

SkTech/MIT Initiative

The 2011–2012 academic year saw the formal launch of MIT's newest major institutional, international collaboration. The [SkTech/MIT Initiative](#) was established in fall 2011 as an Institute-wide portal to facilitate MIT collaboration with the Skolkovo Institute of Science and Technology ([Skoltech](#)). With MIT as a core strategic partner, this new private Russian university integrates and applies Russian, US, and global research and educational models and resources to catalyze research, teaching, and innovation around pressing global issues.

In October 2011, MIT, the Skolkovo Foundation, and Skoltech signed a trilateral agreement to launch the first three years of a collaboration to build capacity in education, research, and entrepreneurship at Skoltech. Under the terms of the agreement, MIT serves as an advisor to Skoltech on programs, structure, and curriculum, and works closely with its faculty and staff on a wide range of developmental, programmatic, and operational challenges. The effort at MIT is led by professor Duane Boning, the SkTech/MIT Initiative's founding director, and engages numerous departments, laboratories, centers, and administrative offices across the Institute.

Context

Political Vision

Under the leadership of president Dmitry Medvedev, and continuing under president Vladimir Putin, the Russian Federation has outlined a high-level national strategy to invest in innovation. One prominent example is the Skolkovo Innovation Center, a science and technology development center being built in the Skolkovo district of Moscow to stimulate the creation and commercialization of breakthrough technologies.

The nonprofit Skolkovo Foundation, founded in 2010, is charged with developing the innovation center. The Skolkovo ecosystem will include the Skolkovo Institute of Science and Technology, corporate research and development centers, business incubators and accelerators, private seed and venture funds, and startup companies, as well as residential space and social infrastructure. Skolkovo is governed by a special law that establishes unique economic conditions for resident companies; more than 200 companies have been awarded resident status. Conceived as a key pillar of the center, Skoltech will be a source of new ideas and internationally competitive talent, benefiting from opportunities for research and commercialization partnerships. The Skolkovo Foundation has committed to funding Skoltech through 2014.

Skoltech Mission and Goals

The mission of Skoltech is to have educational, scholarly, and economic impact in the Russian Federation and around the world by educating leading graduate students and conducting research programs to address key challenges in science, technology, engineering, and innovation using a fusion of exceptional talent in a new university at Skolkovo. Responding to stakeholder demand, Skoltech has outlined a plan for rapid growth. With ongoing support from MIT, plans are under way for campus construction

to support an anticipated community of 200 professors, 300 postdoctoral associates, 1,200 students, and 15 research centers by 2020.

Distinguishing Components

Skoltech seeks to integrate traditional Russian intellectual and industrial strengths with emerging models for impact, including international research and educational models. In an effort to better address pressing challenges, Skoltech has established a triple helix structure to interweave research, education, and innovation. Skoltech will be organized around multidisciplinary technological challenges rather than traditional academic disciplines. The institution will focus on the following programs:

- Energy science and technology
- Biomedical science and technology
- Information science and technology
- Space science and technology
- Nuclear science and technology

Partnership with MIT will help drive a strong international focus, including recruiting international faculty and students, building international research networks, and leveraging an international board of trustees and advisory panels. Another defining component of Skoltech will be its Center for Entrepreneurship and Innovation (CEI), which will integrate education, research, and practice in entrepreneurship and innovation. MIT will assist in creating the center's organization and educational programming.

MIT Role and Contributions

On October 26, 2011, MIT president Susan Hockfield and Skolkovo Foundation president Viktor Vekselberg signed an agreement during a ceremony at the Russian Corporation of Nanotechnologies International Nanotechnology Forum in Moscow to launch the first three years of a trilateral collaboration. The announcement of the formal agreement was the culmination of extensive, multiphase discussions between the Skolkovo Foundation, Skoltech, and MIT to explore the potential and parameters of the collaboration. The assessment was led by Professor Boning, who subsequently agreed to serve as the founding faculty lead of the SkTech/MIT Initiative. Among other benefits, participants determined that the collaboration offers the potential for intellectual exchange, network building, and shared research with Russian and other international colleagues.

