

THE VANCOUVER SUN

Math team gets \$1.1 million grant

Vancouver Sun
Saturday, May 26, 2007
Page: B1 / FRONT
Section: Westcoast News
Byline: Chad Skelton
Dateline: BURNABY
Source: Vancouver Sun

BURNABY - A Burnaby-based team of mathematicians is hoping \$1.1 million in new funding from Ottawa will help it develop mathematical models that can do everything from helping contain a flu pandemic to combatting terrorists.

The federal grant, announced Friday, is going to the Mathematics of Information Technology and Complex Systems (**MITACS**) research network at Simon Fraser University. **MITACS** was founded in 1999 to help mathematicians at universities work on real-world problems with experts in government and the private sector.

The new grant is designed to help **MITACS** build alliances with research centres around the world in four key areas.

Arvind Gupta, scientific director of **MITACS**, said one of those areas is infectious diseases.

Gupta said researchers with **MITACS** have already built several computer models for diseases such as flu, AIDS and severe acute respiratory syndrome (SARS).

The models are designed to use information on an emerging outbreak -- such as who has fallen ill and where -- to predict what the epidemic will do next.

Gupta said the model makes the predictions based on a number of factors, such as population density and a city's public-transit networks.

The model then allows public-health experts to "test drive" solutions -- such as shutting down airports or quarantining the sick -- to see what impact that might have on the epidemic's spread.

Gupta said **MITACS'** disease models are some of the most technologically advanced in the world.

The only problem? Canada is too healthy a country to really know if they work or not.

"We're not a country that every year has a huge pandemic going through it," he said. "Because we don't have a lot of data it's hard to verify that our models are behaving properly."

That's where China comes in.

"They have 1.3 billion people," said Gupta.

"They have many more infectious diseases -- and they've tried many more strategies. So we can incorporate their data and know-how into our models."

Gupta said researchers with **MITACS** are already on location in China, working with academics there to find data on past outbreaks that they can use to fine-tune their models.

"The whole point is to develop models that are good enough that we can use in real-life outbreaks," said Gupta.

In addition to its work on infectious diseases, the federal grant will also help **MITACS** develop a partnership on security issues with the Institute for Pure and Applied Mathematics (IPAM) at the University of California, Los Angeles.

Gupta said that partnership will focus on how to use mathematical models to protect public sites from terrorist attacks -- such as by determining the optimum way to array surveillance cameras.

The final two research areas covered by Friday's grant are improving the design of medical devices and how to price commodities such as natural gas and electricity that are difficult to transport.

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Illustration:

- Colour Photo: Dr. Arvind Gupta says data from China will be valuable in developing his team's mathematical models.

Idnumber: 200705260042

Edition: Final

Story Type: Business

Length: 472 words

Keywords: DISEASES; SARS

Illustration Type: Colour Photo