

#### Vibrant energy for exploration

I faced 2007-2008 with enthusiasm, knowing that the University of Toronto Mississauga's research and innovation agenda had been gaining momentum, and knowing that this energy, this wide-spread passion for creating and sharing knowledge, would continue to thrive.

I was not disappointed.

Our world-class researchers continue to prove that they are second to none, and their dedication to research excellence has once again put U of T Mississauga on the international stage.

This creativity, brilliance and passion is a challenge to capture on the page. Mere words, pictures and charts are pale representations of the day to day explorative activities of our vibrant faculty and student researchers. However, I hope you enjoy a sense of the fruits of discovery as conveyed by some selected accomplishments that are highlighted in this report.

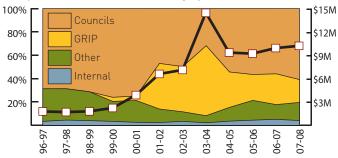


Dr. Ulrich Krull

## Vice-Principal Research

### Performance: At a Glance

Comparison of Research Funding by Source

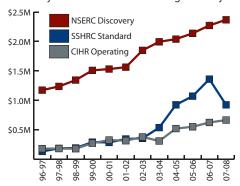


Just over \$10.1 million in research funding was earned by University of Toronto Mississauga researchers in 2007-08. This is just the second time in U of T Mississauga's history that annual research funding has surpassed \$10 million.

As the 'Comparison of Research Funding by Source' chart above illustrates, the majority of this funding represents peer-reviewed, competitive awards granted to faculty from Canada's three granting councils: the Canadian Institutes of Health Research (CIHR), the Social Sciences & Humanities Research Council (SSHRC), and the Natural Science & Engineering Research Council (NSERC).

Each of these three funding agencies offers a primary grant for researcher-initiated projects, and the 'Primary Council Grant Funding History' chart below illustrates U of T Mississauga's funding history in these three funding programs.

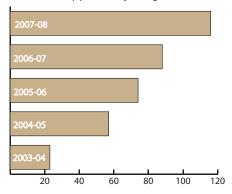
#### Primary Council Grant Funding History



The 2007-08 dip in SSHRC Standard Research Grant funding is due to numerous grant awards that ended. It is anticipated that renewal SSHRC applications will be generated this year, and that the downturn will be reversed in 2008-09. It is notable that funding levels from the NSERC Discovery Grant and CIHR Operating Grant programs have been steadily rising.

Non-infrastructure research revenues—GRIP funding in the 'Comparison of Research Funding by Source' chart—declined slightly in 2007-08 due to a slow-down in the recruitment of new faculty with laboratory equipment needs.

#### Research Opportunity Program Students



Undergraduate students at U of T Mississauga are also actively engaged in the research mission on campus. The Research Opportunity Program (ROP) allows undergraduates to collaborate with faculty on smaller-scale research projects for course credit. As illustrated in the 'Research Opportunity Program Students' chart above, there were a record number of students active in ROP projects in 2007-08.

It should go without saying that the real measure of research performance is not in the financial inputs that make research process possible, nor is it in the number of students that are trained to be successful researchers. Yet these are quantitative measures that are readily tracked, counted, and reported.

The authentic indicator of world-class, innovative research is much more intangible, yet dramatically more powerful. The true measure of research performance lies in the knowledge that has been generated, and in the impact that knowledge is able to have in the community when it is shared.

You are encouraged to read through this report to learn about just a handful of the engaging projects underway throughout 2007-08 at U of T Mississauga. It will immediately become apparent to all readers that the research activities happening on campus will have impacts ranging far and wide

### THE JUBA PROJECT:

### A Blackface Minstrel Legacy

Although blackface minstrel shows have largely disappeared today because of their racist nature, their legacy lives on, says theatre studies professor Dr. Stephen Johnson, as can be seen in contemporary dialect humour and even some blues singing.

"Even though these shows have been suppressed for a long time, the more I looked at them, the more I realized that aspects of them were so deeply embedded in our culture that I needed to understand it."

