This semester there are 3 students studying at UNIS under the support of the SITRA project, all of these students have arrived from Russia, with one originally from Ukraine. From Lomonosov Moscow State University, returning student Eldar Khabibulin is back, and new student Varvara Oreshkina. There is one student from the Moscow Institute of Physics and Technology - Nikita Turko.

Eldar Khabibulin have completed the AT-332 course, taught by Dr. Aleksey Marchenko, and Nikita Turko is currently taking the AT-211 course. Varvara Oreshkina and Eldar Khabibulin are writing diplomas and taking part in field work in Svea.
Oreshkina Varvara
Hometown: Moscow, Russia
Master’s Thesis: Splitting and wedging of sea ice beam under compression

Khabibulin Eldar
Hometown: Moscow, Russia
Master’s Thesis: Failure Scenarios of the Sodhi Beam

Education: 2012-2018: 6-year student Faculty of Mechanics and Mathematics Lomonosov Moscow State University, Department of Plasticity

The purpose of our visiting UNIS in 2018 is to modeling our beams in ANSYS Mechanical APDL and calculate stress intensity factor. In Svea we are going to run series of experiments and compare results with our model in ANSYS and theoretically calculated $K_{1c}$. Also we take part in Cold Lab tests: creep test and thin section with UNIS students.
Eldar Khabibulin’s projects:

1) Autumn 2016
The purpose of my trip to UNIS in 2016 was to make two models for bending of sea ice beam in COMSOL and Itasca PFC software, and then compares the result to experimental tests and to take the AT-332 course. My assignment period at UNIS had started on September 26 and ended November 13, 2016. I split my work time between studying for the AT-322 course and working with software. In sea ice conditions, I cut out Pr. Sodhi's beam and loaded the beam in the center with normal force laying in the ice field space and fixing geometry of cracks. I was aiming to make two equivalent models showing true geometry for cracks, which are already known from a large experiment session completed by my UNIS supervisor Pr. Marchenko.

2) Autumn 2017
That semester out goal was to set up parameters for sea ice and emulate different types of collision between sea ice and concrete structures using DEM Itasca PFC3D 5.0. Also I took part in the “Ice-structure interaction” SIPW03 workshop in Cambridge and got valuable knowledge and experience. You may check my results from autumn 2016 and autumn 2017 in the report on the SITRA project website.

Eldar Khabibulin’s publications:

1) 2017 Geometrical nonlinearity on the problem of a beam with a notch under confined
Sakharov A.N., Khabibulin E.T., Chistyakov P.V.
In miscellany Материалы X Всероссийской конференции по механике деформируемого твердого тела, part 2, p. 181-183

2) 2017 Failure of the beam on 4-point bending test with constraint
Khabibulin E.T., Sakharov A.N., Chistyakov P.V.
In miscellany XXVIII Международная инновационно-ориентированная конференция молодых ученых и студентов (МИКМУС - 2016), p. 109-112

3) 2015 3-point flexure specimen with constraint
Khabibulin E.T., Sakharov A.N., Chistyakov P.V.
In miscellany XXVII Международная инновационно-ориентированная конференция молодых ученых и студентов (МИКМУС - 2015), p. 532-535

Presentations at conferences:

1) 2017 Kinetic energy for the beam with a spreading notch under confined bending (oral)
Khabibulin E.T., Sakharov A.N., Chistyakov P.V.
Ломоносовские чтения - 2017, Lomonosov MSU, Russia, 17-26 april 2017

2) 2016 Failure of the beam on 4-point bending test with constraint (oral)
Khabibulin E.T., Sakharov A.N., Chistyakov P.V.
XXVIII Международная инновационно-ориентированная конференция молодых учёных и студентов "МИКМУС"-2016, Moscow, Russia, 7-9 december 2016

3) 2016 Determination of fracture toughness on 4-point bending test with constraint (oral)
Sakharov A.N., Khabibulin E.T., Chistyakov P.V.
Ломоносовские чтения - 2016, Lomonosov MSU, Russia, 18-27 april 2016

4) 2015 3-point flexure specimen with constraint (oral)
Khabibulin E.T., Sakharov A.N., Chistyakov P.V.
XXVII Международная инновационно-ориентированная конференция молодых учёных и студентов "МИКМУС"-2015, Moscow, Russia, 2-4 december 2015
Varvara Oreshkina’s projects:

1) Condition of limit equilibrium of an weighty ice disk, 2015.

When calculating the load on piles of marine berths in the Arctic zone it is necessary to take into account the load from the frozen ice, cyclically acting on the pile during tides. One approach to assessing the load is to determine the weight of the build-up that can hold onto the pile without destroying it. When calculating, the built-up edge is modeled by an axisymmetric plate. The obtained value of failure load is strongly overestimated in comparison with the experimental data. This means that the model of shearing stresses is inadequate. To obtain a more complete picture, it is necessary to consider the model for taking into account normal stresses.

2) The failure envelop in the space of moments and forces for a beam of a material of different resistance, 2016.

The purpose of this investigation is to describe the process of breaking an ice plate by sea waves in the framework of a one-dimensional model problem - beam equilibrium under action longitudinal force and bending moment. Two cases were analyzed: the first - private, in which longitudinal force was assumed equal to zero, the second - the general, in which the longitudinal force and the bending moment to zero were not equal. Of them were found the dependence of the moment and longitudinal force on the parameter $u$ Illustrated in the space of moments and efforts.

3) The failure load on the ice wedge, 2017.

In that research following problems have been investigated: the type of equilibrium equation for a plane stressed condition; the dependence of the trajectory of principal stresses on an angle was determined; the calculation of the maximum load acting on the normal to the lateral face of the ice field in the form of a wedge at fixed values.
Nikita Turko

Hometown: Zaporizhia, Ukraine
Education: 2013-2017 – Moscow Institute of Physics and Technology, Russian Federation
Bachelor Thesis: Investigation of the stress-strain state of a cylinder by the method of integral equations
Specialization: Mathematical modeling, Hydrodynamics
Supervisor: Rashit Ahmetzievich Ibraev, D. Sc. in Physico-mathematical sciences, professor, Corresponding Member of RAS
Current Position: Master student of Aerophysics and Space Research Department