

## Fighting back with numbers

### Queen's student set to study math, infectious diseases in Botswana

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For Amy Hurford, learning to fight diseases like malaria and tuberculosis is as easy as 1, 2, 3.

From Aug. 19 to 29, the Queen's University PhD student will attend a workshop in Botswana that will focus on teaching math tools and techniques to predict the outbreak and control of disease.

The workshop is organized by Mathematics of Information Technology and Complex Systems, a national math research network, and will involve university students from Ontario as well as Botswana and Zimbabwe. The workshop itself will be led by University of Manitoba professor Abba Gumel and Queen's University professor Troy Day.

Hurford said she hopes the workshop will give her a greater appreciation for infectious disease modelling.

"In particular, a better understanding of what questions are important and why they are important, combined with the skills and knowledge to go about answering such questions."

Hurford said mathematical modelling can be used to answer medical questions that would otherwise be unsolvable. If the math can predict an outbreak, steps can be taken to control it.

"[Modelling] can suggest new hypotheses to providing a more focused and directed approach to experimental research," she said.

"I find working on mathematical problems very rewarding, but I also believe that solving the right problems will lead to very exciting and useful new ideas."



Amy Hurford leaves for Botswana on Saturday, where she will join other students from Ontario, Botswana and Zimbabwe in a study of infectious diseases. The workshop will focus on using mathematical modelling to answer medical questions.

Hurford said you can tell whether to expect the number of individuals infected with a particular disease to increase from the situation in terms of an equation. She cited the example of the 2003 outbreak of SARS that killed 43 people in Toronto.

"When SARS came, there were a few isolated cases, but it wasn't a breakout," she said. "This could have to do with the rate that people recover from the infection versus the rate the disease is transmitted. The transmission rate needs to be high enough relative to

Hurford said increasing the knowledge of how to prevent the spreading of diseases like HIV/AIDs, malaria and tuberculosis will drastically improve the general population's quality of life.

"It's important to build intuition for understanding the important questions you're trying to answer and using math models to make a contribution to bettering people's lives."

recovery and death rates." Hurford said she hopes the workshop will instill her with the necessary technical ability to learn how to predict and control the spread of infectious diseases, one of the essential tools in disease research.

"You also need to understand what the important questions are in relation to the particular diseases you're interested in modelling."