MIT Skoltech Initiative

In academic year 2015, MIT continued its work on five core "tracks" (research, education, innovation, and faculty and student recruitment and hosting), led by MIT teams, to help build the Skolkovo Institute of Science and Technology (Skoltech), located in Moscow, Russia. The MIT–Skoltech Initiative ended the academic year with approximately 20 staff members, who were led by 10 core faculty members, and a headquarters in Building E70. More than 70 additional faculty, together with researchers, students, and staff from across the Institute, participated in this collaboration to build from the ground up a unique, world-class research university in Russia.

A key influence on MIT's activities during AY2015 was a range of discussions and exchanges of documents between Skoltech and MIT during the academic year 2014. These discussions and exchanges were about strategic priorities and approaches for the continued development of Skoltech and MIT's role in that development. As a result, fewer staff members have been working on a revised, more narrowly defined set of goals to directly build capacity at Skoltech through February 2016, the end date for the initial four-year phase of the collaboration.

Administration and Governance

Over the first three years of the collaboration, structures, processes, and personnel were put into place at Skoltech. Attention has now turned to the question of how to scale up and transition rapidly from an MIT-driven startup environment to independently operating and functional Skoltech-led administrative systems.

Governance

The Collaboration Steering Committee met three times—in October 2014 via videoconference, in February 2015 in Cambridge, Massachusetts, and in April 2015, also in Cambridge—to conduct programmatic and financial reviews of the collaboration's activities. As scheduled, the MIT Skoltech Initiative submitted interim and annual financial and program reports detailing the impact of its activities. In addition, an internal oversight committee from MIT's senior administration met monthly throughout the year to provide high-level guidance on strategic directions as well as on operational issues and challenges facing the collaboration.

Skoltech Capacity Building

MIT helped in several areas to build core administrative and operational capacity at Skoltech in several areas. In information technology (IT), the MIT–Skoltech Initiative completed the transfer of several online operational tools or applications (e.g., a proposal management system for research centers and portal for faculty members and postdoctoral associates). In human resources, the MIT team wrapped up their support of the Skoltech policy development process and planning, taking the lead in scheduling and facilitating Policy Review Committee meetings through the end of 2014.

Outreach

The MIT–Skoltech Initiative, in collaboration with Skoltech, launched the Manufacturing Outreach in Research and Education Program to develop holistic and strategic relationships between Skoltech and Russia's manufacturing industry. The program's aim is to help companies recruit students and alumni; keep industry informed about, and engaged in, manufacturing and design education and research activities at Skoltech; build and maintain points of collaboration; and facilitate connections to faculty and researchers. This effort was launched with a Design, Manufacturing, and Materials Workshop in Moscow in May 2015.

Educational Impact

Faculty and staff in the education and student recruitment tracks focused on several tasks: participating in the development, implementation, and transfer of educational programs for Skoltech; attracting students to Skoltech and selecting students for Skoltech; supporting Skoltech students at MIT; and supporting the MIT–Russia Program, which is part of MIT's International Science and Technology Initiatives (MISTI). Top of Form

Educational Program Development and Implementation

To assist in the development of educational programs, instructional designers and developers, collaborating with faculty members, have reviewed, developed, modified, transferred, and assessed courses and other curricular elements (such as innovation and research project guidelines), and curricula. This included the development of master's degree programs in IT, energy, biomedicine, product design and advanced manufacturing, and space. A doctoral degree program that included guidelines and procedures such as research requirements, credit-hour requirements, doctoral committee guidelines, and examination scheduling and requirements was also developed. In terms of the implementation of educational programs, the MIT Skoltech education team and MIT faculty identified and strengthened operational mechanisms and processes, and taught and advised Skoltech students (remotely and in person).

In fall 2014, two courses at Skoltech were taught and supported by three MIT instructors (professors and lecturers). In spring 2015, four additional courses were taught, through in-person, remote, and combined formats, by eight MIT faculty members and lecturers. MIT is responsible for developing, modifying, and transferring at least 20, and up to 37, curricular elements to Skoltech by the end of 2015. By the end of the first half of 2015, MIT had transferred 17 curricular elements and continue to develop or modify additional courses and curricular elements for transfer.

