



\* Please note this is a virtual talk via Zoom. \*

## Discrete Mathematics Seminar

Time: Friday, March 31, 2023, 1:00 - 2:00 PM (Central Time)  
Title: Chip-firing and Critical Groups of Signed Graphs  
Speaker: Ryota Inagaki, Undergraduate Student, UC-Berkeley  
Zoom Link: Meeting ID: 999 2462 8868, Password: DiscreteM

### Abstract:

Chip-firing is a simple game played on a graph  $G$ , where chips are placed on its vertices and distributed according to a simple rule. Certain 'stable and reachable' configurations of chips define the *critical group* of  $G$ , and the dynamics of chip-firing has found applications in mathematics, physics, and economics. We study chip-firing and critical groups for 'signed graphs', modeling a scenario that involves both cooperative and antagonistic interactions. For this, we apply a framework of chip-firing on general invertible matrices developed by Guzman and Kliavns. Then, we determine the critical groups of certain families of signed graphs including wheels, fans, and certain complete graphs, which connect to interesting combinatorial sequences.