# *Mathematical Biology Seminar*

## Monday, February 12, 2024

## 3 pm MDT - 457 CAB (in person)

**Join Zoom Meeting**

https://ualberta-ca.zoom.us/j/98497695684?pwd=SG5pcUVRS0xucW5xd0xBTm1VVCtEUT09

Meeting ID: 984 9769 5684
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## Extreme first passage times for populations of identical rare events


A collection of identical and independent rare event first passage times is considered. The problem of finding the fastest out of $N$ such events to occur is called an extreme first passage time. The rare event times are singular and limit to infinity as a positive parameter scaling the noise magnitude is reduced to zero. In contrast, previous work has shown that the mean of the fastest event time goes to zero in the limit of an infinite number of walkers. The combined limit is studied. In particular, the mean time and the most likely path taken by the fastest random walker are investigated. Using techniques from large deviation theory, it is shown that there is a distinguished limit where the mean time for the fastest walker can take any positive value, depending on a single proportionality constant. Furthermore, it is shown that the mean time and most likely path can be approximated using the solution to a variational problem related to the single-walker rare event.