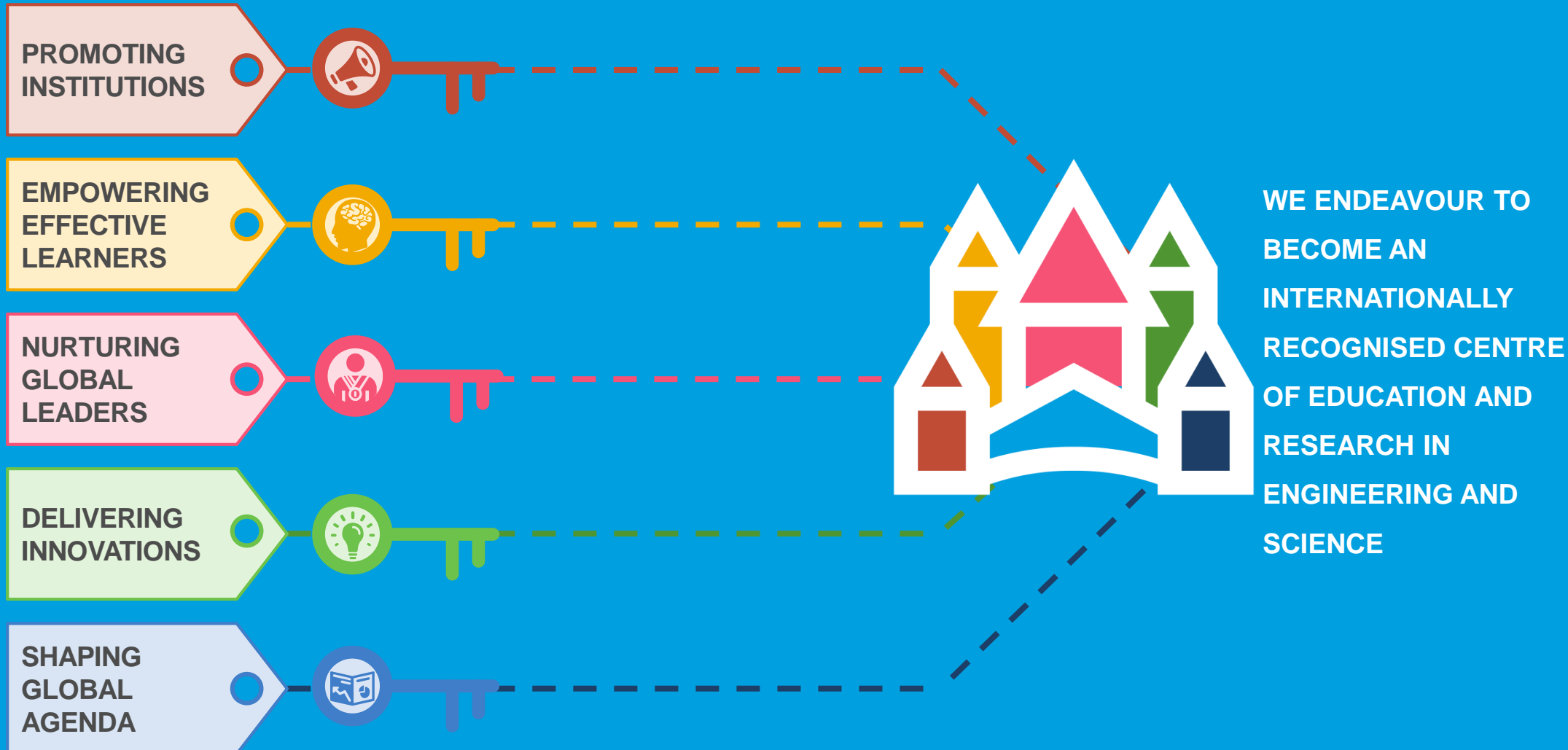


The Council on Competitiveness Enhancement of Leading Russian Universities among Global Research and Education Centres

Timothy E. O'Connor, Vice-Rector of Academic Affairs

Roadmap (3rd stage – 2017)

