WHAT CAN YOU DO IN RUSSIA?

MISTI RUSSIA INTERNSHIPS 2020

Managing Director: Ekaterina Zabrovski
zabroves@mit.edu
ANISOPRINT
Location: Moscow/Skolkovo
Fields: 3D Printing, Engineering, Materials Science
Project: 3D printing of plastic parts reinforced with continuous fibers is one of the most prospective trends in additive technologies. A unique technology has been developed by the project team, which allows to produce composite material samples with the world’s highest strength and stiffness properties. In the future, the technology will allow to 3D print complex composite structures with unique mechanical properties, such as high stiffness and strength as well as optimized directional properties.
Requirements: None
Russian Language Requirement: None

Center for Strategic Research
Location: Moscow
Fields: 3 Think Tank, Political Science, Research
Project: Flexible
Requirements: None
Russian Language Requirement: None

COMNAVRUS
Location: Moscow/Skolkovo
Project: Modular GNSS receiver surveying class with the function “RTK everywhere.”
The project is aimed at creating a geodetic GNSS receiver. An important feature of the receiver is:
- Ability to work in “RTK everywhere” mode (without base stations) via SSR correction (mode of operation is already implemented by US as OEM devices)
- Modularity. Convenient extension of receiver functionality using external modules (via Wi-Fi connection), such as UHF or 3G / 4G / 5G modems
Requirements: None
Russian Language Requirement: None

Gaidar Institute for Economic Policy (think-tank)
Location: Moscow
Fields: Research, Economics, Business, Political Science
Project: Flexible
Requirements: None
Russian Language Requirement: None

Gulag Museum
Location: Moscow
Fields: Art, Research
Project: Flexible
Requirements: None
Russian Language Requirement: No

Higher School of Economics
Location: Moscow, St. Petersburg
Fields: All fields
Project: Flexible
Requirements: None
Russian Language Requirement: No

HoverSurf
Location: Moscow/Skolkovo
Fields: Engineering, Transportation, Sustainability
Project: HoverSurf: The Urban Air Mobility (UAM) Technology Company. One of the biggest world problems today is over-saturation of urban transportation infrastructure. None of the many conventional solutions (e.g., public transportation, tunnel projects, utility sharing, etc.) can really solve the problem due to the ever-growing urban population. The only real solution is for human kind to move to the sky.
HoverSurf is the only UAM company to approach this problem from non-conventional angle. Their sharp focus is on leveraging existing urban transport infrastructure when developing UAM vehicles.
Requirements: None
Russian Language Requirement: No

Institute of Electronics and Mathematics
I.
Location: Moscow
Fields: Physics, Photonics, Quantum Optics, Research
Requirements: None
Russian Language Requirement: Russian II for undergraduates, none for graduate students

II.
Location: Moscow
Fields: Telecommunication, Cryptography, Research
Project: Laboratory of Telecommunication Systems. The focus of the Laboratory is on theoretical and experimental studies in the field of Telecommunication systems, including such areas of research as coding/
communication theory, network protocols, optical and wireless information transmission, cryptography and information security. More information at MISTI Russia website: http://bit.ly/2v9EvPF

Requirements: None

Russian Language Requirement: Russian II for undergraduates, none for graduate students

III.
Location: Moscow
Fields: Engineering, Materials Science, Electronics, Photonics
Project: Laboratory for Modeling and Design of Electronic Components and Devices.
Possible projects:
1. Modeling and design of radiation- and temperature-resistant electronic components, including development of process&device (TCAD) and electrical compact (SPICE) models and methods for extraction of their parameters for bipolar, MOSFETs, BiCMOS, IGBT, SiGe, etc., transistors of various power.
2. Methods and means of measuring the properties of materials and devices in electronics and photonics
Requirements: None

Russian Language Requirement: Russian II for undergraduates, none for graduate students

IV.
Location: Moscow
Fields: Supercomputers, Bio, Chemistry, Physics, Research
Project: International Laboratory for Supercomputer Atomistic Modelling and Multi-scale Analysis.
Possible projects:
1. Molecular dynamics simulations of biomembranes.
2. Rheological properties of hydrocarbons from atomistic models.
3. Parallel graph pattern mining algorithms for anti-money laundering.
4. Properties of ice from GPU-accelerated molecular dynamics.
5. Particle simulation methods for complex plasmas
Requirements: None

