.430 billion |
| **Total PAC** | **$0.60 billion** | **$0.795 billion** | **$0.600 billion** |
| **TOTAL NOAA** | **$1.0 billion** | **$1.022 billion** | **$0.830 billion** |

## National Aeronautics and Space Administration (NASA) ARRA R&D Funding

House Passed: $0.60 billion
Senate Passed: $1.3 billion
Conference Report: $1.0 billion

| RECOVERY BILL: NASA | House passed | Senate passed | Conference report |
|---|---|---|---|
| Science | | | |
| Earth Science Climate Research Missions (Tier 1) | $0.25 billion | N/A | N/A |
| Unspecified | $0.15 billion | $0.30 billion | $0.40 billion |
| **Total Science** | **$0.40 billion** | **$0.30 billion** | **$0.40 billion** |
| Aeronautics | | | |
| Unspecified | $0.15 billion | $0.250 billion | $0.15 billion |
| **Total Aeronautics** | **$0.15 billion** | **$0.250 billion** | **$0.15 billion** |
| Exploration | | | |
| Shuttle Replacement | $0 | $0.50 billion | $0.40 billion |
| **Total Exploration** | **$0** | **$0.50 billion** | **$0.40 billion** |
| Cross-Agency Support Programs (CASP) | | | |
| Natural Disaster Facilities Recovery | $0.05 billion | $0.250 billion | $0.05 billion |
| **Total CASP** | **$0.05 billion** | **$0.250 billion** | **$0.05 billion** |
| **TOTAL NASA** | **$0.60 billion** | **$1.30 billion** | **$1.0 billion** |

## Other Agency ARRA R&D Funding

House Passed: $2.121 billion
Senate Passed: $0.797 billion
Conference Report: $0.616 billion

| Agency | House passed | Senate passed | Conference report |
|---|---|---|---|
| Centers for Disease Control and Prevention (Buildings) | $0.462 billion | $0.412 billion | $0 |
| Health and Human Services (Biomedical Advanced R&D, Pandemic Flu, Cyber Security) | $0.900 billion | $0 | $0 |
| Agricultural Research Service | $0.209 billion | $0 | $0.176 billion |
| Agriculture and Food Research Initiative | $0 | $0.050 billion | $0 |
| Department of Defense Energy Research | $0.350 billion | $0.200 billion | $0.300 billion |
| US Geological Survey | $0.200 billion | $0.135 billion | $0.140 billion |
| **Total Additional R&D Funding** | **$2.121 billion** | **$0.797 billion** | **$0.616 billion** |