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Welcome

Dear Participant,

welcome to "Math meets Industry". It brings together PhD students and faculty members from Norwegian Math departments and industry representatives. In the next two days you will hear keynote lectures highlighting challenges and success stories in collaboration between math and industry both from an academic and industrial perspective. On Thursday, we will have a session on math education, to discuss a math curriculum meeting the societal and industrial challenges of the 21st century. In the afternoon, PhD students from all Norwegian universities will present themselves and their achievements to a mixed audience from academia and industry during a poster session. The first day closes with a science slam for math PhD students moderated by Jo Rislien, followed by a joint dinner.

On Friday in addition to further keynote speakers we have a session about funding opportunities both in the Research council of Norway and EU Horizon 2020 complemented by the presentation of two European projects with strong involvement of university mathematicians and industry. The final session is a partnering event between academia and industry where we want to identify challenging new topics for a closer cooperation of both worlds.

We would like to acknowledge financial support of our sponsors, the Norwegian University of Science and Technology, the Research Council of Norway and the European Consortium for Mathematics in Industry, ECMI.

We look forward to an exciting workshop with interesting talks and lively discussions.

Kind regards,

Elena Celledoni, Jo Eidsvik, Dietmar Hömberg, Jon Kummen, Jo Røislien, Einar Rønquist (organizing committee)







Thursday, September 22, 2016

	Room San Siro 3, 2nd floor
09:45 - 10:15	Registration
10:15 - 10:30	Welcome
10:30 - 11:10	Asgeir Sørensen (NTNU) (Chair: Elena Celledoni):
	Nothing is as practical as a good theory – From fundamental research to industry development
11:10 - 11:50	Stig Faltinsen (Danske Bank) (Chair: Brynjulf Owren):
	A random walk in financial risk management
	Education session (Chair: Jo Eidsvik)
11:50 - 12:10	Håkon Sandbakken (DNVA, Oslo):
	VISTA - A choice between industry and academia?
12:10 - 12:40	Yuriy Rogovchenko (University of Agder):
	PIC-MATH program: preparing undergraduates for a successful career in industry
12:40 - 13:00	Discussion
13:00 - 14:00	Lunch
14:00 - 14:40	Kathrine Frey Frøslie (University of Oslo) (Chair: Bo Lindqvist):
	Statistics as a weapon for improving womens health
14:40 - 16:30	STUDENT POSTER PRESENTATIONS (Chair: Anne Kværnø)
	- Coffee Break -
16:30 - 17:20	Chris Budd (University of Bath), (Chair: Dietmar Hömberg)
	Does maths need industry or does industry need maths?

	Room Mesaninen, 3rd floor
17:30 – 19:30	MATH SLAM (Moderated by Jo Røislien, NTNU, Music: Marius Thorvaldsen) Contestants: Håkon Christopher Bakka (NTNU) Håvard Bjerkevik (NTNU)
	Fredrik Hildrum (NTNU) Petter Kjeverud Nyland (NTNU) Fredrik Meyer (UiO) Daniel Oldekjer (Uni Research CIPR/UiB) Muhammad Salam Siddiqui (NTNU) Knut Sverdrup (University of Cambridge)
	Room San Siro 3, 2nd floor
19:45 - 22:30	Dinner (music with mathematics content as after dinner entertainment)

Friday, September 23, 2016

	Room San Siro 3, 2nd floor (Chair: Fred Godtliebsen)
08:30 - 09:10	Knut-Andreas Lie (SINTEF Oslo/NTNU):
	So you can prove theorems – but can you code?
09:10 - 09:50	Kjell Kristoffersen (NTNU):
	How to make 3-dimensional images of the heart in real time $-$ on GE Vingmed and the ultrasound adventure in Norway
09:50 - 10:10	Coffee Break
	Funding Opportunities (Chair: A. Evgrafov)
10:10 - 10:50	Per Magnus Kommandantvold (RCN, Oslo):
	Funded programs in the Research Council of Norway and EU Horizon 2020
10:50 - 11:00	E. Celledoni (NTNU) and D. Hömberg (NTNU/TU Berlin):
	Two project examples funded in Horizon 2020
	Room Utsikten, 21st floor
11:10 – 12:40	Partnering between industry and academia (Chair: Elena Celledoni and Dietmar Hömberg)
12:40 - 12:50	Closing
13:00 - 14:30	Lunch
	25 700

• Håkon Christopher Bakka (NTNU)

Accounting for physical barriers in species distribution modeling with non-stationary spatial random effects

• Manuel Borregales (UiB)

Numerical convergence of iterative coupling for non-linear Biots model

• Ulrik Enstad (UiO)

Using noncommutative geometry to study the existence of Gabor frames

• Tatiana Konevskikh (NMBU)

Correcting Mie scattering in single cell spectra and modelling fringes in infrared spectra of thin films

• Øystein Klemetsdal and Runar Lie Berge (NTNU)

Unstructured Gridding and Consistent Discretizations for Reservoirs With Faults and Complex Wells

• Kari Krizak Halle (NTNU)

Efficient and powerful familywise error control when testing for genotype-phenotype association in genome-wide association studies.

