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# Information Security Seminar

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## Classifying bent functions by their Cayley graphs



**SPEAKER: Dr Paul Leopardi**  
Bureau of Meteorology

**Date:** Friday 28<sup>th</sup> April

**Time:** 3:00am–4:00pm (Talk & Q/A)

**Venue:** Building 8 Level 9 Room 66 (AGR)  
RMIT City campus

The seminar will be followed by snacks and drinks

**All students and staff are welcome**

**ABSTRACT:** Bent Boolean functions are fascinating and useful combinatorial objects, whose applications include coding theory and cryptography. The number of bent functions explodes with dimension, and various concepts of equivalence are used to classify them. In 1999 Bernasconi and Codenotti noted that the Cayley graph of a bent function is strongly regular. This talk describes the concept of extended Cayley equivalence of bent functions, discusses some connections between bent functions, designs, and codes, and explores the relationship between extended Cayley equivalence and extended affine equivalence. SageMath scripts and SageMathCloud worksheets are used to compute and display some of these relationships, for bent functions up to dimension 8.

**BIO:** Paul Leopardi is a computer scientist and mathematician who works to support scientific applications at the Bureau of Meteorology in Melbourne. His academic career has included stints at UNSW, the University of Sydney, ANU and the University of Newcastle. He is an honorary Fellow at the University of Melbourne. His research interests have included high performance numerical computing, computations with Clifford algebras, constructive approximation, and bioinformatics and well as combinatorics. He was enticed to study Hadamard matrices by Judy-Anne Osborn, Jennifer Serberry and Kathy Horadam, amongst others. This led to the present study.

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