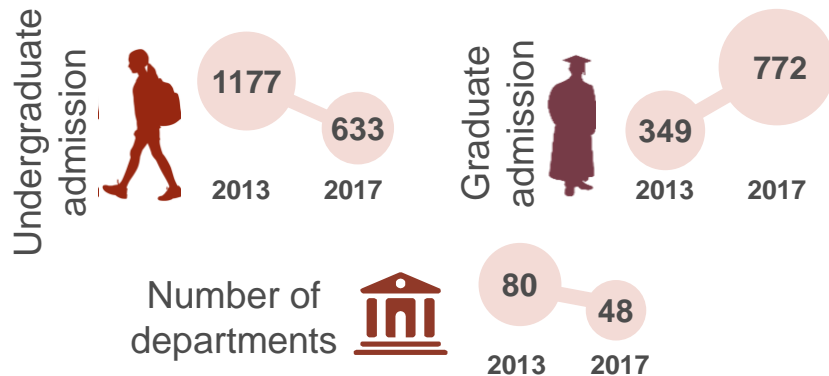




NUST MISIS balances academic autonomy and effective managerial technologies to fulfil goals of all stakeholders

LEADERSHIP AND EFFECTIVE MANAGEMENT

Ability to change fast



Successful mergers



Commitment to transparency and accountability

ACADEMIC AUTONOMY AND SELF-GOVERNANCE

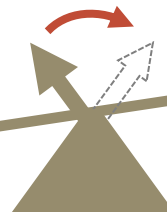
Cherishing independent expertise and meritocratic culture



- Meritocratic culture, cultivated by ISAC, attracts ambitious researchers from leading institutions
- The University's committees on **Faculty Hiring and Remuneration** incorporate independent experts and act on a clear set of rules and KPIs

2017 – Empowering StrAUs institutions

- Establish **ISAC Committee for New Education** to transform StrAUs graduate programs
- Develop **StrAUs Expert Councils** to incorporate business leaders' vision into StrAUs strategy





NUST MISIS research-centered teaching and new educational technologies empower effective life-long learners

Achievements



#201+

#1

#5

Employer-Student
Connections,
world

Overall
rank in
Russia

Plans for 2017

- Project-based **Sirius Materials Science School** in Sochi for talented high-school children from all over Russia



- Enabling universal competencies and flexible student trajectories within undergraduate programs

ALIGNMENT WITH
CHANGES IN THE
GLOBAL LABOR
MARKET



- Project-based Engineering School** online and for 700 children in 35 Moscow schools
- Classroom and extracurricular activities to develop soft skills

NEW TECHNOLOGIES
FOR TEACHING AND
LEARNING



Open Education
National Platform
2nd nationally by the number of MOOCs in Natural Sciences



1/3 Students & Faculty involved

1/6

DIGITAL UNIVERSITY FOR LIFELONG LEARNING



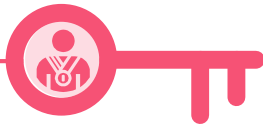
PEDAGOGICAL
INNOVATIONS



- Digital Fabrication Master's program** developed in collaboration with MIT



- Establish a Centre for Quality in Higher Education
- Introduce **teaching feedback loop** with inputs from students and colleagues



NUST MISIS emerging bilingual environment, vibrant international students community and diverse faculty empower global leaders

Achievements

Plans for 2017

ENGLISH-LANGUAGE ENVIRONMENT

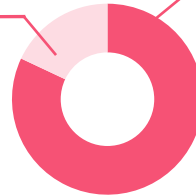


Blended learning



100%
Bachelor students
covered

18% fulfilled the EU requirement for Master's programs enrollment in 2016



- Introduce **English-medium PhD**
- Scaling up teaching and learning conducted in English

INTERNATIONAL BODY OF STUDENTS



23.7

Share of international students, 2016

English-medium master's programmes

8

Applications per placement



ENTRE-
PRENEURIAL
CULTURE

SELF-FULFILMENT

CLEAR CAREER PATH

COLLABORATION WITH WORLD
CLASS SCIENTISTS

CAMPUS IN THE CENTRE OF MOSCOW
DORMITORY - ONE OF THE BEST IN RUSSIA

A DESTINATION OF CHOICE FOR YOUNG SCHOLARS



Young scholars publications 2014-2016

317

0.9

SNIP

Number of postdocs, 2016

21

WORLD-CLASS FACULTY



70 researchers
h-index > 20

Ensure **100% StrAUs** students collaborate in research teams with world-class scientists



We leverage the NUST MISIS leading position in Engineering and Materials Science to deliver economically viable innovations

Achievements

Plans for 2017

WORLD-CLASS RESEARCH IN STEM FIELDS



Publications in top-25% journals by SNIP for 5 years

#1 Engineering
349

#1 Materials Science
559

#1 Position among Project 5-100 participants*

- Enhanced standards for research activity with focus on world-class publications



