Speaker: Jonathan Lenchner

Title: On Some Relatives of the Ehrenfeucht-Fraisse Game and Software for Helping with the Analysis of these Games

Abstract: I will describe a game we call the Multi-Structural (MS) game, which is a relative of the well-known Ehrenfeucht-Fraisse (EF) game for capturing expressivity in First Order (FO) Logic. While the EF game captures the quantifier rank needed to express a First Order sentence, the MS game captures the total number of quantifiers needed to express a First Order sentence. I will explain why the number of quantifiers is potentially a more powerful complexity measure than the quantifier rank, describe some of our work on characterizing the number of quantifiers needed to express Boolean functions, and then lay out the path for using quantifier number as a means for separating classical complexity classes. I will also demonstrate some software I am developing to help with the analysis of EF games and their relatives.

Relevant Papers:

1. Marco Carmosino, Ronald Fagin, Neil Immerman, Phokion G. Kolaitis, Jonathan Lenchner, Rik Sengupta: On the Number of Quantifiers Needed to Define Boolean Functions. MFCS 2024: 34:1-34:16
2. Marco Carmosino, Ronald Fagin, Neil Immerman, Phokion G. Kolaitis, Jonathan Lenchner, Rik Sengupta: Multi-Structural Games and Beyond. Log. Methods Comput. Sci. 20(4) (2024)
3. Ronald Fagin, Jonathan Lenchner, Kenneth W. Regan, Nikhil Vyas: Multi-Structural Games and Number of Quantifiers. Log. Methods Comput. Sci. 21(1) (2025)