

COLLOQUIUM

DEPARTMENT OF MATHEMATICS AND STATISTICS
OAKLAND UNIVERSITY
ROCHESTER, MICHIGAN 48309

Serge Kruk

**Department of Mathematics and Statistics
Oakland University
Rochester, Michigan**

On the ground state of spin glass, protein folding and VLSI design

or

How semidefinite programs model the world

Abstract

“Find the ground state dictated by the Ising model.” “Find the folds in this protein chain.” “Arrange 100 000 transistors to fit on this wafer.” What do these problems in physics, chemistry and computer engineering have in common? I will show how they can all be accurately modeled by semidefinite linear programs. I will then show a new algorithm for finding the optimal solution to such programs, discuss convergence, implementation issues and other practical considerations.

372 Science and Engineering Building

Thursday, November 8th, 2001

3:00 to 4:00 P.M.

**(Refreshment at 2:30 to 3:00 P.M. in Room 368,
Science and Engineering Building)**

About the speaker

A newly-appointed assistant-professor at Oakland University, Dr. Serge Kruk retired from the industrial world in 1993, after a more than a decade designing optimization software, telecommunication protocols and real-time controllers, when he left Bell-Northern Research to become the oldest undergraduate in the Faculty of Mathematics of the University of Waterloo.

Leaving family, friends and country to gather the sequence B.Math, M.Math and Ph.D. his intention was, at first, to return to the *real world* with new and better tools. But a few years misspent as mathematics and computer science instructor at Waterloo, at Wilfrid-Laurier and at Oakland while finishing his dissertation convinced him of the appeal of academia.

His current research interests still bear the stamp of practicality enforced by years in industry: algorithms for semidefinite optimization, scheduling, feasibility and the related numerical linear algebra and analysis.