ILLINOIS TECH

Electrical and Computer Engineering

ECE Seminar Series

Technical feasibility of Visible Light Communication systems for low bitrate smart cities and the Industry 4.0 applications

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12:45 PM to 1:45 PM @ Siegel Hall 118

Abstract

As the need for wireless connectivity increases, this seminar explores Visible Light Communication (VLC) as a promising complementary solution to address the limitations of cellular Radio Frequency (RF) networks. With a focus on applications in smart cities and industrial settings, this presentation explores into the technical complexities of VLC systems. It investigates the challenges posed by light-based systems such as having a real-valued and positive signal. A simulator has been developed to study and quantify the transmission channel behavior and modulation schemes tailored for point-to-point communication in diverse environmental conditions. Notably, the adaptation of Universal Filtered Multicarrier (UFMC) for VLC systems demonstrates promising gains in spectral efficiency and Signal-to-Noise Ratio (SNR). Complementing theoretical advancements, the seminar showcases the development and feasibility testing of low-cost VLC prototypes employing a variety of transmitter/receiver pairs, including single LEDs and photodiodes with chromatic filters. By integrating both simulation-based insights and practical prototyping initiatives, this seminar aims to provide a comprehensive understanding of VLC technology's potential use in urban infrastructure and industrial operations.

Speaker's Biography

Véronique Georlette received her Master degree in electrical engineering specialized in multimedia and telecommunications from the Engineering faculty of Mons (Belgium) in 2018. The same year she joined the department of Electromagnetism and Telecommunications to work on the Wal-e-Cities project. The project aimed at studying VLC for Smart Cities applications. As this project included a research and implementation part, she decided to do a Ph.D. thesis in parallel. The objectives of the project and the thesis are closely related. The main focus of her work includes the study of the technical feasibility of deploying VLC systems in smart cities and industries. In parallel to her work, she gave exercise and laboratory sessions and supervised students from Bachelor to Masters in Belgium, France and Benin. After the end of the Wal-e-Cities project, Véronique moved to Chicago to conduct a year of research thanks to two fellowships, the BAEF (Belgian American Educational Foundation) and one from the Rotary Club of Mons. Her main interest lies in optimizing telecommunication systems using innovative approaches.

This seminar is open to everyone at Illinois Tech. For more information regarding this seminar, please contact the ECE Department at 312.567.3400 or ece@iit.edu