MIT's education team engaged on a number of other fronts to support Skoltech in building and strengthening the operational mechanisms and processes of its educational programs. For example, the MIT team created the "Guide to Classifying Courses by Curriculum Stream" to help Skoltech classify MIT courses that future Skoltech students will take as visiting students. The team also reviewed approximately 80 of the courses the current students registered for, or planned to register for, to help determine into which curriculum stream they fall. This helps students plan the courses and curricular elements, research and innovation projects, and other learning experiences they will complete to fulfill Skoltech requirements and pursue their career goals and plans.

Student Attraction andSelection

To support Skoltech's goal of admitting a combined total of 280 master's degree and doctoral students by the end of 2015, the MIT Student Team conducted recruiting and outreach sessions in fall 2014, in connection with Skoltech opening its online admissions process for the 2016 academic year. In addition, MIT continued to assist in the student selection process through participation in spring and summer Student Selection Weekends, which included challenges, seminars, and interviews.

Student Support

In academic year 2015, MIT hosted 35 Skoltech master's degree students (18 in the fall, 17 in the spring), as special students, as part of the so-called Flex Program. This program is aimed primarily at second-year Skoltech students who need coursework that is directly applicable to their degree paths but is not yet available at Skoltech, and also at Skoltech students who are interested in working on a research project with an MIT faculty member. Thirteen Skoltech students (eight in the fall, five in the spring) came to MIT as visiting students to work on various research projects with MIT faculty.

MIT–Russia Program

As part of MIT's commitment to develop student and postdoctoral exchange and internship programs at and for Skoltech, the MIT–Russia Program (part of MISTI) was established in 2011 to facilitate collaboration between MIT students, faculty and research scientists, and industry and research leaders in Russia. In AY2015, the MIT–Russia Program maintained its portfolio of key activities: summer internships for MIT students in Russia; a lecture series on topics related to Russian science, culture, and politics; and Russian language instruction at MIT. During the summer of 2015, the program sent 10 students for internships to Russia at nine host companies, including private and public sector entities in both industry and academia. To date, 195 MIT students have taken Russian language classes at MIT—growing from 14 in fall 2012 to 39 in spring 2015.

MIT and Skoltech Faculty Engagement

The collaboration has received substantial support from MIT faculty, who have engaged as track leaders, faculty search committee members, innovation project mentors, educational curriculum contributors, and research principal investigators. They have also created new ways for faculty to engage internationally.

Faculty Recruitment

MIT helped refine and execute strategies for the entire spectrum of faculty recruitment at Skoltech, with two primary areas of effort: an application-based process, generally for junior (assistant professor) and mid-level (associate professor) positions; and a targeted process for more senior positions (full professors and research center directors). Twenty-five MIT faculty members serve on specialized faculty search committees. By the middle of 2015, the search committees had reviewed more than 1,200 applications for positions in Moscow and recommended 71 candidates for hire by Skoltech (of which 29 have been hired). MIT faculty also had hosted 141 research seminars by candidates.

Faculty Development Program

Over the course of the academic year, MIT further developed and implemented the pioneering faculty development program (FDP) for Skoltech junior faculty that was designed and launched in 2012. Under the program, a newly hired Skoltech faculty member receives an appointment as a visiting scholar or professor and is resident at MIT for approximately one year. The intent is to immerse faculty in the MIT community and provide programming that develops skills related to entrepreneurship and innovation, teaching and learning, research, leadership, and other competencies relevant to long-term success at Skoltech. Participants are expected to conduct joint research with one or more MIT faculty mentors/hosts. As such, MIT faculty play a critical role in supporting the program.

In AY2015, MIT hosted two Skoltech faculty members. Two joint research projects were renewed in September 2014, and two more projects were renewed in March 2015. The final of five joint research projects will be renewed in July 2015. Work was also conducted during the year to package and transfer as many elements of the FDP as possible to Skoltech. Such elements include lectures, presentations, and seminars, which along with policies, best practices, and suggestions for other programmatic offerings will form the core of an FDP at Skoltech.

