



Department of Computer Science and Engineering

Presents

**Kenneth W. Regan, Computer Science & Engineering
University at Buffalo**

New Research Ideas From Computer Chess

Eleven years since Deep Blue defeated Garry Kasparov, one year since the inexpensive commercial program Deep Fritz 10 running on a standard PC beat Kasparov's successor Vladimir Kramnik, is there anything more in computer chess? This colloquium will detail my involvement in three new areas:

(1) Testing Computer-Cheating Allegations. Since being asked to help on the day the Topalov-Kramnik "Toilet Scandal" broke, I have headed the task of developing scientific tests for allegations that a human player has consulted and followed a computer chess program extensively during a game. My site <http://www.cse.buffalo.edu/~regan/chess/fidelity/> has my and partners' data and conclusions on this and several other cases from the past two years, including two positives. The problem involves Bayesian statistics, and represents the general task of measuring how closely a decision-maker is following recommendations by various agents. Compared to analogous problems in financial markets, however, chess poses special issues.

(2) Statistical Tests of Hash Schemes and Pseudorandom Generators (PRGs). Programs for Chess and Go employ a hashing scheme called "Zobrist" or "Subset-Sum" hashing, whose performance is connected with the deepest questions in Complexity Theory. In rare but reproducible cases, collisions in the hash tables can cause chess programs to mis-evaluate positions:

<http://www.cse.buffalo.edu/~regan/chess/computer/DF10anomalies.htm>

<http://www.cse.buffalo.edu/~regan/chess/computer/>

The program itself becomes a statistical test of the generator of the hash bits, different in kind and power from all other tests that have been used.

(3) Computer-Assisted Theorem-Proving and Heuristic Algorithms. Proving that certain game positions are wins for the player to move is a prototypical hard task in computer systems verification. In response to an unexpected compliment by the world's foremost chess blog, I have conducted history's widest-ranging endgame analysis, by far, with computer assistance. The question is, where was my brain needed? How much of the analysis can be reproduced on governing the engine by heuristics typical of "evolutionary algorithms", namely local optimization + randomness?

The talk will include history and background on computer chess, demonstrations of programs and hash bugs from my "laptop", and a tour through recent news.

**Thursday, January 24, 2008
3:30 - 4:30 PM**

Student Union Room 330 - University at Buffalo – North Campus

This talk is free and open to the public. Refreshments for attendees after the talk in 224 Bell Hall

For more information, please email cse-dept@cse.buffalo.edu or contact (716) 645-3180