UTRGV

School of Mathematical and Statistical Sciences

Colloquium Series

Branch Decompositions: Linear–Time Graph Algorithms and Where to Find Them

Dr. William Christian

National Security Agency

Abstract

In this talk, I will present the concept of branch decompositions originally introduced by Neil Robertson and Paul Seymour in the early 1990's. The branch decomposition construct has been increasing in popularity in part due to a theorem of Bruno Courcelle, which states that one can find linear-time algorithms to solve members of a large class of graph problems using those decompositions. In the past, this result has been downplayed primarily because of one snag: finding an optimal branch decomposition is NP-complete. However, I will share recent progress in trying to overcome that unfortunate reality using machine learning. In addition, I will explain why that problem is not as bad as one might think.

Additionally, I will give a high-level overview of Mathematics and Research at the National Security Agency.

Short Bio of the Speaker

Dr. William Christian has been a Research Mathematician at the National Security Agency since 2004. He has worked in multiple areas from data processing to data analytics as a team member, project lead, and organizational leader. Dr. Christian earned his Ph.D. from Rice University in Computational and Applied Mathematics and BS from the University of Maryland Baltimore County. His research focus is optimization and machine learning on data modeled as graphs, especially networks, for analysis and defense.

Date: Thursday, September 15, 2022

Time: 3:00-4:00 pm CT

EMAGC 2.416

Zoom: https://utrgv.zoom.us/j/85940592784

For further information or for special accommodations, please contact Dr. Alexey Glazyrin via email alexey.glazyrin@utrgv.edu and Dr. Cristina Villalobos via email cristina.villalobos@utrgv.edu