



NEWSLETTER

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# Skolkovo Tech

## Skolkovo Institute of Science and Technology



Bram Caplan  
Director of Student  
Affairs

Greetings from Skolkovo Tech!

In the past two months, it has been fascinating following our first 20 students, getting to know them personally, watching them develop throughout the SkTech/MIT Innovation Workshop, and sending them off on their first year.

I especially want to highlight the stellar work by the Center for Entrepreneurship and Innovation (CEI), which collaborated with our partners at the Massachusetts Institute of Technology (MIT) to produce a unique Innovation Workshop. In August, the students tamed a robot and demonstrated to themselves that the first step to technology innovation is prototyping the entire innovation. I'm looking forward to seeing it grow over the next year.

In the month of September, we have witnessed our senior leadership and capabilities vastly expand. Ed Seidel has begun developing the Research and Innovation program, Mats Hanson has joined as Dean of Education, and Lionel Ponsard will lead our organizational development as Executive Vice President. They will be key in realizing the university's objectives and mission.

We are also excited to welcome our first four faculty members, Yuri Shprits, Victor Lempitsky, Julia Stoyanovich and Alessandro Golkar, each with specialties in Space Physics, Computer Vision, Data and Knowledge Management, and Astronautical Engineering, respectively. They will become guiding forces in the academic lives of our students.

Looking ahead, we are reaching out to universities throughout Russia and the world for the next class of engineering entrepreneurs. After viewing the first class excel at the Innovation Workshop, I am certain we have the right people in place as the foundation of our student culture. With the 2012-13 admissions cycle, we will continue finding outstanding students to work with our growing faculty.

As I tell prospective students, 'Join the adventure and share our passion!'

Bram Caplan  
Director, Student Affairs

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## Innovation@SkTech

### SkTech/MIT Innovation Workshop

Skolkovo Tech's students began their academic program with the four-week SkTech/MIT Innovation Workshop at MIT in August.

The pilot workshop was designed as a new model for engaging industry and embedding commercialization impact in higher education in a collaborative effort between Skolkovo Tech's Center for Entrepreneurship and Innovation (CEI) and MIT faculty.

#### Goals:

- 1) Create a foundational experience in Entrepreneurship and Innovation for all
- 2) Empower students to identify and solve real-world problems with technology
- 3) Instill an entrepreneurial "can-do" attitude in the culture of the first Skolkovo Tech class

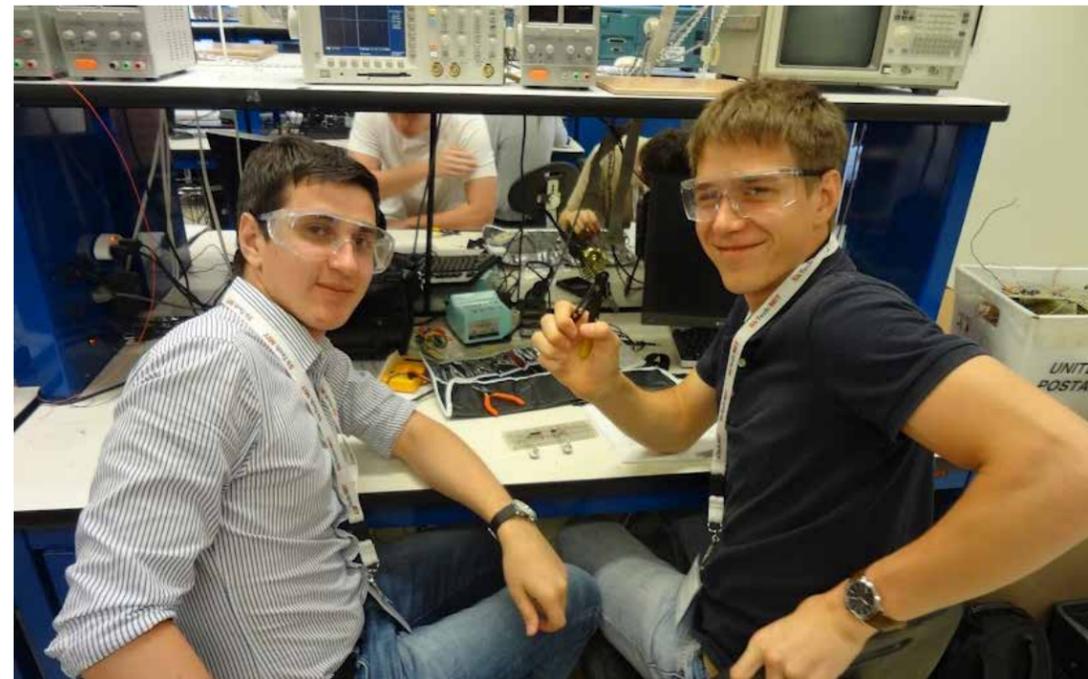
In the uniquely designed Innovation Workshop, 62 members of the MIT innovation ecosystem led guest lectures, oversaw hands-on exercises, conducted company visits and evaluated capstone projects, which challenged and overturned the students' preconceptions about innovation. Participants included 20 students

from Skolkovo Tech, 10 from other Russian universities, six from Asian and European universities, and four from MIT.