Beyond the initial three-year agreement and a two-year extension (still to be agreed upon), leaders at both institutions envision an ongoing strategic partnership dedicated to further building and enhancing capacity at Skoltech and to advancing Russian participation in the global research and innovation communities.

SkTech/MIT Initiative

MIT's contributions are coordinated through the SkTech/MIT Initiative. In the first year of activities, the initiative established projects within seven workstreams: faculty, students, education, research, entrepreneurship and innovation, administration, and campus planning. The first task was to identify and formalize relationships with faculty leads for these areas. A flexible staffing architecture was also established to ensure relevant and timely support across issues.

SkTech/MIT Initiative leaders and staff have been actively involved in advising Skoltech colleagues and in sharing best practice approaches. Early contributions included MIT support for benchmarking studies on learning spaces and innovation programs, architect meetings, student recruitment, design of faculty search campaigns, research strategy, curriculum development, administrative strategy and policy development, space management data, professional capacity enhancement, and a range of events.

Within MIT, the scope of the Skoltech partnership has created a platform for internal engagement and collaboration. Initiative affiliates have facilitated Skoltech consultations with individual faculty members and administrative experts in areas such as resource development and faculty policies in multiple schools and programs, such as the MIT Sloan School of Management, the MIT International Science and Technology Initiatives (MISTI), the MIT Energy Initiative, and the Deshpande Center for Technological Innovation.

Leadership

The SkTech/MIT Initiative is directed by Professor Boning, who has extensive experience with international programs, including involvement in the Cambridge-MIT Initiative, the MIT-Singapore Program, and the MIT and Masdar Institute Cooperative Program. Other faculty leaders include Michael Cima, faculty lead for research; Charles Cooney, faculty lead for entrepreneurship and innovation; Stephen Graves, faculty lead for students; Brian Anthony, David Hardt, and Warren Seering, faculty co-leads for education; Bruce Tidor, faculty search co-chair; Dick Yue, faculty lead for faculty development; and Marc Baldo, faculty lead for postdoctoral programming.

There is also significant MIT presence at Skoltech. In October 2011, Skoltech's board of trustees nominated Edward Crawley as the institute's founding president. Professor Crawley is the Ford professor of engineering at MIT and previously served as founding co-director of the System Design and Management Program, director of the Bernard M. Gordon-MIT Engineering Leadership Program, and head of the Department of Aeronautics and Astronautics. He holds three MIT degrees: an SB and SM in Aeronautics and Astronautics and an ScD in Aerospace Structures. Fellow MIT alumni serving on the Skoltech team include Ilia Dubinsky, who holds a PhD in Physical Chemistry, as director of CEI, and Brendan Smith '06 as academic affairs specialist. Many other alumni have served as informal consultants and advisors over the year.

Early Milestones and Events

First Call for Research Proposals

The central component of Skoltech's research mission will be the formation of 15 centers for research, education, and innovation, spanning five strategic multidisciplinary areas of focus: information science and technology, biomedical science and technology, energy science and technology, nuclear science and technology, and space science and technology. Each center will partner Skoltech with an international co-lead institution and a Russian co-lead institution (and, through them, with a wider international network of research partners), aiming to create transformational new science and technology.

The establishment of the 15 centers will occur through at least three rounds of requests for proposals. Proposals offer preliminary visions for collaborative, interdisciplinary, and international research endeavors based at Skoltech. To facilitate the process, MIT and Skoltech cohosted a first proposers conference in February, attracting over 300 attendees; a second proposers conference will be held in July, with more than 500 participants expected.

