Holcombe Department of Electrical and Computer Engineering
Lecturer Presentation

Introduction to Encryption

Dr. Ronald Mraz

Lecturer, US Coast Guard Academy

Abstract

Encryption (or Secret Writing) ensures that only those that can decrypt encrypted data are the only ones who can view or share information from that data. This lecture will introduce Symmetric Cyphers where the sender and receiver share the same key for encryption and decryption. As examples, we examine Caesar and Vigenere ciphers. This will form the basis to understand more sophisticated methods employing electro-mechanical and computer-based encryption.

Biography of Speaker

Dr. Mraz received his Doctorate in Electrical and Computer Engineering from Carnegie Mellon University in 1992. He holds a Master's of Science Degree in Electrical Engineering from Syracuse University and a Bachelor of Science degree in Electrical Engineering from Drexel University. He is a Senior Member of the Institute of Electrical and Electronic Engineers (IEEE), a member of the Association for Computing Machinery (ACM) and a member of the Armed Forces Communications and Electronics Association (AFCEA). He has over 50 patents and has published more than 12 articles in the field of Computer Engineering. He is an expert on networking, computer security, real-time systems and computer architectures.

He is currently a Lecturer teaching undergraduate classes within the EE/Cyber Systems program at the US Coast Guard Academy in New London, CT. These courses include Intro to Information Security, Software Engineering, Intro to Computing and Independent Study. Prior to this he was an Adjunct Professor in the Computer Science Department at The University at Albany (SUNY) teaching Graduate Classes in Operating Systems and Computer Organization.

Dr. Mraz has over 30 years of private sector experience which included a variety of technical positions at major corporations such as Westinghouse and IBM. He began his career developing microprocessor controls for switching power converter systems at Westinghouse Research. He then participated in the development of several high-performance vector and supercomputing systems for IBM Server and Research Divisions. Subsequently, he developed metrics for analyzing communication hardware in high performance networks for super computer and real-time applications such as streaming video transmission.

As founder and CEO of Owl Computing Technologies, Inc. he directed advanced development of secure data transfer systems for over 15 years. The company sold a product based on data diode technology developed at Sandia National Labs. These products are a key component in many network security architectures used in the DOD, government agencies, and critical infrastructure. In 2017, the company was sold to a DC based private equity firm and continues to grow and expand as Owl Cyber Defense Solutions, LLC.