Johnson began The Juba Project as a way to explore blackface minstrelsy from a historic but also a performance perspective. He named it after the African American man who is credited with inventing tap dance and was a famous performer in 1840s England, where blackface minstrel shows were a fad.

"An actual person of colour who danced in this otherwise white man's blackface minstrel show is so unusual that it's arresting," says Johnson.

Part of the project has been to interpret the historical information available about Juba through contemporary performance. Johnson had some of his theatre studies students prepare textual and visual materials about Juba and blackface minstrelsy, gathered mostly from newspapers of the day, and present them to five student dancers with varied backgrounds, from highland dance to ballet.

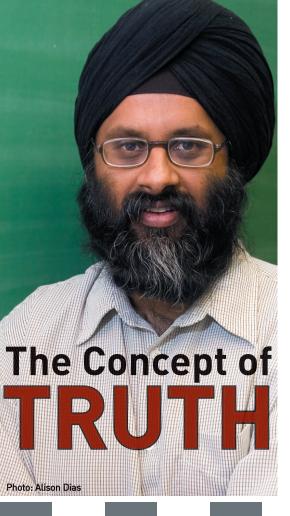
The idea was not to recreate what Juba would have done, says Johnson, but to interpret his dance and his place in blackface minstrel shows from a modern perspective.

"It was very interesting what they did," he says. "There was a wonderful dance which clearly was a more contemporary style. It was quite vivid the way she moved, and it spoke to the violence of a person of colour dancing surrounded by, and being stared at by, white people and white people in blackface. There was something very eerie about what she captured."

Each of the dancers brought something unique to their performance, something Johnson says actually echoes the reviews of Juba himself. "He was described in such an extraordinarily contradictory manner it's as if everyone who saw him saw what they wanted to see or that he was doing something so unusual, so new, that they had no way of describing it."

—Bruce Gillespie





In the philosophy department, Professor Gurpreet Rattan's primary academic interest is in the philosophy of language and mind, and in epistemology or the philosophy of knowledge. He is currently engaged in an extensive research project that tries to understand what is fundamentally distinctive about human beings as knowers.

Humans share cognitive capacities like perception, memory, and rudimentary forms of communication and reasoning with animals. But according to Rattan, only human beings have the ability to reflect and critically evaluate their beliefs and the processes, reasoning, and methods, through which belief is formed. What is distinctive of human knowers is their capacity to reflect upon and critically evaluate even the most basic aspects of their belief- and knowledge-forming practices.

An understanding of the nature of critical reflection also helps to better understand subjective, intersubjective and objective aspects of what Rattan calls our "epistemic self-conception". We have a special subjective, first-person point of view on ourselves, but how does this mesh with the idea of objective knowledge?

How is objective knowledge possible in the face of the deep and seemingly irreconcilable disagreement with others? From where do we get the idea that our beliefs are answerable to a mind-independent world—that our beliefs ought to be true? Rattan's idea is that we can integrate and make deeper sense of these basic aspects of our epistemic self-conception through a clarified understanding of the nature of critical reflection.

Rattan hopes that his research contributes to understanding some technical problems in the philosophy of mind and language and epistemology, but also to gaining a deeper understanding of ourselves as knowers—knowers of ourselves, each other, and the mind-independent world.

-Nancy Morris



kind's most intriguing philosophical questions.

The project, titled *The Decision Between Us*, focuses on the place of art in the politics and ethics of the society, and ultimately, on whether humans can coexist in ways that are politically and ethically sound.

"Art is inextricably linked with the political and the ethical," says Ricco. "I wouldn't argue that they're the same thing, but I do believe that you cannot think about one without thinking about the other two."

With the notion that art suggests new ways of engaging in political and ethical relations by doing what the more traditional fields of politics and ethics cannot do, Ricco is studying particular instances in the history of art that have staged relational spaces, which allow us to think of politics and ethics in particular ways.

