

Innovation and the University

Innovation

- What is it, and its relationship to entrepreneurship?
- How do you support it?
 - Business
 - Culture
- How to you educate people for it?
 - Students
 - Professionals

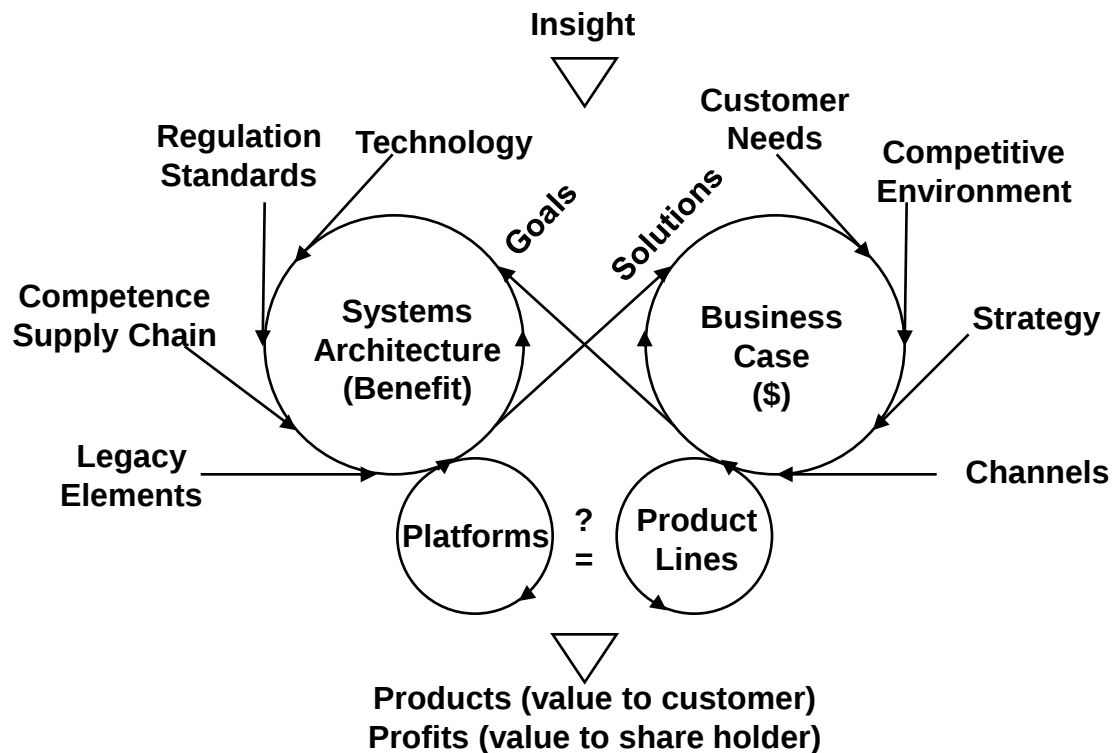
Innovation

- Innovation is the delivery to market, or end user, of new products (goods and services)
 - Sometimes based on new science and technology
 - Sometimes based on new market opportunity
- Entrepreneurship
 - Originally meant innovation, or the creation of something new
 - Now generally means the creation of a new enterprise, in which innovation occurs

Education for Innovation

- A hands-on education centered on innovation
 - An education based on “useful knowledge” - the technical fundamentals necessary for innovation
 - An education in the process of innovation
 - An education in the skills of innovation
 - An education that leads to the self confidence necessary for innovation
 - A preparation for leadership

A Model of Innovation



Overview and Invitation

SkTech

Edward Crawley
February 2011

SkTech at a Glance

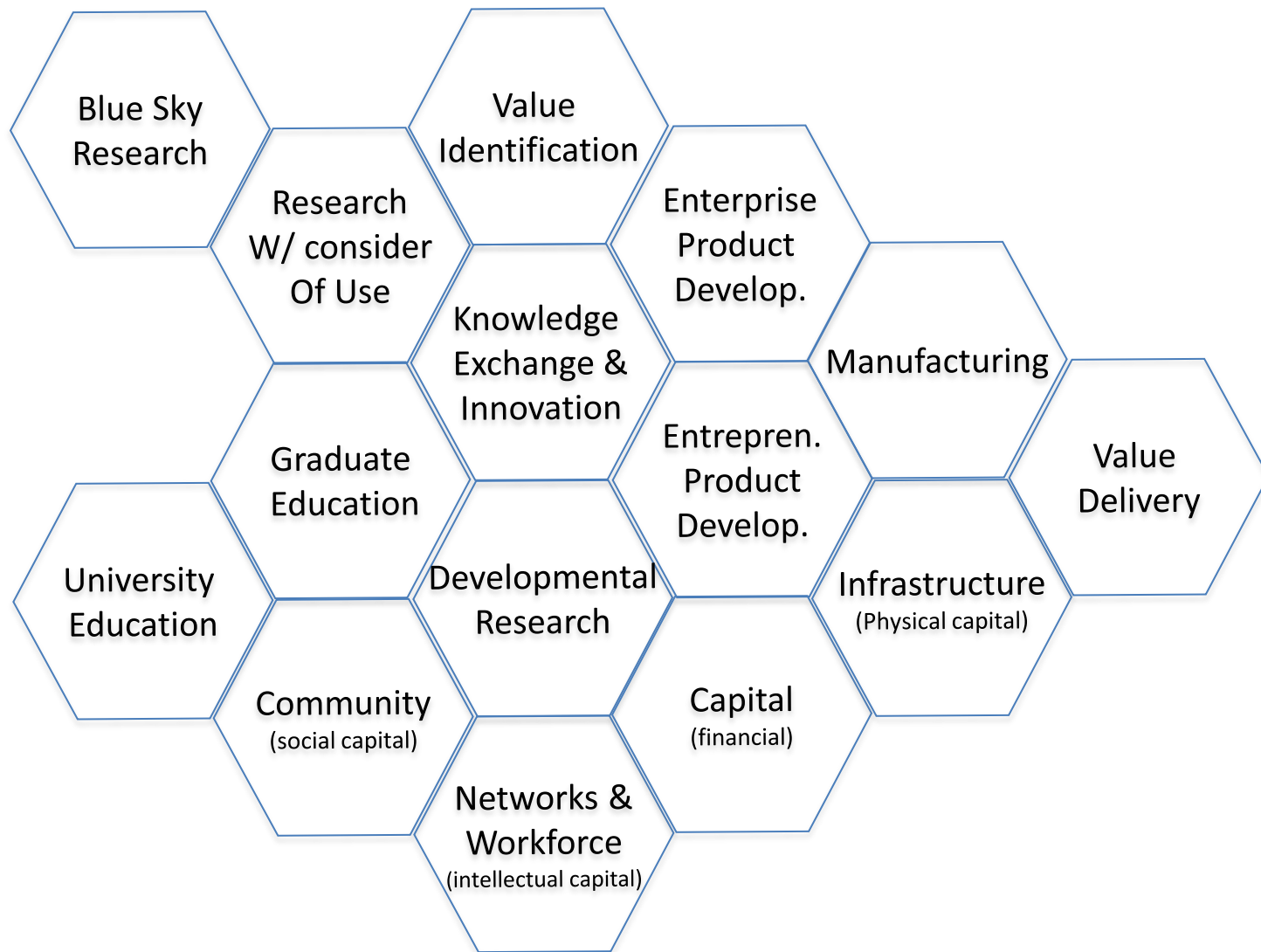
- A unique Russian institution in an international context
- 200 faculty, 300 post-docs, 1200 graduate students by the end of the decade
- Polarized around science and technology
- Addressing problems and issues in IT, Energy, Biomedicine, Space and Nuclear
- With strong programs in support of innovation and entrepreneurship
- On a new campus, to be build in Skolkovo
- An important part of the Skolkovo innovation ecosystem