• Lu Li (NTNU)

Energy Preserving Krylov Projection Methods for Large and Sparse Linear Hamiltonian Equations

• Fredrik Meyer (UiO)

Deformation theory and algebraic geometry: getting rid of the bad points

• Lars Hov Odsæter (DNVA)

Conservation of Mass in Reservoir Simulation

• Daniel Oldekjer (Uni Research CIPER/ UiB)

Uncertainty quantification and error reduction for modeling of CO2 transport in subsurface saline aquifers

• Torbjørn Ringholm and Sølve Eidnes (NTNU)

Conservative Moving Grid Methods for PDEs

• Muhammad Salam Siddiqui (NTNU)

Numerical analysis of NREL 5MW Wind Turbine: A study towards a better understanding of wake characteristic and torque generation mechanism

• Alexander Schmeding (NTNU)

Shape analysis on Lie groups (and beyond) with applications

• Knut Sverdrup (University of Cambridge)

Numerical solutions for a unified formulation of continuum mechanics

Chris Budd (University of Bath)

Does maths need industry or does industry need maths?

Mathematical modelling plays a vital role in modern industry, with applications as diverse as microwave cooking, computer graphics, telecommunications and even the incubation of penguin eggs.

In this talk I will describe the process of applying maths in an industrial context, with a light hearted look at the ups and downs of doing this. I will give many examples from my own experience. I will also try to show how the process of going out into industry can teach us a lot of new maths and some ways to make this all possible.

Stig Faltinsen (Danske Bank)

A random walk in financial risk management

In this talk, we show examples of how mathematics is applied in finance, banking and life insurance. Important modelling themes are risk measurement, risk management, pricing and forecasting. Within these industries, a wide range of mathematical disciplines is made use of for example Statistics, stochastic calculus, Monte Carlo simulations, time series analysis and numerical solutions of SDEs and PDEs to mention some.

Kathrine Frey Frøslie (University of Oslo)

Statistics as a weapon for improving womens health

Obesity and diabetes are world health problems. Pregnancy serves as a stress test for a womans metabolism, and women who develop gestational diabetes are at high risk of subsequent type 2 diabetes. Maternal body mass index and blood glucose levels are associated with neonatal characteristics, and may affect the childs future metabolism and morbidity.

Metabolic regulation is comprised of inherently continuous and temporal processes in the body. Data from such processes may provide insight in central biological mechanisms, provided that they are analysed by sufficiently advanced statistical methods.

Functional data analysis (FDA) is a collection of statistical techniques specifically developed to analyse curve data. When applying FDA, the entire curve is used as the basic unit of information, instead of single measurements at specific time points, or simple summary measures.

We used FDA to analyse glucose data from 1031 pregnant women. FDA was superior to traditional analyses of glucose data, in differentiating between women who did and did not develop gestational diabetes during pregnancy. The shape information from glucose curve data was also associated with birth weight, neonatal percentage of fat, and C-peptide in cord blood, demonstrating physiological relevance of temporal characteristics of maternal glucose curves. FDA may therefore contribute to the understanding of the metabolic changes during pregnancy, with improved womens health as the ultimate goal.

Kjell Kristoffersen (Norwegian University of Science and Technology)

How to make 3-dimensional images of the heart in real time – on GE Vingmed and the ultrasound adventure in Norway

Ultrasound imaging is enabled by advanced signal processing, and the talk will cover selected application examples from this field. I will also discuss how multi-disciplinary cooperation with academia has been important for the Norwegian industrial activity.

Knut-Andreas Lie (SINTEF Oslo/Norwegian University of Science and Technology)

So you can prove theorems - but can you code?

Academic mathematics and contract research for industry often have somewhat different focus. In the talk, I will discuss some of the differences. In particular, I will try to highlight how mathematicians can and should contribute to software development.

Yuriy Rogovchenko (University of Agder)

PIC-MATH program: preparing undergraduates for a successful career in industry

Asgeir Sørensen (Norwegian University of Science and Technology)

Nothing is as practical as a good theory – From fundamental research to industry development

The lecture covers selected examples on how mathematics have been used in mathematical modelling and control system design for various marine applications related to the blue economy associated with the oceans. The lecture will cover the steps from fundamental to applied research and further into innovations and technology spin-offs. Mathematical aspects touched upon are — linear algebra, functional analysis, dynamical systems characterized by ODE and PDE, numerical methods.

Wifi access during the conference

Free Wifi access is provided by the Hotel. Log on to scandic_easy. Open your browser, after the redirect (you might need to add a security exception depending on your browser setting) use the button Click to connect. You then need to give your name and a phone number to use the Wifi to get access.

Voting during Math Slam

During the Math Slam you have the opportunity to vote for the candidates. For this purpose we will use Kahoot! It is a free system which you can use with any smartphone, tablet, or laptop. During the MathSlam you have to visit https://kahoot.it to participate, whence you should make sure to have a charged phone/computer with you. Further information and a complete rundown will be given during the event.