2021

Internship program of Skoltech MSc Students «Industrial Immersion»

Skolkovo Institute of Science and Technology

Skoltech project book
Content

1. Essentials of the program
2. Statistics
3. Program participants in 2021
4. Projects
   • Data Science & Information Science and Technology
   • Advanced Manufacturing Technologies
   • Petroleum Engineering
   • Energy Systems
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   • Photonics and Quantum Materials
   • Space and Engineering Systems
   • Life Sciences
5. Contacts
**Essentials**

**Industrial immersion partner company** - industrial enterprise or organization of the industrial sector, a small innovative company, a subject of the Skolkovo ecosystem, an industry institute or an organization that realizes a project on governmental support of business development, accepting students for Industrial Immersion.

**Industrial Immersion project** focuses on a short-term development of assigned tasks of research, manufacturing or operational problems specified by the host company. Students solve the project task under supervision of a Skoltech professor or employee appointed to monitor the project. Results obtained within the project belong to the host Company.

**Terms:**
8 weeks during summer term
Assessment is carried out based on the report and poster
Host company: how to participate in the program

01. Propose technically attractive project
02. Provide equipped working places in the company’s office. Project implementation in the company’s environment is important for students’ exposure to a corporate culture
03. Assign an employee of the company to supervise the project/students
04. Develop a detailed technical task of the proposed project
05. Draw up a work plan with the students
06. Monitor the project progress
07. Accept results, assess report and approve project poster for Industry Day Conference.
# Statistics

<table>
<thead>
<tr>
<th>Field</th>
<th>Students</th>
<th>Companies</th>
<th>Projects</th>
<th>Team Projects</th>
<th>Format online</th>
<th>Format offline</th>
<th>Format hybrid</th>
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<tbody>
<tr>
<td>Data Science</td>
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<td>Advanced Manufacturing Technologies</td>
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<td>Photonics and Quantum Materials</td>
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<td>13</td>
<td>17</td>
<td>4</td>
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<tr>
<td>Space and Engineering Systems</td>
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<td>12</td>
<td>17</td>
<td>7</td>
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<td>4</td>
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<tr>
<td>Life Sciences</td>
<td>39</td>
<td>19</td>
<td>36</td>
<td>3</td>
<td>12</td>
<td>4</td>
<td>20</td>
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</tbody>
</table>

**Bcero**

|                    | 266 | 116 | 218 | 38 | 122 | 57 | 39 |

48 Companies — Skolkovo residents

20 Companies — Skoltech startups inclusively
27% LARGE COMPANIES

- 22% STATE
- 78% PRIVATE

59% RUSSIAN
41% INTERNATIONAL*

8% MEDIUM-SIZED COMPANIES

- 0% STATE
- 100% PRIVATE

60% RUSSIAN
40% INTERNATIONAL*

64% SMALL COMPANIES & MICRO-ENTITIES

- 1% STATE
- 99% PRIVATE

91% RUSSIAN
9% INTERNATIONAL*

* including Russian companies with foreign capital
Companies - program participants in 2021

1. Academy of Management. Russian Ministry of the Interior
2. Adoptomedia
3. Arrival Robotics
4. Art.Lebedev
5. Biomimetix
6. BostonGene
7. Boeing
8. Big Three
9. Center for Testing, Certification, Standardization of Functional Materials and Technologies
10. CityAir
11. CML
12. Collins aerospace
13. Core Technologies
14. Cryptochemistry
15. Dance School online
16. Deco Geophysical
17. Dentistry center Vysshaya Shkola
18. Digital Petroleum
19. D-Orbit
20. DokaGene. Phytoengineering Research center
21. EVRAZ
22. EvoCargo
23. Farmadoc
24. FitPlay
25. Gazpromneft - Digital Solutions
26. Gazprom VNIIGAZ
27. Gazpromneft NTC
28. Gazpromneft – Technological Partnerships
29. Generuim
30. Genetico
31. Geonom
32. Geonaft
33. GeoAlert
34. Hait.ai
35. Head Kraken
36. Hevel
37. Huawei
38. IBM
39. IN3D
40. Intel
41. Insilico
42. InEnergy
43. IPG
44. Ira Labs
45. IT universe
46. K
47. KAMAZ Innovation Center
48. Key to Energy
49. Kintech
50. LabAdvance
51. Lenta
52. LyghtJet
53. M&S decisions
54. Market Council
55. Milaboratory
56. MMK - Informservice
57. Motorica
58. MolTech
59. MRM Proteomics R
60. Mehrafarid Saizh Parsian Co.
61. Nanosemantics Lab
62. Native Robotics
63. Neurotrend
64. Nissan
65. Novaprint 3D
66. New Spintronic Technologies
67. Numerical Engineering platform
68. O3-Coatings
69. Oz Forensics
70. OZNA
71. Pertamina Hulu
72. Piklema Predictive
73. PNPPK
74. PrimeBioMed
75. Ptt
76. RamMics
77. Rosneft - Bashneft Research Institute
78. Rosseti Belgorod
79. Russian Quantum Center
80. RT-Climate
81. Rustor
82. Samsung
83. SberBank
84. SberHealth
85. SberMarket
86. Scontel
87. Semantic Hub
88. SIMETRA
89. Siberian Generating Company
90. Sibur PolyLab
91. Skolkovo Gymnasium
92. SMA
93. Smart solutions
94. SOKO
95. Spark Beyond
96. Spekt - M
97. Stochastic Analysis Lab. HSE
98. Syntelly
99. TekhnoScan
100. Tensor Fields
101. Tesart
102. TetraQuant
103. Tevian
104. Tion
105. Tirphotonics
106. Topaz
107. Tsuru Robotics
108. Twin3D
109. Vector
110. VisionLabs
111. VNIIneft
112. VNII Dukhova. Rosatom
113. Vyksa metallurgical plant. OMK
114. WareVision
115. Watts battery
116. Yandex
<table>
<thead>
<tr>
<th>Projects areas</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Data Science</strong></td>
<td>machine Learning, Data Analytics, Artificial Intelligence, IoT</td>
</tr>
<tr>
<td><strong>Information Science &amp; Technology</strong></td>
<td>cyber-physical systems, additive technologies, composite materials, Industrial robotics, thermal spray and functional coatings, mechanical testing</td>
</tr>
<tr>
<td><strong>Advanced Manufacturing Technologies</strong></td>
<td>systems Engineering (+MBSE), the Earth remote sensing image processing, small space devices, robotics, machine learning</td>
</tr>
<tr>
<td><strong>Space and Engineering Systems</strong></td>
<td>laser technologies, hybrid photonic/optoelectronic quantum devices, spectroscopy, nanomaterials</td>
</tr>
<tr>
<td><strong>Photonics and Quantum Materials</strong></td>
<td>smart grids, energy markets, power electronics; power systems modeling and optimization; energy storage and renewable energy; monitoring and control of power systems; microgrids</td>
</tr>
<tr>
<td><strong>Energy Systems</strong></td>
<td>EOR, drilling geomechanics, mathematical modelling, unconventional and hard to recover hydrocarbons, geophysics, basin modelling, seismic modeling and interpretation, data-driven reservoir characterization, machine learning based resource allocation</td>
</tr>
<tr>
<td><strong>Petroleum Engineering</strong></td>
<td>materials for electrochemical energy storage</td>
</tr>
<tr>
<td><strong>Life Sciences</strong></td>
<td>bioinformatics, drug discovery, agro biotech, neurotechnologies, medical software</td>
</tr>
</tbody>
</table>
Students: 110
Companies: 37
Projects total: 90
Team projects: 15
Online projects: 73
Offline projects: 12
Hybrid projects: 5