Cambridge, Massachusetts



animated



Discover
Ideas

Develop
Technologies

Conceive
Products

Design
Products

Implement
Products

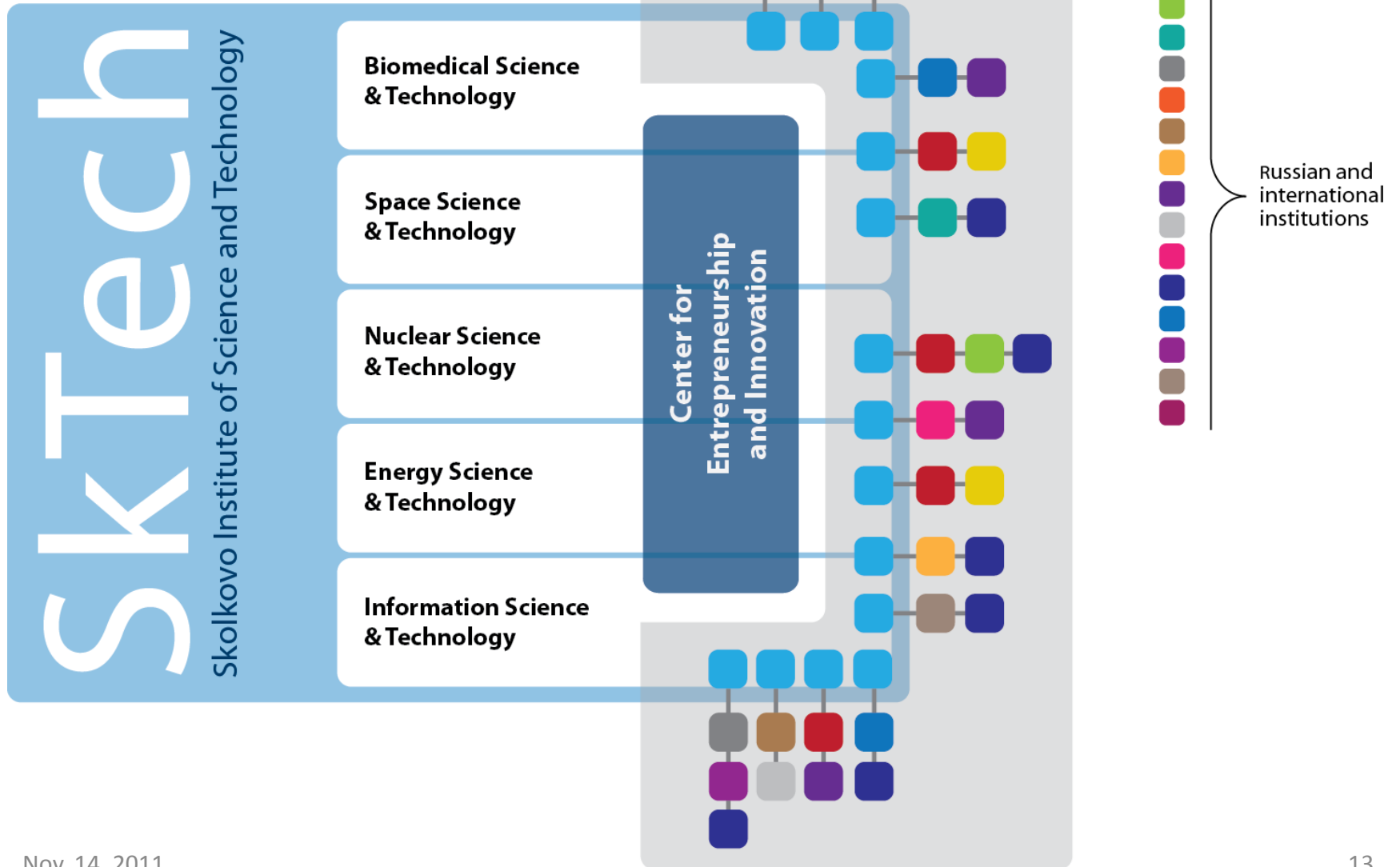
Operate
Products

Vision

Skolkovo Institute of Technology will be a central element of the innovation ecosystem of Skolkovo, attracting, educating and engaging the best talent from within the Russian Federation and overseas, interacting closely with research laboratories, ventures, enterprises and industrial partners, and helping to create a crucible of economic and entrepreneurial activity based on the application of science and technology.

