



Department of Mathematics
and Statistics
3640 Colonel Glenn Hwy.
Dayton, OH 45435-0001
(937) 775-2785
FAX (937) 775-2081
mthstt@wright.edu
<http://www.math.wright.edu>

**WRIGHT STATE UNIVERSITY
MATHEMATICS & STATISTICS COLLOQUIUM**

SPEAKER: Prof. John Polhill
Bloomsburg University

TITLE: Product Constructions of Paley Partial Difference Sets

DATE: Friday, November 6, 2009

ROOM/TIME: 2:30 Refreshments 222MM
3:00 Talk 224MM

HOST: Dr. Yuqing Chen

ABSTRACT:

We will begin with an introduction to difference sets (DSs) and partial difference sets (PDSs), including their correspondence to symmetric designs and strongly regular graphs respectively. We will then focus on 3 of the more famous types of these sets, namely Hadamard (Menon) difference sets, Paley-Hadamard difference sets, and Paley partial difference sets. Paley partial difference sets were first constructed by R.E.A.C. Paley in 1933 using finite fields. For 60 years, the only known constructions continued to be in elementary abelian groups (i.e. the additive group of a finite field). In the 1990's, Dr. James Davis was able to produce Paley PDSs in other groups of prime power order. By modifying Dr. Yuqing Chen's construction for Hadamard difference sets we will construct Paley partial difference sets in groups of order which is not a prime power, the first such construction. The talk will conclude with a discussion of some open related problems.

ABOUT THE SPEAKER:

Dr. Polhill received his bachelors degree from the University of Richmond in 1993 under the guidance of Dr. James Davis, and it was there that he first learned of difference sets. He continued to work with Dr. Davis and also Dr. Harold N. Ward at the University of Virginia, where he received his doctorate in 1999. During his time at Virginia, he worked on the Hadamard difference set construction, attempting to generalize the work of Wright State's Dr. Yuqing Chen. Dr. Polhill immediately began teaching at Bloomsburg University of Pennsylvania after receiving his degree, and still works there today. Over the past few years, he has enjoyed working on several combinatorial problems with the BU Combinatorics Seminar.