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Ramsey Theory, trees, and ultrafilters

This talk will introduce two areas of close interactions between Ramsey theory on trees and ultrafilters. In one direction, we show that Ramsey theory on trees can provide a general approach for classification problems regarding certain structures on ultrafilters, namely structures induced by Rudin-Keisler and Tukey reductions. At the core of this are canonical equivalence relations, extending the Erdős-Rado canonization theorem on finite sets of natural numbers. The second direction we overview is the use of Ramsey theory on trees to investigate partition relations on homogeneous relational structures. This has potential connections with topological dynamics, as will be made clear in the talk.