The first proposal call ended March 13, 2012, and tallied 129 submissions from more than 360 universities and research institutions in 20 countries, including submissions involving six Nobel Laureates, one Fields Medal winner, and numerous national academy members, as well as outstanding young researchers. The SkTech/MIT Initiative worked with Skoltech to facilitate a rigorous, comprehensive international peer review of current and future proposals. Following the peer review, 13 finalist teams were invited to submit full proposals. The research teams were drawn from many of the world's leading universities, including Harvard Medical School; Imperial College London; Lomonosov Moscow State University; Massachusetts General Hospital; Max Planck Institute of Quantum Optics; Moscow Engineering Physics Institute; Oak Ridge National Laboratory; University of California, Berkeley; University of Cambridge; University of Groningen; University of Helsinki; University of Pennsylvania; and others.

Inaugural Student Cohort

With ongoing MIT support, Skoltech recruited and admitted its first cohort of 20 students in June 2012 for an interdisciplinary master's degree program. Students represented 14 different Russian universities with an average grade point average of 4.8/5.0 and Test of English as a Foreign Language scores of 99/120. For the next three years, the students, each holding at least a bachelor's degree, will participate in a unique pilot educational program.

SkTech/MIT Initiative affiliates helped Skoltech leaders develop a rigorous admissions process, designed to assess applicants' academic abilities, leadership qualities, and potential. MIT will host the inaugural student class for a four-week innovation workshop in August to introduce them to selected topics on entrepreneurship and innovation.

Curriculum Design

From March 15 to 16, 2012, the SkTech/MIT Initiative held the first education workshop in Moscow dedicated to educational programs and curriculum design at Skoltech. The purpose was to begin the work of designing educational programs and curricula that would meet stakeholder needs and achieve the desired educational outcomes.

Since the goals of the workshop were to identify stakeholder needs in the context of Skoltech educational programs, to provide a forum for discussion of those needs, and to synthesize the discussion output, a wide range of stakeholders were invited. The workshop attracted nearly 100 participants, including international experts on graduate education, 19 MIT faculty members, as well as senior Russian academics from a number of well-known institutions. Both Russian universities and research institutes were represented.

Faculty Appointments

SkTech/MIT advisors worked with Skoltech to establish and publicize the Distinguished Founding Faculty Fellowship program. The initiative was designed to recruit senior faculty and experts who hold permanent appointments elsewhere to participate in the intellectual exercise of designing and establishing a new university. The call for nominations was issued in November 2011, and by February 2012 Skoltech had confirmed four appointments. During this same period, MIT provided ongoing support and guidance in launching a comprehensive global search process and review procedure for junior and mid-career faculty. As of summer 2012, Skoltech had appointed a total of 17 faculty fellows from a wide range of institutes and with a diverse set of academic and research backgrounds.

Core Administrative Organization

Following the appointment of founding president Edward Crawley, Skoltech moved quickly to build organizational capacity. MIT personnel have advised on key infrastructure and talent needs, helping to define and fill a series of high-level roles and to provide direct operational and policy support as well.

Steering Committee

An eight-member joint steering committee was established to guide the MIT-Skoltech collaboration. The committee is co-chaired by Claude Canizares, vice president for research and associate provost at MIT, and Oleg Alekseev, vice president and chief operating officer for education and research at the Skolkovo Foundation. Other MIT members include Ian Waitz, dean of the School of Engineering; Marc Kastner, dean of the School of Science; and R. Gregory Morgan, vice president and general counsel.

Advancing MIT-Russia Engagement

The formal signing of the agreement with Skoltech and the Skolkovo Foundation has created a platform for systematically increasing MIT engagement with Russian political and business leaders, Russian researchers and educators, and international researchers

and industry liaisons, leading to a host of new research and educational opportunities and collaborations for MIT faculty and staff.

Leadership Presence at St. Petersburg Forum

In June 2012, representatives of MIT attended the three-day St. Petersburg International Economic Forum. Then provost L. Rafael Reif, Professor Boning, professor Charles Cooney, and R. Gregory Morgan participated in the event. This year's four themes were Securing the Future, Realizing Russia's Potential, Leadership Series: Conversations to Make a Difference, and Responding to Impact Technologies. The forum is an annual international conference held under the auspices of the president of the Russian Federation. Attended by over 2,500 political and business leaders, leading scientists, public figures, and members of the media, it is an important opportunity to discuss pressing issues facing Russia and the world. MIT's repeat attendance helped reinforce relationships, establish new connections, and launch discussions that will inform future research. Skoltech's President Crawley also participated in the forum as a speaker at several sessions.

