Single molecule discrimination as the sequential hypothesis testing, maximum information gain measurement ALEXEI GOUN, Postdoctoral researcher — Detection of single molecule and single molecule complexes is used widely in the field of molecular biology, biochemistry, physical chemistry. The task is often to discriminate among several distinct possibilities such as which molecule (A,T,C,G) out of the set is present, is the excitation transfer pair in bound or loose state. At present the approach is to accumulate the sufficient statistics for reliable discrimination among the possible outcomes. We suggest the different approaches that adjust the experimental conditions on every step of the measurement in order to maximize the expected information gain of the experiment. The approach is illustrated on the task of single molecule discrimination. Our simulation shows that approach based on sequential hypothesis testing and sequential experimental planning outperforms traditional maximum likelihood hypothesis testing.

Alexei Goun
Postdoctoral researcher