



Geoffrey Ye Li, ITP Lab, Dept EEE, Imperial College London

Biography: Geoffrey Ye Li has been a Chair Professor at Imperial College London since 2020. Before moving to Imperial, he was with Georgia Institute of Technology as a Professor for 20 years and with AT&T Labs - Research in New Jersey, USA, as a Principal Technical Staff Member for five years. His general research interests include statistical signal processing and machine learning for wireless communications. In these areas, he has published over 600 referred journal and conference papers in addition to over 40 granted patents. His publications have been cited 50,000 times with H-index of over 100 and he has been listed as the *World's Most Influential Scientific Mind*, also known as a *Highly-Cited Researcher*, by Thomson Reuters almost every year since 2001. He has been an IEEE Fellow since 2006 and an IET Fellow since 2021. He received several prestigious awards from *IEEE ComSoc*, *IEEE VTS*, and *IEEE SPS*, including 2019 *IEEE ComSoc Edwin Howard Armstrong Achievement Award*.

Abstract: Title: From Conventional to Semantic Communications based on Deep Learning

To transmit a text message or a picture, we usually convert it into a symbol sequence and transmit the symbols in a conventional communication system, which is designed based on the block structure. It has been demonstrated recently that deep learning (DL) has great potentials to break the bottleneck of the block-based communication system. In this talk, we first provide our recent endeavors in developing end-to-end (E2E) communications, which combine all blocks at the transmitter by a neural network and those at the receiver by another neural network. Even if deep learning based E2E communication systems have a potential to outperform the conventional block-based communication systems in terms of performance and complexity, their spectrum efficiency is still limited by Shannon capacity since they essentially transmit bits or symbols. Semantic communication systems transmit and recover the desired meaning of the transmitted content (for example, a text message or a picture) directly and can significantly improve transmission efficiency. We will present our initial results on semantic communications.