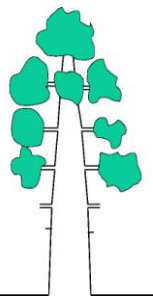


Master's Programme Specializing in Technomathematics at Lappeenranta University of Technology

Technomathematics is the art and science of applying mathematics and computational models into real life problem areas in industrial research and applied science, such as

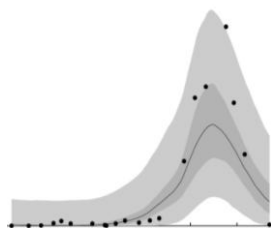
- Measurements, experiments and intelligent data-analysis
- Modelling and simulation of systems and processes
- Production management and process monitoring/control
- Financial models, risk analysis and decision support systems.



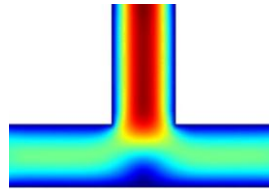
We train our graduates to combine modeling, computational skills, advanced theory and data analysis in innovative ways. We produce solutions for questions in industrial R&D. Some examples of applications and research areas: inverse problems, stochastic methods, Bayesian methods with MCMC, fuzzy logic and systems, fuzzy methods in knowledge engineering, data assimilation techniques, computational fluid dynamics, wavelets and image/signal analysis, data intensive methods in weather models, forest inventory, environmental monitoring.

Our research focuses on the following themes:

Inverse problems. We are part of the Finnish Centre of Excellence in Inverse Problems Research. Inverse problems appear in several fields, including medical imaging, astronomy, geophysics, nondestructive material testing: the task is to identify a structure or model by given measurements. At LUT, you



will learn about statistical inverse methods, especially Bayesian sampling methods and advanced Kalman filtering.



Numerical methods, Computational fluid dynamics.

One of the scientific success stories of the 20th Century is numerical weather prediction.

In Lappeenranta, you can also learn to simulate demanding two-phase industrial flows and chemical processes in them, as well as get well-versed in supercomputing techniques to simulate stratospheric winds and chemical reactions there.

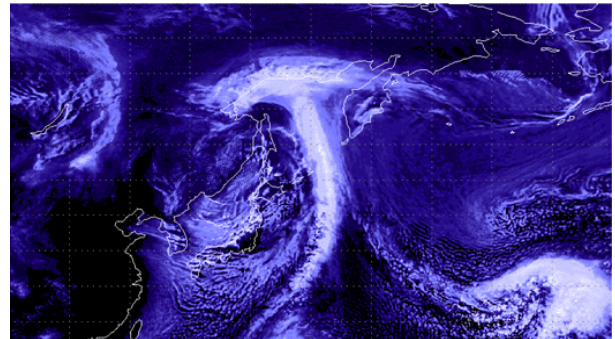


Figure 1: A typhoon simulated on the Earth Simulator, uses a parallel algorithm originally invented by researchers in Lappeenranta. (Courtesy of the Earth Simulator Center in Yokohama, Japan)

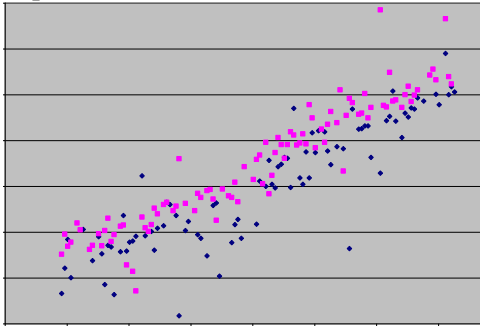
Fuzzy logic and soft computing. Lappeenranta researchers have long been at the forefront of theoretical research into the foundations of fuzzy logic. It is applied to numerous industrial problems where soft computing methods have become a dominant vehicle of innovation.

Our collaboration in research is global. We host and have access to state-of-the-art parallel supercomputers at LUT and at the Center for Scientific Computing CSC.

You will have an opportunity to go on towards a PhD in the special fields of our laboratory, or in mathematical topics originating in the other departments. These include information processing, chemical & process engineering, electrical engineering, chemometrics, virtual design technology and control engineering. Industrial projects will offer opportunities as well.

Education in Applied Mathematics at LUT is international. One of our goals is the development of university pedagogy in applied mathematics education.

We are a node in the European Consortium of Mathematics in Industry ECMI that features more than 20 universities in Europe. We also collaborate with several universities in Russia, Balkans, India and Africa. We have double degree arrangements with our partner universities.



We offer a two year programme to become a Master of Science in Engineering specializing in Technomathematics. The list of available courses contains 20-25 items.

The programme covers two years of full-time study and finishes in a master thesis done on a real problem with industry or in a research team. Entrance requirements, application procedure etc may be found

More information:

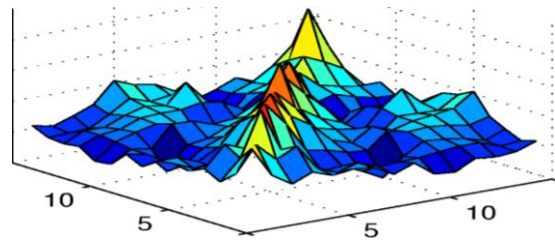
www.lut.fi/en/technology/mathsphysics

Application procedure:

www.lut.fi/en/admissions

International coordinator Ms Pirkko Pesu
admission@lut.fi

via our web pages. Programme outline is given below. Modifications are possible.



MS in Engineering 120 credits (ects)
Major in Technomathematics

General studies 18cr

Linear algebra and normed spaces

Differential equations

Major studies, elective modules 32cr

Theory of applied analysis

Numerical methods, optimization and scientific comp

Data driven modelling

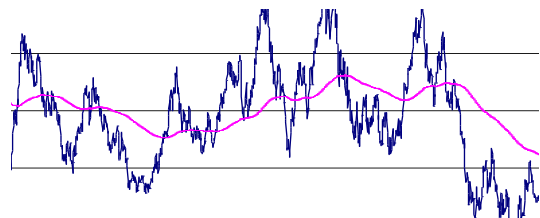
Fuzzy methods and soft computing

Case study seminar 5cr

Minor studies and elective courses 35cr

Thesis 30cr

Updated Oct 2011



Open your mind. LUT.

Lappeenranta University of Technology

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