

Postdoctoral and project researcher positions in FAME Flagship at UEF

University of Eastern Finland
Department of Technical Physics
Biomedical Imaging Unit at the A.I. Virtanen Institute

1. Multimodal imaging of three-phase pipe flow

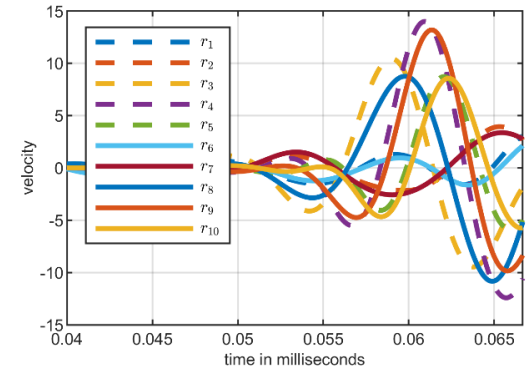
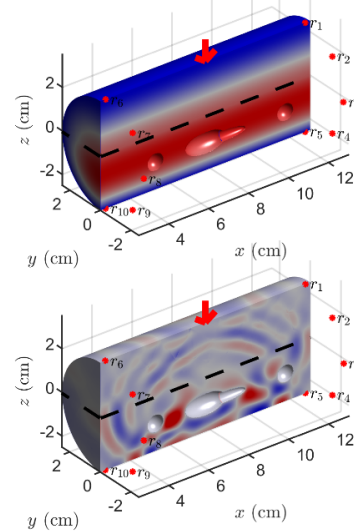
This postdoctoral project focuses on creating environmental-friendly, non-ionizing measurement technology for real-time imaging of three-phase flows within the process industry. Understanding, prediction and measurement of such flows are key to the overall efficiency and safety of industrial processes.

Here, we aim to advance the characterization of three-phase flow by employing tomographic multimodal imaging approaches. Novel image reconstruction and measurement techniques are developed to combine ultrasound, electrical, and electromagnetic flow tomography techniques to a unique multimodal imaging technology.

With the proposed approach, it is possible to estimate the flow velocities and volumetric flow rates of different phases in real-time, enabling better monitoring and control of process flows in various industrial applications.

Supervisors: Prof. Marko Vauhkonen and research director Timo Lähivaara

Collaborating institutions: Tianjin University, China and Graz University of Technology, Austria



2. Industrial modelling and optimization

This postdoctoral project focuses on general mathematical and statistical modelling of industrial problems. A particular focus is laid on measurement and uncertainty modelling, optimization and optimal control. The methodologies can involve both physical modelling and neural network type approaches.

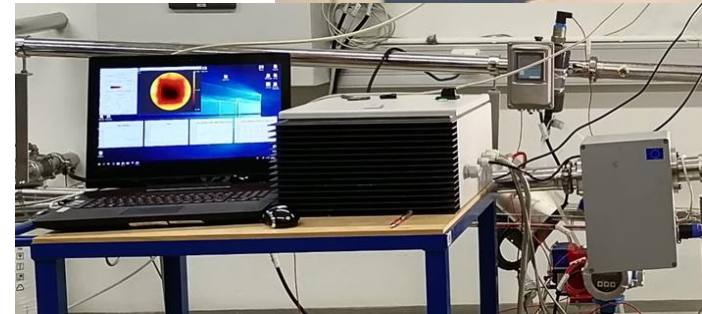
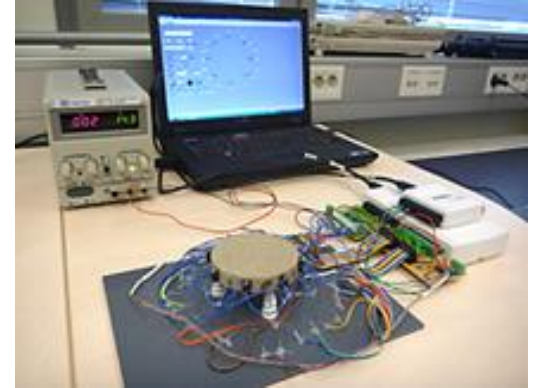
While optimization is a central aim in industry, it is often challenging to construct such models which represent the actual processes with adequate accuracy. One of the main reasons is the computational complexity of realistic models.

Recently, major progress has been made in constructing computationally efficient frameworks for solving industrial control as well as other optimization and estimation problems.

In this project we consider several types of industrial challenges both as computational topics and implementations in industrial environments.

Supervisors: Profs. Jari Kaipio, Leo Kärkkäinen and Aku Seppänen

Collaborating institutions: Several industrial and academic partners from Finland and overseas.



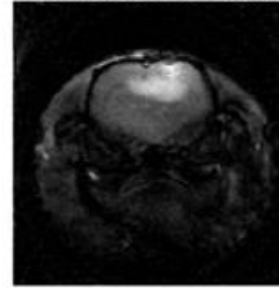
3. Computational Imaging in MRI

This post doctoral project focuses on development of image reconstruction and denoising methods for MRI jointly with novel data acquisition methods for high-resolution 5D MRI. Optimally, the development of the mathematical methods is complemented by practical implementation of the tailored sampling strategies and pulse sequences on pre-clinical MRI scanners. The position is placed jointly at A.I. Virtanen institute and Department of Technical physics and supports the ongoing research on biomedical and computational imaging and at both sites.

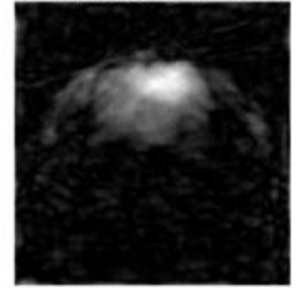
Supervisors: Profs. Ville Kolehmainen, Mikko Nissi and Olli Gröhn, and research director Mikko Kettunen

Collaborating institutions: University of Minnesota

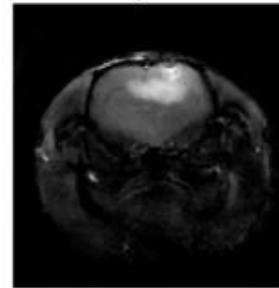
LS low temporal resolution



LS high temporal resolution



TGV low temporal resolution



TGV high temporal resolution

