Doctorate School PLUS

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PARIS LODRON UNIVERSITÄT SALZBURG

MARS

Models, Algorithms, Computers and Systems

Series of Talks

SS 2023

A cooperation with SMC

Department of Mathematics
Department of Computer Science

Paris Lodron University Salzburg

PARIS LODRON UNIVERSITÄT SALZBURG | Mathematics

PARIS LODRON UNIVERSITÄT SALZBURG | Computer Science

MARS – Models, Algorithms, Computers, and Systems

Modern high tech research in science and technology requires to a great extent an interdisciplinary approach. This applies particularly to wide areas of the methodological sciences mathematics and computer science, where generally one or more aspects of a chain of consecutive closely interlocked fields of research are considered. These start with a mathematical model, continue with algorithmic problems and finally cover aspects of the implementation on computers or high performance computing environments and therefore also issues on the efficiency of computer systems.

MARS is a doctoral programme at the Doctorate School PLUS (DSP Programme), which is organized by the departments of mathematics and computer sciences of the Paris Lodron University Salzburg. Its objective is to educate doctoral students in the research fields models, algorithms, computers, and systems and also to achieve new insights and research findings especially with regard to the inter-dependency of these fields of research. The focus will be on important topics relevant for the Salzburg research site. MARS fields of research form particularly from a methodological point a cohesive and closely linked line of research and cover a wide spectrum of scientific interests.

Joint activities constitute the structured doctoral program in MARS. These include seminars with external guest speakers, one day workshops with external guests and multi day retreats away from the university, as well as summer schools on the topics of MARS.

Programm

Thursday, 15:00-15:45
Lecture room 414, 1st floor

Singularity formation for the three-dimensional Keller-Segel model.
Birgit Schörkhuber (Innsbruck),
June 29, 2023

The description of dynamics in terms of time-dependent partial differential equations (PDEs) plays a fundamental role in natural sciences and applications. In many models, nonlinearities appear naturally due to self-reinforcing processes. Consequently, nonlinear effects may dominate smoothing mechanisms such as dissipation or dispersion, resulting in the formation of singularities in finite time, i.e. solutions might "blow up".

In this talk, I will give a general introduction into this topic and discuss recent results on singularity formation for the Keller-Segel equation, which is a well-known model in mathematical biology and astrophysics.

The talk is based on joint work with Irfan Glogić.