

2019 Belmont Undergraduate Research Symposium

Mathematics and Computer Science

Moderator: Ryan D. Fox, Ph.D.

April 11, 2019, 6:30-7:30 p.m.
Janet Ayers Academic Centre, Room 2143

6:30 p.m. – 6:45 p.m.

Random Number Generators

Chris Guardo

Faculty Advisor: Daniel C. Biles, Ph.D.

Deriving methods to generate pseudorandom numbers has been a difficult task in computer science. Improved random number generation has important applications to gambling, computer simulation, cryptography, and creating simple random samples in statistics. In my research, we determined detectable properties of randomness that can be found in strings of digits given by random number generators. We used several random number generators and produced one hundred digits between 0 and 9 with each. Afterwards, we tested each list of random digits for uniformity and independence of the distribution. Through these statistical tests and comparisons, we discovered which random number generators produce the most functionally random results. Drawing inspiration from these methods, we created our own method of computing pseudorandom numbers and compared its sequence of digits to those of traditional methods of random number generation. We then refined the method to see if it could produce a more functionally random technique for generating a sequence of digits than previous methods.

6:45 p.m. – 7:00 p.m.

Creating an Algorithm to Write a Billboard #1 Hit

Jared Yoakem

Faculty Advisor: Daniel C. Biles, Ph.D.

We present an algorithm that can be computer coded to write the tune for a pop song. Through analyzing the characteristics of a number of hit songs, we identified key features of these that we wanted our algorithm to mimic. Stochastic features were included so that the program would create a new unique song every time it was run.