Elena Bazanova, the Director of the Academic Writing Center

- Nurturing **new markets**, actively involving potential stakeholders
- Designing materials for **new rapidly developing industries**
- Facilitating **large scale projects** with existing partners, including pioneer joint R&D centre with RUSAL

STRONG TIES WITH CORPORATE WORLD



INFRASTRUCTURE FOR INNOVATIONS



- Centre for **Industrial Prototyping** of High Complexity
- FabLab

- Cross-cultural Collider
- Engineering Kitchen
- Office for Technology Transfer

ENTREPRENEURIAL EDUCATION AND CULTURE



- Russian student forum of youth entrepreneurship



Entrepreneurship modules in each educational program

2020 targets completion

*Source: Report by Elsevier Research Intelligence Analytical Centre, XVIII Conference-Workshop of Project 5-100



NUST MISIS aspires to shape global agenda on materials design and quantum technologies

Achievements

HIGH BRAND RECOGNITION



- **+61%** Publications about NUST MISIS in the leading Russian media*
- The leading conference on education in Russia



Jimmy Wales, the founder of Wikipedia

Plans for 2017

- Launching MISIS TED talks **TED^x**
- Scaling up summer schools for graduate Russian and international students



HIGH REPUTATION IN THE GLOBAL ACADEMIC COMMUNITY



MISIS standing in U.S. News Materials Science Rankings, 2017

#283



#2

Rank in Russia

#97

Global Research Reputation

- Becoming an indispensable partner in **Mega Science collaborations** by providing materials and engineering solutions



CONCENTRATION ON GLOBAL CHALLENGES



- **15 publications in top-1% journals** for 2014-2016 on quantum technologies, metamaterials, biomedicine, materials design

- Attracted a team of **110** world-class researchers



Improve life-expectancy and quality of life

Re-industrialize national economy

Engineer tools for scientific discovery



NUST MISIS champions interdisciplinary research at the junction of biomedicine, engineering and metamaterials

New functional materials and nanostructures with special electric and magnetic properties for hybrid sensor systems, therapy and diagnostics



Academic supervisor

Yu. Korchev, *h-index* – 41

Professor, Imperial College
London

StrAU:
“Materials Design”

StrAU
“Future Energy”

StrAU
“Quality of Life”

GLOBAL CHALLENGES

- **The increased prevalence of chronic diseases and persistently high mortality rates caused by oncological diseases**

RESEARCH TEAM

Kotelyanskiy V.
(Skoltech)

h-index **67**

Vazkes L.
(Complutense
University of Madrid)

h-index **53**

Majouga A.
(NUST MISIS,
Lomonosov MSU)

h-index **11**

NUST MISIS young
scholars

60+

BACKGROUND 2014-2016

22 publications in Top-10%
journals for 2014-2016 in
related research fields

- Laboratory “Biomedicine materials” funded by the Program 5-100
- High-tech R&D equipment
- Master’s program “Inorganic Nanomaterials”

RESULTS 2017-2020

75 publications in Top-10%
journals for 2017-2020

- Drugs that comprise the possibility of combination of therapy and diagnostics; magnetoelectric materials for advanced applications in nanoelectronics and spintronics
- Enter international market for a new generation of biomedical materials
- New Master’s program “Biomedical Nanomaterials and Nanotechnologies”

Budget: **750 mln rubles**, including confirmed co-financing – 250 mln rubles



Joint R&D centre with RUSAL lies in the heart of an engineering cluster bringing together leading industrial companies



Aluminium matrix composites and alloys



Academic supervisor

R. Valiev, *h-index* - 84

Professor, Ufa State Aviation
Technical University

StrAU:
“High-tech Moscow”

GLOBAL CHALLENGES

- Reindustrialization of developed economies
- Implementation of 3D printing for industrial production

RESEARCH TEAM

Smurov I. (NUST
MISIS, ENISE) *h-index* **29**

Eskin D.
(Brunel University) *h-index* **24**

Murashkin M.
(Saint Petersburg
State University) *h-index* **20**

Belov N.
(NUST MISIS) *h-index* **15**

NUST MISIS young
scholars **60+**

BACKGROUND 2014-2016

16 publications in Top-10%
journals for 2014-2016 in
related research fields

- Centre for Industrial Prototyping of High Complexity (Pirozhkov V., Director)
- Laboratory on additive and subtractive production based on cold spray and laser technologies
- R&D projects with RUSAL for 846 mln rubles during 2014-2016

