# iDynoMiCS 2: Fully flexible computer modelling platform for microbial ecology

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## Abstract

The source code is publicly available to download from `https://github.com/roughhawkbit/iDynoMiCS-2`.

## Author Summary

TODO

## Introduction

Software based on [1]. Useful references [2].

## Methods

We follow the Overview, Design concepts and Details (ODD) protocol for description of iDynoMiCS 2 [3]. Further details are available in Supporting Information for some parts of the model description.

### Purpose

### State variables and scales

### Process overview and scheduling

Each compartment is self-contained. No interaction between compartments within a global time-step, all transfers are stored and happen instantly between timesteps.

### Design concepts

Emergence

Modularity

Ease of comparison

### Initialization

### Input

### Submodels

## Results

TODO

## Discussion

TODO

## Supporting Information

## Acknowledgments

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## References

1. Lardon LA, Merkey BV, Martins S, Dötsch A, Picioreanu C, Kreft J-U, Smets BF. iDynoMiCS: next-generation individual-based modelling of biofilms. Environ Microbiol. 2011 13(9):2416-2434. doi:10.1111/j.1462-2920.2011.02414.x

2. Ferrer J, Prats C, Lopez D. Individual-based Modelling: An essential tool for microbiology. J Biol Phys. 2008. 34(1-2): 19–37. doi:10.1007/s10867-008-9082-3.

3. Grimm V, Berger U, Bastiansen F, Eliassen S, Ginot V, Giske J, Goss-Custard J, et al. A standard protocol for describing Individual-based and Agent-based Models. Ecological Modelling. 2006. 198 (1-2): 115–26. doi:10.1016/j.ecolmodel.2006.04.023.