



Helping grow  
Saskatchewan's  
tech sector.

The IEEE North Saskatchewan Section Circuits and Systems / Signal Processing / Communications Joint Chapter is proud to present:

## INTRODUCTION TO CHANNEL CODING: CLASSICAL AND MODERN

### Abstract:

Claude Shannon's 1948 celebrated paper "A Mathematical Theory of Communication" founded the fields of channel coding, source coding, and information theory. Shannon proved the existence of channel codes which ensure reliable communication provided that the information rate does not exceed the so-called capacity of the channel. For the next half century that followed Shannon's landmark publication, a large number of very clever and very effective channel codes had been devised. However, none of them was demonstrated to closely approach Shannon's theoretical limit in a practical setting. The first breakthrough came in 1993 with the discovery of turbo codes, the first class of channel codes shown to operate near Shannon's capacity limit. A second breakthrough came around 1996 with the rediscovery of low-density parity-check (LDPC) codes, which were also shown to achieve near-capacity performance.

The first part of this seminar introduces and explains encoding and decoding principles of some of the most common channel codes, both classical and modern, including linear block codes, convolutional codes, turbo codes and LDPC codes. Their applications in practical communication systems such as 5G cellular, digital video broadcasting, and cable TV networks are also discussed. The second part focuses on a new class of capacity-achieving channel codes known as polar codes, which have modest encoding and decoding complexity, making them attractive for many applications.

**Date: October 24, 2019**

**Time: 4:30 pm – 7:30 pm**

**Location: Philae Room, The Galleria, Innovation Place, 15 Innovation Blvd**

**Price: \$10 – IEEE Members; \$20 – Non-IEEE Members**

**Registration Deadline: October 22, 2019**

Refreshments will be provided during the Seminar.

Registration: <https://events.vtools.ieee.org/m/204965>

Sponsored by [Innovation Place](#)

