The Building of an Innovation City: Innopolis

GOALS:

• **Double** GDP from ICT in Tatarstan to 7%

• **Impact** the growth of GDP of Russian economy through growth of IT industry

• **Employ** 60,000 IT specialists

• **Provide** solid foundation for the development and incubation of new startups

• **Create** an education system for school children

• **Develop** strong industry/academia connection

• **Attract** foreign capital and MNC’s
The Concept 2020 plan identifies the strategic role that technology plays in transforming the practices and processes that fuel economic growth and the development of business, industry and government.

- **78% Growth**
  - 2007: 5.6%
  - 2020: 10%
  - Percent of High Technology

- **77% Growth**
  - 2007: 10%
  - 2020: 18.6%
  - Percent of Innovation

- **321% Growth**
  - 2007: 9.5%
  - 2020: 40%
  - Industrial Enterprises Implementing Technological Innovation
Long-term policy targets for high-tech and science-intensive sectors (%GDP)
A number of factors are inhibiting the growth of Russia’s IT industry:

• Weak intellectual property rights, regulations, laws and advantages
• Insufficient collaboration between the Universities and the business sector
• Dependence on the government as a principle customer
Shortage of Qualified IT Specialists

% of Companies who report an acute shortage of IT specialists

2009: 43%
2010: 44%
2011: 54%
CMU and iCarnegie were asked to conduct an industry and education assessment in the fall of 2012 focused on:

- Examine the strengths and weaknesses of current educational practices
- Examine the education system and its ability to meet the needs of the IT industry
- Identify the skills and competencies needed by Russian IT graduates
- Understand the social and cultural contexts in which programs will be embedded to ensure their success
Required IT Skills Across Industry

- **Executives**: Leadership Skills
- **Senior IT Professionals**: Strategic Business Skills
  - Project and Product Management Skills
  - Systems Architecture
- **Junior IT Professionals**: Specific Technical Skills
  - Computer Science Skills
- **Entrepreneurial Skills**: Critical Soft Skills (Teamwork, Communication)
- **Tactical Business Skills**
A number of steps must be taken by the government, industry and academia:

• Focus on the development of practical programs (academic and professional) that address industry’s needs

• Build a robust research infrastructure of international caliber

• Create an innovation ecosystem including an IT park, an incubation/accelerator and the training to support it

• Create a pipeline of highly qualified STEM ready school students
Innopolis day 1
Innopolis City
Innopolis City Plan
Current state of construction
• Degree programs tailored to the needs of the Russian IT industry, co-developed with professors of international caliber and local industry

• Professional non-degree programs that provide skill enhancement training for industry personnel in areas of IT management, IT entrepreneurship and technology strategy

• The curriculum will be distinguished by the following characteristics:
  – practicality
  – project-orientation and industry-focused
  – focus on soft skills
  – flexibility
Innopolis University at a Glance

**IT/Computer Science focus:**
- **5,000** students by **2020**
- **200** research projects per year by **2020**

**Internationally recognized quality of education:**
- Modern curricula adopted from global leaders in IT education
- World-renowned professionals as guest speakers

**Emphasis on business needs:**
- Learning by doing approach
- Entrepreneurship programs
- **200** entrepreneurs per year
- **5-10** successful start-ups per year

**Hands-on experience Collaboration with industry partners:**
- Microsoft, Google, IBM, Intel, Boeing, Siemens, Yandex, Mail.ru, Kaspersky, ABBYY, Parallels, 1C, etc
- Practical assignments in companies: **2,000** trainee jobs per year by **2020**
Four distinct bachelor’s degree programs (out of 12 identified during the assessment) using a common core and four years of study are being designed:

- Artificial Intelligence
- Software Engineering
- Information Security
- Data Science
- Graphics and Game Development
2 years common core
• Strong math/science basis
• English as language of instruction
• Early admission – 24 month before graduation from high school
• Graduates ready for employment
• Strong connection with Industry
  – up to 31 weeks of internships in 4 years
  – collaborative development of the curriculum
  – Invited professors to teach electives
  – Professional programs
Innopolis University Faculty

**Samir Belhaouari** (Switzerland) H-index 11
Associate Professor PhD from EPF Lausanne. Research interests include pattern recognition in biomedicine and security systems, probability theory.