Skolkovo Foundation Professorships

In 2014, five MIT faculty members from across the Institute were recognized as Skolkovo Foundation Professors. The MIT-based appointments recognize significant engagement in the collaboration between MIT and Skoltech. Faculty members were informed of the appointments by MIT vice president Claude Canizares. The 2014 recipients were Professor of Mechanical Engineering and Biological Engineering Peter So, Professor of Electrical Engineering and Computer Science James Kirtley, Professor of Mechanical Engineering Douglas Hart, Abraham Siegel Professor of Management Stephen Graves, and Philip J. Solondz Professor of Engineering Dick K. P. Yue. All five of these continued through 2015, and were joined by Professor of Materials Science and Engineering Carl Thompson and Professor of Mechanical Engineering Konstantin Turitsyn.

New Research Opportunities

Research is one of the core elements of Skoltech's multidisciplinary Centers for Research, Education, and Innovation (CREIs). CREIs represent the building blocks of Skoltech's integrated approach to combining research, education, and innovation activities organized in five core thematic areas: biomedicine, IT, space, nuclear science, and energy, as well as in cross-cutting areas of research. In addition to supporting the process of CREI selection and establishment, the MIT Research Team supported the expansion of Skoltech's research organization and administration, which strengthens Skoltech's faculty research and ensures the integrated management of CREIs. The activities of the Research Team addressed Skoltech's priorities in several key task areas, described below.

Establishment of CREIs and Industry Programs

The MIT Research Team guided and assisted Skoltech in CREI negotiations, establishment, and rollout of operations. In addition, the MIT team provided input on facilities, laboratory establishment, and processes and policies for putting CREIs and research at Skoltech into operation. During the first half of 2015, the MIT Research Team prepared an outline for a readiness review to identify gaps between research needs and operational readiness to minimize delays in starting operations. The review is intended to help Skoltech researchers and faculty identify operational and administrative needs, including funding, permits, facilities, and equipment.

Toward the end of 2014, Skoltech initiated a review of its biomedicine research strategy. MIT assisted in this process by supporting a workshop on computational biomedicine in Amsterdam, Netherlands, in October 2014. During the first half of 2015, interviews were conducted with Russian, Skoltech, and MIT faculty, and international pharmaceutical companies, to develop recommendations on appropriate research areas for Skoltech faculty.

In 2015, the MIT team provided input and contributed to the Advanced Mathematical Methods for Energy Systems Conference in June 2015, organized by the Skoltech Center for Energy Systems. MIT faculty and senior staff gave presentations at the conference.

Research with a consideration-of-use and industry engagements are central to Skoltech's unique approach as a university. Since 2013, the MIT Research Team has been providing advice and recommendations on industry outreach and models for partnering on projects. In 2015, the MIT research team complemented these recommendations with a primer on launching mutually beneficial industry partnerships, including a step-by-step guide on how to initiate discussions with companies, a summary of tiered benefits for industry from university centers, and an overview of key organizational indicators of successful university–industry partnerships.

The MIT Research Team has also supported the establishment of Skoltech's Office for Sponsored Programs and continued to provide advice and input to the operations of the office. In 2015, the research team provided an overview of non-Russian research funding organizations, including European and U.S. government and private funding sources; identified and informed Skoltech of current international open calls targeted at, or with eligibility for, Russian universities; and provided guidelines for evaluating online funding database tools and selecting the best one for Skoltech's intended use.

Strategic Development Projects

The strategic development projects (SDPs) launched in 2012 are teams of MIT and Russian researchers who received awards from Skoltech to conduct joint research, with the goal of seeding a network for research and capacity building for the initiative across five thematic areas (biomedicine, energy, IT, space, and nuclear science). Researchers in Russia represent such leading institutions as Moscow State University, Institute of Physics RAS, the New Economic School, and the Moscow Institute of Physics and Technology. The SDPs enabled the rapid engagement of MIT faculty with MIT–Skoltech institution-building efforts. They also enabled the forging of MIT–Russian research

links and fostered the development of strong CREIs. MIT faculty from the SDP teams provided valuable contributions in building capacity for Skoltech, including serving on faculty search committees and assisting in the design and implementation of educational programs. The funding for the 11 SDPs has ended; the SDP teams presented their research at a Russian–American Research Symposium in Moscow in December 2014. MIT faculty and SDP participants, along with other leading entrepreneurs and researchers, shared insights on scientific trends in biomedicine, energy, computational science and technology, advanced materials, aerospace, and entrepreneurship. The symposium attracted more than 400 participants and presenters and further enhanced the visibility and standing of Skoltech as a Russian university with international reach.