1. Academy of Management. Russian Ministry of the Interior
2. Adoptomedia
3. Art.Lebedev
4. Dance School online
5. EVRAZ
6. EvoCargo
7. FitPlay
8. Haut.ai
9. Head Kraken
10. Huawei
11. IN3D
12. Intel
13. Ira Labs
14. KAMAZ Innovation Center
15. Lenta
16. MMK-Informservice
17. Motorika
18. MRM Proteomics R
19. Nanosemantics Lab
20. Oz Forensics
21. Pklema Predictive
22. Samsung
23. SberBank
24. SberHealth
25. SberMarket
26. Siberian Generating Company
27. SIMETRA
28. SOKO
29. Spark Beyond
30. Stochastic Analysis Lab. HSE
31. Syntelly
32. Tensor Fields
33. Tesart
34. Tevian
35. Twin3D
36. VisionLabs
37. Yandex

Industrial Immersion Coordinator
Maria Pukalchik
Automatic analysis of publications in the media, determination of the sentiment of publications and their visualization

Skoltech supervisor
Maria Pukalchik
Hybrid

Development of an econometric model for evaluating the effectiveness of advertising investments

Skoltech supervisor
Pavel Osinenko
online

Generating images from a text description

Skoltech supervisor
Ivan Oseledets
offline

Development of algorithms for a step-by-step dance training system based on neural networks

Skoltech supervisor
Andrey Somov
online

Development of an expert system for Coke Oven Battery No1.

Skoltech supervisor
Ivan Oseledets
Online

Development of a neural network model for determining the lane

Skoltech supervisor
Maxim Panov
online
<table>
<thead>
<tr>
<th>Project Title</th>
<th>Supervisor(s)</th>
<th>Type</th>
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</thead>
<tbody>
<tr>
<td>Development of a prototype of a system of following cars in a column</td>
<td>Skoltech supervisor, Maria Pukalchik</td>
<td>online</td>
</tr>
<tr>
<td>FitPlay</td>
<td>Skoltech supervisor, Maria Pukalchik</td>
<td>online</td>
</tr>
<tr>
<td>Development of AI methods for human pose estimation and physical activity identification in conditions of fitness centres</td>
<td>Skoltech supervisor, Maria Pukalchik</td>
<td>online</td>
</tr>
<tr>
<td>Development of an algorithm for detecting skin on various images of body areas</td>
<td>Skoltech supervisor, Dmitry Dylov</td>
<td>hybrid</td>
</tr>
<tr>
<td>Development of an algorithm for decomposition of skin images into interpretable components</td>
<td>Skoltech supervisor, Maria Pukalchik</td>
<td>online</td>
</tr>
<tr>
<td>Al-assistance for Epilepsy detection and segmentation</td>
<td>Skoltech supervisor, Maxim Panov</td>
<td>online</td>
</tr>
<tr>
<td>Analysis of psycho-emotional and physical conditions of eSports players</td>
<td>Skoltech supervisor, Andrey Somov</td>
<td>online</td>
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</table>
Data Science. Information Science & Technology

Development of a model for estimating the uncertainty of the position and orientation of pedestrians based on signals from inertial sensors

Skoltech supervisor
Gonzalo Ferrer

Errors in wireless communication systems and their impact on spatial multiplexing in massive MIMO

Skoltech supervisor
Maria Pukalchik

Topological Data Analysis for NL

Skoltech supervisor
Alexander Bernstein

High-fidelity portrait segmentation

Skoltech supervisor
Vladimir Spokoiny

Development of high throughput parallel decoding algorithms for polar codes

Skoltech supervisor
Alexey Frolov

Development of algorithms for simulation and improvement of the optical system based on Zernike polynomials