Mission

- 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



Principles of Culture

- A focus on innovation
 - Useful knowledge
 - Value all parts of the process from conceptualization to delivery
 - Research with a consideration of use
 - Accelerate ideas
- Intensity, curiosity and adventure
- Focus on Problem, interdisciplinary and post disciplinary
- Unity of the faculty
- Excellence and limited objectives
- Intellectual continuum
- Equity, diversity and respect

Goal Areas

- Faculty and leadership
 - Students
 - Education
 - Research
 - Innovation and Entrepreneurship
 - Administration
 - Campus
-
- The Double Helix
- The Triple Helix

Ref: Etzkowitz, the Triple Helix (see Resource/Links)

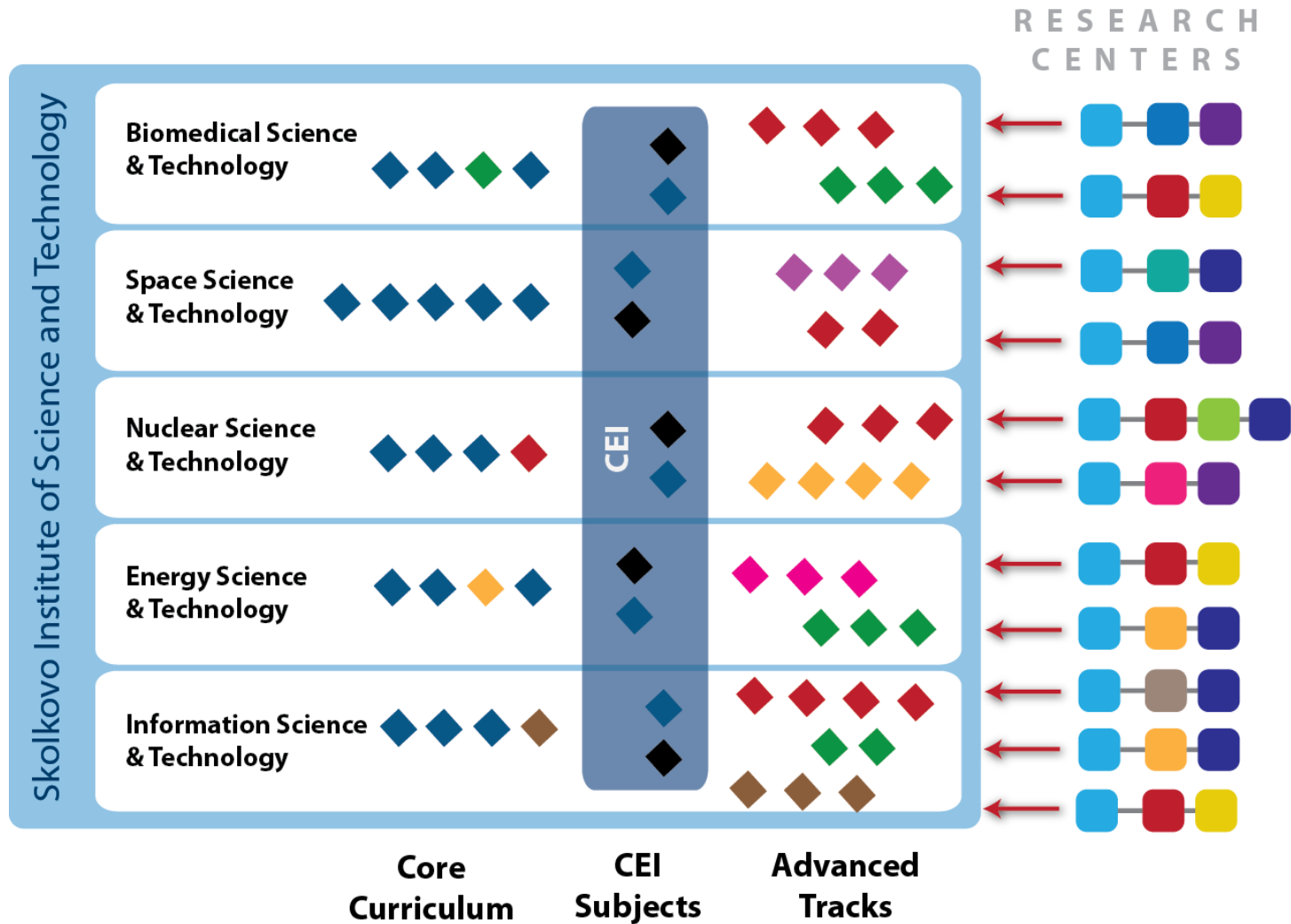
Skolkovo Tech

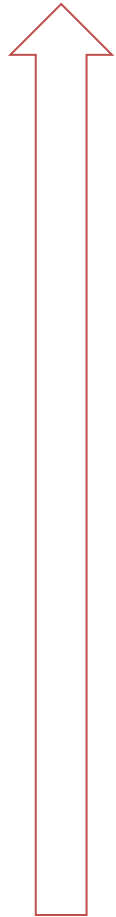
Skolkovo Institute of Science and Technology

Founding Faculty Fellows

- Participate in the intellectual exercise of the design and establishment of a new university
- Explore the function of universities, the creation of new research programs, the design of advanced educational environments and programs, and the interface between universities and industry that drives innovation
- Faculty at major university, mid career to senior, or senior staff at research centers
- At least half time for at least four months, negotiable
- Search: <http://web.mit.edu/sktech>

