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Steganography, introduced in the Naval Horizons video by Luke Murphy, is the field associated with the process of hiding information in nondescript packages, allowing for undetected transmission of messages. Examples of this include invisible ink, acrostics, data concealment, and backmasking. Although steganography is often used by hackers to introduce malware into electronic systems, it has more desirable applications. Knowledge of steganography is important for cybersecurity, secured communication, and protection of important documents. During wartime, steganography can be used by military forces to communicate information to allied troops without alerting enemies to its presence. Hiding information in unremarkable packages is more reliable than encoding messages with cyphers without masking their existence and hoping the cypher will not be cracked. That being said, steganography is not completely unidentifiable - if someone knows what to look for, masked messages can be pinpointed. Steganalysis, created to combat steganography, is the technology or process of detecting information hidden by steganography. This challenge of finding new ways to obscure the presence of information and overcome steganalysis was what originally drew me to steganography as a topic. I love the idea of communicating information without the act being obvious to third parties.

In doing more research on this topic, I found a specific type of steganography that really inspired me. Binary color codes primarily rely on the first four digits, leaving the last four able to be manipulated without detection. This means that the main digits of the binary code for a different color can be substituted at the back end of the original color's code, without an obvious effect on the color. If run through code that reads the binary of an image and separates the last half of the color codes, a new image can be created, pixel by pixel, completely separate from the originally visible image carrying the data. An inconspicuous photo of a pet can turn into a secret message!

The Naval Horizons videos not only inspired me to be more creative in hiding my data, they also taught me the importance of embracing our natural world and incorporating seemingly unrelated fields to create new breakthroughs. Dr. Christin Murphy knew what she wanted to do from a young age, and she pursued her interest in marine biology, working to discover new information about the ocean. She was able to utilize this fascination with sea creatures to reimagine the process of energy efficiency, all through analyzing the structure of seal whiskers. I've always loved the idea of incorporating different fields into science and engineering, because I have a lot of intense interests, and being able to use my knowledge of those in my future occupation would be a dream come true. Biomimicry is a great example of combining fields, and for anyone who grew up watching the show, Dr. Murphy is a real-life Wild Kratt!

The future of steganography is bright, as there are limitless methods of concealing the communication of information, and the field is ever-evolving. The incorporation of concepts from other fields, such as art and physics, will provide more paths for the science to grow. Within 10-20 years, the transfer of information will become completely untraceable; civilians will be able to rest easy knowing their private information is protected, and military groups will be able to keep their research and communications protected from outside ears. Naval Horizons is one of many groups paving the way to this future by introducing the next generation to the concepts needed to make this future a reality.