Skoltech supervisor
Andrzej Cichocki
<table>
<thead>
<tr>
<th>Skoltech supervisor</th>
<th>Research Area</th>
<th>Online Status</th>
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<tbody>
<tr>
<td>Evgeny Burnaev</td>
<td>Analysis and construction of the 3D mesh segmentation network algorithm</td>
<td>online</td>
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<tr>
<td>Alexey Frolov</td>
<td>Shelf estimation in soft decoding of spatially related codes like Staircase and oFEC</td>
<td>online</td>
</tr>
<tr>
<td>Alexey Zaytsev</td>
<td>Adversarial attacks for machine translation problems</td>
<td>offline</td>
</tr>
<tr>
<td>Ivan Oseledets</td>
<td>Development of tissue simulation algorithms using neural networks</td>
<td>online</td>
</tr>
<tr>
<td>Sergey Rykovanov</td>
<td>Development of new tools and hybridization of GPU application in HPC</td>
<td>online</td>
</tr>
<tr>
<td>Mikhail Belyaev</td>
<td>Automatic body composition analysis using medical image segmentation</td>
<td>online</td>
</tr>
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</table>
Active learning in the problem of analyzing large samples of medical images

-Skoltech supervisor
Maxim Panov
online

Development of a method for visualizing pathologies of great vessels based on automatic analysis of medical images

-Skoltech supervisor
Mikhail Belyaev
online

Development of industrial computer vision methods for unmanned vehicles

-Skoltech supervisor
Maria Pukalchik
online

Development of an analytical predictive model for predicting incoming traffic to retail stores and organizing the work of the checkout line without queues

-Skoltech supervisor
Pavel Osinenko
online

Forecasting the prices of hot rolled coils on the basis of FOB Black Sea

-Skoltech supervisor
Andrzej Cichocki
online

Monitoring of physiological parameters when controlling a bioelectric hand prosthesis

-Skoltech supervisor
Mikhail Lebedev
online
Blood biomarkers assessment by highly multiplexed proteomics mass spectrometry based quantitative tests for precision medicine

Ivan Oseledets, Christoph Borchers

Multilingual speech synthesis with preservation of natural language accent

Ivan Oseledets

Development of a module for filtering an incoming audio stream containing human speech from background noises affecting the operation of keyword spotting models using deep learning

Maxim Fedorov

Development of algorithms for identity verification by voice

Nikolay Brilliantov, Ivan Oseledets, Sergey Rykovannov

Development of algorithms for determining gender, age and emotions by voice

Alexey Vishnyakov

Development of algorithms for generating chatbot responses using neural networks

Mikhail Belyaev, Alexey Frolov, Alexander Panchenko
Development of an algorithm that makes it possible to increase the efficiency of biometric identification by using a variety of face images in the video sequence

Skoltech supervisor
Maria Pukalchik

Improving sound quality with reduced bandwidth using deep generative models

Skoltech supervisor
Evgeny Burnaev, Maria Pukalchik

Skoltech supervisor
Pavel Osinenko

Digital driver advisor to optimize your driving style

Development of decision support system to optimize driving style

Skoltech supervisor
Dmitry Yarotsky, Andrey Somov

Neural image-based rendering without test-time optimization

High resolution video synthesis for single image reenactment

Skoltech supervisor
Maria Pukalchik

Skoltech supervisor
Victor Lempitsky
Improving quality and efficiency of diffusion denoising probabilistic models

Integration of a full-body avatar generating model into an Android AR application

Personalized portrait editing

Development of a training method for the depth of completion of models on mixtures of datasets

Camera pose confidence estimation for visual localization task

Training Discrete Hidden Variable Models

Skoltech supervisor

Skoltech supervisor

Skoltech supervisor

Skoltech supervisor

Skoltech supervisor

Skoltech supervisor
<table>
<thead>
<tr>
<th>Company</th>
<th>Project Description</th>
<th>Supervisor</th>
<th>Collaboration Type</th>
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<tr>
<td>SAMSUNG</td>
<td>Creation of photorealistic avatars using 3D neural network methods</td>
<td>Dmitry Dylov</td>
<td>online</td>
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<tr>
<td>SAMSUNG</td>
<td>Development of interactive segmentation models</td>
<td>Victor Lempitsky</td>
<td>online</td>
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<td>SAMSUNG</td>
<td>StyleGAN distillation for feed-forward video synthesis</td>
<td>Pavel Osinenko</td>
<td>online</td>
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<tr>
<td>SBER BANK</td>
<td>Uncertainty estimation for reliable and accountable medical diagnostics via Transformer-based text classification models</td>
<td>Alexander Panchenko</td>
<td>online</td>
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<td>SBER BANK</td>
<td>Aggregation of heterogeneous data in deep learning models</td>
<td>Alexey Zaytsev</td>
<td>online</td>
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<tr>
<td>SBER BANK</td>
<td>Methods for extraction of communities in large networks based on clustering and link prediction</td>
<td>Alexey Zaytsev</td>
<td>online</td>
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Vehicle motion prediction, data-driven approach

Modern approaches to assessing the sensitivity of demand based on uplift models and neural networks

