**First Announcement**

**FIRST WINTER MODELLING WEEK IN MACEDONIA**

**Supported by COST Action Mathematics for Industry Network**

**12 February – 16 February 2018, Goce Delcev University – Stip, Macedonia**

Faculty of Computer Science - Department of Mathematics and Statistics, Faculty of Electrical Engineering and Faculty of Technology with the support of the TD 1409 MI-NET Cost Action, is pleased to announce the first MI-NET Modelling Week in Macedonia. The aims of the Modelling Week are: widening, broadening and sharing knowledge relevant to the Action's objectives through working on modern and actual problems which can be solved with mathematics and mathematical modelling.

This Modelling Week will have 4 main aims:

1) To train students and early career researchers to engage in study groups and similar activities.
2) To offer broader skills training - team-working, using of the modelling methodology, writing of reports, and enhancing communication/presentation skills.
3) To learn how different branches of mathematics can be applied in various industrial settings.
4) The students are meant to benefit from an international exposure, where they discover the multi-cultural and cross-national nature of mathematics in general, and industrial mathematics in particular.

The Modelling Week will be under auspices of Prof. Blazo Boev, Rector of the Goce Delcev University, Stip, Macedonia

Program Committee:

1. Vineta Srebrenkoska, PhD – Macedonia
2. Tatjana Atanasova – Pachemska, PhD – Macedonia
3. Poul G. Hjorth, PhD – Denmark
4. Wojciech Okrasinski, PhD – Poland
5. Joerg Elzenbach, PhD – Germany
6. Gregoris Makrides, PhD – Cyprus
7. Biljana Jolevska – Tuneska, PhD – Macedonia
8. Limonka Koceva Lazarova, PhD - Macedonia

Organizing Committee:

1. Vineta Srebrenkoska – Macedonia
2. Tatjana Atanasova – Pachemska – Macedonia
3. Svetlana Risteska – Macedonia
4. Igor Dimovski - Macedonia
5. Marija Miteva – Macedonia
6. Limonka Koceva Lazarova – Macedonia
7. Riste Timovski - Macedonia

**Modelling Week programme:**

**Monday 12 February 2018**

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| 10.00 – 10.30 | Registration of the participants |
| 10.30 – 11.30 | Welcome and presentation of the Action MI-NET and presentation of the program of the modeling week – plenary session with guests and media |
| 11.30 – 13.00 | Problem Overviews – Presentation of the problems. Definition of the groups. |
| 13.00 – 14.30 | Lunch break |
| 14.30 – 16.00 | Common discussion. Work begins. |
| 16.00 – 16:30 | Coffee break |
| 16.30 – 18:00 | Work in progress |
| 19.30 – 21.30 | Social Evening<br>welcome party |

**Tuesday 13 February 2018**

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| 09.00 – 10.30 | Work in progress |
| 10.30 – 11.00 | Coffee break |
| 11.00 – 12.30 | Work in progress |
| 12.30 – 14.30 | Lunch break |
| 14.30 – 16.00 | Work in progress |
| 16.00 – 16.15 | Coffee break |
| 16.15 – 17.00 | Coordination and ideas exchange / discussion |
| | Free evening |

**Wednesday 14 February 2018**

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| 09.00 – 10.30 | Transportation to the Institute of Advanced Composites and Robotics (IACR) in Prilep for the participants who work on the third problem and for other interested participants |
| 09.00 – 10.30 | Work in progress for the participants who will not go to IACR |
| 10.30 – 11.00 | Welcome and coffee break (in Prilep)/coffee break in GDU, Stip |
| 11.00 – 12.30 | Demonstration of the labs and industrial problems (in Prilep) /<br>Work in progress in GDU, Stip |
| 12.30 – 14.30 | Lunch |
| 14.30 – 16:00 | Group working |
| 16.00 – 16:15 | Coffee break |
| 16.15 – 17.00 | Preparing for the presentations of ideas and initial problems' results and solutions |
| 17:00 – 18:30 | Transportation from Prilep to Stip |
| | Free evening |

**Thursday 15 February 2018**

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| 09.30 – 11.00 | Group working |
| 11.00 – 11.30 | Coffee break |
| 11.30 – 13.00 | Group working |

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| 13.00 – 14.30 | Lunch break |
| 14.30 – 17.00 | Preparation of the presentations |
| 17.00 – 17.30 | Coffee break |
| 17.30 – 19:00 | Preparation of the presentations |
| | Free evening |

**Friday 16 February 2018**

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| 09.30 – 11.00 | Final group presentations |
| 11.00 – 11.30 | Coffee break |
| 11.30 – 13.00 | Final group presentations & Discussion |
| 13.00 – 14.30 | Lunch break |
| 14.30 – 15.00 | Final discussion, comments and initiative for future works |

The work during the Modelling Week is structured to maximise time for networking and informal discussions.

