



**DEPARTMENT OF MATHEMATICS**  
**Spring 2023 MATH Colloquium Series**

# **The Paradoxes of the Game**

## **Penney Ante**



**Philip Farmer**

**Researcher/Instructor, Bay Area**

Penney Ante is a game in which two players each choose a sequence of three consecutive tosses of a fair coin -- say HHT or HTT. The players then begin flipping a coin and recording the outcomes. The player whose sequence of three tosses comes up first wins. This game leads to all kinds of counter-intuitive results. For example, the expected waiting time for both the sequences HHT and HTT is eight tosses. But in a race, HHT comes up before HTT on the average two-thirds of the time. Techniques will be presented for calculating the expected waiting time for a sequence of three tosses, as well as a simple algorithm that converts any sequence of three tosses into another sequence of three tosses more likely to win a race than the original sequence.



**Mar. 23, 2023**  
**THURSDAY**

**4:00 PM**  
**BSS#166**

**FOR MORE INFO GO TO [HTTPS://MATH.HUMBOLDT.EDU/GET-INVOLVED/MATHEMATICS-COLLOQUIUM](https://math.humboldt.edu/get-involved/mathematics-colloquium)**

**WE CORDIALLY INVITE YOU TO THE PRE-COLLOQUIUM TEA IN BSS#312**  
**AT 3:30 PM**