GAMM STUDENT CHAPTER SCIENCE SLAM 2024
HANNOVER · BOCHUM · BRAUNSCHWEIG · HAMBURG

Leibniz Universität Hannover

GAMM Student Chapter Science Slam 2024 - Program

11:45 Lunch

12:45 Opening
13:00 Industry Talk
Benedikt Wegener & Alexey Fofonov | d-fine GmbH
14:00 Coffee break

14:15 Science Slam Talks I
Superficial Interactions
15:00 Coffee break

15:15 Science Slam Talks II
Live Long and Prosper
16:00 Coffee break

16:15 Science Slam Talks III
Computing Is Better Than Nothing
17:00 Closing

18:00 Dinner

Science Slam Talks - Detailed Program

I. Superficial Interactions

Chair: Miriam Kick, Leibniz-University Hannover

1.) **Bose Einstein Condensate: The super chill party!!**
Mahima Yadav, Ruhr-University Bochum
This talk focuses on approximating the ground states of rotating Bose-Einstein condensates. The ground states are described as the constrained minimizers of the Gross-Pitaevskii energy functional on a Riemannian manifold.

2.) **M&MS - Marvelous and Minimal Surfaces**
Eleonora Ficola, Universität Hamburg
Aim of the talk is providing an introduction to one of the most popular problems in Geometric Measure Theory: the minimal surface (or Plateau) problem. I will also present some modern variants - i.e. solutions of the inhomogeneous problem with prescribed mean curvature measure - and sketch some of our recent results in this direction.

3.) **Parameter estimation for fluid-structure interaction without all the pain**
Julian Roth, Leibniz-University Hannover
Have you ever looked at a flag waving in the wind and wondered what material the flag is made of? If yes, this is your lucky day since I will present a simple way for solving parameter estimation for fluid-structure interaction and I will try to convince you that this is fairly easy to implement.

II. Live Long and Prosper

Chair: Henrik Wyschka, Universität Hamburg

4.) **Live Life Time Product and Healing Prediction of Smart Stent**
Alexandros Tragoudas, Leibniz-University Hannover
This project aims to contribute significantly to the understanding of coronary stent behaviour by developing a robust computational model and possible creation of an innovative product. Through the integration of diverse physical phenomena, calibration with experimental data, and the incorporation of artificial intelligence, the project seeks to enhance the accuracy and efficiency of stent life cycle predictions.

5.) **Phase-field modeling of coupled crack propagation and polarization switching in ferroelectrics**
Thuc Pham Phu, Ruhr-University Bochum
Ferroelectric materials are a subclass of piezoelectric materials that retain their polarization state below the Curie temperature after the applied electric field has been removed. Due to its rise in popularity and application within various industries, the fracture behavior of the material is of great interest in research. This study presents the phase-field model to describe both the crack advancement process in a specimen and the polarization switching that occurs around the crack tip.

6.) **Breaking the Cycle to Master Fatigue**
Hüray Ilayda Kök, Leibniz-University Hannover
This talk presents an innovative approach to model fatigue, focusing on breakthroughs in computational efficiency and modeling accuracy. By breaking conventional cycles and integrating advanced methods, significant progress is made in fatigue prediction and evaluation of structural integrity.

III. Computing Is Better Than Nothing

Chair: Mischa Blaszczyk, Ruhr-University Bochum

7.) **How to implement "Nothing" in thermodynamic topology optimization**
Max von Zabiensky, Leibniz-University Hannover
The aim of topology optimization of hyperelastic materials is to obtain a sufficiently converged black-and-white solution, which can be subject to large deformations. If numerical elements with low density are distorted too much, the solution of the finite element method diverges or the algorithm aborts due to singularities. Being able to specifically control this effect would enhance the stability of hyperelastic topology optimization.

8.) **Preconditioners for linear systems in RBF-FD discretizations**
Michael Koch, Hamburg University of Technology
Radial basis function finite difference (RBF-FD) discretization has recently emerged as an alternative to classical finite difference or finite element discretization of (systems) of partial differential equations. We focus on the construction of preconditioners for the iterative solution of the resulting linear systems of equations. We illustrate the performance of the preconditioners in the solution of the three-dimensional convection-diffusion equation.

9.) **Efficient computations of large-scale vibroacoustic models**
Yannik Hüpel, Technische Universität Braunschweig
How can we improve the computational efficiency of aircraft cabin noise computations and what can we do with faster computations?