Visual SLAM algorithm using semantic information in wheeled robots

Pedestrian motion prediction, data-driven approach

Data engineering for signals for legacy human computer interface

Embeddings of categorical features for RNNs

Skoltech supervisor

Gonzalo Ferrer

online

Skoltech supervisor

Gonzalo Ferrer

online

Skoltech supervisor

Maria Pukalchik

offline

Skoltech supervisor

Alexey Zaytsev

online

Skoltech supervisor

Gonzalo Ferrer

online

Skoltech supervisor

Alexey Zaytsev

online
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<th>Project</th>
<th>Description</th>
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<th>Online</th>
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<tr>
<td><strong>SBER BANK</strong></td>
<td>Analysis of credit risk leading indicators based on transaction embeddings</td>
<td>Alexey Zaytsev</td>
<td>online</td>
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<tr>
<td><strong>СБЕР ЗДОРОВЬЕ</strong></td>
<td>Recognition of the voice command of the recording to the doctor in the audio files of the call center</td>
<td>Andrey Somov</td>
<td>online</td>
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<tr>
<td><strong>СБЕР МАРКЕТ</strong></td>
<td>Development of methods for predicting customer churn</td>
<td>Andrey Somov</td>
<td>online</td>
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<tr>
<td><strong>СБЕР МАРКЕТ</strong></td>
<td>Development of ML classification of customers by demographic features and purchase history</td>
<td>Dmitry Yudin</td>
<td>offline</td>
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<tr>
<td><strong>СБЕР МАРКЕТ</strong></td>
<td>Forecasting the number of service orders</td>
<td>Vladimir Spokoiny</td>
<td>online</td>
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<tr>
<td><strong>SBER MARKET</strong></td>
<td>Enrichment of transport network graph data based on satellite images and / or DVR data (georeferenced video)</td>
<td>Vladimir Palyulin</td>
<td>online</td>
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</tbody>
</table>
Development of a service for standardization of FIAS address records

Skoltech supervisor
Maria Pukalchik

Data-driven parameters estimation for decentralized finance

Skoltech supervisor
Maria Pukalchik

Using machine learning for design and investigation of a multi-layered absorbing material with tunable parameters for FDTD simulations

Skoltech supervisor
Maria Pukalchik

Development of methods for assessing inhomogeneities

Skoltech supervisor
Ivan Oseledets

Artistic molecular structure visualization

Skoltech supervisor
Petr Popov

Artistic molecular structure visualization

Skoltech supervisor
Maria Pukalchik
Development of AI system for detecting phenotypic stages of plant

Time Series and Sequence Pattern Analysis and Insights

Environment-based descriptor for molecules

Applying Mask-R-CNN and RetinaNet Deep Learning Models to Recognize and Predict Apple Decay

Application of deep learning models to recognize individual signs of growth and development of apple trees

Assimilating remote sensing information into the crop simulation models
Data Science. Information Science & Technology

Signal generation and processing for narrowband IoT systems

Skoltech supervisor
Dmitry Lakontsev
offline

Development of algorithms for detecting fake documents by photo and video

Skoltech supervisor
Alexey Zaytsev
offline

Development of algorithms for detecting different tables based on photo

Skoltech supervisor
Evgeny Burnaev
offline

Few-shot photorealistic 3D face reconstruction

Skoltech supervisor
Maria Pukalchik
online

Development of IoT PCB for shooting triggers of DSLR cameras

Skoltech supervisor
Dmitry Yudin
online

Improving 3D human reconstruction with Novel view synthesis and super-resolution

Skoltech supervisor
Alexey Zaytsev
online
Variance reduction in Monte Carlo and Markov Chain Monte Carlo algorithms with applications

Skoltech supervisor
Vladimir Spokoiny
online

One shot liveness detection algorithm improvement on replay testset

Skoltech supervisor
Ivan Oseledets
online

Depth Inpainting: Dynamic Objects’ Point Cloud Registration

Skoltech supervisor
Maxim Panov
offline

Development of methods and approaches to segmentation of the lidar cloud and lidar points

Skoltech supervisor
Ferrer Gonzalo
offline

Computer vision to automate the production of HD maps for a drone

Skoltech supervisor
Dmitry Dylov
hybrid

Development of conversion and semantic search methods

Skoltech supervisor
Maria Pukalchik
offline
Advanced Manufacturing Technologies

Students 16
Companies 13
Projects total 14
Team projects 1
Online projects 6
Offline projects 5
Hybrid projects 3

1. Arrival Robotics
2. Boeing
3. BIG Three
4. Center for Testing, Certification, Standardization of Functional Materials and Technologies
5. CML
6. Collins Aerospace
7. Gazpromneft - Digital Solutions
8. IPG
9. Numerical Engineering platform
10. O3-Coatings
11. Rosneft - Bashneft Research Institute
12. Sibur PolyLab
13. Vyksa metallurgical plant. OMK

Industrial Immersion Coordinator
Dmitry Krasovsky
Development of an automated system for selecting the manipulator grip applicable to a particular part

Skoltech supervisor
Igor Uzhinsky
online

Machine Learning for Flat Plate Buckling Prediction

Skoltech supervisor
Sergey Abaimov
offline

Analysis of garbage container occupancy data for the creation of electronic services in the field of solid waste management

Skoltech supervisor
Igor Uzhinsky
offline

Analysis of thermoplastic pultrusion composites

Skoltech supervisor
Alexander Safonov
offline

FE analysis of dynamic processes (NVH, strength) in an electric truck chassis parts

Skoltech supervisor
Igor Uzhinsky
online

Optimization of the machining process for the obtained geometric features

Skoltech supervisor
Sergey Abaimov
hybrid
Evaluation of the prospects for the practical application of 3D printing of ceramic products in the framework of the programs for the development of new materials of Gazpromneft

