The Charles Phelps Taft Research Center and
the Department of Mathematical Sciences
present

Henrik Shahgholian

Professor, Royal Institute of Technology, Sweden

The Obstacle Problem and Its Ramifications

Thursday, March 6, 2008
4 pm Room 301 Braunstein Hall

I will give an account of recent developments of the obstacle-type problems, which refer to free boundary problems with a governing equation of the type $\Delta u = f(u)$ with $f(t)$ having a discontinuity at $t = 0$, say. The equation changes qualitatively across the boundary $\partial \{\pm u>0\}$. I'll present some problems in physics, mechanics, biology, and finance, which lead to such equations. I also give an example of systems of free boundaries, coming up in optimal switching problems.

The Two-Phase Membrane Problem and Regularity of the Free Boundary

Friday, March 7, 2008
3 pm Room 301 Braunstein Hall

This second Taft lecture will be devoted to detailed mathematical analysis of the so-called two-phase free boundary problem, arising in optimal control, and heat control problems $\Delta u = \lambda_+ \chi_{\{u>0\}} - \lambda_- \chi_{\{u<0\}}$ with $\lambda_\pm > 0$ Lipschitz. I will describe recently developed tools to show the regularity of solution function u and the free boundary.

For more information, please contact Professor Srdjan Stojanovic at stojans@ucmail.uc.edu