RESULTS 2017-2020

40 publications in Top-10%
journals for 2017-2020

10 international patents for
2017-2020

2 bln rubles from related R&D
projects for 2017-2020

RUSAL will fund state of the art research, including publications in the top journals. This cooperation replicates the model of the most innovative American universities

Budget: **1050 mln rubles**, including confirmed co-financing – 550 mln rubles



NUST MISIS enhances international reputation taking a key role in developing materials for the LHCb and SHiP experiments at CERN

Prospective technological, methodical and material solutions for new physical effects searches



Academic supervisor

A. Golutvin, *h-index* – 51

Professor, CERN/Imperial College London

StrAU:
“High-tech Moscow”

GLOBAL CHALLENGES

- **Engineering instruments for scientific discoveries**

RESEARCH TEAM

Jacobsson R.
(CERN)

h-index **48**

Lindner R.
(CERN)

h-index **29**

Poluhina N.
(NUST MISIS, Russian Academy of Sciences)

h-index **21**

De Lellis G. (Istituto Nazionale di Fisica Nucleare-INFN)

h-index **21**

NUST MISIS young scholars

90+

BACKGROUND 2014-2016

25 publications in Top-10% journals for 2014-2016 in related research fields

- Center of international microscopy school; shared knowledge center of Metallurgy and Materials Engineering; magnet division
- Series of scanning and transmitting electronic microscopes; complex for preparing thin foil
- CERN internships for MISIS young scholars in 2015-2016

RESULTS 2017-2020

90 publications in Top-10% journals for 2017-2020

- New technologies and materials, including radiation hard scintillators, silicon sensors and emulsions.
- Technologies could find applications in a wide range of settings, from diagnostics to medical applications, and even space-exploration
- Two new joint Master’s programs with CERN and INFN

Budget: **750 mln rubles**, including confirmed co-financing – 250 mln rubles



Collaboration with experiments at CERN offers MISIS:

Unique range of particle accelerator facilities that enable research at the forefront of human knowledge

Participation in world-class HEP (high-energy physics) research

Access to people from all over the world to push the frontiers of science and technology for the benefit of all

