

**Speaker:** Matt Ziemke (USC)

**Title:** Generators of Quantum Dynamical Semigroups

**Abstract:** Quantum Dynamical Semigroups (QDSs) originally arose in the study of the evolutions of irreversible open quantum systems. Mathematically, they are a generalization of classical Markov semigroups where the underlying function space is replaced by a non-commutative operator algebra. In 1976, Lindblad showed the generator,  $L$ , of a uniformly continuous QDS can be written in the form

$$L(A) = \psi(A) + G^*A + AG$$

for all operators  $A$  in the underlying operator algebra, where  $\psi$  is completely positive and  $G$  is an element of the operator algebra. Unfortunately, there are many examples of QDSs which are not uniformly continuous and a similar form for a general generator has still not been found.

In this talk, we will look at a proof of Lindblad's Theorem, after giving some necessary background information, and show how we can give an analogous form for the generator when we replace the assumption of uniform continuity by an assumption about the domain of the generator.