International Visits at MIT

A combination of bimonthly planning meetings and hosted developmental visits have helped raise Skoltech visibility at MIT. The coordination process has enabled delegations from Skoltech to visit the MIT campus and participate in the campus community on a regular basis since the agreement signing in October.

MIT Student and Faculty Engagement in Russia

As a direct extension of the SkTech/MIT Initiative, MIT developed two new sources of support for students and faculty during AY2012 through MISTI. In January, the two groups supported a new independent activities period opportunity in Russia for undergraduate and graduate students. The program organized a joint visit to St. Petersburg, Moscow, and Kazan from January 14–21 and gave preference to MIT students with prior innovation experience. The purpose of the trip was to meet counterparts from Russian universities to discuss MIT's problem-solving approach and to exchange ideas on the educational and innovation challenges faced by both nations. The experience included two predeparture seminars, discussions with Russian business practitioners and educators, and visits to cultural sites. The offering reflected the initiative's emphasis on innovative, hands-on pedagogy.

In June, MISTI announced a new seed fund to encourage research collaborations between MIT and Russian research institutions as part of its general Global Seed Funds program. With the support of the SkTech/MIT Initiative and MISTI, Russian language instruction has been renewed at MIT, following a break of 18 years.

Entrepreneurship Support

One goal of the SkTech/MIT Initiative is building connections with and leveraging learning from other international programs at MIT. In May, the initiative collaborated with Global Innovation Labs, the MIT Portugal Program, and MISTI to sponsor Summer

School Founders Bootcamp, a two-week program designed to help Russian university students understand how science and entrepreneurship are practiced outside of Russia.

The scientific program included lectures by MIT professors Jacob White, Elfar Adalsteinsson, Vladimir Bulovic, David Perreault, and Karl Berggren, who introduced students to the latest developments in electronics, medical devices, and nanomaterials. The lectures were accompanied by visits to interdepartmental laboratories, such as the Microsystems Technology Laboratories, the Media Lab, and the David H. Koch Institute for Integrative Cancer Research. Robert Urban, executive director at the Koch Institute, reviewed leading practices in cancer research. Along with MIT Portugal participants, the Russian students attended a lecture titled “Marketing of Innovation” by Bill Aulet, managing director of the Martin Trust Center for MIT Entrepreneurship. David Gamarnik, the Nanyang Technological University professor and an associate professor of operations research at MIT Sloan, presented a lecture on the role of mathematical modeling in management decision making.

Similarly, the SkTech/MIT Initiative entrepreneurship and innovation workstream played a central role in organizing the summer 2012 Founders’ Skills Accelerator. This pilot program enabled MIT student teams to spend the summer iterating startup ideas. Designed as an active learning experience, the Accelerator program distributes awards based on completion of predetermined, customized milestones while providing monetary fellowships for qualified students, dedicated desk space, and mentoring. The program is a joint project of all five MIT schools and attracted significant attention. With 129 teams applying, ten were selected for summer 2012 funding. The program provides a model for implementation of similar programs at Skoltech.

Research Opportunities

More than 100 MIT faculty, researchers, and affiliates attended the first joint Skoltech-MIT conference for research center proposals in February 2012. In June, five MIT research teams were among the 13 teams invited to submit full proposals. MIT participation and selection in this initial round reaffirms the potential for novel, international research collaborations and support for large-scale multidisciplinary inquiries.

Looking Ahead

The SkTech/MIT Initiative was created with the support and deep commitment of MIT’s senior leadership. Midway through the first year in this three-year collaboration, SkTech/MIT representatives believe that the collaboration is an important addition to MIT’s global engagements and is poised to yield further opportunities for MIT faculty, researchers, students, alumni, and affiliates, as well as catalyze new collaborative approaches to research, education, and innovation.

Duane Boning
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