First-class learning in a high-tech, multicultural environment

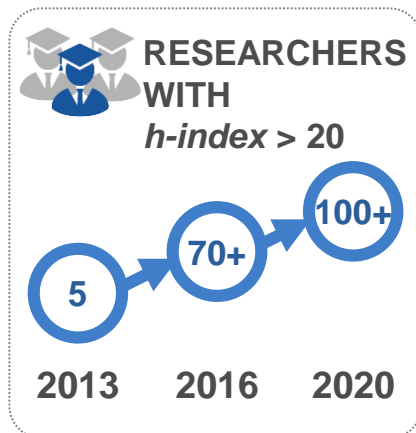
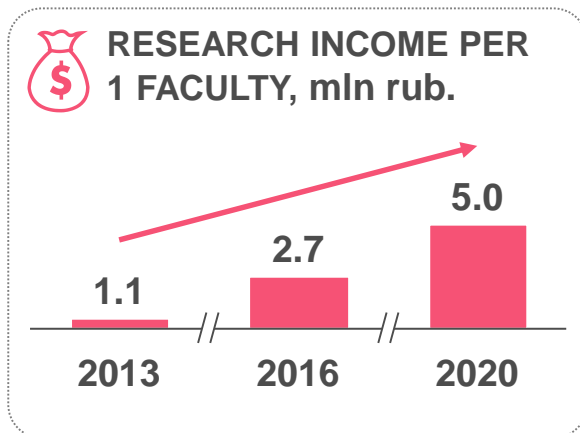
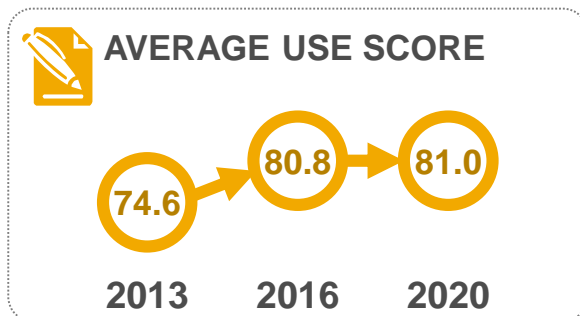
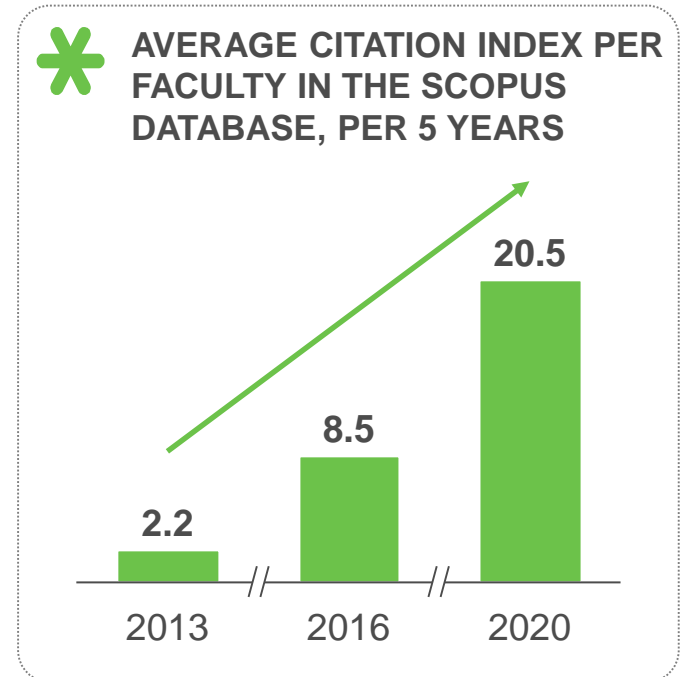
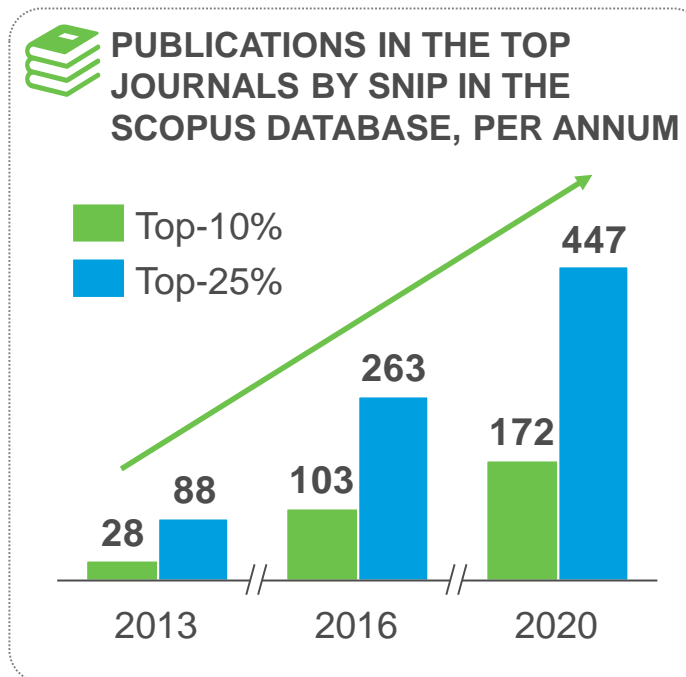
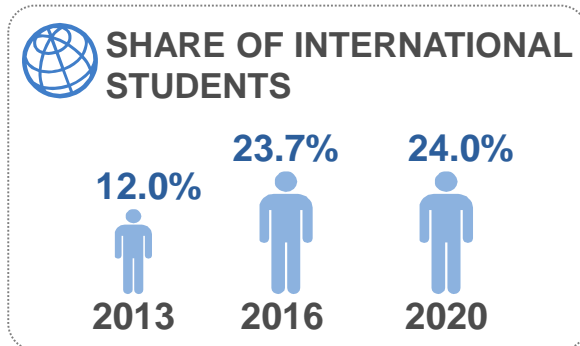
Great opportunities for young researchers from MISIS to accelerate their careers

Close collaboration between MISIS and CERN staff for applications to world-class HEP research

Strengthening of the ties between Russia and CERN



NUST MISIS remains steadily on track to achieve Roadmap 2020 goals



QS WORLD UNIVERSITY RANKINGS by subject 2017

| Subject | 2013 | 2016 | 2020 |
|------------------------------|---------|------|------|
| Mineral & Mining Engineering | 31 | #2 | #2 |
| Materials Science | 251-300 | #2 | #1 |
| Mechanical Engineering | 351-400 | #6 | #3 |

○ Rank in Russia