**SPEAKER:** Su Huang

**TITLE:** Advanced processing methods of electro-optic polymers for next generation photonic devices

**ABSTRACT:**

Organic electro-optic (E-O) materials have attracted considerable research attention in the past 20 years due to their rising potentials in a lot of novel photonic applications, such as high-speed telecommunication, terahertz generation and ultra-fast optical interconnections. In order to gain the Pockels effect based E-O activity, the centro-symmetry of amorphous organic E-O materials needs to be removed by a poling process, which introduces orientation to the polar chromophores by applying high electric field. After poling, this collective orientation is subject to a slow decay over time, which can eventually dissipate the E-O activity of the poled material. Thus the study of how to effectively introduce and preserve chromophore orientation forms an important part in the research of organic E-O materials.

Dr. Su Huang’s work focused on utilizing advanced processing methods to increase the poling efficiency, alignment stability and device adaptability of organic E-O materials. He developed a barrier layer approach that can significantly increase the poling efficiency and alignment stability of highly polarizable E-O materials. More importantly, he invented a method to pole E-O materials using the depolarization field of pyroelectric crystals instead of external power supply, which can efficiently pole organic E-O materials both in thin film form and in nano-photonic devices. The discovery is revolutionary because it has largely simplified the poling process of E-O materials in sophisticated photonic devices. With the re-usable pyroelectric crystals, thousands of nanophotonic devices can be poled in one simple process, which makes mass production of E-O polymer based photonic device achievable in the near future.