Abstract
Finding a Nash equilibrium of an extensive form game is a central problem in computational game theory. For a two-person, zero-sum game this problem can be formulated as a linear program, which in principle is solvable via standard algorithms such as the simplex or interior-point methods. However, most interesting games lead to enormous linear programs that are beyond today's computational capabilities. We propose specialized algorithms that tailor modern smoothing techniques to the highly structure polytopes that arise in the Nash equilibrium formulation. We discuss computational results with instances of poker, whose Nash equilibrium formulation requires about a billion variables and a billion constraints.

This is joint work with Sam Hoda, Andrew Gilpin, and Tuomas Sandholm at Carnegie Mellon University.

BIO:
Javier Pena is an Associate Professor of Operations Research at the Tepper School of Business, Carnegie Mellon University. Prior to joining Carnegie Mellon, he earned his PhD in Applied Mathematics from Cornell University in 1998, and held a postdoctoral position at the Mathematical Sciences Research Institute in Berkeley, California from 1998--1999. He does research on algorithms for convex optimization, applications of conic programming to finance, and equilibrium computation in game theory.

Refreshments will be served in 401 Daniels Hall at 4:00 p.m.