Skoltech supervisor
Igor Shishkovsky hybrid

Laser treatment of coatings obtained by Cold Gas-Dynamic Sputtering

Skoltech supervisor
Dmitriy Dzhurinskiy offline

Numerical calculation of detonation in a channel with obstacles

Skoltech supervisor
Aslan Kasimov offline

Analysis of one model of hyperbolic systems on the basis of dynamic mode decomposition

Skoltech supervisor
Aslan Kasimov online

Study of electrochemical properties of protective coating materials, including analysis of industry standards API-571, NACE MR0175

Skoltech supervisor
Dmitriy Dzhurinskiy online

Machine learning algorithm for automatic determination of the number of modes for studies at steady-state production / injection modes

Skoltech supervisor
Sergey Abaimov online
## Advanced Manufacturing Technologies

<table>
<thead>
<tr>
<th>SIBUR PolyLAB</th>
<th>Sk resident</th>
<th>1</th>
<th>Designing injection molds for recycled materials</th>
<th>Skoltech supervisor</th>
<th>Igor Shishkovsky</th>
<th>hybrid</th>
</tr>
</thead>
<tbody>
<tr>
<td>OMK - metallurgical plant Vyksa</td>
<td>Development of an algorithm for detecting microstructure boundaries</td>
<td>Skoltech supervisor</td>
<td>Igor Uzhinsky</td>
<td>online</td>
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</tr>
</tbody>
</table>
Petroleum Engineering

Students 21
Companies 11
Projects total 18
Team projects 2
Online projects 9
Offline projects 9

1. Deco Geophysical
2. Digital Petroleum
3. Gazprom VNIGAZ
4. Gazpromneft NTC
5. Gazpromneft – Technological Partnerships
6. Geonaft
7. LabAdvance
8. OZNA
9. Pertamina Hulu Indonesia
10. SMA
11. VNIIneft

Industrial Immersion Coordinator
Natalia Kiani
Petroleum Engineering

Development of geological models building techniques based on seismoacoustic survey data

Skoltech supervisor
Dmitry Pissarenko
online

Hydrocarbon reserves mapping based on material balance models of reservoir

Skoltech supervisor
Dmitry Koroteev
online

Petrophysical property estimation in target well with help of Kriging and data from neighboring wells.

Skoltech supervisor
Dmitry Koroteev, Alexey Tchistiakov
online

Development of a numerical model of hydrate deposition in wells producing gas from low-temperature fields

Skoltech supervisor
Vladimir Istomin
online

Analysis of the applicability of the VOI methodology for assessing the conduct of well logging and laboratory studies of the core

Skoltech supervisor
Dmitry Koroteev, Mikhail Spasennykh, Yuri Popov
online

Mathematical modeling of multiphase flow in the process of cleaning of a hydraulic fracture and bringing the well into operation

Skoltech supervisor
Andrey Osiptsov
offline
EOR agent selection based on 3D digital core model

Skoltech supervisor
Alexey Cheremisin

Spectral decomposition of the wave field

Skoltech supervisor
Sergey Stanchits

Identifying anomalies in time series based on parameterizing a nonlinear manifold

Skoltech supervisor
Dmitry Koroteev

Interpretability of geological relationships within fluid flow simulation of semi-synthetic field case

Skoltech supervisor
Alexey Cheremisin

Rheological properties of alternative fracturing fluids

Skoltech supervisor
Andrey Osiptsov

Application of the results of 3D geomechanical modeling of the reservoir for solving practical problems in the well construction and in the field operation

Skoltech supervisor
Alexey Tchistiakov
Experimental studies using microfluidic technology

Skoltech supervisor
Alexey Cheremisin offline

Production testing of the wells with Mobile test separator “Massomer” located on truck

Skoltech supervisor
Andrey Osiptsov offline

Sample preparation of geological samples for microtomography and electron microscopy

Skoltech supervisor
Alexey Cheremisin offline

Study of the relationship between leaching zones and sequence-stratigraphic surfaces in carbonate reservoirs

Skoltech supervisor
Alexey Tchistiakov online

Carbonate Reservoir Characterization in the Bekapai Field, Mahakam Delta, Kutai Basin, Indonesia

Skoltech supervisor
Alexey Tchistiakov offline

Influence of sequence-stratigraphic boundaries on the distribution of zones of diagenetic cementation in carbonate reservoirs

Skoltech supervisor
Alexey Tchistiakov online
### Energy Systems

<table>
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</table>

1. Key to Energy  
2. Market Council  
3. Mehrfarid Sazeh Parsian  
4. Rosseti Belgorod  
5. Tion  
6. Topaz  
7. Watts battery

---

Industrial Immersion Coordinator  
Ekaterina Guseva
Energy Systems

Optimization of the Power To Gas Model in the Long-Term Scenario for the Russian / Italian Energy Market

Skoltech supervisor
David Pozo
online

Integration of 100 number of 5 KW PV sites into the national power grid through PowerFactory software

Skoltech supervisor
Petr Vorobev
online

Development of a high-quality measurement system for energy storage devices

Skoltech supervisor
Petr Vorobev
online

Development of the principle (algorithm) for the formation of a multi-zone maintenance rate as part of the tariff for services for the transmission of electricity through the networks of territorial grid organizations

Skoltech supervisor
David Pozo
online

Development of an algorithm (methodology) for generating a price signal for a power transmission service (rate for maintenance and technological consumption - power losses) for a consumer or a group of consumers, depending on the flow of electricity in the supply network infrastructure

Skoltech supervisor
David Pozo
online

Development of an integrated environment for creating “digital twins” and modeling the indoor climate

