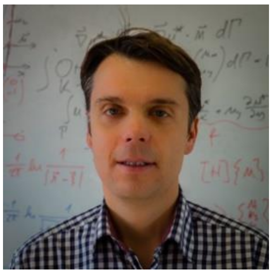
14 Mayıs 2024 Salı – Mühendislik Fakültesi Seminer Salonu, 09 :00 – 12 :00.
May 14, 2024 Tuesday – Faculty of Engineering Seminar Hall, 09:00 – 12:00

NANOMETRE

https://www.linkedin.com/company/nanofluids-modeling-strategies-evaluation-based-on-natural-circulation-mini-loops-nanometre

Nanoakışkanların Modellenmesinde Kullanılan Yaklaşımların Doğal Taşınım Mini-Döngüleri Yardımıyla Değerlendirilmesi (Nanofluids Modeling Strategies Evaluation based on Natural Circulation Mini-Loops, NANOMETRE) başlıklı TÜBİTAK 1071 Slovenya İle İkili İşbirliği Projesi Kapsamında yapılacak İkili İşbirliği Ziyareti kapsamında, projenin Slovenya ekibi üyeleri Prof. Dr. Jure Ravnik (Slovenya Ekibi Proje Yürütücüsü), Dr. Blaž Kamenik ve Nejc Vovk 14 Mayıs 2024 Salı günü saat 09:00-12:00 saatleri arasında araştırma konuları hakkında sunumlar yapacaklardır. Isı transferinin modellenmesi, iki fazlı akış, nanoakışkanlar konularına ilgi duyan katılımcılar davetlidir. Moderatör: Doç. Dr. Elif Begüm Elçioğlu (Türkiye Ekibi Proje Yürütücüsü)	Within the scope of the Bilateral Cooperation Research Project titled Nanofluids Modeling Strategies Evaluation based on Natural Circulation Mini-Loops (NANOMETRE), the Slovenian team members, Prof. Dr. Jure Ravnik (Principal Investigator of the Slovenian Team), Dr. Blaž Kamenik and Nejc Vovk will be giving their lectures on May 14th 2024, between 09:00-12:00. Undergraduate and graduate students as well as academic staff, who are interested in heat transfer modelling, two-phase flow, and nanofluids are welcome to attend. Moderator: Assoc. Prof. Dr. Elif Begüm Elçioğlu (Principal Investigator of the Turkish Team)

Prof. Dr. Jure Ravnik	**Title:** Research in the field of mathematical modeling of transport phenomena
	**Abstract:** In the lecture, I will shed light on the more interesting parts of research in the field of multiphase flow modelling. I will pay particular attention to the dynamics of non-spherical particles in the Stokes flow regime. For particles of super-ellipsoid shapes, I will present new models for drag and torque. Furthermore, I will present the application of these technologies to predict the airways load due to air pollution and to improve the performance of heat exchangers using nanoparticles suspended in liquids. I will also share with the listeners the experience gained in the development and application of the boundary element method for the simulation of flows at low Reynolds numbers. I will also spend some time on stochastic methods for estimating the uncertainty of numerical simulations and for evaluating the sensitivity of results to changes in input parameters.
Dr. Blaž Kamenik	**Title:** Multi-scale modelling of freeze drying
	**Abstract:** In my presentation, I will talk about multi-scale simulation approaches for freeze drying taking place inside of the vials. The freeze-drying process is a drying process taking place at low system pressures and temperatures and is mostly used for drying high-value products, such as pharmaceuticals or foods. The main advantage of this process is that the structure of the product is preserved, and consequently, the product dried in that way maintains its properties for a long time. Numerical models of different complexities will be presented, from a model focusing purely on the pressure drop inside the vial, which is present due to the vial neck and rubber stopper geometry, to a model describing the deposition process taking place inside the condenser, and finally a multi-level model that couples the hydrodynamic conditions inside the system (CFD solution) with the local drying kinetics of all the vials in the system (1D model).
Nejc Vovk	**Title:** Neural Network Models for Flow Induced Drag on Particles in Stokes Flow
	**Abstract:** In particle-laden flows, the particle drag force is dependent not only on flow regime, but also on the presence of nearby particles. This effect is important in creeping flow (Stokes flow) regime, Re << 1, where fluid viscous forces are dominant. Particle-laden Stokes flow was simulated using boundary element method (BEM), to compute particle forces. The obtained results were used to train a neural network model, for particle force prediction. A total of 6000 particle-laden flow simulations, with varying particle volume fractions, were carried out for neural network training data acquisition. The particle volume fraction was accounted for as the actual distance between particles. Multiple neural network models were tested to evaluate neural network model parameters' influence on the accuracy of model prediction. The compared neural network model parameters include activation function, optimizer, and number of hidden layers. The combinations of neural network model parameters were tested for a wide range of artificial neuron quantities.