



Iowa Colloquium on Information, Complexity, and Logic

March 28th Meeting

Location: Drake University in Collier-Scripps 135

[Map of Drake University](#)

[Parking Map](#)

Time: Thursday, March 28th at 3:00 PM

Speaker: Titus Klinge (Carleton College)

Title: Real-Time Equivalence of Chemical Reaction Networks and Analog Computers

Abstract: In this talk, we will explore the equivalence of chemical reaction networks (CRN) and general purpose analog computers (GPACs). In particular, we will prove that the class of real-time GPAC-computable real numbers is equivalent to the class \mathbb{R}_{RTCRN} of real-time CRN-computable real numbers. Roughly, a real number α is in \mathbb{R}_{RTCRN} if there is a CRN with integral rate constants and a designated species X such that, when all species concentrations are initialized to zero, X converges exponentially quickly to α . Using the equivalence with the GPAC model, we will prove that any real number that is real-time CRN-computable with integer initial concentrations is also in \mathbb{R}_{RTCRN} . Finally, using the above theorems we will show that the transcendental numbers e and π are members of \mathbb{R}_{RTCRN} .

This is joint work with Xiang Huang and James Lathrop.

Parking Information: There are a limited number of guest parking passes available. Please contact Adam Case (adam.case@drake.edu) to request a pass. There is also free parking along 24th Street on the east side of Lot 1, and two hour parking is available along 25th Street on the west side of Lot 1.