Bacterial chemotaxis

Bacteria respond to chemical cues by performing a biased random walk
that enables them to migrate towards attractants and away from repellents.
Bias is achieved by regulating the duration of the bacterial runs as a function of the environment, inferred from the history of chemoattractant detections experienced by the bacterium. This time-signal is processed using a time convolution function that can be assayed by measuring the response of the bacterium to short pulses of chemoattractant and a new experimental method based on inference methods.
 The convolution constitutes an elementary form of memory, which
is encoded at the molecular level by the underlying biochemical
network. Bacteria also feature adaptation of their chemotactic response to the surrounding environment.
The phenomenology and theoretical models of chemotaxis as well as its
functional and evolutionary dynamics will be reviewed during the talk.