

Department of Mathematics & Statistics
Richard F. Barry Jr. Seminar Series

**“Existence Results for Classes of Steady State Reaction
Diffusion Equations”**

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Abstract

In this talk, via the method of sub-super solutions, we will review existence results for positive solutions to steady state reaction diffusion equations of the form $-\Delta u = \lambda f(u)$ in Ω , with $u = 0$ on the boundary, where λ is a positive parameter, Ω is a bounded domain with smooth boundary, Δ is the Laplacian operator, and $f : (0, \infty) \rightarrow \mathbb{R}$ is a C^1 increasing function such that $\lim_{s \rightarrow \infty} \frac{f(s)}{s} = 0$. We will discuss the cases when $f(0) > 0$ (positone), $f(0) = 0$, $f(0) < 0$ (semipositone), and $\lim_{s \rightarrow 0^+} f(s) = -\infty$ (infinite semipositone).

Speaker Bio:

Ratnasingham Shivaji joined the University of North Carolina at Greensboro (UNCG) as H. Barton Excellence Professor and Head of the Department of Mathematics and Statistics in July 2011. Prior to joining UNCG, he served for twenty-six years at Mississippi State University (MSU), where he was honored as a W.L. Giles Distinguished Professor. He received his Ph.D in Mathematics from Heriot-Watt University in Edinburgh, Scotland in 1981 and his B.S (first class honors) from the University of Sri Lanka in 1977. Shivaji's area of specialization is partial differential equations, and in particular, nonlinear elliptic boundary value problems. His research work has applications in combustion theory, chemical reactor theory, and population dynamics, and has been funded by the National Science Foundation and the Simon's Foundation. To date, Shivaji has authored or coauthored one hundred and twenty-one research papers, and served as thesis advisor for eleven Ph.D. graduates.

Friday, October 3, 2014 (1:30- 2:30 PM)
2nd Floor, E&CS Building, Room 2120