MSc Seminar

Thursday August 29, 2019 at 2:00PM in Reynolds, Room 2224

Amidakuji: Optimal Ladder Lotteries
Patrick Di Salvo

Advisor: Dr. Joe Sawada
Advisory Committee: Dr. Charlie Obimbo

ABSTRACT:

An Amidakuji/Ladder Lottery is a custom in Japan which allows for a pseudo-random assignment of children to prizes. Usually done in Japanese schools, a teacher will draw N vertical lines, hereby known as lines, where N is the number of students in class. At the bottom of each line will be a unique prize. And at the top of each line will be the name of one of the students. The teacher will then draw 0 or more horizontal lines, hereby known as bars, connecting two adjacent lines. The more bars there are the more random (and fun) the Amidakuji is. No two endpoints of two bars can be touching. Each student then traces his/her line, and whenever s/he encounters an end point of a bar along his/her line, s/he must cross the bar and continue going down the adjacent line. The student continues tracing down the lines and crossing bars, until s/he gets to the end of the ladder lottery. The prize at the bottom of the ladder lottery is his/her prize.
Ladder Lotteries make for interesting combinatorial objects when they are derived from a permutation. Such Ladder Lotteries are called optimal if for every inversion in the permutation, there exists exactly one bar in the ladder. This seminar is intended to teach the audience about optimal ladder lotteries by defining and explaining key concepts about ladder lotteries. The seminar will also cover an algorithm to enumerate optimal ladder lotteries, areas of application, and open problems regarding optimal ladder lotteries.