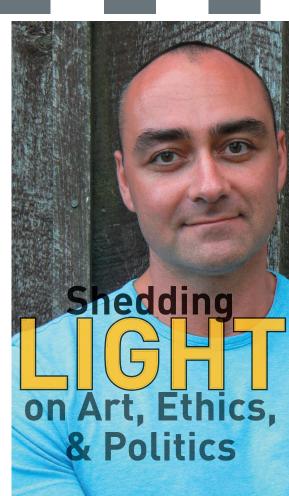


An example of this "art of participation" is seen in the work of famous artist Felix Gonzalez-Torres, who placed a pile of generic candy in a gallery and invited visitors to take a piece. Through this installation, Gonzalez stages an ethical decision involving the visitors in a collective process but since there are no rules or boundaries to guide them in how to take part in the work, the installation never reaches a conclusion.

Ricco says that by leaving any final decision open and in question, this performative staging encourages viewers to think both individually and collectively about their engagement with the work and in doing so, to form something suggestive about how, for instance, to share a space without anyone feeling the need to claim it as their own.

"Art is an arena where people experience something open-mindedly," says Michelle Johnson, who with her peer Claudia Ciornei, reads the core texts and discusses them with Ricco as part of her undergraduate Research Opportunity Project. "It can really shed a light on the arenas of politics and ethics."

—Nadeem Basaria



**Photo: Christine Shaw** 

Managing
WEGG
The Healthy
Way

The atmosphere in Dr. Janet Polivy's lab is fun and friendly—and often quite tasty!

University of Toronto Mississauga student Nurin Jiwa is working with Polivy on her research into the effects of different temptations on diet success. With the professor as advisor and director, Nurin has learned the step by step process, from writing and presenting an ethics protocol, to creating the test setting and performing the research.

Their goal is to discover if different degrees of food cues have a different effect on dieter's and non-dieter's urge to eat. Together they defined the parameters, establishing what is a weak cue, such as a picture of food, as opposed to a strong cue, such as a warm plate of cookies sitting directly in front of the participant.

The educational benefits to Nurin are immeasurable: the chance to actively participate in research at this level is a treat, but to form the structure of the project from beginning to end is a rare and invaluable opportunity for an undergraduate. The experience is enhanced when directed by the enthusiasm and experience of a professor such as Polivy.

The advantage of Polivy's research to the world at large is obvious. Weight control and chronic dieting is a hot topic today, with the obvious rise in obesity, as well as the pervasiveness of anorexia and bulimia.

With media projecting the image of the svelte, skinny physique, along with the next quick fix diet to achieve it, it is refreshing to see research being done to help chronic and dissatisfied dieters find a healthy way to manage their weight. It is extra promising to see the next generation involved in this research from the ground up.

-Nancy Morris







In the Kaneff building at U of T Mississauga, a new bridge is being formed between two distinct academic fields: finance and psychology.

Dr. Lisa Kramer's previous research has been of such value and interest that it made news in papers such as the *Globe & Mail* and the *Wall Street Journal*, and was profiled on CBC radio and television. It is no surprise, then, that her current research holds the potential to help financial market analysts make solid predictions, and to stabilize the financial situation for a specific set of vulnerable people.

Seasonal affective disorder is a form of depression that appears to increase in the darker winter months, and lessen as the brighter months arrive. Commonly called SAD, the condition touches the lives of many people from many diverse financial brackets.

Kramer is looking to discover if people inflicted with this condition are more or less likely to take financial risks based on the seasonal cycle of the disorder. It would appear, as she finishes the first stage of her research, that the market does in fact fluctuate in relation to the common yearly pattern of depression experienced by those with SAD.

The next phase involves looking at individuals with and without SAD, primarily through surveys, to see if they are changing their investments during the winter months to lower risk options, and then changing those investments to riskier, higher return possibilities as daylight becomes more plentiful. The consequence to the investor who changes investments seasonally is missed opportunity, lower investment income and added stress, so foreknowledge for SAD sufferers and those who advise them financially is highly beneficial.

Kramer's research is an exciting contribution to the somewhat new and fascinating field of behavioral finance, the development of which will definitely bring a much needed human face to the world of financial investing.

