



**Katarína Bod'ová et al. Bacterial chemotaxis.** Bacteria execute run-and-tumble motion to climb the chemoattractant gradient, starting at a random position within a specified region. (A) True transition rates in the model of run-and-tumble bacterial motion in a chemical gradient. The model consists of random switching between three deterministic behavioral states (run, tumble left, tumble right). (B) Transition (logarithmic) rates inferred from the simulated trajectories assuming a model with three deterministic states. (C) Inferred transition (logarithmic) rates for the coarse-grained model of bacterial chemotaxis with one stochastic, compound “tumble” state. Regions poorly sampled by simulated trajectories are shown in white. For more details, see our paper called “Probabilistic models of individual and collective animal behavior”, [doi.org/10.1371/journal.pone.0193049](https://doi.org/10.1371/journal.pone.0193049).