MIT colleagues Luis Perez-Breva, PhD and Professor Charles Cooney organized the workshop with support from Jose Estabil (SkTech/MIT CEI) and CEI Director Ilya Dubinsky. They immersed students in experiential learning to teach them how to prototype whole technology innovations: the problem solved, the technology to solve it, the possibilities for impact, and the vehicle to bring the proposed innovation to life.

"The experience empowered the students and calibrated their expectations of what is needed to start: it was not millions of dollars. Innovation is a continuum. It's not just a function of having cool technology or a savvy business plan. Innovation requires tinkering, reasoning and experimenting, and iterating several components. Innovation is a process."

-Luis Perez-Breva, PhD, architect and director of the Innovation Workshop and MIT Research Scientist and Lecturer



For further details about activities by the Center for Entrepreneurship and Innovation (CEI), please contact Ilya Dubinsky, Director of CEI, at [dubinsky@skolkovotech.ru](mailto:dubinsky@skolkovotech.ru).

For more information about Skolkovo Tech students and admissions, please contact Bram Caplan, Director of Student Affairs at [caplan@skolkovotech.ru](mailto:caplan@skolkovotech.ru) or visit the student application website <http://apply.skolkovotech.ru>.

## Students@SkTech

### Quick Success Projects

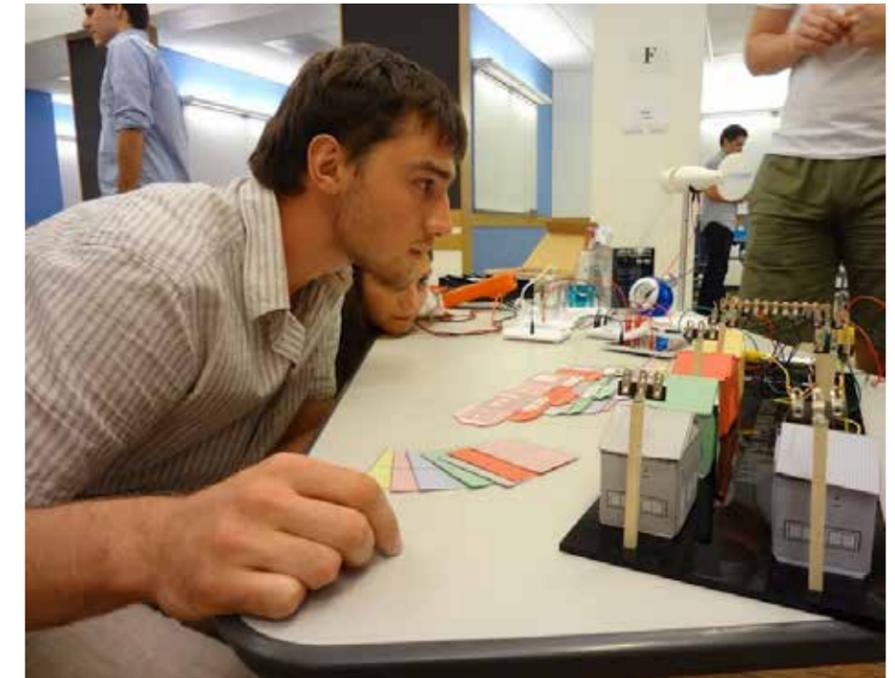
In the first week of the workshop, participants embarked on "quick success projects" that developed their confidence in working with technology. Each morning, students were engaged in lectures to prepare them for specific challenges for which they had minimal prior knowledge. They then went on to tame a robot, simulate a power system and restore the vision of a computer.

"Imagine, students arriving in the morning without any background in the subject of the day and leaving by the end with a circuit they had built themselves. That builds confidence."

