KoMSO CHALLENGE WORKSHOP

Mathematical Modeling, Simulation and Optimization in Food Industries

The industrial production and handling of food poses interesting and challenging mathematical questions of non-standard nature.
This workshop will discuss a variety of mathematical aspects in food industry. These range from modeling, simulation and optimization of growth and microbial activity over food processing with aromatic facets up to logistics of distribution.

The aim of this workshop is to bring together people from food industries and from academia in order to find mathematical challenges of common interests and to foster synergies and collaborations.

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Universität Trier

KoMSO

KoMSO
Committee for Mathematical Modeling, Simulation and Optimization
KoMSO unites the triad of mathematical modeling, simulation and optimization (MSO) as new field of technology in research and development to reinforce the innovational strength of Germany as high-tech location. As a strategic alliance it is KoMSO's purpose to determine current and future demand areas in MSO, to make them visible, and to support respective projects.
KoMSO is currently funded by the German Federal Ministry of Education and Research (BMBF) as part of the "Mathematics for Innovations in Industry and Services" program.

Department of Mathematics at Trier University
Both in research and teaching, the Department of Mathematics of Trier University focuses on applied mathematics, with a special emphasis in the fields of Applied Analysis, Numerical Analysis, Mathematical Optimization, and Statistics.
It offers bachelor and master programs in applied mathematics and business mathematics, as well as education for mathematics teachers. In addition, it offers postgraduate education, for example in the research training group on algorithmic optimization funded by the Deutsche Forschungsgemeinschaft (DFG). Within the Trier Center of Sustainable Systems (TriCSS), the department strongly collaborates with the Departments of Economics and Geosciences at Trier University.

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KoMSO CHALLENGE WORKSHOP · **PROGRAM**

Mathematical Modeling, Simulation and Optimization in Food Industries

MARCH 17 & 18, 2016
Trier University
Universitätsring 15, Building E, Room 51, 54296 Trier

THURSDAY – MARCH 17, 2016

8:00 Registration

9:00 **Address of Welcome**
Volker Schulz (Trier University, Germany)

9:15 **The Influence of Fluid Dynamics on Human Oral Perception and Swallowing**
Adam Burbidge (Nestlé Research Center, Nestec Ltd., Lausanne, Switzerland)

10:00 **Economic Model Predictive Control with Parameter and State Estimation for Energy Consumption during Wine Fermentation**
Christina Schenk (Trier University, Germany)

10:45 Coffee Break

11:15 **Function Identification and Optimal Control Methods applied to the Wine Fermentation Process**
Juri Merger (University of Würzburg, Germany)

12:00 **Aerial Mapping for the Purpose of Optimizing Logistical Challenges during Grape Harvest**
Martin Häfele (Zurich University of Applied Sciences, Wädenswil, Switzerland)

12:45 Group Photo / Lunch

14:15 **Flow Analysis and Energy Optimization of Wine Fermentations**
Dominik Schmidt (Hochschule Geisenheim University, Germany)

15:00 **Mixer-Tank Design Optimization for Food Products exhibiting non-Newtonian Flow Behavior**
Jonas Müller (Hochschule Geisenheim University, Germany)

15:45 Coffee Break

16:15 **Molecular Dynamics Simulations in Food Science: Why are Cooked Spaghetti Soft?**
Frederik Heber (Saarland University, Saarbrücken, Germany)

17:00 **Discussion**

18:30 **Dinner and Wine Tasting at Gaststätte Kesselstatt**

FRIDAY – MARCH 18, 2016

9:00 **Discussion Summary of Previous Day**
Volker Schulz (Trier University, Germany)

9:15 **Nonequilibrium Thermodynamic Modeling of Industrial Flows**
Natalie Germann (TUM School of Life Sciences Weihenstephan, Germany)

10:00 **Granular Flow in Food Industries: Simulation of Silo Discharge and Pneumatic Transport**
Sebastian Rau (Fraunhofer Institute for Industrial Mathematics ITWM, Kaiserslautern, Germany)

10:45 Coffee Break

11:15 **Listeria Overgrowth as an Allelopathic Biocontrol Problem: A Modeling Approach**
Hermann J. Eberl (University of Guelph, Ontario, Canada)

12:00 **Closing Discussion and Farewell**