AEB Open Event:
Round Table
“AEB-Skolkovo Partnership”

January 30, 2014

Skoltech – Opportunities for Collaboration with Industry

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Skoltech
Skolkovo Institute of Science and Technology

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Skoltech

Сколковский институт науки и технологий

ABOUT SKOLKOVO INSTITUTE OF SCIENCE AND TECHNOLOGY (SKOLTECH)

General Description

Skoltech at a Glance:

- A new Russian institution in an **international context**.
- **200** faculty, **300** post-docs, **1200** graduate students by 2020.
- On a **new campus** to be built in Skolkovo.

Skoltech's Mission:

- Become a **gate to the best world research and science groups**.
- To keep the balance between **basic research** and **advanced research** aimed at being transferred into Russian companies.

Skoltech's Support:

- Considerable **start-up support** from the Government.
- Financial **support from the Russian industry:**
  - Endowment filling.
  - Co-funding within Skoltech research projects.

General Description

Governmental Expectations from Skoltech:

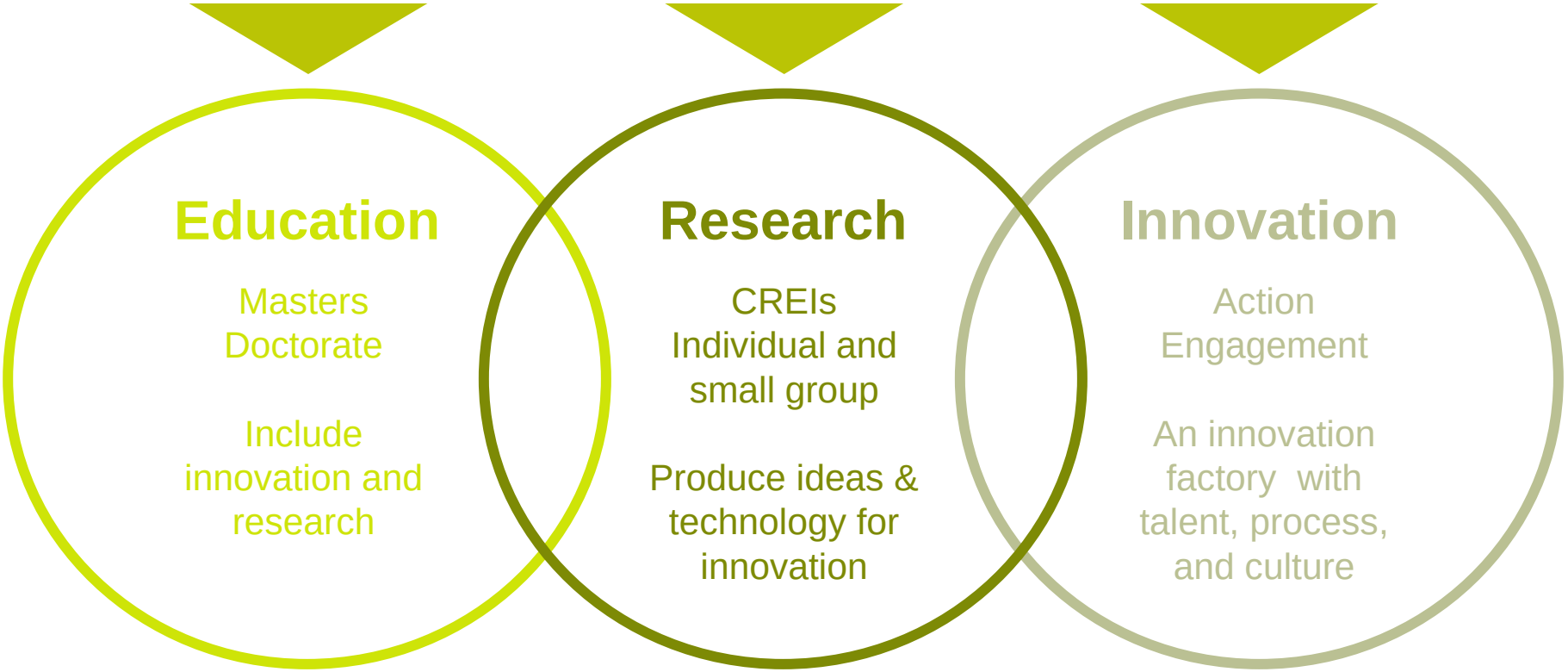
- **Developing educational programs** in top-priority directions for industry.
- **Providing industry with research** according to the new technological industry needs.
- Setting-up new **effective mechanisms of collaboration** between education, science and industry as a new issue of post-soviet culture in education and science.
- Easing the **access to international research and educational network** to exchange knowledge and competences in science and education with the world's top players.

Main goals - stakeholder's view

- To bring new competences to support industrial programs ("bridge")
- To be a model to support changes if Russian R&D and Education ("model")
- To be an intellectual part of Skolkovo Innovation Center ("core")

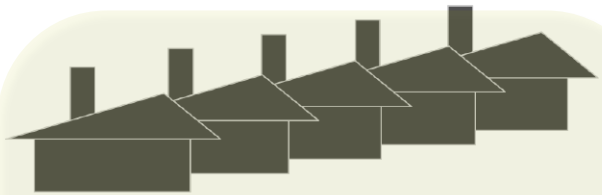
General Description

Interconnected Research, Education and Innovation.



➜ **Mission**: To have educational, scholarly and economic impact in the Russian Federation and around the world

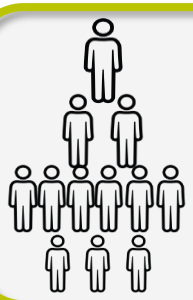
SkT-IND – Principles and Instruments



RUSSIAN INDUSTRY

Priority topics
Target specialists
Technology implementation

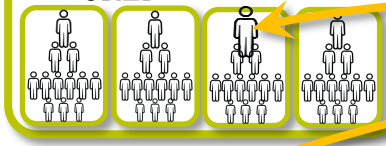
TYPICAL
SCIENTIFIC GROUP (SG)



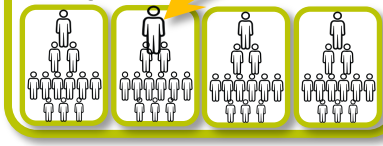
1 professor
2 postdocs
6 postgraduates
3 technical staff

SG are operating independently or as part of the CREI, driven by the COMPLEX program.

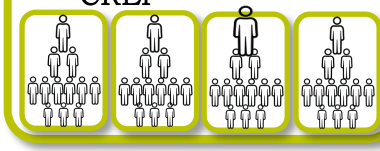
CREI



CREI



CREI

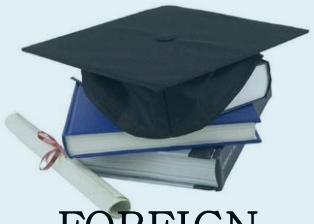


••• 15 by 2015

Target staff training
Research synergy

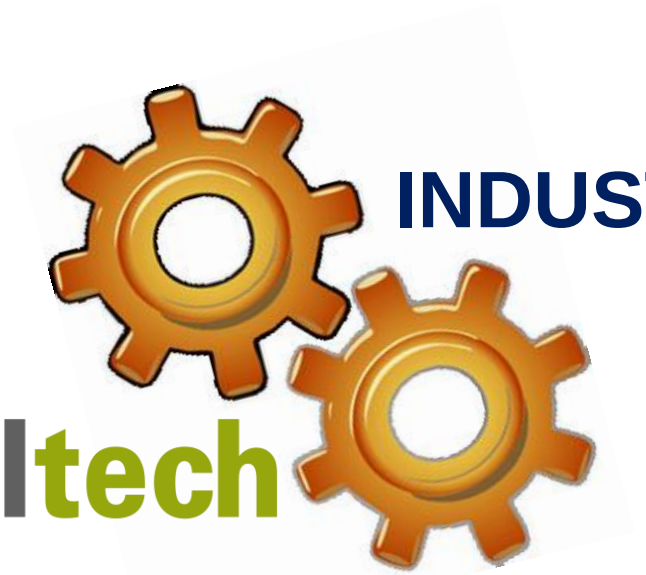
RUSSIAN UNIVERSITIES

Competences
Joint research



FOREIGN UNIVERSITIES

PART II



COLLABORATION WITH INDUSTRY –

GENERAL PRINCIPLES AND INSTRUMENTS

SkT-IND – Principles and Instruments

Different Types of Joint Projects:

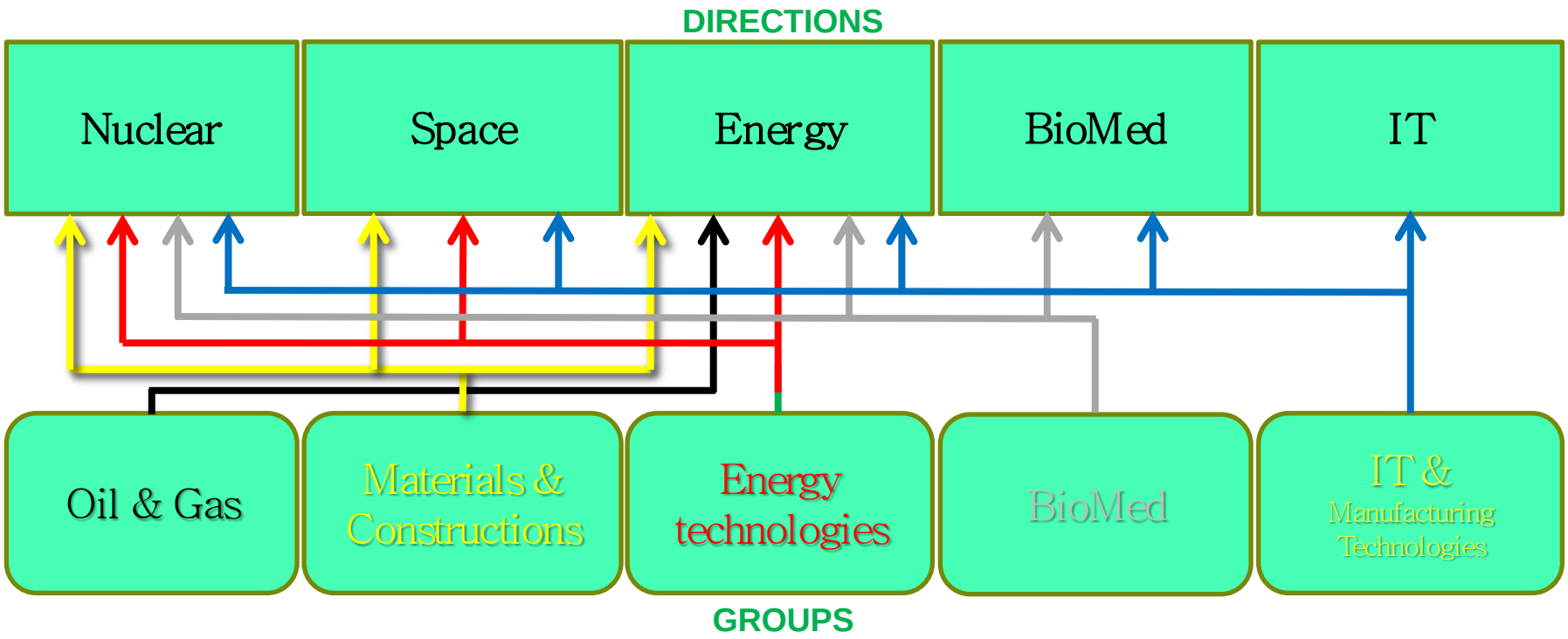
- Research long-term and short-term projects.
- Educational programs for industrial experts.
- Faculty sabbaticals in industry and vice versa.
- MIT designed students' internship program "Industrial Immersion".

Open Form of Interactions

- Industry is welcome to interact with any Skoltech faculty or any Skoltech office on any issue.
- Industrial Partnership Office (IPO) is in charge of long-term projects and Consortia-based projects.

SkT-IND – Principles and Instruments

Skoltech Industrial Advisory Groups



- **Advisory Group** – a platform for coordination of industrial issues.
- **Members of Advisory Groups** – R&D and technological experts.

SkT-IND – Principles and Instruments

Oil & Gas

Gazprom Neft, Rosneft, Zarubegneft, Tatneft, Novatek, Lukoil, Salym Petroleum, Transneft

Materials & Constructions

Russian Railways, United Aircraft Corporation, Uralvagonzavod, Russian Highways, Rocket and Space Corporation "Energia", Russian Helicopters, Oboronprom, Rosatom, ApATeCh

Energy technologies

Russian Grids, INTER RAO, VNIPIenergoprom, En+, RAO ES, RusHydro, UES System Operator, Energy Forecasting Agency

BioMed

R-Pharm, GosNIIgenetika, Biocad, Chemrar, PetrovaxPharm, InterLabService, Pharm-cluster of Kaluga, BioPharm-cluster "Severnij"

IT

ABBYY, Microsoft Rus, TechnoServ, Rostelekom, IDC, Intel, EMC, IBS, 1C, Association of Software Developers "Domestic software"