-Nancy Morris

### Vitamin D & Public Health

Utilizing the diverse student population at U of T Mississauga, Professor Esteban Parra, PhD candidate Agnes Gozdzik and post-doctoral fellow Jodi Lynn Barta of the Anthropology department have teamed to conduct the first study to systematically examine vitamin D levels in a group of young Canadians and categorize the results by ancestry, and they're coming to an alarming discovery.

Vitamin D levels were low in the sample, and more particularly in the students of non-European ancestry. Insufficient levels of vitamin D have been associated with the risk of cancer, osteoporosis, multiple sclerosis, diabetes, and susceptibility to tuberculosis and influenza, so these results have important implications for public health.

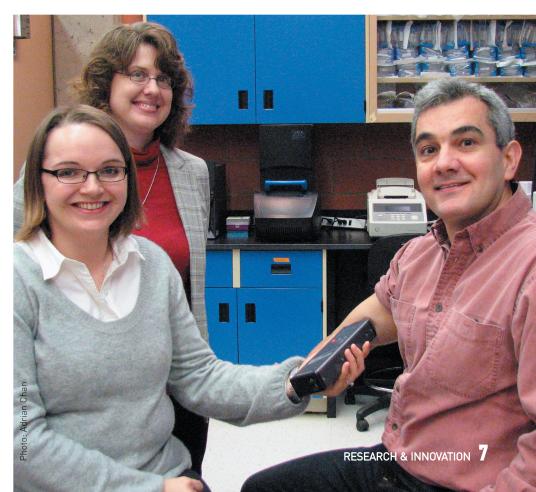
Most of a person's vitamin D is made when their skin is exposed to ultraviolet light. Those with darker skin have more pigmentation due to a natural sunscreen called melanin that slows the skin's production of vitamin D. Combine darker skin with Canada's high latitude, where ultraviolet light is too weak for vitamin D production between November and mid-March, and this becomes a problem, particularly when dietary vitamin D intake is low.

"Dark skin is great to have in equatorial parts of the world where there's a lot of ultraviolet light exposure, but if you're living in a high latitude like Canada, dark skin can be disadvantageous," says Gozdzik, who has spent most of her time this winter in the lab administering tests and questionnaires to students to determine and compare their vitamin D levels.

Parra suggests the results of this study can encourage better public understanding and awareness of vitamin D levels. "There is a controversy in the field," explains Parra. "Health Canada recommends young adults take 200 IU of vitamin D per day. But we have found in our study that these recommendations are insufficient to ensure adequate vitamin D levels."

The Canadian Cancer Society has recently recommended that a vitamin D supplement of 1000 IU/day be taken by all Canadian adults during the fall and winter, and adults at higher risk of having lower vitamin D levels—those who are older, with dark skin, who don't go outside often, or who wear clothing that covers most of their skin—should consider taking vitamin D supplementation of 1,000 IU/day all year round.

-Nadeem Basaria





# The MPACT of Globalisation

As the world flattens, globalisation of industries is on the rapid rise. You can buy a laptop computer from a store in Toronto, its hardware manufactured in Silicon Valley, and call for customer support in Bombay. But how does globalisation affect the industry mix for different cities, and what are its consequences for their economic make-up? Last summer, Professor Shalini Sharma, along with undergraduate students Neeta Sahadev and Omair Ali Khan from the department of Economics, set out to investigate.

They created an index of the 15 largest and 15 smallest US cities and gathered information from the US government and US Census on their industrial composition. Tracking changes in the economic make-up of their sample cities, Sharma and her students hypothesized whether those changes were correlated with local, national or international industry shocks. The premise is that economists could use this information to infer about the broader relationship between trade, liberalization and general openness on the economic structure of cities.

"The world is urbanizing very rapidly and cities are becoming very important," says Sharma. "One of the questions we're looking at is how a global shock impacts industrial composition differently in smaller, more specialized cities like Rochester, NY, than in larger more diversified cities like New York, NY."

This summer, Sharma will take on two new students to build on the data that Sahadev and Khan set up last summer. Their aim is to use specific variables that measure the impact of globalization and industrial composition of cities, as well as to shed light on employment situations and growth strategies from city to city.