-Luis Perez-Breva, PhD

### Capstone Innovation Prototyping Projects

Following these key exercises, the students took on open-ended challenges. Problems ranged from "How can you become energy independent?" to "How can you transport reality to the Internet and control reality from anywhere?" With these questions, students were charged with designing complete innovation prototypes involving a technology prototype, a report leading to concrete next steps, and something inspiring — a presentation — that would help the audience understand the means by which technology can solve a problem and have an impact in society.

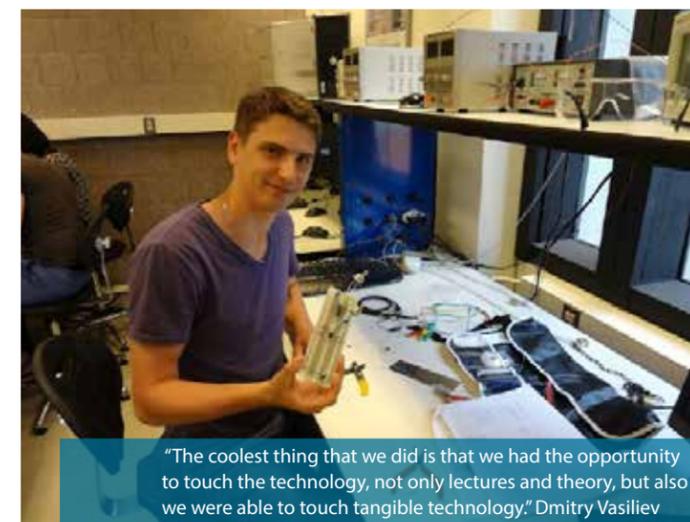


Dmitry Semchenko, Skolkovo Tech, and Tatyana Chernova, Moscow State Technical University (Bauman)

### Innovation Prototyping Lab

The workshop conceived a new kind of a lab: the Innovation Prototyping Lab. Organizers stocked it with parts easily attainable on the Internet totalling under \$500. Despite the cost barriers, the lab permitted the students to produce almost anything and was compared to a "garage in a lab." Using their lab resources, skills, and guidance from workshop staff and industry mentors, students produced innovation prototypes. One team created a scale demonstration of the problems associated with developing and controlling a smart grid, another team developed a system for monitoring the movement of conference-goers, and yet another produced a mobile app that uses machine vision to count inventory in bars.

"With just two weeks, under \$500 per team, motivation, and the belief that innovation is a process participants accomplished something quite amazing: they understood it takes less to get started than to complain about resources" said Luis Perez-Breva. "Now that they have calibrated what it takes to start to innovate, their task is to keep on practicing, two weeks at a time for the remainder of their programs." Based on the workshop's success, the CEI, Luis Perez-Breva, Charles Cooney, and Jose Estabil are beginning plans for next year's Innovation Workshop.



"The coolest thing that we did is that we had the opportunity to touch the technology, not only lectures and theory, but also we were able to touch tangible technology." Dmitry Vasiliev

## Faculty@SkTech

Dr. Shprits studies the dynamics of energetic particle populations, which are harmful to satellites and humans in the near-Earth space environment. In particular, he focuses on understanding, predicting, and mitigating space hazards. His work has been highlighted in National Geographic, Forbes, and New Scientist, and he has published over 60 manuscripts in peer reviewed scientific journals. He has also served as PI on 15 projects funded by NASA, NSF, AFRL, and UCOP.

Recipient of the 2012 U.S. Presidential Early Career Award for Scientists and Engineers

"Throughout my experience, I have observed that nothing encourages graduate students more than the application of their knowledge to real problems and their own success. My educational philosophy thus concentrates on setting up clear but very ambitious practical problems for my incoming graduate students. I have found that most of the time they exceed my expectations."



**Yuri Shprits**  
Associate Professor

B.Sc., Moscow Institute of Physics and Technology  
M.S., Meteorology, University of Oklahoma  
M.S., Atmos. Sci. (Space Phys.), UCLA  
Ph.D., Atmos. Sci. (Space Phys.), UCLA

**Victor Lempitsky**  
Assistant Professor

Victor Lempitsky has conducted research in various organizations including Yandex, the University of Oxford, and Microsoft Research Cambridge. With these organizations, he has committed himself to developing computer vision, visual recognition, and biomedical image analysis.

His works have attracted 900 citations over the last 5 years, and in 2009, he won the best paper award at the international symposium on Functional Imaging and Modeling of the Heart (FIMH).

"As a Muscovite who has done a fair bit of traveling and working abroad, I am excited about the opportunity to start a research group in computer vision and image analysis in my home city. Even more so, to be able to do this in an environment that promotes academic excellence, international collaborations across disciplines, and partnerships with industry really convinced me to join Skolkovo Tech."