SkTech Curriculum: Core &





Rigor: Quest for Fundamental Understanding

Niels Bohr
(“pure” fundamental)

Louis Pasteur
(fundamental w/ eye toward commercialization)



Thomas Edison
(“pure” applied)

Relevance: Consideration of Use

Skolkovo Tech

Skolkovo Institute of Science and Technology

Multi-Institutional Research Centers

**SkTech
Research
Center**

SkTech

**International
University**

**Russian
Univ./Inst.**

- Start-up: Existing international and Russian institutions
- Steady-state: SkTech grows to be equal partner in Research Center

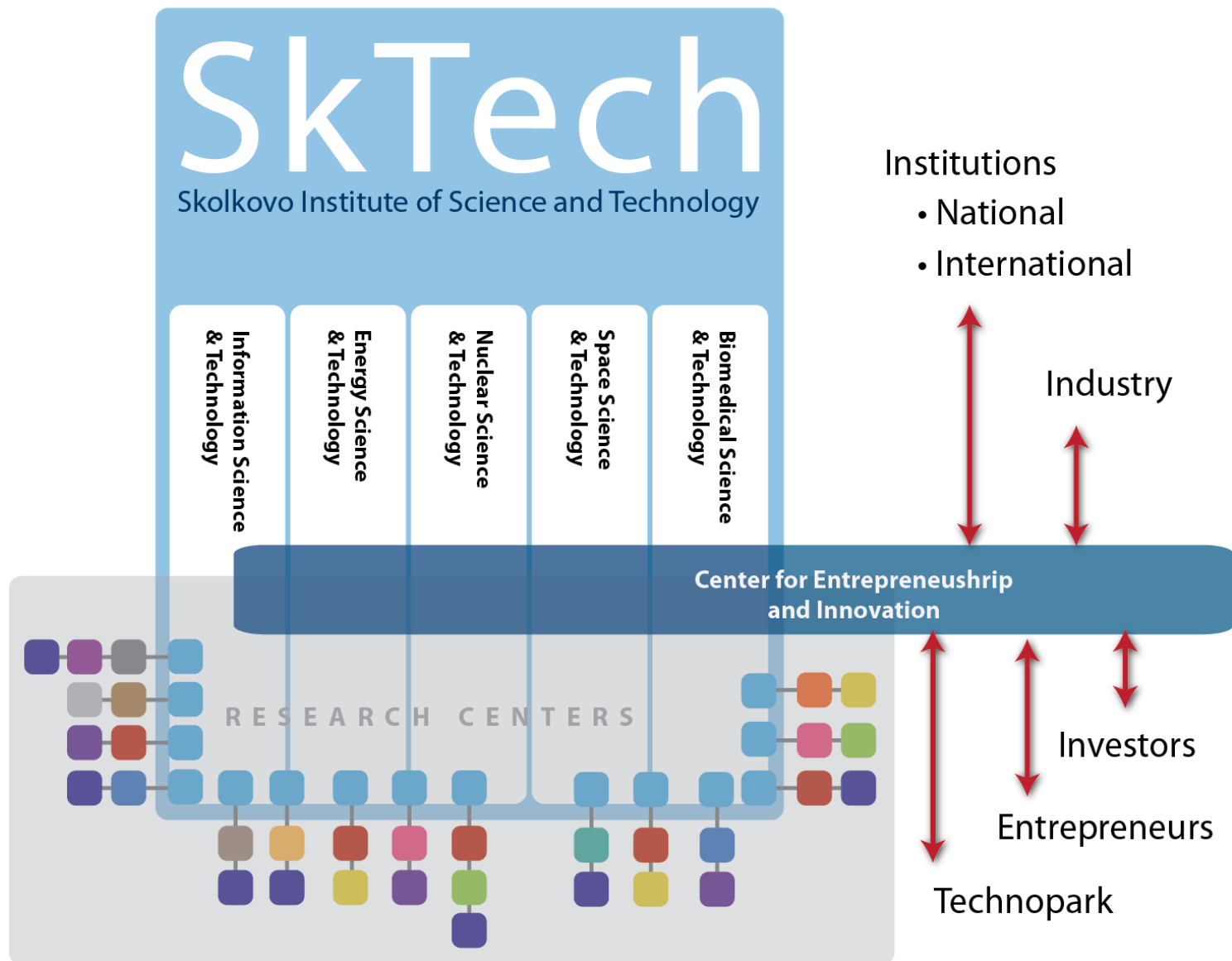
Goals: Innovation and Entrepreneurship

- To create create programs that will engage SkTech students and faculty in innovation and entrepreneurship, and will accelerate research outcomes towards commercialization

Innovation and Entrepreneurship

- Deep and meaningful focus on knowledge exchange
- Emphasis on the human elements of knowledge exchange
- Sustained relationships with industry, Russian and Intl U's
- Engaging industry to shape the research and educational program
- Supported by appropriate structures, especially with active support for knowledge exchange outward
- A culture of knowledge exchange
- Empowered people

Functional Structure for CEI@SkTech



University Engagement Strategy

- SkTech will engage collaborators from leading institutions in the Russian Federation around the world to build towards its mission and goals
- Universities in the RF will be primarily engaged to attract students and faculty, and to build research programs on strengths in science and specialized areas of technology
 - The benefit to them will be interaction with SkTech, international research institutions, and substantial funding to support research and capitalize research facilities
- Universities outside the RF will be primarily engaged to attract faculty, and build research programs on evolving science and technology, and inform programs on innovation and entrepreneurship
 - The benefit to them will be interaction with SkTech and RF research institutions, the opportunity to help shape an institution

RF University Near Term Engagement (2012)

- International collaborators will be offered an array of opportunities to interact with SkTech
 - Introductory visits and faculty seminars
 - Founding Faculty Fellows Program
 - Involvement in the creation of the E&I, Research and Education planning processes
 - Invitation to Research workshops
 - Funding through the Research Center programs
 - Funding through the Innovation Support Program
 - Piloting of Innovation Education Program
 - Pilot class of Master's students

Invitation

- SkTech is one of the most exciting and impactful new educational ventures in the world
- It will succeed it will be because of important partnerships and participants
- Welcome to the adventure!



