

PARTIAL DIFFERENTIAL EQUATIONS-GOVERNED MODELS AND OPTIMIZATION IN ENGINEERING APPLICATIONS

Rabia Altunay^{1,2}, Jarkko Suuronen¹

¹LUT University

²Turku University of Applied Sciences

e-mail: rabia.altunay@lut.fi

Keywords: optimization, numerical methods, partial differential equations

Abstract of the session

This minisymposium focuses on mathematical models governed by partial differential equations along with numerical methods and optimization techniques for tackling engineering challenges. The discussions cover computational approaches in fluid dynamics, drug dissolution, filtration, and transportation systems. One key method presented is homogenization, which alleviates the discretization burden in finite element methods. The importance of sophisticated computational tools is demonstrated in the design of personalized drugs. Also, efficient evolutionary algorithms and surrogate models are presented to accelerate the parameter optimization of computationally heavy models with a focus on the applications.

Presentations of the session (totally 2 hours)

- 1. Miguel Angel Uribe Laverde, Evolutionary algorithms for bus rapid transit system (40+5 min)**
- 2. Andreas Rupp, Continuous super-resolution for the simulation of multiscale porous materials (20+5 min)**
- 3. Rabia Altunay, Mathematical modeling of drug dissolution (20+5 min)**
- 4. Jarkko Suuronen, Optimal inverse design of personalized drugs (20+5 min)**

(Note that the first speaker may have a longer presentation than the other, or, you may propose 4 x 30 minutes, always reserve 5 minutes for questions and changes of the speakers).