Skoltech supervisor
Henni Ouerdane
online
Energy Systems

Optimizing New Methods for Efficient Electrochemical Energy Storage

Henni Ouerdane
Skoltech supervisor
online

Design and implementation of a modular system for MPPT solar panel controllers

Federico Ibanez
Skoltech supervisor
hybrid
# Materials Science

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<th>Students</th>
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<td>Hybrid projects</td>
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</tr>
</tbody>
</table>

1. Biomimetix
2. CityAir
3. Core Technologies
4. Cryptochemistry
5. Hevel
6. InEnergy
7. K+
8. Kintech
9. Nissan
10. Novaprint 3D
11. Ptt
12. Rustor
13. TetraQuant
14. Vector

---

**Industrial Immersion Coordinator**

Ekaterina Guseva

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Skoltech
Materials Science

Study of the features of self-healing processes in hydrogels based on polyvinyl alcohol
Skoltech supervisor
Alexey Salimon

Development of sensor systems for selective monitoring of gas environments
Skoltech supervisor
Fedor Fedorov

Automation the elastic tensor calculations combined with Machine learning interatomic potentials with Active learning
Skoltech supervisor
Artem Oganov

Replication of Crystal GAN for superconducting hydrides
Skoltech supervisor
Artiom Oganov

Fabrication and characterization of perovskite/silicon tandem solar cells
Skoltech supervisor
Aleksandra Boldyreva

Development of a method for assessing the degree of charge of a vanadium flow battery
Skoltech supervisor
Victoria Nikitina
<table>
<thead>
<tr>
<th>Title</th>
<th>Supervisor(s)</th>
<th>Type</th>
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<tbody>
<tr>
<td>Fabrication of electrodes based on hard carbon and their characterization by Raman spectroscopy. Synthesis of high-voltage cathode material KVPO4F and characterization of its electrochemical properties</td>
<td>Sergey Ryazantsev, Stanislav Fedotov</td>
<td>hybrid</td>
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<tr>
<td>Calculation of defect properties in metal oxides</td>
<td>Sergey Levchenko</td>
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<tr>
<td>Finding ways to improve low-temperature lithium-ion batteries for use in electric cars</td>
<td>Stanislav Fedotov</td>
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<tr>
<td>Analysis of promising thermoelectric materials for efficient conversion of thermal energy using the magnetocaloric effect</td>
<td>Andriy Zhugayevych</td>
<td>online</td>
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<tr>
<td>Critical analysis of the development of elastomers and new devices based on them</td>
<td>Dmitry Krasnikov</td>
<td>online</td>
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</table>

*Note: The terms 'Skoltech startup' and 'offline' are used to denote different types of presentations or projects.*
<table>
<thead>
<tr>
<th>Project</th>
<th>Description</th>
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<th>Status</th>
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<tr>
<td>RUSTOR</td>
<td>Development of a method for obtaining gas-tight membranes based on LLZO as an electrolyte in solid-state lithium-ion batteries. Computer simulation of charge transfer via the Li / Li interface</td>
<td>Skoltech supervisor, Alexandra Savina, Dmitry Aksenov</td>
<td>hybrid</td>
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<td>RUSTOR</td>
<td>Development of a hydrothermal method for the synthesis of cathode materials based on layered transition metal oxides</td>
<td>Skoltech supervisor, Alexandra Savina</td>
<td>hybrid</td>
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<tr>
<td>RUSTOR</td>
<td>Review of Lithium Conducting Solid State Electrolytes: Approaches for Thin, Hybrid and Safe Materials</td>
<td>Skoltech supervisor, Mariam Pogosova</td>
<td>online</td>
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<tr>
<td>RUSTOR</td>
<td>Development of the methods for Au nanoparticle production in the reactor CR-1B</td>
<td>Skoltech supervisor, Dmitry Gorin</td>
<td>offline</td>
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<tr>
<td>TetraQuant</td>
<td>Cortisol biosensor based on semiconductor carbon nanotubes</td>
<td>Skoltech supervisor, Fedor Fedorov</td>
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Phononis and Quantum Materials

<table>
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<tr>
<th>Category</th>
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<td>Hybrid projects</td>
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</table>

1. Cryptochemistry
2. Dentistry center Vyshaya Shkola
3. IBM
4. Novaprint 3D
5. New Spintronic Technologies
6. PNPPK
7. RamMics
8. RQC
9. Scontel
10. Spektr-M
11. TekhnoScan
12. Tirfotonics
13. VNIIA Dukhova. Rosatom

Industrial Immersion Coordinator
Dmitry Krasnikov

Skoltech
Photonics and Quantum Materials

Development of methods for mathematical processing of medical images with the calculation of physical and mechanical characteristics of biological tissues

Sergey Rykovanov

Switching time and bandwidth of organic polariton gates

Pavlos Lagoudakis

Segmentation and analysis of the coding devices and nanomaterials market

Dmitry Krasnikov

Verification of the protocol for assessing the smell of food polymers

Fedor Fedorov

Computer simulation of a magnetic logic element at the position of the domain boundary

Dmitry Krasnikov

Optimization of the radiating semiconductor structure of the near-infrared range

Dmitry Krasnikov
Photonics and Quantum Materials

Development of an analytical database of Raman spectra of gases and gas mixtures. Creating a software package for working with a medical spectrometer
Skoltech supervisor
Dmitry Krasnikov  offline

Development of methods for creating optical sensors for determining trace amounts of molecules. Optimization of the morphology of metal nanostructures on the dielectric surface in order to create highly sensitive optical sensors for detecting biological molecules
Skoltech supervisor
Dmitry Krasnikov  offline

