

Introduction

Why there is need of a Mathematics with Industry Day?

What is a MiMM<sup>®</sup> day?

Examples of industrial problems

What do we gain via a Mathematics with Industry Day?

Where there is place for improvement?

When does the next MiMM<sup>®</sup> day take place?

# Mathematics with Industry Day – Thoughts towards a training methodology in applied mathematics

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Erasmus Day, Oct. 16, 2020, iTEM Webinar

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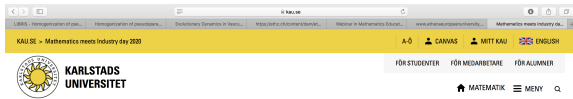
Joint work with:

*Elisabet Mellroth*, dr. (high school teacher, expert in education of gifted students, Karlstad, Sweden), co-owner of the idea of the MiMM<sup>®</sup> day

*Omar Richardson*, PhD student in applied mathematics (Karlstad, Sweden)

The industrial problems and *rules of the game* are published online at

🌐 <https://www.kau.se/MiMM-day>



## MATHEMATICS MEETS INDUSTRY DAY 2020

Mathematics meets Industry at the 4th Mellroth-Muntesan day (MiMM<sup>®</sup> day) at Karlstad University. Companies propose scientific challenges. Teams of mathematicians consisting of senior researchers, doctoral and university students as well as upper secondary students work together to come up with solution strategies to the proposed problem.

15TH OF DECEMBER AT KARLSTAD UNIVERSITY

### AIM

Three companies propose one scientific challenge each to the mathematicians, i.e. problems handling relevant unsolved current technological or societal issues in search for a suitable solution.

### PROBLEMS 2020

- The MIL resource optimisation problem

### APPROACH

During the MiMM<sup>®</sup> day, teams will be formed to attack the industrial problems. Each team will be composed of mathematicians with very different levels of seniority, i.e. senior researchers (1), doctoral students (1-3), university students (2-3) and upper secondary students (2-3). The problem owners from each of the companies will also join the teams. The solution sessions will be English.



MORE INFORMATION

A. Muntean

Mathematics with Industry Day

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# Why there is need of a Mathematics with Industry Day?

Current situation:

- The society is increasingly "technological"
- (Local) industry hires (local) *highly-specialized people*
- Every thing that matters is *multi-disciplinary*
- *Hands-on attitude and excellent communication skills*
- Smart/gifted children (or university students, or PhD students, us, etc.) cannot focus on difficult tasks without immediate reward
- Smart children handle more tasks at once
- Grow successful young people (and teachers)

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How can we combine everything via a single multiple-purpose activity?

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## What is a MiMM<sup>®</sup> day?

Transition from *problem-based learning* to *challenge-based learning*

- one day event
- companies present the problems in the morning
- mixed groups of mathematicians work in teams/problem during the day
- presentation of the results in the late afternoon
- free "fika" lunch and dinner together + lots of coffee
- evaluation of the event

*NB. Problem owners join the teams during the whole day. The event is highly interactive.*

## Examples of industrial problems

Let's explore together <https://www.kau.se/MIMM-day>

- Past industrial problems
- Current industrial problem (**The MRI resource optimization problem** (proposed by Region Värmland))

## What do we gain via a Mathematics with Industry Day?

- allow everyone to see *How mathematicians think?*, and also *What mathematicians can in principle do for the society?*
- additional motivation to study natural sciences
- train researchers to work in industrial mathematics
- improved contact between mathematics, industry, and society
- . . .



## Where are the main difficulties when organizing a MiMM<sup>®</sup> day?

- How to select the right industrial problems?
- How to decide on the composition of working groups? Is a moderator needed? How big should be the group size? How many girls, how many boys?
- Where to find the key "group-glueing" people?
- How to make MiMM<sup>®</sup> day a "corona-proof" concept?

## Next MiMM<sup>®</sup> day?

- December 15, 2020 - the event day
- Via zoom, also supported by iTEM
- Registration opens soon
- Search for 2 more industrial problems
- Participation is free, but must be active
- Limited number of participants

*Feel welcome to join us!*