1125-93-1028 **Sergei Avdonin*** (s.avdonin@alaska.edu), 2534 Bridlewood Lane, Atlanta, GA 30339, and **Nina Avdonina** and **Julian Edward**. *Inverse Problems for the Wave Equation on Graphs.*

Quantum graphs are metric graphs with differential equations defined on the edges. Recent interest in control and inverse problems for quantum graphs is motivated by applications to important problems of classical and quantum physics, chemistry, biology, and engineering.

In this talk we describe exact controllability and identifiability results for the wave equation on compact graphs. We consider inverse problems for graph-like networks of inhomogeneous strings with masses attached at the interior vertices. For graphs without cycles, we demonstrate that the unknown densities of the strings, lengths of the edges, attached masses, and the topology of the graph can be recovered using observations associated with all but one boundary vertices. For graphs with cycles additional observations at the internal vertices are required for constructing stable identification algorithms. The proofs are based on the boundary control method and leaf peeling method developed in our previous papers.

The exact controllability results in non-symmetric Sobolev spaces related to described identification problems are proved. We will also discuss the corresponding multivariate sampling and interpolation problems. (Received September 14, 2016)