Russian Language Requirement: Russian II for undergraduates, none for graduate students

The focus of the research group is on:
1. Theoretical and computational studies of collective phenomena in many-body systems.
2. Development of algorithms for numerical simulation and modeling of emergent behavior in many-body and multi-agent systems.
3. Applying ideas and methods of computational physics in other research fields.
Requirements: None

Russian Language Requirement: Russian II for undergraduates, none for graduate students

VI.
Location: Moscow
Fields: Engineering, Research
Project: Laboratory of IP-based Real Time Video Production
Possible projects:
1. Television equipment for RTSP thin-stream video, remote linear video editing, monitoring, streaming and recording.
2. Online services and hardware solutions for automation of camera and editor’s work. Full-auto multi-camera video production including AI human tracking and camera switching.
3. Video stream and signal monitoring, automation of expo/chroma correction for multicamera systems, flow control, etc.
4. Lecture capture systems, integration to information environment of the university.
Requirements: None

Russian Language Requirement: Russian II for undergraduates, none for graduate students

VII.
Location: Moscow
Fields: Big Data, Software Architecture, Analytics, Education
Project: Infrastructure for individualization of higher education; digital fingertip and digital portfolio. LTI and EdX External Grader automatic grading tools for teacherless teaching and grading.
Requirements: None

Russian Language Requirement: Russian II for undergraduates, none for graduate students

VIII.
Location: Moscow
Fields: CS, Engineering, Research
Project: Internet technologies and services Lab
Possible project: “Object oriented design patterns for common situations.”
Nowadays many of popular software frameworks and libraries tend to be called object-oriented, but their design most of the time violates one of the basic OOP principles—encapsulation. This prevents creating maintainable and testable applications.

The main objective of the work is development of new “true” object-oriented patterns for some common situations and demonstrate their use with simple application examples.

**Requirements:**
1. Practical experience in software development.
2. Practical experience with any object-oriented programming language (Java is preferable).
3. Knowledge of UML.

**Russian Language Requirement:** Russian II for undergraduates, none for graduate students

**IX.**
**Location:** Moscow
**Fields:** CS, Engineering, Research, VR, 3D Printing
**Project:** The laboratory of 3D Imaging and Computer Graphics. The laboratory conducts a wide range of research and design work in the field of virtual, augmented, mixed realities (VAMR), Internet of things, sensor technologies and 3D printing.

**Requirements:** None

**Russian Language Requirement:** Russian II for undergraduates, none for graduate students

**JetBrains**

**I.**
**Location:** St. Petersburg
**Fields:** CS
**Project:** Software Developer Intern at JetBrains. More info: goo.gl/Vsr5NE

**Requirements:**
1. Have knowledge of the Scala programming language.
2. Have experience with the sbt build tool (depending on the project).
3. Have basic knowledge of using Git.
4. Know about web API programming (depending on the project).
5. Have experience using IntelliJ IDEA or other JetBrains IDEs.

**Russian Language Requirement:** None

**II.**
**Location:** St. Petersburg
**Fields:** CS, Robotics, Research
**Project:** Mobile Robot Algorithms Lab: Research Intern. More info: goo.gl/Vsr5NE

**Requirements:**
1. Linux
2. C++
3. Probability theory.
We’ll be super excited if you have an understanding of ROS concepts and experience in computer vision.

**Russian Language Requirement:** None

**III.**
**Location:** St. Petersburg
**Fields:** CS, Math
**Project:** Programming Languages and Tools Lab: Research Intern. More info: goo.gl/Vsr5NE

**Requirements:**
1. Deep knowledge in formal language theory.
2. A good math background (linear algebra, graph theory, and logic).
3. We’ll be super excited if you have experience in functional programming (preferably F# or Scala) and parallel and GPGPU programming.