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Skolkovo Tech

Skolkovo Institute of Science and Technology

Goals: Faculty and Leadership

- To attract, promote and retain at SkTech a faculty of superb scholars, and dedicated and effective educators who are interested in innovation and research with a consideration of use, as well as an effective administrative team

Goals: Education

- To create and deliver at SkTech an integrated graduate education, which fulfills important learning outcomes in knowledge, skills and attitudes for research, innovation and entrepreneurship

A Vibrant Education

- Master's and PhD programs, that contain a blend of innovation and problem focused education
- Working with Russian universities to engage their students early, and attract the best Russian graduate students, rather than losing them abroad - and soon attracting students internationally
- Master's and Doctoral students working side by side with researchers and professors of all ranks – an intellectual continuum

Goals: Students

- To attract to SkTech, provide for and nurture, graduate, and engage and support throughout their careers a cadre of excellent students who will have impact on their society

Inaugural M.Sc. Fellows Program

- Three-Year Master's Program
- 2012-2015 Academic Years
- 1st Year at: MIT, Stanford, Imperial, or ETH Zurich
- 2nd-3rd Years at Skolkovo Tech
- Fields of study:
 - Information Science and Technology
 - Energy Science and Technology
- Upon completion: M.Sc., Skolkovo Tech degree

Eligibility for 2012-2015 Program

- Completed undergraduate degree by July 2012
- Proficiency in English (TOEFL, IELTS)
- Citizen and resident of RF
- Ability to begin study in fall 2012 outside of RF
- Commitment to Skolkovo Tech for 2012-15
- Demonstrated leadership potential and scholarly aptitude
- apply.skolkovotech.ru

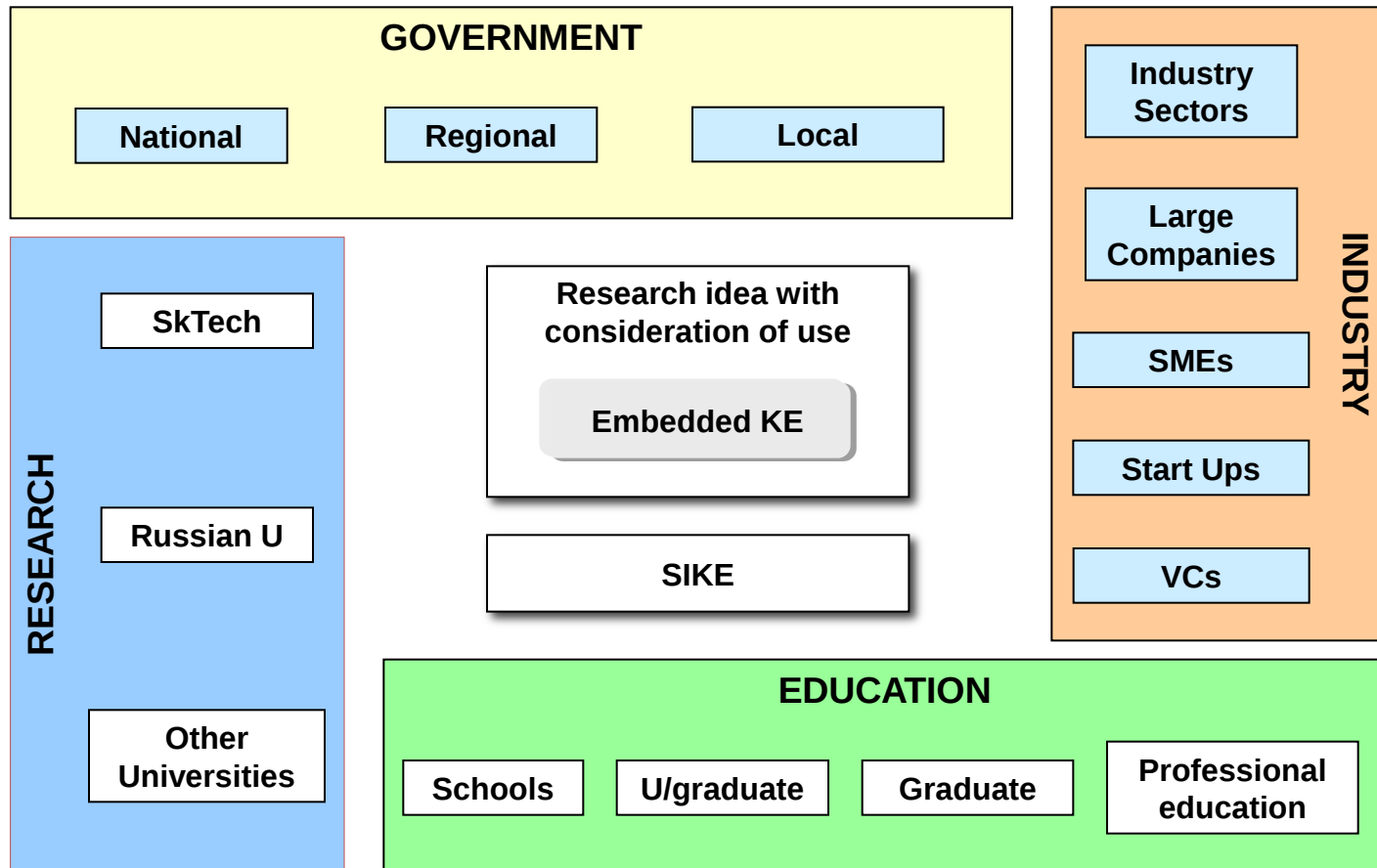
Goals: Research

- To create create research programs to address pressing needs of members of society and society as a whole, which build upon fundamental science and technology, yet are guided by a consideration of use

