PostDoc Position:

Distributed Communication & Algorithms for Microbiological Systems

We are looking for a PostDoc at Université Paris-Saclay to develop ***algorithms for consortia of bacterial cells in distributed biocomputing circuits***.

Position. We offer a PostDoc position in a highly interdisciplinary project, working on the foundations of new robust distributed algorithms in microbiological systems. The position will be allocated for 1 year, with the possibility of extension.

Background. Our objective is to use synthetic intercellular communication systems in bacterial systems to implement robust biological distributed algorithms. We will combine *methods from synthetic biology* with *theory from distributed computing* to build and test these synthetic bacterial systems. The hired PostDoc will contribute to the design and modelling of a synthetic communication system, based on previous work [5], and to the design of new distributed algorithms.

Job profile. The candidate should have previous wet-lab experience, ideally including engineering of *E. coli* and microfluidics. Strong communication skills and the willingness to work collaboratively with other members of the team, including biologists, mathematicians, computer scientists, and control theorists is important. Background in computer science, coding (Python), and modelling are an advantage, but not essential.

Project. The position is part of the DREAMY project (Distributed Algorithms for Microbiological Systems) funded by the French National Research Agency (ANR) and RFSI. The interdisciplinary project is a collaboration between partners from several leading French institutions: CNRS, INRAE, Inria, Université Paris-Saclay, and University of Bordeaux. The position will be in tight collaboration with members of Micalis (INRAE).

Application. For questions, please contact Matthias Fuegger (mfuegger@lmf.cnrs.fr) and Thomas Nowak (thomas@thomasnowak.net). To apply, please send a cover letter and a CV (with contact details of at least two referees).

Selected References.

1. Regot, S. *et al.* Distributed biological computation with multicellular engineered networks. *Nature* **469**, 207–211 (2011). *https://doi.org/10.1038/nature09679*
2. Tamsir, A., Tabor, J. J. & Voigt, C. A. Robust multicellular computing using genetically encoded NOR gates and chemical 'wires'. *Nature* **469**, 212–5 (2011). *https://doi.org/10.1038/nature09565*
3. Ortiz, M. E. & Endy, D. Engineered cell-cell communication via DNA messaging. *J. Biol. Eng.* **6**, (2012). *https://doi.org/10.1186/1754-1611-6-16*
4. Cho, D-J. *et al.* Distributed Computation with Continual Population Growth. *International Symposium on Distributed Computing (DISC 2020)*. https://drops.dagstuhl.de/opus/volltexte/2020/13085/
5. Pathania, A. *et al*. A synthetic communication system uncovers extracellular immunity that self-limits bacteriophage transmission. *bioRxiv*, 2022. https://www.biorxiv.org/content/10.1101/2022.05.11.491355v2