**Russian Language Requirement:** None

**Joint Institute for Nuclear Research in Dubna**

**Location:** Dubna, Moscow region
**Fields:** Physics, Nuclear
**Project:** Flexible

**Russian Language Requirement:** Strong Russian

**Kidsave International**

**Location:** Moscow
**Fields:** NGO, Charity
**Project:** Flexible

**Russian Language Requirement:** None

**Maria’s Children**

**Location:** Moscow
**Fields:** NGO, Charity
**Project:** Flexible

**Russian Language Requirement:** None

**National Nuclear Research University MEPPhI**

**Location:** Moscow
**Fields:** Physics, Math, CS
**Project:** Flexible

**Russian Language Requirement:** Russian II for undergraduates, none for graduate students

**National University of Science and Technology MISiS**

**Location:** Moscow
**Fields:** Materials Science, Metallurgy, Mining, Bio Materials, Nano, IT, Engineering, Research
Project: MISIS focuses on materials science, metallurgy and mining, as well as bio materials, nano- and IT-technologies. The University has over 30 world-class scientific labs and 3 engineering centers, which employ prominent Russian and international scientists. MISIS successfully carries out joint projects with the largest Russian and foreign high-tech companies.

Requirements: None
Russian Language Requirement: Russian II for undergraduates, none for graduate students

Nikola-Lenivets Art Park
Location: Nikola-Lenivets
Fields: Architecture, Urban Studies, Research
Project: Interns will work as researchers and teaching assistants at the Nikola-Lenivets Classroom. They will be immersed in the life of Nikola-Lenivets Art Park, attending evening lectures and design sessions which take place as part of the workshops, but will also be expected to develop their own vector of research. They will help design a spatial and cultural proposal for how people can live and prosper in the contemporary and future rural condition, in Russia and beyond. More information at MISTI Russia website: http://bit.ly/37ohGwJ

Requirements: None
Russian Language Requirement: Russian II for undergraduates, none for graduate students

PIR-Center for Political Studies
Location: Moscow
Fields: Political Science, Think Tank, Research
Project: Flexible

Requirements: None
Russian Language Requirement: None

Skoltech University
I.
Location: Moscow/Skolkovo
Fields: Computer Science, AI, ML, Algorithms, Chemistry
Project:
1. Search for novel materials and novel unusual chemical compound using artificial intelligence.
2. Development of materials predicting and analysis methods and codes based on machine learning and evolutionary algorithms.

Requirements: None
Russian Language Requirement: None

II.
Location: Moscow/Skolkovo
Fields: Computer Science, Medical Vision, Computational Prototyping

Project: Computer vision; medical vision projects

Requirements: None

Russian Language Requirement: None

III.
Location: Moscow/Skolkovo
Fields: Startups, Entrepreneurship, Teaching, Research
Project: Flexible.

Possible projects:
1. Carrying out startup summer bootcamp for prospective Skoltech projects & startups
2. Working with the Skoltech Student Startup Club for best practices exchange, identifying and planning particular activities the Club can perform

Requirements: None
Russian Language Requirement: None

IV.
Location: Moscow/Skolkovo
Fields: Data Visualization, VR, Data Science
Project: Data processing and visualization in Virtual Reality (DataVR). Data science is already considered the fourth pillar of science together with experiments, theory and computational science. One can gain a lot of insight and knowledge from handling and processing huge amounts of data, the volume of which is growing exponentially. Data visualization (bringing processed data to the form easily understandable by humans) is of critical importance. There are a lot of frameworks for 3D data visualization. The aim of this challenging and interesting summer project is to create, test and present new frameworks for data visualization in virtual reality (VR) using APIs of different VR devices.

Requirements: Candidates for the internship in DataVR should have some experience in 3D data visualization (OpenGL), knowledge of Python, and preferably C/C++ and Blender.

Russian Language Requirement: None

V.
Location: Moscow/Skolkovo
Fields: Robotics, SLAM, Autonomous Navigation, Computer Vision, VR, CS
Project:
1. Autonomous navigation, mobile robotics, SLAM, and scan-matching.
2. Swarm of drones, and quadcopter flight control.
3. Smart robotic factory with embedded computer vision (joint project with MIT Professor Kamal Youcef-Toumi.