A University Organized Around the Triple Helix

- Three fundamental roles of a university
- Education, research, and knowledge exchange with industry and support of innovation and entrepreneurship
- These three strands are linked together
- It is the combination of these that drive regional economic growth

Knowledge Integration Communities



Goals: Administration

- To develop and deploy an effective, efficient, responsive and lean administrative organization for SkTech that supports the faculty and students in their mission, strategy and goals
- First year goals:
 - Stand up the Human Resource functions of SkTech, and hire the targeted administrative staff and faculty
 - Stand up the financial functions of SkTech, create a budget, implement financial controls, and pass the first audit
 - Develop a program and plan for resource development, and meet the first year goal
 - Move SkTech into its interim space, and support the IT needs of the team
 - Create an effective PR and communications function for SkTech
 - Support other administrative functions such as legal and reporting

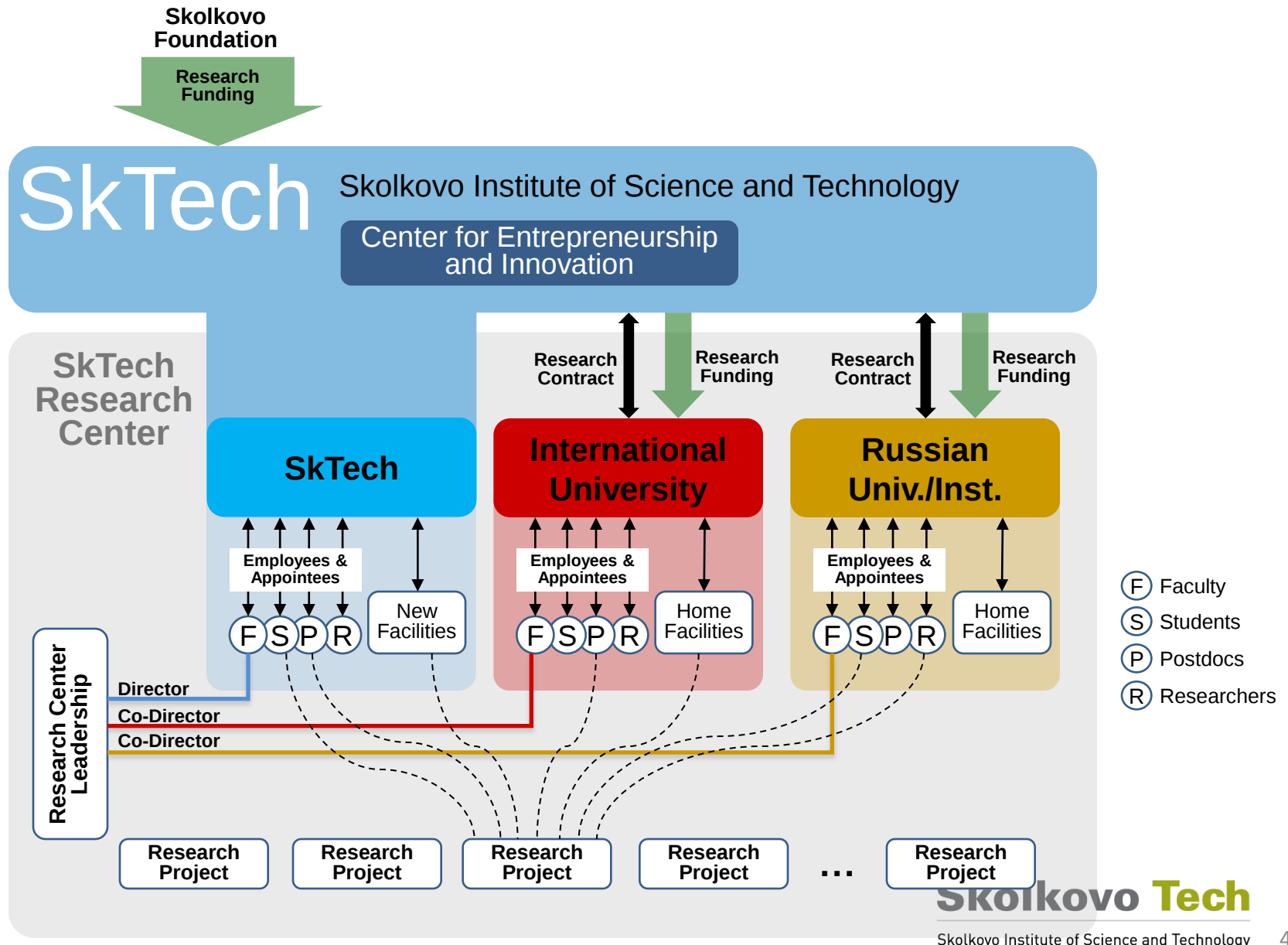
Goals: Campus

- Work with the Skolkovo Foundation development team to build towards an aesthetic and functional campus for SkTech
- First year goals:
 - To help to define the program for the campus
 - To support client interaction with the architect and building team
 - To ensure that a plan which supports the needs of SkTech is created in a timely manner for opening in Fall 2014