…and many others

PART III

SKOLTECH INDUSTRIAL PROJECTS

IPO-LED PROJECTS

General Description

Summary of Skoltech High Priority Directions:

(generated by the science community and by the industry)

Energy:

- Hydrocarbon fuel production and transportation
- Hydrocarbon processing
- Electrical power systems generation and distribution
- Electrical energy storage

Biomedicine:

- Computational and systems biology
- Immunology and infectious disease
- Gene- and nano-medicine
- Regenerative medicine

Nuclear:

- Nuclear energy safety
- Materials for extreme environments
- Non-energy applications

IT:

- Machine learning and AI
- Advanced computing systems
- Big Data
- Electronics materials and device
- Quantum physics/technology

Space:

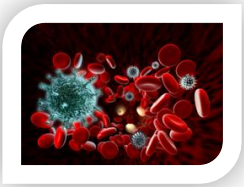
- Supporting humans in long term space exploration
- Small satellites
- Utilization of space data

Cross-cutting:

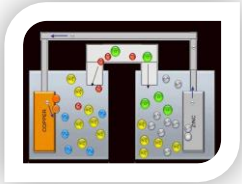
- Advanced materials
- Computational and data-intensive science & engineering
- Human engineering and cognition

➜ 3 CREIs based on the best selected proposals of the round 1:

- STEM CELLS CENTER
  - Director appointed (Prof. Anton Berns)
  - Start operating in June



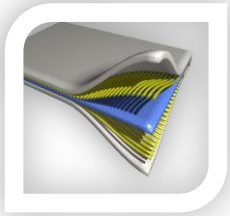
- INFECTIOUS DISEASES AND HUMAN HEALTH CENTER
  - Finalizing procedures of director appointment
  - Finalizing operational plans



- ELECTROCHEMISTRY ENERGY CENTRE
  - Director search negotiating with two main candidates
  - Working on operational plans

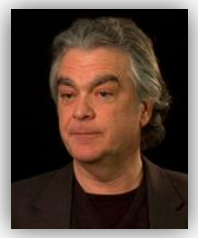
Skoltech IPO Industrial Projects

3 projects are being designed in close cooperation with industry:



ADVANCED MATERIALS AND STRUCTURES

- Director Prof. Zafer Gurdal



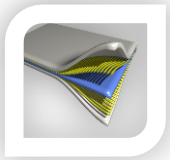
COMPLEX ENERGY SYSTEMS DESIGNING

- Director Prof. Janusz Bialek

HYDROCARBON RECOVERY

- Director Prof. Iskander Akhatov

Skoltech IPO Industrial Projects



ADVANCED MATERIALS AND STRUCTURES

Physical mechanics of metal-, ceramics- and polymer-based materials and composites of structural parts for designs with a multimodal structure.

- Materials, composites, coatings and structures capable of adapting to external forces (force, temperature, radiation, frequency, etc.).
- Physical mechanics of organic binding agents.
- Tribology, friction, and wear in critical parts of complex structures.

UAC UNITED AIRCRAFT CORPORATION

РАКЕТНО-КОСМИЧЕСКАЯ КОРПОРАЦИЯ ЭНЕРГИЯ ИМЕНИ С.П. КОРОЛЁВА

UNITED INDUSTRIAL CORPORATION OBORONPROM

ROSATOM

Skoltech IPO Industrial Projects

ENERGY SYSTEMS

Focus on smart grids, energy markets, joint infrastructures, energy hardware:

- Theories, methods and algorithms of intellectual energy management systems.
- Complex socio-economic, cyber-physical models of future energy systems.
- Energy infrastructure fragility/resiliency, market structures and interdependence.
- Alternative renewable energy (wind, solar, geothermal, etc.).
- Superconductivity, technological solutions based on superconductivity.

Skoltech IPO Industrial Projects

HYDROCARBON RECOVERY

Focus on new knowledge and new solutions for "hard to recover" resources, unconventional hydrocarbons and production at harsh conditions:

- Brown oil fields, carbonate, fractured and anisotropic reservoirs.
- Tight oil (Achimov and other low permeable formations).
- Shale oil (Bazhenov formation).
- Heavy oil and natural bitumen .
- Gas condensate fields, unconventional gas, gas hydrates.
- Arctic shelf and polar regions.
- Geothermal systems.

The end

THANK YOU FOR YOUR TIME!