1067-39-2341 **Jesus Rodriguez** and **Zachary Abernathy*** (zjaberna@ncsu.edu). *Nonlinear Discrete Sturm-Liouville Problems with Global Boundary Conditions.*

This talk shall be devoted to the study of nonlinear difference equations subject to global nonlinear boundary conditions. We provide sufficient conditions for the existence of solutions based on properties of the nonlinearities and the eigenvalues of an associated linear Sturm-Liouville problem. We shall rewrite the nonlinear boundary value problem as an operator equation of the form

$$\mathcal{L}x - \Psi x = \mathcal{G}x.$$

The study of equations of this form has been frequent in the literature, where $\mathcal{L}$ is a linear differential expression, Ψ is a continuously Fréchet differentiable operator, and $\mathcal{G}$ is an operator with bounded range. For example, the case when $\mathcal{L}$ is an ordinary differential operator has been studied extensively by authors such as Lazer, Leach, Sanchez, Brown, and Lin. Landesman and Lazer considered the case when $\mathcal{L}$ is a self adjoint partial differential operator. Our formulation of the operator equation incorporates both the dynamics and the boundary conditions, and the non-local boundary conditions are significantly more general than those that have previously appeared in the above-mentioned analogous results for differential equations. (Received September 22, 2010)