Intensions

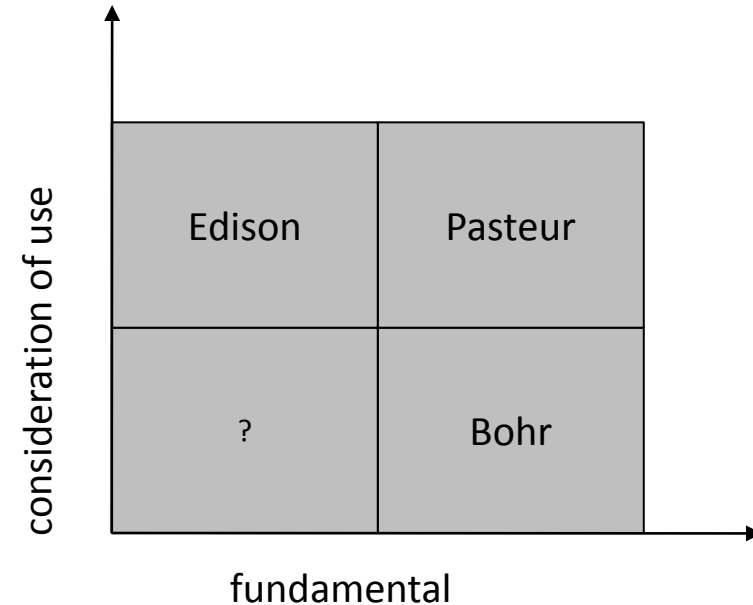
- We intend to help others by creating center of learning and knowledge that will positively impact society
- We intend to attract and nourish world class scholars and students, thinkers and doers, to lead this effort
- We intend to create closely linked programs of research, education and knowledge exchange, catalyzing innovation and entrepreneurship

SkTech Research Centre Structure



Research with a Consideration of Use

- Principle: The development of fundamental new ideas should be guided by the consideration of use
 - Someone should have a clear vision of how research will be used
 - This vision should guide development, even at an early age
- Implication: Work closely with those who do truly blue sky research, but vary rapidly after the discovery of a new science or the development of a new technology, develop it further in this setting of consideration of use



Ref: Stokes, Pasteur's Quadrant (see Resource/Links)

Functions and Outcomes

- Grow *talented people*
- Discover *ideas* and develop *technologies*
- Accelerate *innovation*
- Create *opportunity* for RF students and those abroad
- Establish a *portal* for interaction
- Become a vibrant part of the Skolkovo *innovation ecosystem*
- Support the *growth and modernization* of the economy of the RF

Program Benefits:

SkTech covers major expenses:

- Tuition/fees
- Summertime employment at SkTech to contribute to design the university!
- Travel (flights, visas)
- Monthly stipend during academic years
- Semester book allowance
- Medical insurance

Application Timeline & Process in 2012

- 15 March 2012: Application Deadline
- apply.skolkovotech.ru
- 2 April: Announcement of 40 Semifinalists
- 11-13 May: “Final Selection Weekend”
- 13 May: Announcement of 20 Finalists
- June-July: Visas, Travel Logistics
- August: Innovation Boot Camp at MIT
- Late August/September: Fellows Begin Academic Program
- May/June 2013: Return to SkTech

A university organized around Problems and Opportunities

- Five domains of interest
- Research in these domains
- Education in these domains
- Knowledge exchange and support for innovation in these domains
- This organization allows for industry to more easily engage, and ideas to more easily flow
- This is an interdisciplinary or post disciplinary organization
- But within the faculty, there are disciplinary interest groups: materials, computational environments, complex systems, data systems, etc.

Near Term Engagement (2012)

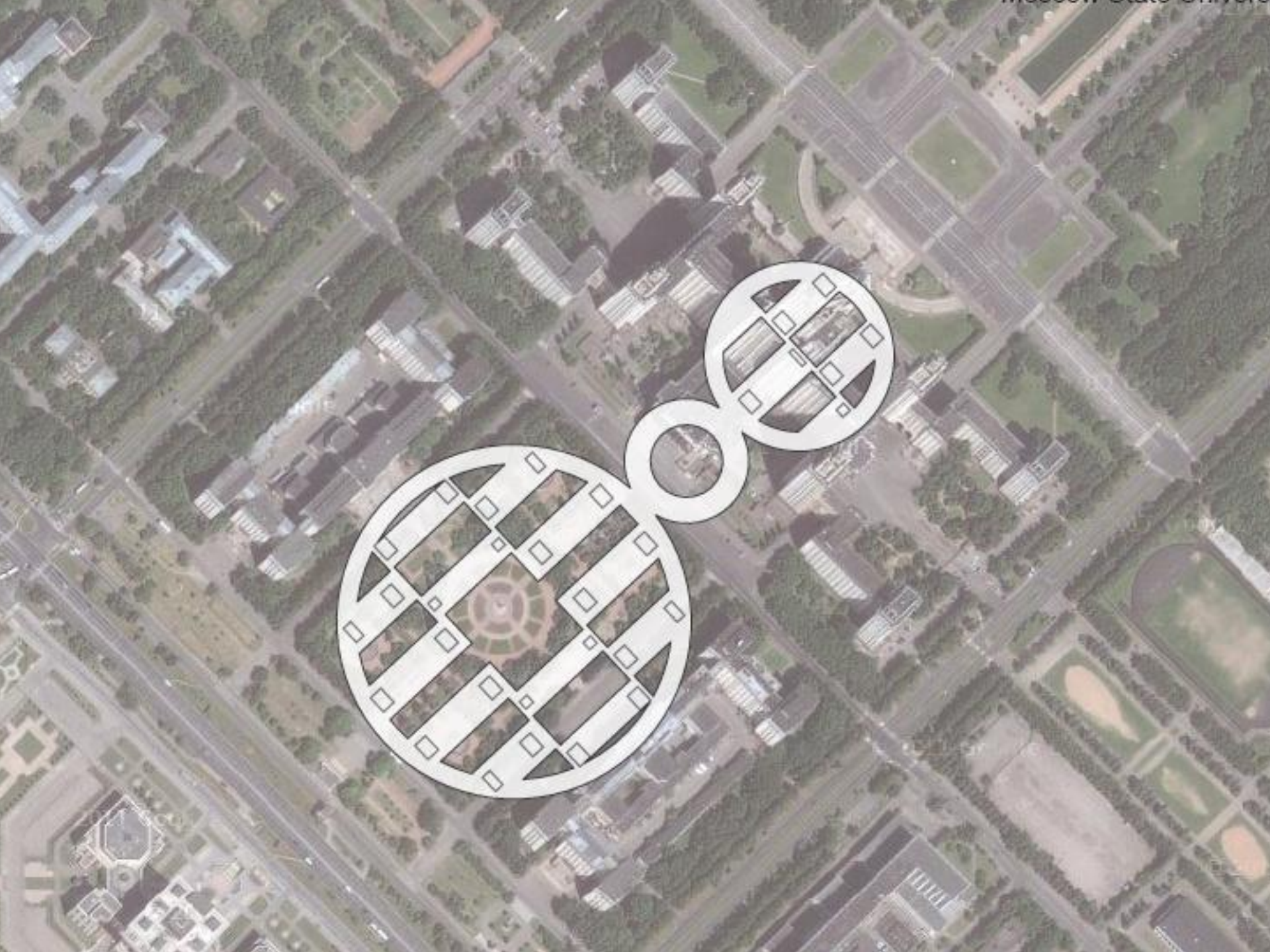
- International collaborators will be offered an array of opportunities to interact with SkTech
 - Introductory visits and faculty seminars
 - Founding Faculty Fellows Program
 - Involvement in the creation of the E&I, Research and Education planning processes
 - Invitation to Research workshops
 - Funding through the Research Center programs
 - Shared benchmarking for Innovation programs
 - Enrollment of SkTech students in Fall 2012
 - Study Visits by SkTech team for deep exchange