Optimization of the sensitivity of sub-THz frequency range detectors
Skoltech supervisor
Dmitry Krasnikov  offline

Study of the interaction of exciton-polariton condensates using optically-induced potentials
Skoltech supervisor
Pavlos Lagoudakis  offline

Study and design of an ultra-fast optical classifier based on spinor polariton lattice as an associative network
Skoltech supervisor
Mael Brossard  offline

Measurement of internal relaxation time in ultrathin NbN films
Skoltech supervisor
Dmitry Krasnikov  offline
Photonics and Quantum Materials

**Development of an analytical database of Raman spectra of gases and gas mixtures**

- Skoltech supervisor: Dmitry Krasnikov
- Offline

**Development of elements of femtosecond fiber lasers elements**

- Skoltech supervisor: Yurii Gladush
- Offline

**Development of ultrafast graphene-based photodetectors**

- Skoltech supervisor: Dmitry Krasnikov
- Offline

**Investigation of thermooptic properties of photonic integrated devices made of silicon nitride**

- Skoltech supervisor: Dmitry Krasnikov
- Offline

**Development of a measuring complex for quantum electronics elements in ultra-low temperatures**

- Skoltech supervisor: Dmitry Krasnikov
- Offline
## Space and Engineering Systems

<table>
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<td>Offline projects</td>
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<td>Hybrid projects</td>
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2. Boing        7. Native Robotics  
3. D-Orbit      8. Smart Solutions  
4. EvoCargo     9. RT-Climate  
5. GeoAlert     10. SOKO  

Industrial Immersion Coordinator  
Anastasia Ilina
Space and Engineering Systems

**Creation of algorithms for generating images from a text description**

Skoltech supervisor

Evgeny Burnaev

offline

**Development of algorithms for controlling the angular position of the platform of an unmanned vehicle with air suspension**

Skoltech supervisor

Dzmitry Tsetserukou

offline

**3D Variation Analysis auto-report project**

Skoltech supervisor

Tatiana Podladchikova

offline

**Conducting numerical experiments to develop new deep machine learning models**

Skoltech supervisor

Vladimir Ignatiev

offline

**System architecture study of on-orbit servicing (OOS) Infrastructure. Satellite constellations for internet of things connectivity for Earth observation**

Skoltech supervisor

Alessandro Golkar

online

**Lyght Jet**

Designing Vtol aircraft (vertical take-off and landing) powered by fuel cell

Skoltech supervisor

Anton Ivanov

hybrid

**Dzmitry Tsetserukou**

**Alessandro Golkar**

**Evgeny Burnaev**

**Skoltech supervisor**

**Tatiana Podladchikova**

**Skoltech supervisor**

**Vladimir Ignatiev**

**Skoltech supervisor**

**Anton Ivanov**

**Skoltech supervisor**
# Space and Engineering Systems

<table>
<thead>
<tr>
<th>Project</th>
<th>Description</th>
<th>Supervisor(s)</th>
<th>Methodology</th>
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<tr>
<td>Native Robotics</td>
<td>Development of a computer vision system for determining the pose of parts</td>
<td>Dzmitry Tsetserukou Skoltech supervisor</td>
<td>offline</td>
</tr>
<tr>
<td>Smart Solutions</td>
<td>CubeSat Attitude and Orbit Control Flight Software Verification and Validation</td>
<td>Anton Ivanov Skoltech supervisor hybrid</td>
<td>online</td>
</tr>
<tr>
<td>Smart Solutions</td>
<td>Design of intelligent control systems and technologies for constellations of small spacecraft (SSC)</td>
<td>Anton Ivanov Skoltech supervisor online</td>
<td>online</td>
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<tr>
<td>RT-CLIMATE</td>
<td>The use of a 3D-printed heat exchanger for space purposes in thermal installations for general economic purposes</td>
<td>Nikolay Mullin Skoltech supervisor online</td>
<td>online</td>
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<tr>
<td>Skoltech</td>
<td>Development of an algorithm for predicting high-speed solar wind fluxes and geomagnetic activity based on coronal holes in the Sun</td>
<td>Tatiana Podladchikova Skoltech supervisor online</td>
<td>online</td>
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<tr>
<td>SOKO</td>
<td>Development of Integrated Robotic Systems and Machine Learning Approaches for Agricultural Purposes</td>
<td>Anton Ivanov Skoltech supervisor hybrid</td>
<td>hybrid</td>
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</table>
## Space and Engineering Systems

### Development of a system for generating and conducting light shows of drones

- **Skoltech supervisor:** Dzmitry Tsetserukou
- **Status:** online

### Development and testing of a control system for a group of UAVs aimed at exploration purposes

- **Skoltech supervisor:** Dzmitry Tsetserukou
- **Status:** hybrid

### Creation of the SLAM algorithm for a delivery robot for work in street and city conditions

- **Skoltech supervisor:** Dzmitry Tsetserukou
- **Status:** offline

### Development of a prototype of a robot for the delivery of small-sized cargo

- **Skoltech supervisor:** Dzmitry Tsetserukou
- **Status:** online

### Development of the two-wheeled mobile platform for plant disease detection. Specific tasks: development of localization and navigation algorithms for autonomous work indoor and outdoor

- **Skoltech supervisor:** Dzmitry Tsetserukou
- **Status:** offline
Life Sciences

Students 39
Companies 19
Projects total 36
Team projects 3
Online projects 12
Offline projects 4
Hybrid projects 20

1. BostonGene
2. DokaGene.
   Phytoengineering Research center
3. Farmadoc
4. Generuim
5. Genetico
6. Geonome
7. Insilico
8. IRA labs
9. IT universe
10. M&S decisions
11. Milaboratory
12. MolTech
13. MRM Proteomics R
14. Neurotrend
15. PrimeBioMed
16. Skolkovo Gymnasium
17. Semantic Hub
18. SOKO
19. Syntelly