For more information on the Faculty Search, please contact Mikhail Myagkov, Vice President for Academic Affairs, at [myagkov@skolkovotech.ru](mailto:myagkov@skolkovotech.ru).

## Skolkovo Tech Welcomes New Faculty Members

The first leaders of the university's educational and research programs were selected from a pool of over 600 applications. They will have the unique opportunity to develop interdisciplinary graduate education programs, develop independent, internationally recognized research programs; and lead scientific and technological innovation at Skolkovo Tech.

M.S. (specialist), Mathematics and Applied Mathematics, Moscow State University  
Ph.D. (kandidat nauk), Applied Mathematics, Moscow State University



B.S., Aerospace Engineering, University of Rome "La Sapienza"  
M.S., Astronautical Engineering, University of Rome "La Sapienza"  
Ph.D., Aeronautics and Astronautics, MIT



Julia Stoyanovich researches data and knowledge management. Her activities have focused on developing novel information discovery approaches, with the goal of helping the user identify relevant information, and ultimately transform that information into knowledge. She is particularly excited about the challenges that arise in life sciences applications and in social information processing.

"Computing is a living and breathing discipline that seamlessly combines fundamental engineering principles and elegant algorithmic approaches with novel ideas and technologies motivated by academic research, industry trends, and end-user needs. My field is at the center of societal change, and is positioned to be an integrator and an enabler of other disciplines. Students should be exposed to all major aspects of this multi-faceted field, becoming solid engineers and algorithmic thinkers, as well as passionate innovators. Imparting this "big picture" view of the field on students is the main goal of Computing education."

**Alessandro Golkar**  
Assistant Professor

Dr. Golkar's work focuses on the development of systems engineering tools and methodologies for architecting large engineering systems, including applications for robotic space exploration, human spaceflight, satellite systems and energy infrastructures. He has also concentrated on hardware development of small satellites for space exploration and terrestrial applications.

His atmospheric sensing payload was chosen by the European Space Agency to fly onboard the BEXUS 7 stratospheric balloon campaign at Esrange in Kiruna, Sweden.

"After finishing my Ph.D., I wanted to develop my own space systems laboratory. With my students, I would design satellites for space exploration and Earth-focused applications, and then fly them into space. Skolkovo Tech offered me the unique opportunity to start this venture. It is not easy to find any place in the world to launch a laboratory from a clean sheet. Here at Skolkovo Tech, we have the opportunity to create a culture. And in the process have a real impact in aerospace research!"



**Julia Stoyanovich**  
Assistant Professor  
(part-time)

B.S., Computer Science and Mathematics and Statistics, University of Massachusetts Amherst  
M.S., Computer Science, Columbia University  
Ph.D., Computer Science, Columbia University

## Leadership@SkTech



**Mats Hanson**  
Dean of Education

### Education:

MSME; 1974; Mechanical Eng. with Pedagogy; KTH Royal Institute of Technology, Sweden  
MSME; 1976;

### Career

1998 – Professor in Mechatronics, KTH  
2000-2011 – Co-founder and Director, KTH Learning Lab  
2005-2008 Vice Rector of Education, KTH

Skolkovo Tech is actively seeking interested, committed and qualified applicants for faculty and staff positions.

Descriptions of staff positions can be found on [www.skolkovotech.ru](http://www.skolkovotech.ru).

### Why are you excited to join Skolkovo Tech?

My passion is science, technology and engineering education, so Skolkovo Tech matches that ideally. And being part of a team that is building a new world-class university in Russia is a challenge I could not resist.

### Were there any formative points that influenced your approach to education?

I realized this passion for education at a very early age. In high school, I started a tennis school, teaching hundreds of kids and organizing paths for different skill levels. Then when I delved into science and engineering at university, the desire to educate remained but refocused on students in physics, mathematics and mechanical engineering.

A critical moment came during a year-long sabbatical at Stanford University, where I developed relationships with many creative colleagues, who would prove instrumental in founding the Learning Labs.

### What are the Learning Labs?

The Learning Labs were founded in the late 1990s as a collaborative effort among the Royal Institute of Technology, Uppsala University, and Karolinska Institute in Sweden and Stanford University. We created them with two major objectives: 1) to balance the status and importance of research and education and 2) to educate faculty in pedagogy and didactics so they develop both programs and curriculum elements that promote student learning, instead of their own teaching obligations.