Beliefs

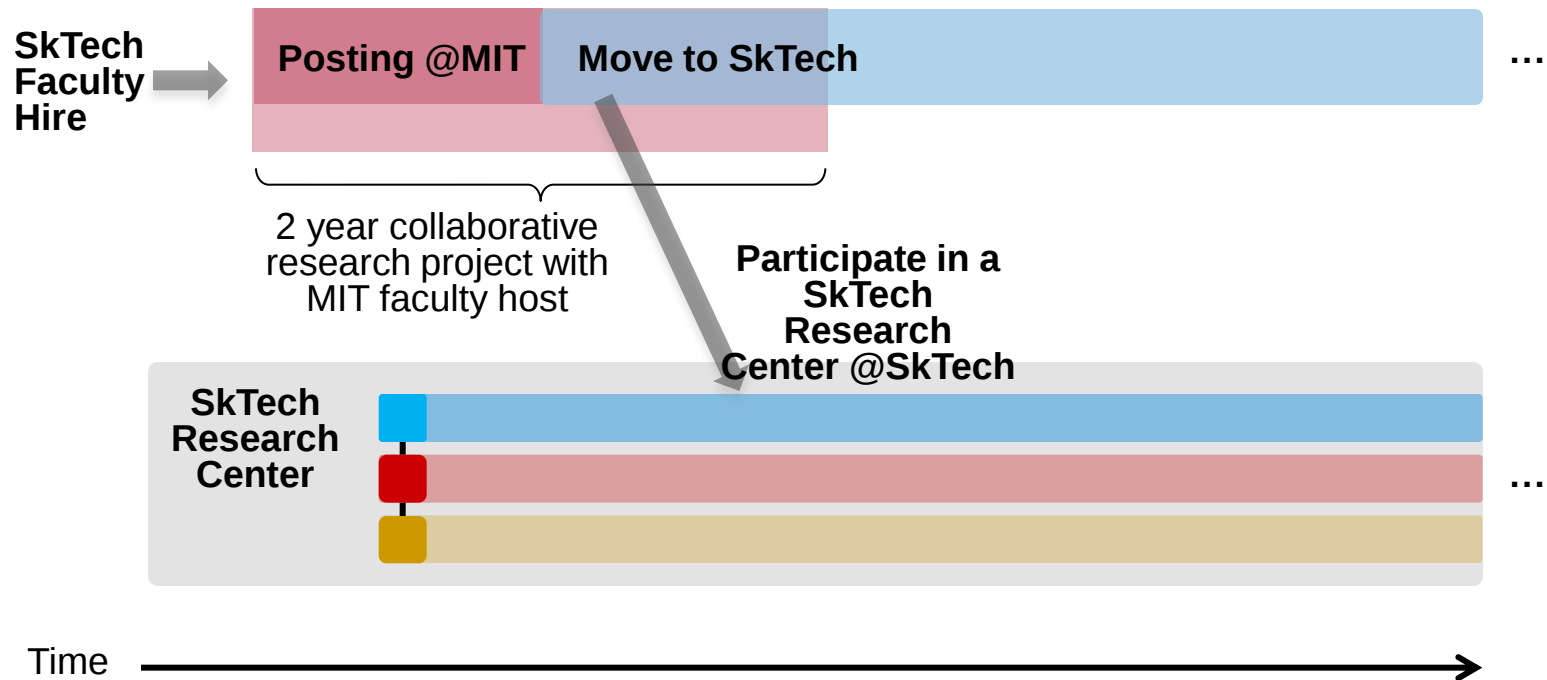
- We believe that it is possible to create from nothing a new university of high international quality
- We believe that such a university can impact the innovation system, at least on a regional scale, and perhaps nationally and internationally
- We believe that an effective innovation system can improve the quality of life, health, and economic stability of a nation
- We believe we can do this at Skolkovo

Innovation and Entrepreneurship

- Deep and meaningful focus on knowledge exchange
 - Emphasis on the human elements of knowledge exchange, building on long term contact to build relationships of trust and open communications
 - Sustained relationships with industry, Russian and Intl U's
 - Engaging industry to shape the research and educational program, with structured engagement with industry, to understand their needs
 - Supported by appropriate structures, especially with active support for knowledge exchange outward
 - A culture of knowledge exchange
 - Empowered people
- A third integral part of the triple helix
- Also organized around the themes



SkTech Faculty Development



Search: <http://web.mit.edu/sktech>