# Statistical inference for structured populations governed by fragmentation-transport

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**Abstract**

We investigate inference in simple models that decribe the evolution (in size or age) of a population of bacteria across scales. The size of the system evolves according to a fragmentation-transport equation: each individual grows with a given transport rate, and splits into two offsprings, according to a binary fragmentation process with unknown division rate that depends on its size. Macroscopically, the system is well approximated by a PDE and statistical inference transfers into a nonlinear inverse problem. Microscopically, a more accurate description is given by a stochastic piecewise deterministic Markov process, which allows for other methods of inference, introducing however stochastic dependence. We will discuss and present some new results on the inference of the division rate. Real data analysis is conducted on *E. coli* experimental data.