These were major breakthroughs for technical universities. For a university like Stanford, well known for its research, teaching didn't necessarily play a major role in education. By stressing the importance of education, we transformed the system, so that education is as equally as important as research when deciding positions and promotions here at KTH.

### Can you explain a little bit about your field of expertise, mechatronics

Mechatronics is the synergistic integration of mechanical engineering, electronics, and intelligent computer control—for example, installing systems and software in cars. As a professor at KTH, I created the first courses and programs in mechatronics. Through research projects, my students and I engaged Swedish companies such as Scania, Saab and Volvo to create solutions integrating electronics and computer control. Before they were in wide usage, we developed anti-lock breaks, active suspension systems, diesel engine combustion control systems etc.

It is this real experience in integrating innovation and creativity with entrepreneurship in curriculum and courses that I hope to use to enhance Skolkovo Tech.

### What steps must Skolkovo Tech take this year to be ready for the 2013-14 academic year?

Throughout this upcoming school year, I am prioritizing four activities: 1) recruiting motivated and talented students, 2) gathering a team of world-class faculty members, 3) establishing a set of core and elective courses, and 4) forming a conducive learning environment including physical and virtual learning spaces.

### Why focus on the learning spaces?

I have found that it is the learning environment—the classrooms, the coffee shops, the labs, campus and the surrounding environment — that truly promotes creativity within students. The ability to “write on the walls” or use facilities at any hour of the day allows for expression of creativity and learning when it arrives. We want a physical space that promotes an open culture for sharing ideas and permits students to build and test prototypes at various stages. You need to test a program, use a super computer, or connect sensors? We'll have that. Our physical spaces should empower our students to turn their ideas into realities.

## Research@SkTech

### First CREIs Are Selected

After a rigorous and comprehensive seven-month selection process, Skolkovo Tech announced October 3 that it will launch negotiations with leading universities and institutes from around the world to form its first three Centers for Research, Education and Innovation (CREI).

The first three CREIs, which focus on Biomedicine and Energy, will serve as instrumental partnerships accelerating the university's capability to address critical challenges in society and establishing it as a leader in these respective spheres of research.

CREIs are international partnerships, initiated by Skolkovo Tech as a new model to build capacity at Skolkovo Tech while addressing critical problems facing industry and society, particularly in a Russian context. These ambitious projects consist of researchers from at least three universities or research institutes: Skolkovo Tech, a Russian university or institute, and a non-Russian university. A typical CREI receives about \$10 million worth of funding, depending on the scope of each research program.

Skolkovo Tech received 129 proposals, an international peer review panel evaluated each proposal, semifinalists presented their ideas in person, and finally, the Skolkovo Tech Board of Trustees gave its approval of the three leading proposals.

Researchers from institutions and universities located in almost 30 countries applied, which included six Nobel Laureates, one Fields Medal winner, and numerous members of national academies.

Infectious Disease and RNA Therapeutics, proposed by leading partners from the Massachusetts Institute of Technology (MIT), USA and Lomonosov Moscow State University (MSU), Russia, with participation from University of Texas Southwestern (UTS), USA.

Stem Cell Research, proposed by leading partners from University Medical Centre Groningen, Netherlands and Vavilov Institute of General Genetics, Russia.

Electro Chemical Energy storage, proposed by leading partners from the Massachusetts Institute of Technology, USA and Lomonosov Moscow State University (MSU), Russia.

“In these three-way collaborations, all parties benefit. Russian researchers and industry gain better access to cutting-edge international science and technologies; our international partners profit from more access to the academic knowledge and new ideas produced within Russian institutes; and Skolkovo Tech will become even more attractive for the world's best scientists as it continues to develop its educational, research and innovation programs. Ultimately, I foresee major benefits for Russia as it further integrates into the world's scientific community, and commercializes the outcomes of this research.”

-Edward F. Crawley, Skolkovo Tech President

For more information about Skolkovo Tech's Research Center Program, please contact Ivan Sherstov, Director of Research, at [sherstov@skolkovotech.ru](mailto:sherstov@skolkovotech.ru) or contact [SkTech-rc-call@mit.edu](mailto:SkTech-rc-call@mit.edu). Further information can be found at the Skolkovo Tech website: <http://skolkovotech.ru/research>



# Join the Adventure! Skolkovo Tech

Skolkovo Tech launched its 2012-2013  
admissions cycle on September 1!  
To find out more and submit your application:

<http://apply.skolkovotech.ru/>

For all press related inquiries and  
to learn more about Skolkovo  
Tech, please contact Justin Varilek  
at [varilek@skolkovotech.ru](mailto:varilek@skolkovotech.ru).

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