

# Online Seminar on Chemotaxis

Date: 16th of November 2022 9:00 – 10:00 in “Central EU” hour  
(which is 16:00 – 17:00 in “Beijing” hour and 17:00 – 18:00 in “Seoul–Tokyo” hour)

Speaker: Piotr Biler (Uniwersytet Wrocławski)

Title: Large global solutions of the parabolic-parabolic Keller-Segel system in  $\mathbb{R}^d$  and blowup for related toy models

Abstract:

The minimal chemotaxis system consists of two parabolic equations

$$u_t - \Delta u + \nabla \cdot (u \nabla \varphi) = 0, \quad \tau \varphi_t = \Delta \varphi + u,$$

and describes the evolution of the density population  $u$  under diffusion and attraction directed by the gradient  $\nabla \varphi$  of the chemoattractant density in the whole space  $\mathbb{R}^d$ . The question: What is the minimal regularity and what is the maximal size of initial data leading to global-in-time solutions? is addressed in the higher dimensional case  $d \geq 3$ . At the same time conditions for the finite time blowup of solutions are found. The answers depend in a sensitive way on the size of the coefficient  $\tau$  varying from 0 (the parabolic-elliptic case) to  $\infty$  in the fully parabolic case.

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