Information Rates and Optimal Decoding in Large Neural Populations

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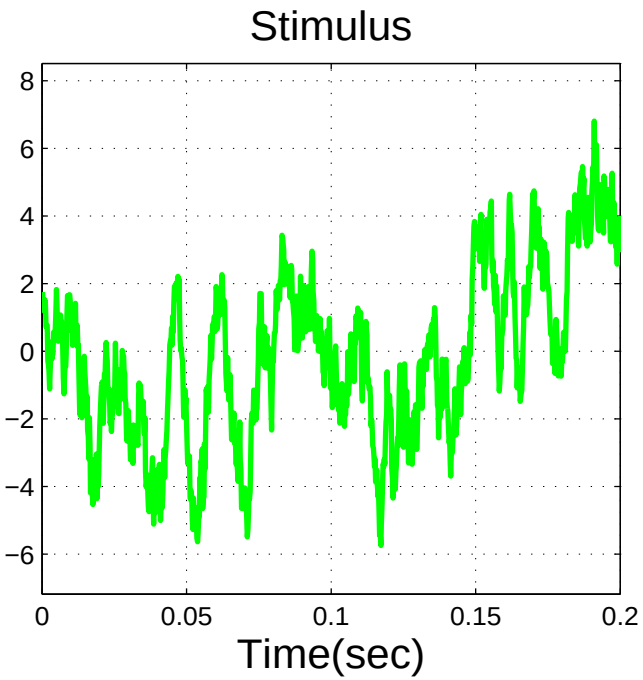
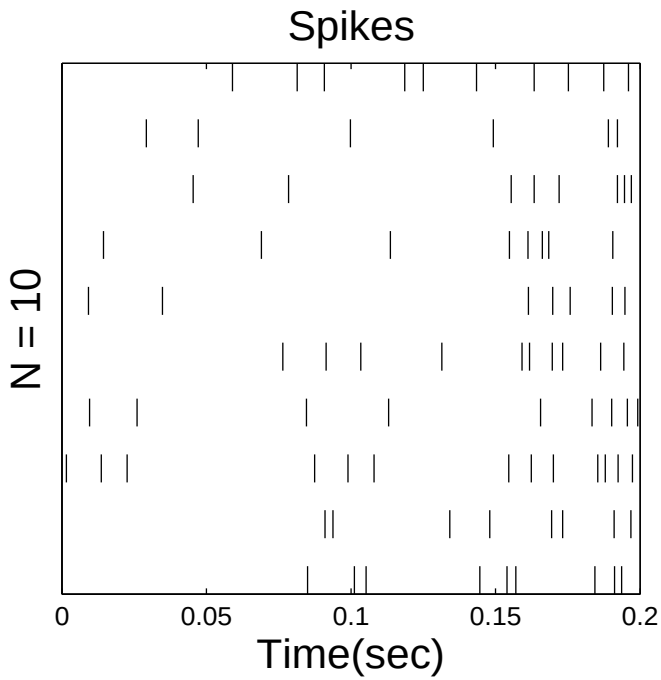
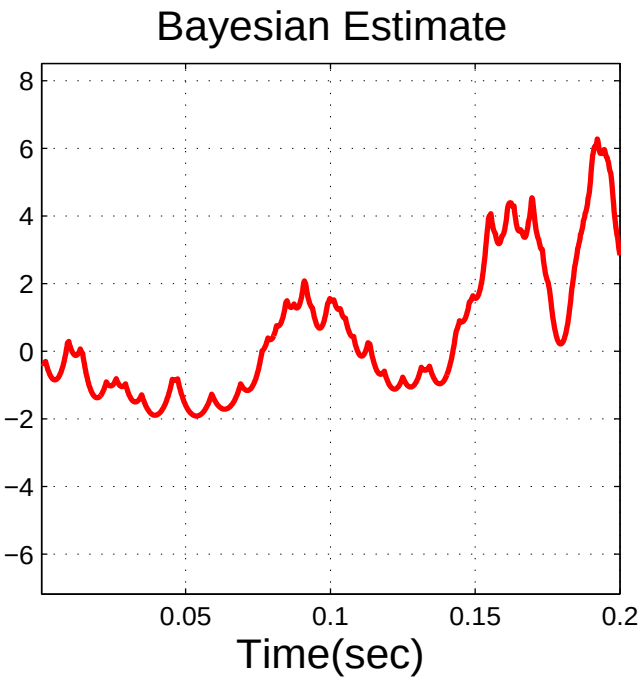
Presented by David Pfau







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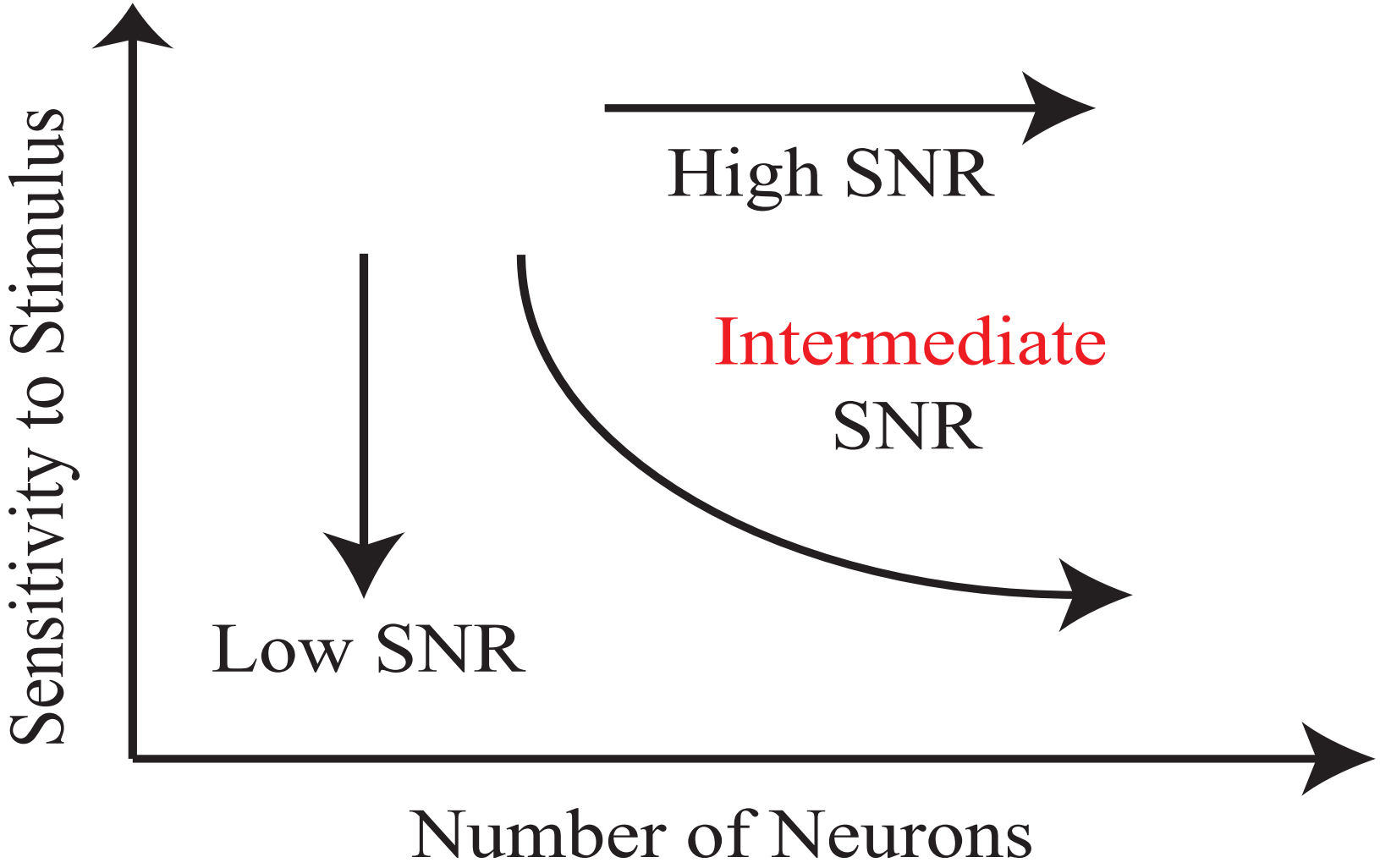
