1135-35-14 **Jerome Goddard II**, **Quinn A Morris*** (qmorris1@swarthmore.edu), **Catherine Payne**, **R Shivaji** and **Byungjae Song**. *Steady States of Reaction-Diffusion Equations with U-Shaped Density Dependent Dispersal on the Boundary.*

We consider positive solutions to equations of the form

$$\begin{cases} -\Delta u = \lambda u(1-u), & x \in \Omega, \\ \frac{\partial u}{\partial \eta} + \gamma\sqrt{\lambda} g(u)u = 0, & x \in \partial\Omega, \end{cases}$$

where $\lambda, \gamma > 0$ are parameters, $g : [0,1] \to [0,\infty)$ is a nonlinear function, and Ω is a bounded domain in $\mathbb{R}^N$, $N \geq 1$. Such problems arise in the study of population dynamics in a habitat Ω when the population exhibits nonlinear density dependent dispersal on the boundary. We analyze the persistence of the population (existence, non-existence, uniqueness, and multiplicity of positive steady states) as the patch size (λ) and hostility of the outside matrix (γ) vary. We obtain our results via the method of sub-super solutions. (Received August 25, 2017)