Sahadev says working on the globalisation project with Sharma last summer strengthened her research and analytical skills. She's tracking the progression of the project this summer. "Governments can use this research to plan ahead and determine how to cushion for impacts they cannot control," notes Sahadev. "I think it's an important topic and the work so far has been very promising."

-Nadeem Basaria

# PURE Mathematics

This past April, Professor Yael Karshon of the Department of Mathematical and Computational Sciences was announced as the recipient of the Canadian Mathematical Society's 2009 Krieger-Nelson Prize. The prize recognizes outstanding research by a female mathematician. Karshon will present the Prize Lecture at the society's summer meeting in St. John's.

Karshon is happy to receive this honour and sees the prize as a way of increasing the exposure of women mathematicians. "Women in mathematics do excellent work but there are too few female graduate students, post-docs, and faculty. This is a problem because young females in the field often need that critical mass in order to 'go for it'".

Dr. Karshon is one of the country's leading experts in the field of symplectic geometry. Historically, this type of geometry was studied for its use as the underpinning of classical mechanics, or the study of moving bodies, including



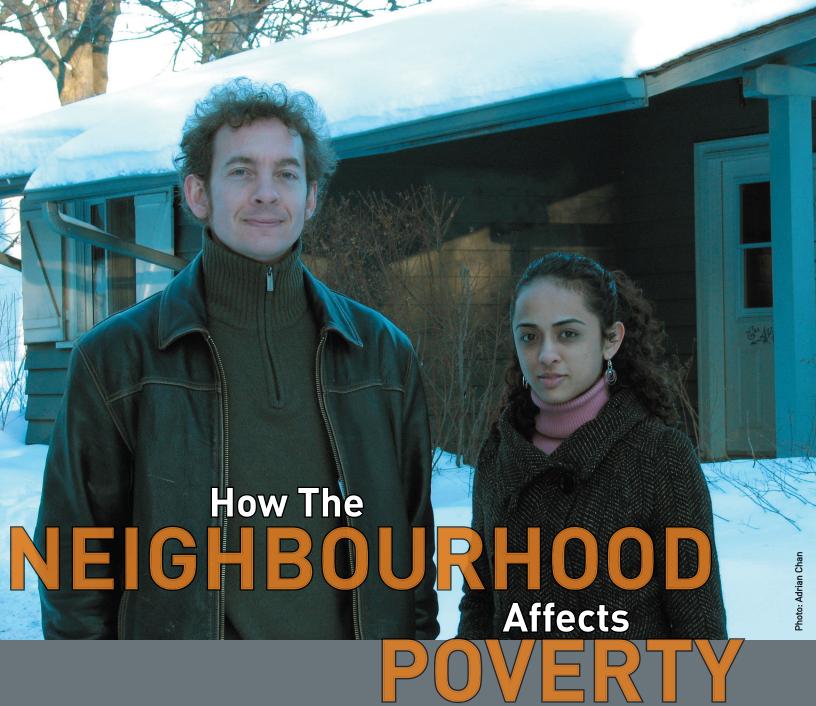
everything from particles of matter to pieces of machinery to planets. But as equations similar to those governing motion started appearing in different contexts outside of classical mechanics, they began to warrant attention on their own. "As soon as you have a mathematical structure coming up in lots of different ways, we start being interested in the structure for its own sake," says Karshon.

Karshon's research focuses on symmetries in symplectic geometry. "A 'baby example' would be a sphere—the surface of a ball—with its rotational symmetry: if you rotate it, the shape doesn't change."

When asked about possible applications of her research, Karshon explains that "again and again in history, research in pure mathematics turned out to have applications that we entirely didn't expect". But she sees such applications as a mere by-product. "When we do math, what drives us is its inherent beauty, elegance, and depth".

-Bruce Gillespie





Examining the effects of governmental downloading of services in Canadian cities has been the impetus behind Professor Alan Walks' project, "Urban Poverty, Municipal Expenditure and the Political Economy of Downloading."

