CCSU
DEPARTMENT OF MATHEMATICAL SCIENCES
COLLOQUIUM

Friday, August 30
3:00 – 4:00 PM
Maria Sanford, Room 101

THE MATHEMATICS OF CONTINGENCY TABLES, PART I

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Abstract: In statistics, categorical variables take on values from a finite set. Analyzing how two such variables interact is the goal of a contingency table. Consider this example from the 1962 Health Examination Survey: a group of 6672 people were given a questionnaire, which included a question on gender, and another on handedness. Quantifying how these variables are related is useful, just like it is with two numerical variables. One way to do this is to analyze the number of people in each of the four subgroups induced by these two variables: see the table below. Part 1 of this talk explains several ways of analyzing a contingency table of counts, starting with the most common – doing a chi-square hypothesis test of independence – but also looking at other mathematical approaches such as resampling. Once the fundamentals are covered, we will look at an example inspired by the 2016 paper by Robert Oliver and Kannan Soundararajan, "Unexpected Biases in the Distribution of Consecutive Primes." Finally, Part 2 (tentatively scheduled spring semester, 2020) will explain the basic ideas of how algebraic statistics, a combination of ideas from both algebraic geometry and statistics, applies to contingency tables. Some of this work dates back to the 1970s, but current interest has been driven by the ability to find approximate solutions with computers, which has been developed over the past twenty years. These ideas have been popularized by a group of researchers including Seth Sullivant, Mathias Drton, Bernd Sturmfels, Lior Pachter, Satoshi Aoki, Hisayuki Hara, and Akimichi Takemura.

	Male	Female
Right-handed	2780	3281
Other	311	300

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