



Department of
Mathematical Sciences

Colloquium

Dr. Steve Butler

Professor of Mathematics

Iowa State University

Friday,
September 30, 2022
@ 2:00pm

EMS Building, E495



Dr. Steve Butler

**UW-Milwaukee
Department of
Mathematical Sciences**

**EMS Building, Room E403
3200 North Cramer Street
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Spectral Faux Trees and Coalescing Sets

A classic problem in mathematics is “Can you hear the shape of a drum?” In graph theory, this is often phrased in terms of the eigenvalues of matrices associated with a graph, and whether a particular set of eigenvalues is associated with a unique graph. We will look at the existence and construction of graphs which are not trees but share eigenvalues with some tree (these are the “spectral faux trees” and examples where we “cannot hear the shape of a tree”). The answer to this problem varies significantly with which type of matrix is considered and we will consider several common matrices. We will also present a result that unexpectedly came up during the investigation of spectral faux trees that deals with the results of coalescing graphs.

Joint work with Elena D’Avanzo, Rachel Heikkinen, Joel Jeffries, Alyssa Kruczek, and Harper Niergarth

**Refreshments will be served in EMS E495
following this event.**



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