1086-92-2483 **Jonathan J Sarhad*** (jonathan.sarhad@ucr.edu), **Robert C Carlson** and **Kurt E Anderson**. *Population Persistence In River Networks Using Quantum Graphs.*

Aquatic organisms contend with downstream biased flow in a complex tree-like domain. Differential equation models are often used to study population persistence by considering the dependence of persistence on such variables as advection rate, dispersal characteristics, and domain size. Classical differential equation models rely on interval domains to facilitate analysis while other models that explicitly consider network geometry discretize river habitat into distinct patches. We use a reaction-diffusion-advection equation in a quantum tree graph to identify when a single population will grow at low density, by doing a principal eigenvalue analysis in terms of domain scaling parameters and advection speeds. Our analytical and numerical studies show that network geometry has a significant impact on persistence. This presentation will discuss model definition, basic properties of solutions, and persistence results, while placing emphasis on numerical results. In particular, numerical results show that domain volume alone is a poor indicator of persistence and that interval models can underestimate or overestimate persistence relative to tree models, depending on advection speed. (Received September 25, 2012)