ECE SEMINAR

Department of Electrical and Computer Engineering

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2:30pm- 3:30pm
SEC 105

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Electromagnetics after 150 Years: Past Impact and Future Directions

After the 150th year of Maxwell's equations, they continue to be impactful. Electromagnetics and Maxwell's equations have been instrumental in the conception of many electrical engineering and optical technologies. In the beginning, it was telegraphy, and rotating machineries. Over the years, Maxwell's equations have given rise to wireless communications, antennas, radar, masers, optics, and photonics. The amazing feature of Maxwell's equations is that they are valid from subatomic length scale to galactic length scale. They are also valid over a vast frequency range where the wavelength could be very long as well as being very short. Furthermore, they are also valid in classical electromagnetics as well as in quantum electromagnetics. The validity of electromagnetic theory has been tested at many different length scales in several parts per billion. As a result, electromagnetic theory has impacted a whole sleuth of technologies in electrical engineering, optics, photonics, as well as in material science. Because of the highly predictive value of Maxwell's equations, there has been always a quest for their accurate solutions. Various methods to solve Maxwell's equations have been developed since the dawn of their discovery. With the advent of computers, the need for more accurate and robust solutions does not diminish, but indeed increases. These accurate solution providers work in synergy with designers and experimenters to develop new technologies. We will also discuss future directions in this area.

W.C. Chew received all his degrees from MIT. His research interests is in wave and field physics, specializing in fast algorithms in computational electromagnetics in the last 20 years. After graduating from MIT in 1980, he worked at Schlumberger-Doll Research. In 1985, he joined U Illinois Urbana-Champaign, was the director of the Electromagnetics Lab at UIUC from 1995-2007. During 2000-2005, he was the Founder Professor at UIUC, 2005-2009, the Y.T. Lo Chair Professor, and since 2013, the Fisher Distinguished Professor. During 2007-2011, he served as the Dean of Engineering at The University of Hong Kong. He has authored and co-authored three books, over 400 journal papers, and over 500 conference papers. He is a fellow of various societies, and an ISI highly cited author. In 2008 he received the C.T. Tai Distinguished Educator Award from IEEE AP-S, in 2013 he was elected to the National Academy of Engineering, and in 2015 he received the ACES Computational Electromagnetics Award.

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