Requirements: None

Russian Language Requirement: None
VI. 
**Location:** Moscow/Skolkovo  
**Fields:** Physics, Quantum Theory, Quantum Technology  
**Project:** Internships in Deep Quantum Laboratory.  
MIT students are invited to spend 3 months or longer conducting research in the areas of quantum theory, and quantum technology at Skoltech University’s Deep Quantum Laboratory, which focuses on theory and quantum algorithms development and has a long history of collaboration with MIT. Those admitted into the program will join the international lab led by Prof. Jacob Biamonte. The lab has successfully hosted students through the program before and has ongoing projects related to the theory of tensor networks, machine learning applied to quantum physics, using quantum computers to accelerate machine learning tasks, quantum walks on complex networks etc.  
**Requirements:** None  
**Russian Language Requirement:** None

VII. 
**Location:** Moscow/Skolkovo  
**Fields:** ML, Data, Medicine, Biology  
**Project:** Development of digital platform for virtual point mutation screening using machine learning and atomic structures of membrane proteins. Point mutation is the minimal change in the genome, that, however, can lead to dramatic consequences, as for example disease and pathology. Machine learning and data analysis of large-scale point mutation screening allow to derive prediction models for the personalized medicine, as well as for design of proteins with desired properties.  

Recently, we developed computational approach [1,2] to design thermostabilizing mutations in G protein-coupled receptors, one of the most important pharmacological protein family. With this method, it became possible to resolve three-dimensional structures of several pharmacological targets [3,4,5,6,7,8]. The project of this internship is to develop digital platform for virtual point mutation screening using machine learning and atomic structures of membrane proteins.  

Data types: sequences (1D), sequence alignments (2D), protein structures (3D), and its high-dimensional representations (tensors, R^n)  
**Requirements:** None  
**Russian Language Requirement:** None

SOMOV Engineering Lab  
**Location:** Moscow/Skolkovo  
**Fields:** Engineering, Environmental, Sustainability  
**Project:** The company focuses on environmental monitoring solutions to measure toxic gases in the air, to determine environmental conditions and to transmit the received data via mobile communication networks.  
**Requirements:** None  
**Russian Language Requirement:** None

SOVA Center for Information and Analysis  
**Location:** Moscow  
**Fields:** NGO, Research  
**Project:** Flexible  
**Requirements:** None  
**Russian Language Requirement:** None

SPUTNIX  
**Location:** Moscow/Skolkovo  
**Fields:** AeroAstro, Engineering  
**Project:** SPUTNIX LLC is the Russian private company, manufacturing high-tech microsatellite components and technologies, as well as microsatellite-based services. They've been working since 2011, providing cost-effective solutions, based on microsatellite technology, and a high level of technical support.  
**Requirements:** None  
**Russian Language Requirement:** None

TAU Tracker  
**Location:** Moscow/Skolkovo  
**Fields:** CS, VR, Engineering  
**Project:** AU Tracker – modular tracking system purposed for VR developers and training systems. It’s based on magnetic-inertial technology. Sensors are fixed on a body or object, system perform measurements and estimates position and orientation of sensors in a volume where weak magnetic field is created. Further, estimated data are passed to visualization system. Technology does not use cameras, not affected by blind zones or accumulated error problems and provides immersion experience for users and intuitive interaction with virtual world. AU Tracker’s first goal is to complete two handed tracker version, due to an architecture of the system it will be scaled further to full body version. They are also working on a room scale tracking.  
**Requirements:** None  
**Russian Language Requirement:** None

The Moscow School of Social and Economic Sciences (Shaninka)  
**Location:** Moscow/Skolkovo  
**Fields:** Urban Studies, Research  
**Project:** Flexible  
**Requirements:** None
**Russian Language Requirement:** None

**The Moscow Times**
*Location:* Moscow
*Fields:* Writing, Journalism
*Project:* Flexible
*Requirements:* None
*Russian Language Requirement:* None

**Tsaritsyno Museum and Park**
*Location:* Moscow
*Fields:* Art, Research
*Project:* Flexible
*Requirements:* None
*Russian Language Requirement:* None

**Tsuru Robotics**
*Location:* Moscow/Skolkovo
*Fields:* Robotics, CS, Research, Engineering
*Project:* Tsuru Robotics is an international R&D bureau focused on deep tech full-stack robotics and drone development. They develop vertically integrated robotic systems from scratch, including PCB, software and mechanical design.

Tsuru Robotics develops and deploys novel robotic systems with focus on flying robots, highly-integrated control modules and microminiature industrial electronics.

**Zil Cultural Center**
*Location:* Moscow
*Fields:* Art, Research, Archives, Research
*Project:* Flexible
*Requirements:* None
*Russian Language Requirement:* Russian II for undergraduates, none for graduate students

**WATTs Battery**
*Location:* Moscow/Skolkovo
*Fields:* Energy, Batteries, Engineering