As part of a 399Y course project, fourth-year environmental management and geographic information systems student Jaya Persaud worked alongside Walks to compile, organize and analyze data, review relevant literature, and present her findings at the U of T Mississauga's 2008 Research Opportunity Project fair that was held in March.

Our research is intended to get at the social and spatial impacts of downloading of responsibilities for tax-revenue collection and government spending from upper levels of government to lower levels—particularly from the provinces to the municipalities," says Walks, an assistant professor in the department of Geography.

The research aims to see if this shift in functions has produced greater spatial and social inequality in large urban areas such as Montreal, Toronto and Vancouver.

The data Persaud collected for these cities was from the early-1990s to the present Censuses, and she analyzed factors such as demographics, financial records for municipal revenue and expenditure, and tax rates.

Walks says the research completed for this project will serve as a solid foundation for examining the causes of neighbourhood inequality in Canadian cities, as well as exploring "neighbourhood effects" regarding how the community in which a person lives might impact the individual's life chances in terms of employment and poverty, and how this influences the attitudes they hold.

"Jaya was a fantastic student and provided some important initial results, and over the next few years I'll be adding to those results," says Walks. "I hope to write a book eventually, on the larger topic of social and spatial polarization in Canadian cities, the factors that have produced it and potential policies that might ameliorate it."

-Carla DeMarco

Shedding light on the intricate workings of the voluntary sector is the main focus for sociology Professor Paula Maurutto's research project on the regulation of the nonprofit sector.

"The agency's internal regulations, the demands imposed by various levels of government and private funders—for example, through legislation, grant requirements, and evidence based outcome measures—all converge on the day-to-day work of social service agencies" says Maurutto.

By studying this complex structure and the particular challenges of the voluntary sector, Maurutto aims to document the ways in which agencies resolve or manage contradictory demands.

Maurutto's research team, which includes sociology student, Asha Ramsumair, is working in collaboration with research analyst Sandy Shaw from the Peel Newcomers Strategy Group (PNSG) to identify strategies for providing culturally sensitive programming to new immigrants.

Ramsumair, currently in her fourth year of study, is responsible for compiling and investigating data on local and international social service models that have facilitated the social and economic integration of immigrants.

Ramsumair's and Maurutto's research findings will contribute to PNSG's mandate of achieving a more coordinated and holistic delivery of services to newcomers and immigrants in the Region of Peel; an area which faces particular challenges since it accommodates over 93 distinct ethnic communities.

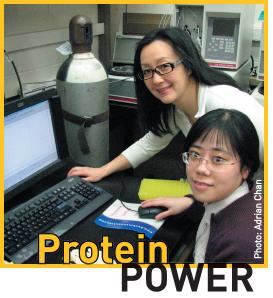
-Carla DeMarco

### Understanding How

# NON-PROFITS Manage Competing

## DEMANDS





Combining chemistry and biology in an interdisciplinary approach, Professor Shin and her undergraduate student Melody Qu are whipping up some interesting proteins in the lab at University of Toronto Mississauga. They're working to understand one of science's most misunderstood and complex problems—that of protein folding and solubility.

In Shin's lab, researchers design new and unusual proteins from natural amino acids that target desired DNA sites. In the short run, they're gaining a better understanding of how nature uses proteins to bind to DNA and regulate genes. In the long run, there is potential to develop drugs and therapy for a variety of diseases, including cancer.

Many proteins don't fold properly, so they do not remain soluble and begin to precipitate out. The most common example of this is seen in Alzheimer's disease, where protein that is not dissolved deposits on the brain. Shin and Qu however, target cancer-related cascades, specifically, the Myc network involved in 70-80% of all known cancers. "If you're going to pick a target, pick a good one," says Shin.

Qu, who started working in Shin's lab as part of the Research Opportunity Program in her second year, says the most rewarding part of her work is her exposure to an array of chemical and biological techniques. Qu, who is now pursuing a medical degree, worked in the lab making enzymes, which cut proteins, more specifically target a desired site. The optimized conditions encourage the enzyme to remove undesired parts of proteins rather than cutting randomly, and promote proper protein folding, getting one step closer to targeting specific diseases.