**Proposed problems list:**

**Problem 1**

*a)* Considering the modern way of life, where the two parents usually work more than 8 hours during the day and they usually spent much time outside of the home, there is a neediness for caring of the children in kindergartens, or in a care centers for children. However, children as a sensitive category have specific requirements which depend of their age. They require different approaches and care. Because of that the kindergartens and day care centers face with a problem when the employees should be organized throughout the working day, or only partially included in a certain period of the day. Therefore, it is necessary to make a schedule of employees in the kindergartens or in a day care center for children. An optimization model should be made, which will manage to deal with the large number of children attending such centers, on the one hand, and the employees on the other. It is necessary to take into consideration that groups should be formed depending on the age of children. In addition, it is good to be considered the case when there are sick children in the group that requires particular care from a caregiver or a medical person. The children with special needs should be included in the regular groups, but in that case a psychologist will be needed. The basic needs of children should be considered: feeding, sleeping, upbringing, learning. In the day center, there are small children aged from 1 to 6 years who do not attend school, as well as children from 6 to 10 years old who go to school.

*b)* Very similar is the problem in rest home. It is needed an optimization method and model to handle with the increasing demand of supplying healthcare services to elderly. That means, by using the limited number of caregivers and making proper scheduling, as more as possible, elder patients to be serviced. The main problem here is scheduling patients (elderly people) to the available caregivers. Scheduling is the allocation of shared resources over time to competing activities. ( L.K.Lazarova)

**Problem 2:** The company A deals with retail trade, in chain of supermarkets and a few warehouses. One of the supermarkets is located in an area where there are not many other markets of this type. Because of that, in this supermarket very often are generated crowds

by the buyers on the cash boxes. There are three cash-settling boxes in this supermarket, but in some cases queues are created from buyers. These queues and the delaying on the cash boxes are reasons because the byers are dissatisfied. The company does not want to lose its customers and therefore is considering improving the supermarket by expanding the space. It is considering whether it is necessary to include additional cash boxes in order to reduce the waiting queues and, if it is necessary, how many additional cash boxes would achieve the desired goal. It is needed to be determine the optimal number of cash boxes to increase the efficiency of the customer service.

In addition, the problem in this company is the way of storage of products in the warehouse. How to manage stocks in the warehouse. Which criteria should be prioritized for entry and exit of products from the warehouse? The model of warehouse storage is needed.

(T.A.Pachemska)

**Problem 3:** Optimization of the industrial processes for production of advanced polymer composites by implementation of the full factorial experimental design. The aim is to give the participants insight into the production processes of the advanced composites and optimization of the process parameters to solve the problems with the varying of the quality of the composites structures. The participants follow a short description about the production processes of the advanced composites and applying of the mathematical modeling for optimization of the process parameters. After this, the production processes will be demonstrated at the labs of Institute of Advanced Composites and Robotics (IACR). The participants will analyze the different properties of the composite materials in a group and they will prepare optimized mathematical model which the best describes the process.

(Vineta Srebrenkoska)

**Application:**

- A brief CV (with the indication of MSc, PhD or other higher degrees).
- Motivation letter for participating in the training school, which should indicate the academic/professional status of the applicant.

If you are interested for participation, you can enroll by one of these two ways:

1) You can fill the application google form on this link: https://drive.google.com/open?id=1WUHU4LSY7rJPrK1nR9AB3BHN0aDeNtfaPVtcVUnoRpE
   A brief CV and motivation letter should be named with your first and last name.
2) Or you can send your application via e-mail to Tatjana Atanasova - Pachemska (tatjana.pacemska@ugd.edu.mk) or Limonka Koceva Lazarova (limonka.lazarova@ugd.edu.mk) and use the subject line: “Application COST Modelling Week MI-NET 2017”.

**Who can participate?**

The Modelling Week is aimed towards Masters, PhD students, Early Career Investigators (up to 8 years after their PhD).
The number of (sponsored) participants is limited to 20.

**Financial support:**

**The applicants can be reimbursed according to the COST Action guidelines**.
The final grant amount will be confirmed, depending on the country of the trainees and on budgetary considerations. Prior to the Modelling Week, each trainee will receive a grant

letter stipulating the fixed amount on his or her grant. The grant is intended to cover the majority of trainees' travel, accommodation, and subsistence during the Modelling Week. Trainees will be required to pay for their own travel, accommodation, and subsistence prior to receiving their grant.

Costs for accommodation, food, and travel will be reimbursed after the workshop via the COST platform based on receipts.

**Deadline:**
The deadline for the submission of applications is **15 January 2018**. The notification of acceptance or rejection will be sent by **20 January 2018** at the latest.

**We would appreciate if you could forward this announcement via e-mail to colleagues or students who may be interested in participating. More information available soon at:** http://mi-network.org/

Supported by: