



# EU-MATHS-IN Finland

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### Report of 2024

The Finnish National Network on Mathematical Modelling is formed by the following Finnish universities and their departments.

- Lappeenranta-Lahti University of Technology (LUT), School of Engineering Science
- Tampere University (TAU), Faculty of Information Technology and Communication Sciences, Unit of Computing Sciences
- University of Eastern Finland (UEF), Department of Technical Physics (Kuopio)
- University of Eastern Finland (UEF), Department of Physics and Mathematics, (Joensuu)
- University of Jyväskylä (JYU), Faculty of Information Technology
- University of Oulu (OU), Faculty of Natural Sciences, Department of Mathematical Sciences
- University of Helsinki (UH), Department of Mathematics and Statistics

The units/ departments share their interest and experience in mathematical modelling in order to develop and use mathematical methodology to solve important problems in science, economics and industry. The main activities of the network consist of modelling, simulation, collaboration with industry and society, in terms of projects, modelling weeks, modelling education and study groups.

The Network is associated with the Finnish Centre of Excellence in Inverse Modelling and Imaging supported by Academy of Finland with Aalto University (AU), Finnish Meteorological Institute (FMI), Lappeenranta-Lahti University of Technology (LUT), Tampere University (TAU), University of Eastern Finland (UEF), University of Helsinki (UH), University of Jyväskylä (JYU), University of Oulu (OU).

### Flagship of Advanced Mathematics

Flagship of Advanced Mathematics for Sensing, Imaging and Modelling (FAME) is a multidisciplinary consortium of eight academic partners harnessing applied mathematics and physics for the benefit of the society.

It is based on scientific excellence on applied inverse problems research in Finland.

In FAME we will collaborate with stakeholders in industry and society to promote Finnish economy and global wellness.

In the Industrial Collaboration impact theme of FAME, we will work with industry through joint projects, seminars, meetings, and various workshops. The goal is to transfer knowledge on sensing, imaging, and modeling from academia to industrial applications.

## **Education**

During the fall 2024 the network organized teaching of the "Basic Course on Mathematical Modelling" both in Finnish and English. The course on "Advanced Mathematical Modelling: Discrete Models" was given in the spring. The courses were taught and studied over the Internet with teachers and students from six nodes.

## **Finnish Applied Mathematics Network**

In the fall of 2024, the network agreement for teaching collaboration was updated, and the courses in Mathematical Modelling will be part of the Applied Mathematics Network. The network includes Tampere University (coordinator), University of Eastern Finland, University of Jyväskylä, LUT University, University of Oulu, and Åbo Akademi. Degree students from the universities involved in the network can apply for the network's courses.

## **Workshops & Modelling weeks**

Workshop on industrial mathematics was organised on the Finnish Mathematical Days, January 2024, in Aalto University.

The network has disseminated information on ECMI modelling weeks, student competitions, and ECMI conferences to its members.

## **Africa-cooperation**

We have continued collaboration with a consortium of 6 universities in Eastern Africa. A recent achievement was the founding of an African-European network CoRE-Math (Cluster of Research Excellence in Mathematics) [www.africaeuropecoremath.org](http://www.africaeuropecoremath.org) that aims to develop a collaborative PhD programme in mathematics that delivers "high-quality, sustainable training to meet the demand for well-trained mathematicians in academia and society". The [CoRE initiative](#) is a flagship project of the partnership between the African Research Universities Alliance ([ARUA](#)) and The Guild of European Research-Intensive Universities ([The Guild](#)). Finland is represented in the management group of CoRE-Math. LUT is a partner of the network with several European universities.

Tampere University has a three-year Erasmus+ agreement with some universities in southern Africa. Within its framework, Finnish researchers hold courses in industrial mathematics at the respective universities, and African students can visit Tampere University. In 2024, this was realized in Windhoek, Namibia, as a lecture course related to the possibilities of data mining and as a keynote speech by a Finnish professor at the SAMSA conference <https://unam.edu.na/samsa2024/portfolio/prof-esco-turunen/>

## **COST Digital Forensics**

Long-term cooperation between TAU and Central Office for Information Technology in the Security Sector (ZITIS, Munchen) has been on hiatus in 2024, but will continue when the raw data of the German partner's field research becomes available.

## **OpenDesk**

The Finnish network has disseminated information on OpenDesk to its members.

## **Projects**

Can be found on the members' homepages:

- LUT University: <https://www.lut.fi/web/en/school-of-engineering-science/research>
- Tampere University: <https://www.tuni.fi/en/about-us/computing-sciences#switcher-trigger--research>
- University of Eastern Finland (Kuopio): <https://uefconnect.uef.fi/en/group/computational-physics-and-inverse-problems-research-group/>
- University of Eastern Finland (Joensuu): <https://www.uef.fi/en/research#paragraph-1321>
- University of Jyväskylä: <https://www.jyu.fi/en/research>
- University of Oulu: <https://www.oulu.fi/en/university/faculties-and-units/faculty-science/mathematical-sciences>
- University of Helsinki: <https://www.helsinki.fi/en/faculty-science/research>

## **Organization**

The council of the network had 8 meetings in 2024. The council members were:

Sampsa Pursiainen TAU (chair)

Matti Heiliö LUT (vice-chair), Lassi Roininen LUT (deputy)

Esko Turunen TAU, Simo Ali-Löytty TAU (deputy)  
Seppo Pohjolainen TAU (secretary)  
Timo Tiihonen JYU, Ilkka Pölönen JYU (deputy)  
Marko Vauhkonen UEF/Physics  
Risto Korhonen UEF/Mathematics  
Mikko Sillanpää OU, Marko Leinonen OU (deputy)  
Samuli Siltanen HU, Sangita Kulathinal HU (deputy)

The network has members in the following organizations:

EU-MATHS-IN

Council: Sampsa Pursiainen, Matti Heiliö (deputy)  
National point of contact for Dissemination and Media activities: Seppo Pohjolainen  
National point of contact for Success Stories: Marko Vauhkonen  
National point of contact for Job Portal: Simo Ali-Löytty

ECMI

Council: Sampsa Pursiainen , Lassi Roininen (deputy)

COST

Digital Forensics: Esko Turunen