



COLLOQUIUM

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**Reed-Muller codes with application to quantum
computation and information retrieval**

Friday November 22th at 3pm in RT 1516

Bio: Dr. Manganiello has been a Clemson faculty member since 2013. He received his MS degree in Mathematics from the University of Pisa, Italy, and the PhD in Mathematics from the University of Zurich, Switzerland. Dr. Manganiello was a postdoctoral scholar of Dr. Frank Kschischang in the Department of Electrical & Computer Engineering of the University of Toronto. For this academic year, Dr. Manganiello is holding a visiting scientist position in the Cybersecurity Research Lab of the Ted Rogers School of Management of Ryerson University in Toronto, Canada.

Abstract: In recent years communication problems have evolved based on the needs of the society. In this talk we will consider two very distinct modern communication problems. The first one is the problem of achieving universal fault-tolerant quantum computation and the second is of multiparty information retrieval. Although these two problems are completely different, there is a family of classical linear codes that adapts to the needs of both. Reed-Muller (RM) codes are a well-known family of classical linear codes based on the evaluation of multivariate polynomials over finite fields. They have been extensively studied throughout the years and have been previously used in deep-space communication. Their advantageous algebraic properties make them a good candidate for many applications. This is a talk aimed to a broad audience. We will introduce RM codes and learn some of their most important algebraic properties. We will then see how RM codes can help in achieving universal fault-tolerant quantum computation, one of the most vital theoretical aspects of quantum information processing, and how their local properties make them employable for problems of multiparty information retrieval.

Refreshments at 2:30pm in RT 1517