Skoltech Research Management and Operations

Building the Skoltech research organization and administration has been another central activity of the Research Team, to ensure that Skoltech can effectively support CREIs' establishment and operations, faculty, and student research. In 2013, the Research Team started developing, refining, and rolling out the most critical research functions, including the Grants and Contracts Office. The ongoing establishment of these offices was further supported in 2015. In addition, the Research Team continued updating and advising on content for Skoltech's Research Operations Manual (ROM), which was rolled out in June 2014, including meeting with Skoltech for a review of the manual's development status in December 2014. The ROM is designed to guide new CREI directors through CREI establishment, management, and research operations, and facilitate faculty and student research at Skoltech in general. MIT also provided advice and guidance on the development and implementation of critical research policies, procedures, and reporting structures.

Building an Innovation Ecosystem

In AY2015, the MIT Center for Entrepreneurship and Innovation (CEI) team continued to build capacity at Skoltech, enabled in part by the MIT-designed foundational educational and administrative programs launched in 2012 and 2013. Skoltech's Student Team estimated in June 2014 that 40% of Skoltech master's students are involved in one or more innovation projects, a byproduct of the growing innovation and entrepreneurship culture taking root at Skoltech. Highlights of activities during this period included quite a few for entrepreneurship and innovation education and for knowledge exchange.

Entrepreneurship and Innovation Education

MIT successfully transferred three credit-bearing activities to Skoltech in December 2014:

- The Skoltech Innovation Workshop, developed by Chemical Engineering Research Scientist Dr. Luis Perez-Breva, is a compulsory, multi-week, hands-on, credit-bearing course for all entering Skoltech master's degree students that teaches and demonstrates the connection between innovation, impact, research, and education that is central to Skoltech's mission.

- Venture Financing is an immersive, action-oriented course developed by Sloan School of Management Senior Lecturer Shari Loessberg that explains the principles of early-stage venture financing opportunities through the use of simulated term-sheet negotiations with real corporate lawyers and venture capitalists.
- Innovation assistantships were developed by Dr. Perez-Breva of MIT and Dr. Ilia Dubinsky of Skoltech to provide students a way to hone entrepreneurial and innovation skills by developing a new venture within an academic framework. The concept, guidelines, and practical examples were included in the transfer.

In addition to supporting and enhancing the transferred curricular elements with additional materials in 2015, the Entrepreneurship and Innovation Team is also overseeing development of modules relevant to action-based instruction for Skoltech to use with future entrepreneurship classes.

Knowledge Exchange

MIT helped review grant proposals and sourced US-based mentors for the 2014 Skoltech Translational Research Innovation Program (STRIP, formerly SIP) grants, a program that provides proof-of-concept research grants. The four 2014 projects have wrapped up and the final review and strategy session was concluded at the sixth STRIP Conference in Moscow in May 2015. At the same time, the new call for proposals was released and MIT, along with Skoltech and catalysts/reviewers, are deciding on the new grant awardees. Full management of the program was transferred to Skoltech in the first half of 2015.

MIT's Technology Licensing Office continued to support the professional and operational capability of the Skoltech Knowledge Transfer Office (KTO), including supporting licensing activity through the review of intellectual property (IP) procedures of specific IP case management, mainly through weekly videoconference calls. This support was supplemented by in-person visits by a senior technology licensing officer, including participation in a Technology Transfer and Commercialization Workshop hosted by Skoltech's KTO in November 2014, and delivery of a seminar at the Skolkovo Foundation's Forum on Intellectual Property as part of the Startup Village event in Skolkovo in June 2015.

A Multiyear Collaboration

The formal Collaboration Agreement of October 2011 established a three-year relationship between MIT, the Skolkovo Foundation, and Skoltech and outlined the possibility of a two-year extension. In late 2012, after one year of activities, the parties extended the term to a fourth year. The experience to date has been one of new perspectives, rapid development, and expanding stakeholder engagement in both the US and Russia. As the collaboration has grown across multiple dimensions, the MIT Skoltech Initiative has further accelerated the development of Skoltech.

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