

CIF: Small: Best Wiretap Codes for Real-world Physical-layer Security

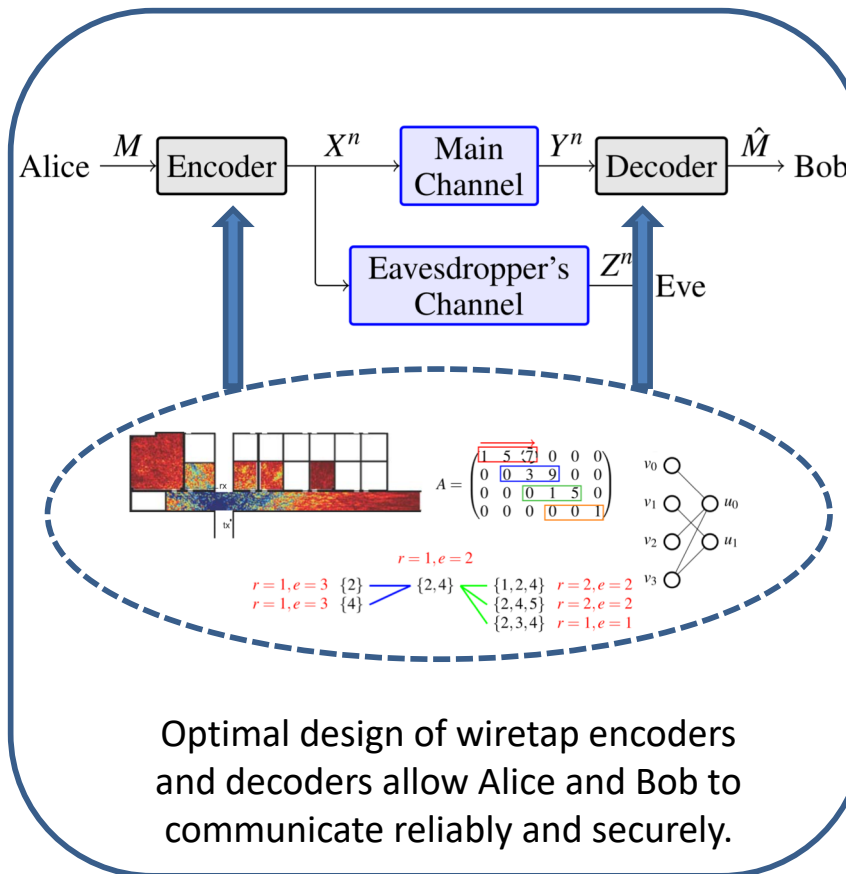
Challenge:

- Find and design new *optimal* wiretap coding structures for discrete memoryless communication models and more realistic models of communication channels (e.g., Gaussian and fading).

Solution:

- The technical approach is to prove the optimality of several well-known block codes, and find algorithms that can build optimal codes for code parameters not covered by one of the well-known families of codes.
- The project begins October 2019, and future innovations will be published in a timely manner.

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Scientific Impact:

- Wiretap codes achieve security through the physical layer of a communications system, and can therefore add on to any existing system.
- Currently known code constructions satisfy information theoretic security measures as blocklength tends to infinity in the code design. The results from this project are to be optimal finite blocklength codes.

Broader Impact:

- All wireless communication systems can be strengthened by application of optimal wiretap codes.
- Wiretap codes could be included in future wireless standards.
- The project recruits women undergraduate researchers through WE@BYU (Women in Engineering at BYU) and BYU IMMERSE programs.