Bringing Research to LIFE

Upcoming Events

Café Scientifique

TUBERCULOSIS: THE HIDDEN EPIDEMIC

Most Canadians think that tuberculosis (TB) is a disease of the past. In reality, while general rates of TB in Canada are slowly decreasing, in some regions such as Nunavut and Manitoba, they have risen over the past decade. In this Café Scientifique, we explore, through the lens of research, clinical care, public health, human rights, advocacy and personal experience, the story behind the numbers – how socioeconomic, environmental, biologic and cultural factors are affecting the incidence of TB in Canadian communities, and how our experience fits within the context of global TB and the pursuit of TB control/eradication.

Experts:

Dr. Anne Fanning

Dr. Pamela Orr

Moderator:

Dr. Brenda Elias

Tuesday, Oct. 23, 2012, 7:00 pm
McNally Robinson Booksellers
1120 Grant Avenue – Event Atrium

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Undergraduate Research Poster Competition

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Thursday Nov. 1, 2012
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Manitoba Rooms 210-224
University Centre,
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A game of chance?

Innovator in computer science provides more than lottery guarantees

BY KATIE CHALMERS-BROOKS
For The Bulletin

Playing the lottery comes down to pure luck and chance. But what if you removed this element of unpredictability? Computer science professor John van Rees is trying to do just that.

He studies lotto designs and over 10 years has proved several major theorems that can predict — on a small scale — how many tickets a person would have to purchase to ensure a win.

"We want to find the minimum size set (of tickets) you would have to buy to guarantee you would have to win the minimum prize," van Rees explains.

He uses mathematics to develop computer programs to identify these formulas. So far he has figured out the equations for draws that require choosing numbers from a pool of 20 (as opposed to 49, the amount used for Lotto 6/49). His findings, which he worked on with Ben Li (once his PhD student and now his colleague at the U of M), are published in the prestigious *Handbook of Combinatorial Designs*.

"Knowing these smaller numbers hopefully will help you get bigger numbers," van Rees says, noting that other academics have come up with a winning scheme that would work for the popular Lotto 6/49, but not one that would necessarily be profitable.

To guarantee winning a prize in the national draw, with its jackpot often in the multi millions, you would need to buy between 87 and 163 tickets. At $2 a ticket, a win of $10 would be a certain financial loss.

"You think why in the world would you ever do that, but of course you may get bigger prizes — that's not ruled out, it's just giving you the guarantee that you'll win," he says. "You're guaranteed 10 bucks back, but in fact you may get a lot more."

A more precise theorem may exist, but it has yet to be discovered.

"There may be better schemes, we don't know them yet," van Rees says.

Much thought goes into the development of van Rees' lotto-related programming but, fittingly, luck can also play a role. He designs the programs to launch searches, the results of which to some degree are unpredictable. "It's kind of funny, sometimes you can get numbers right on because some nice theoretical design exists and you can use it. And the number next door doesn't use the theoretical design and it doesn't do anything for you and you have to stick with more rudimentary things."

There's no shortage of online pitches selling supposed mathematical tools that claim to improve your odds of winning. Amateur computer programmers are developing crude programs all the time, van Rees says.

Photo by Mike Latschislaw

Computer science professor John van Rees uses math and programming to provide guarantees when playing the lottery.

Such programs determine ranges at best. Programs showing the upper bounds of that range — the greatest amount of tickets you might need to secure a win —are much more abundant and easier to determine than those identifying the lower bounds. Van Rees is interested in doing more research on the latter.

"The more interesting part is the lower bound; it's so much harder. The enthusiast doesn't look at it," he says.

Van Rees admits his research is topical and garners quite a bit of interest, given the popularity of playing the lottery, but his findings prove useful well beyond this realm. His work could help computer scientists develop programs in areas like communications theory, which studies how messages are sent across various channels. That could mean eliminating noise in satellite imaging from Mars to Earth, or, on a smaller level, retrieving data on a disc that has gone wonky.

Van Rees predicts these innovative design studies will be even more relevant as time goes on and technology catches up. "It's not one of the big applied areas yet but I think give it 10 or 20 years and it will become a very applied area. It's partly waiting for computers to get faster and faster," he says. "I think it will come."

For now, he finds himself clarifying to people that his research doesn't provide ways for people to make money playing their lucky numbers, but rather provides mathematical guarantees. And in the end, there really is only one way to guarantee you won't have to part with your hard-earned cash. When delivering seminars on his lotto designs, one of his slides asks the audience—in big, bold letters—'How do you stay ahead in the lottery game?' In fine print beneath, the reply reads: 'Don't buy any tickets.'

"If you don't buy any tickets, you don't lose anything," van Rees says. "You buy a ticket, you almost certainly lose."

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Comments, submissions and event listings to: research_communications@umanitoba.ca
Phone: (204) 474-7300 Fax (204) 261-0325