Industrial Immersion Coordinator
Vera Rybko
Annotation of T and B cell biomarker data. Creating a database of annotated biomarkers

Ranking of anticancer therapies based on predictive biomarkers

Clinical and molecule analytics of imaging projects

Development of methods for analysis of B cell repertoire

Identification and validation of expression signatures associated with the tumor microenvironment

Compositional analysis of tumor microenvironment

Skoltech supervisor
Vera Rybko hybrid
Optimization of the technology of pseudo-suspension cultivation of human mesenchymal stromal cells using microcarriers

Skoltech supervisor
Vera Rybko
offline

Expression and purification of adeno-associated viral particles from HEK293 cell line

Skoltech supervisor
Vera Rybko
offline

Review of bioinformatic approaches for somatic variants calling of NGS data on tumor samples

Skoltech supervisor
Vera Rybko
online

Heterologous expression of recombinant protein slpA in L. rhamnosus

Skoltech supervisor
Vera Rybko
hybrid

Development of PCR-based test systems for differential diagnosis of phytopathogenic bacteria Pectobacterium and Dickeya. PCR-based test systems development for phytopathogenic viruses differentiational diagnostics

Skoltech supervisor
Vera Rybko
online

Allergen immunotherapy competitive landscape analysis

Skoltech supervisor
Vera Rybko
online

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<tr>
<th>Life Sciences</th>
<th>Skoltech supervisor</th>
<th>Vera Rybko</th>
<th>online</th>
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<tr>
<td>Review of bioinformatic tools for analysis and interpretation of mitochondrial DNA variants using WGS data</td>
<td>Skoltech supervisor</td>
<td>Vera Rybko</td>
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<td>Geonome</td>
<td>Skoltech startup</td>
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<td>Estimating the parameters of oil well from its microbiom</td>
<td>Skoltech supervisor</td>
<td>Vera Rybko</td>
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<td>Geonome</td>
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<tr>
<td>Development of technical and scientific research documentation for microbiome products in the extractive industry</td>
<td>Skoltech supervisor</td>
<td>Vera Rybko</td>
<td>online</td>
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<tr>
<td>Geonome</td>
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<tr>
<td>Developing bioinformatic pipeline in oil metagenome analysis</td>
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<td>Vera Rybko</td>
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<tr>
<td>Development of the probabilistic models for differential gene expression</td>
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<td>Vera Rybko</td>
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<td>Geonome</td>
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<tr>
<td>Development of a strategy aimed at improvement of IRA Labs valuation</td>
<td>Skoltech supervisor</td>
<td>Vera Rybko</td>
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## Life Sciences

<table>
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<tr>
<th>Project Description</th>
<th>Supervisor</th>
<th>Type</th>
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<tbody>
<tr>
<td>Development of a clinical system for olfactory neurorehabilitation</td>
<td>Vera Rybko</td>
<td>offline</td>
</tr>
<tr>
<td>Investigation of different parametric time-to-event models for PFS and OS assessment in cancer</td>
<td>Vera Rybko</td>
<td>hybrid</td>
</tr>
<tr>
<td>Industrialization: validation and benchmarking of the M&amp;SD ODE solver in R system</td>
<td>Vera Rybko</td>
<td>hybrid</td>
</tr>
<tr>
<td>Development of an additional education program in biology and bioinformatics for secondary education students of natural sciences track</td>
<td>Vera Rybko</td>
<td>hybrid</td>
</tr>
<tr>
<td>Comparative analysis of vaccination technologies against tumor-associated antigens and tumor neoantigens</td>
<td>Vera Rybko</td>
<td>hybrid</td>
</tr>
<tr>
<td>Comparing algorithms for building and analysis of immunoglobulin trees</td>
<td>Vera Rybko</td>
<td>hybrid</td>
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</table>
Life Sciences

Investigation of vaccine X properties

Skoltech supervisor
Vera Rybko

Development of efficient algorithms for working with data in the BAM format for the analysis of TCR and BCR repertoire sequencing data

Skoltech supervisor
Vera Rybko

Application of neural networks for prediction of drug structure

Skoltech supervisor
Vera Rybko

Implementing a graph convolutional neural network (GCNN) for predicting affinity of a protein-ligand interaction

Skoltech supervisor
Vera Rybko

Compilation and visualization of the protein-disease associative graph

Skoltech supervisor
Vera Rybko

Analysis of Potential Protein Biomarkers for Cardiovascular Diseases

Skoltech supervisor
Vera Rybko
Life Sciences

Synthesis of proteotypic peptide standards for quantitative next-generation MS-based proteomics assays

Applying of electroencephalography in neuromarketing research

Tumor marker PMS2 antibody for immunohistochemistry development plan

Analysis of oncology patients' needs in the countries of Latin America as a basis for training AI-platform

Search for SNPs linked with valuable features of soy bean (Glycine max)

Molecular structure reconstruction from atomic densities

Skoltech supervisor
Vera Rybko

Skoltech supervisor
Vera Rybko

Skoltech supervisor
Vera Rybko

Skoltech supervisor
Vera Rybko
Contacts

Zhanna Turubarova  
Head of Industrial Studies  
8 (916) 288-37-88  
z.turubarova@skoltech.ru

Nadezhda Rylkova  
Specialist  
8 (985) 770-66-40  
n.rylkova@skoltech.ru

Industrial Studies  
Education Department  
industry@skoltech.ru