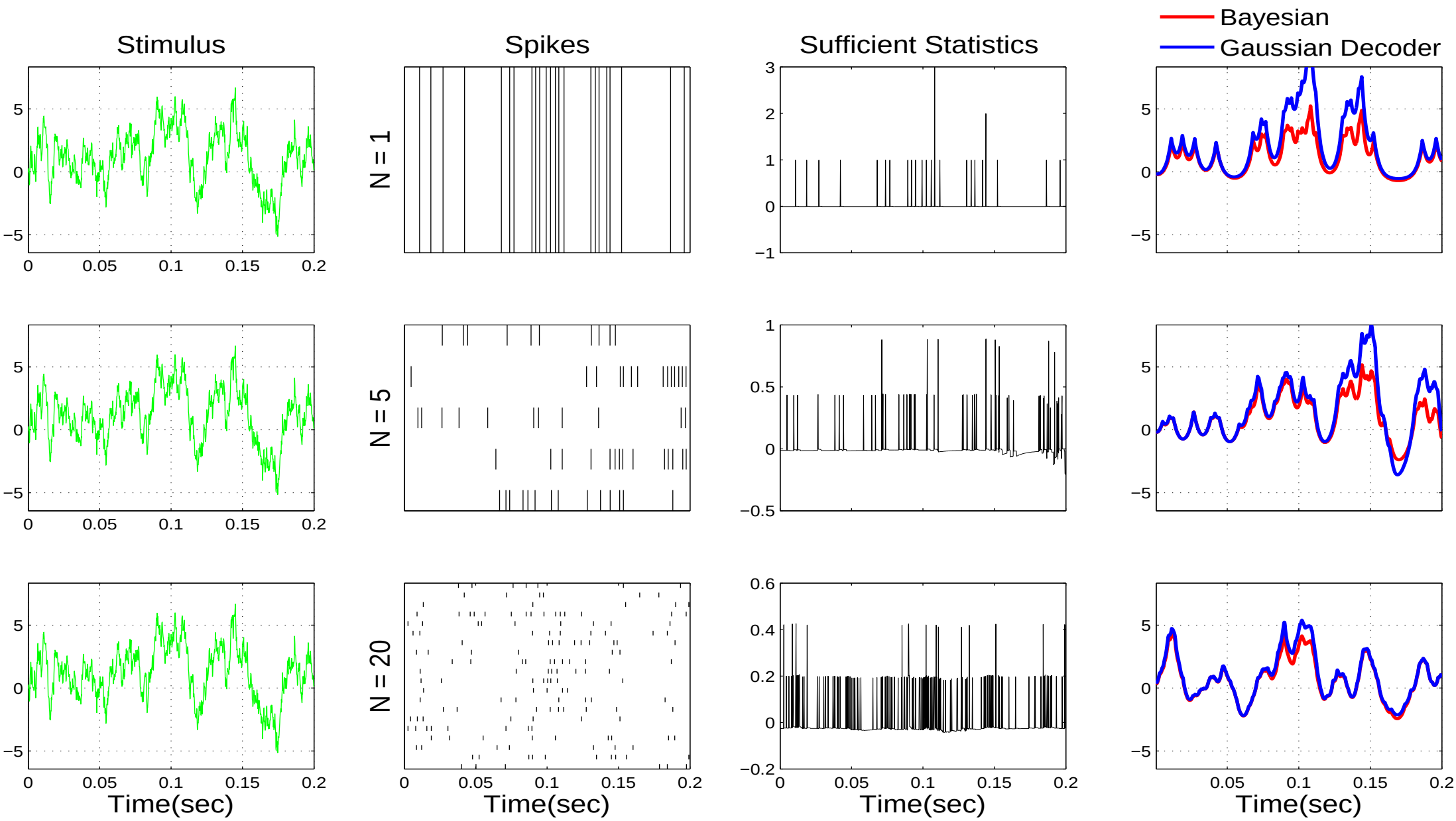
Biologically-relevant Intermediate signal-to-noise ratio: in spite of the large number of neurons, the total amount of information provided by the population remains **finite**.



- Single neurons convey small amounts of information about the stimulus.
- Neural populations convey a finite amount of information.
- In the limit of large population size, the sufficient statistics have a linearly-weighted form and a Gaussian distribution, even in many nonlinear, coupled spiking networks.
- This makes it easy to compute optimal decoders and information rates.



The optimal Bayesian decoder is well-approximated by a linear function of the sufficient statistics when n is even moderately large.