**Fachbereich 08 – Physik, Mathematik und Informatik**
**Institut für Mathematik**
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JOHANNES GUTENBERG UNIVERSITÄT MAINZ

# Oberseminar Stochastik

Am **Dienstag, 21. Mai 2019**, wird

**Herr Franz Baumdicker (Princeton University und Universität Freiburg):**

einen Vortrag halten mit dem Titel:

## *"Estimating evolutionary rates in the defense memory of the prokaryotic immune system CRISPR"*

Abstract:

Bacteria and archaea are under constant attack by a myriad of viruses. Consequently, many prokaryotes harbor immune systems against such viral attacks. A prominent example is the CRISPR system, that led to the CRISPR-Cas genome editing technology.

The prokaryotic CRISPR defense system includes an array of spacer sequences that encode an inheritable memory of previous infections. These spacer sequences correspond to short sequence samples from past viral attacks and provide a specific immunity against this particular virus. Notably, new spacer sequences are always inserted at the beginning of the array, while deletion of spacers can occur at any position in the array. In a sample of CRISPR arrays, spacers can thus be present in all or a subset of the sample, but the order of spacer sequences in the array will be conserved across the sample. This order represents the chronological infection history of the host.

In an evolutionary model for spacer acquisition and deletion we derived the distribution of the number of different spacers between spacers that are present in all arrays. In particular, the order of spacers in the arrays can be used to estimate the rate of spacer deletions independently of the spacer acquisition rate. A property that is usually hard to obtain in population genetics. These estimates provide a basis to study the co-evolution of CRISPR possessing prokaryotes and their viruses.

**Zeit:** Dienstag, 21. Mai 2019, 14 Uhr c.t.

**Ort:** Raum 05-136, Institut für Mathematik, Staudingerweg 9, 55128 Mainz

Alle Interessierten sind herzlich eingeladen!

gez. Matthias Birkner