Sano Computational Medicine Seminars

Monday, 23 November 2020, 14:00-15:30 (CEST)

Join us via Zoom: https://seminar.sano.science/

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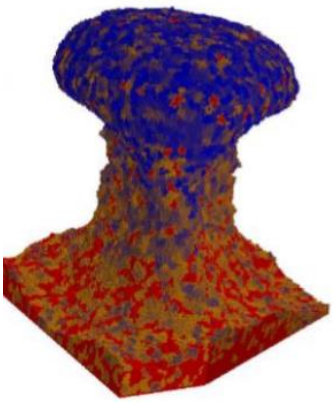
https://pure.uva.nl/ws/files/36020905/Thesis.pdf

Exploring Complex Interactions in Bacterial Biofilms and Colonies – An *In-Silico* Approach

Abstract

Biofilms are macroscopic structures emerging from microscopic interactions of bacteria and their environment. These structures harbor antibiotic resistant bacteria and prevent proper elimination of the bacterial population during drug treatments. To design optimal treatment strategies, a proper understanding of the development of biofilm structures is necessary. The mechanisms behind the spontaneous formation of cap and stalk of the biofilm structures are less understood. Multi-scale computational models can lend insight into the intricacies of solute-cell interactions driving such structural formations. It can also enable identification of suitable drug candidates.

This talk will emphasize on the combined use of mesoscale computational models, *in-vitro* gene knockout experiments and mass transfer kinetics in microbial research. In addition to morphological analysis, the talk will also focus on the influence of different environments on quorum sensing and quorum quenching, which typically occur in natural and engineered environments.



References:

1. Sheraton, V M, et al. "Mesoscopic energy minimization drives Pseudomonas aeruginosa biofilm morphologies and consequent stratification of antibiotic activity based on cell metabolism." *Antimicrobial agents and chemotherapy* 62.5 (2018).
2. Sheraton, V M, et al. "Convection and the extracellular matrix dictate inter- and intra-biofilm quorum sensing communication in environmental systems." *Environmental Science & Technology* (2020).
3. Sheraton, V. M., V. R. Melnikov, and P. M. A. Sloot. "Prediction and quantification of bacterial biofilm detachment using Glazier–Graner–Hogeweg method based model simulations." Journal of theoretical biology 482 (2019): 109994.