**Manuel Mazzara** (Italy) H-index 10
Associate Professor PhD from University of Bologna. Work experience as SE in Microsoft. Research interests include e-health social networks, software development.

**David Vernon** (Ireland) H-index 25
Visiting Professor Coordinator of the European Network for the Advancement of Artificial Cognitive Systems. Research interests include artificial intelligence, cognitive systems, robotics.

**Bertrand Meyer** (France) H-index 38
Visiting Professor Professor of Software Engineering at ETH Zurich, author of programming language Eiffel.

**Eugene Zouev** (Russia) H-index 6
Visiting Professor Software architect and compiler developer. Expert in programming languages.
Innopolis University Faculty

**Joo Young Lee** (Korea/USA)
*Assistant Professor* PhD’14 from Syracuse University, USA. Research interests Reputation management, social network analysis, machine learning, data mining. *Training in KAIST and Polytechnic of Milan, Fall 2014.*

**Michele Mazzucco** (Italy) H-index 10
*Assistant Professor* PhD’09 from Newcastle University, UK. Work experience as Capacity Planning Engineer in Demoware. Research interests include distributed data processing, queuing theory, stochastic optimization. *Training in ETH Zurich, Spring 2015.*

**Joseph Brown** (Canada)
*Assistant Professor* PhD’14 from University of Guelph, Canada. Research interests include artificial intelligence, genetic algorithms, manufacturing system analysis. *Training in IT University of Copenhagen, Fall 2014.*

**Qiang Qu** (China)
*Assistant Professor* PhD’14 from Aarhus University, Denmark. Research interests include query optimization, graph mining, large-scale datasets, social network analysis. *Training in ETH Zurich, Fall 2014.*

**Adil Khan** (Pakistan/Korea) H-index 9
*Assistant Professor* PhD’11 from Kyung Hee University, Korea. Research interests include machine learning, artificial intelligence, pattern recognition, data mining, mobile robots. *Training in Polytechnic of Milan, Spring 2015.*
Rustam Ibrahimov (Russia) H-index 24
Visiting Professor Professor of Econometrics at Business School Imperial College, London. PhD Yale University, Associate Professor Harvard’s Economic Department.

Salvatore Distefano (Italy) H-index 13
Visiting Professor Professor at Polytechnic of Milan. His research interests include performance evaluation, parallel and distributed computing, software engineering, and reliability techniques.

Max Talanov (Russia)
Professor of the Practice Software design architect at Fujitsu GDC Russia. Research interests include computational emotions, artificial cognition.
Innopolis University Consultants

**David Parnas** (Ireland, Canada)
Professor Emeritus, pioneer of Software Engineering. Best known for developing the concept of information hiding in modular programming – important element of object-oriented programming.

**Matthias Kaiserswerth** (Switzerland, IBM)
Professor of Computer Science, Director and Vice President of IBM Research in Zurich. The lab has 4 Nobel price laureates, in 2013 Gordon Bell Prize.

**Lynn Stein** (USA, Olin College)
Professor of Computer Science and Engineering at Olin College, previously Associate Professor at MIT. Pioneered the development of a new and innovative approach to the teaching of CS.

**Isak Froumin** (Russia, HSE)
Professor of Education at HSE. Leading expert on university education. Winner of the RF Government Prize in Education in 2003 and in 2009. Advisor to the Minister of Education and Science of Russia Federation.
Bachelor Students
Master Students
STEM Robotics centers
Current State of Innopolis University

- **CMU**
  - MS graduates at CMU: 14
  - MS in SE with CMU: 24
  - International Advisory Board

- **ETH-Zurich**
  - International faculty: 10
  - BS in SE, AI, DS one year: 27
  - 3 STEM: 2500+
  - Administration staff: 30
Plans for 2014-2016

• First year students in 2015
• A number of additional BS programs
• Dual MS degree with Carnegie Mellon in Software Engineering and in Robotics
• Extending partners to other top world Universities
• World Robot Olympiad
• Ershov Informatics Conference, 18-20 Aug 2014
Innopolis University is established as an IT academic resource in Russia addressing national economic needs and priorities.

The university will offer bachelor’s degrees in several IT specialties, and a joint master’s degree in Software Engineering and Robotics with Carnegie Mellon.

The university will use a practical ‘learn-by-doing’ approach to all of its programs with an emphasis on robust faculty training and the introduction of best practices and international accreditation.
We are open to cooperate!