Shin notes that scientists have been struggling with the protein folding problem for decades. But she also alludes to a promising future that could touch the lives of many. "Protein-DNA interaction is how nature regulates our genes. If we can turn on and off genes ourselves, then we may be able to modulate disease."

—Nadeem Basaria

In the Historical Studies department, Dr. Shafique Virani's research collaboration with undergraduate students enrolled in the Research Opportunity Program has grown to include around 30 students, many of whom are volunteers from other departments. They are drawn in by the intriguing and socially relevant subject matter, as well as the enthusiasm of the participants.

Virani's research interests begin with the broad topic of Islamic texts, and includes the study of a wide spectrum of valuable religious manuscripts and printed works in Arabic, Persian, Tajik, Urdu, Hindi, Gujarati and other languages.

It is these texts which many ROP students are helping to survey, catalogue, translate and summarize. In addition, some student researchers are helping Virani to develop an academic website that brings together valuable online resources that can be useful in teaching classes on Islam.

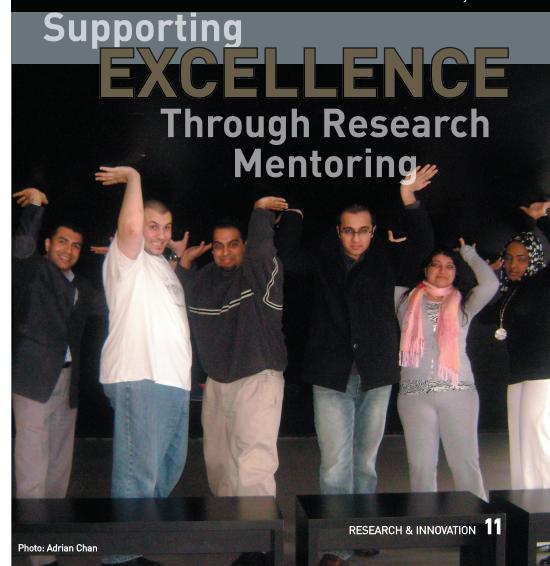
In one case, Virani has translated the classic novel, "The Repentance of Nasuh," from Urdu to English. His ROP students proofread the completed project, researched appropriate illustrations to be included, and have been inspired to help convert it into an audio book.

With support from the English & Drama department, and technical expertise from the Institute of Communication & Culture, there is excitement over the possibility of the creation of a radio drama. At this level, Virani's project will not only bring together multiple academic departments, but also has the potential for a much wider social impact, contributing to cultural diversity and understanding at the university and beyond.

Another of Virani's projects involves a traveler's diary from 1923, which forms the basis of his forthcoming joint publication, Journey to the Roof of the World: The Travels of Pir Sabzali. This documented trek through uncharted villages compelled one ROP student to research and locate the various stops along the way, creating material for a unique and historically valuable map of the unknown area. From there, interest spread beyond the ROP students once again, to a talented volunteer who is providing beautiful and culturally accurate illustrations based on the impressive historical research of the ROP group.

In Virani's case, the professor-student relationship has become mutually inspiring; Virani's passion for his work is obviously contagious, and he, in turn, delights in the motivation of a brilliant team of ROP students whom he mentors.

-Nancy Morris



### Re-Drafting A Constitution

Dr. Ana Maria Bejarano's office in the Political Science department is filled with the books and objects of a culturally proud and well-travelled academic. With her research work focused in and around her own native land of Colombia, her enthusiasm is both expected and contagious.

Bejarano is currently examining the process of constitutional change in five Andean countries: Venezuela, Colombia, Ecuador, Peru and Bolivia. The Andean region is home to a number of struggling democracies, and each country is in a different stage in the process of institutional change. For instance, this past spring Boliva was in the final stage with a new constitution awaiting approval via referendum.

Bejarano was recently invited to be an exclusive observer in the constitutional process that just concluded in Ecuador. Her ultimate research goal is to discover how the actual political process of redrafting a country's constitution affects the final product.

Her audience is twofold. First, the individual countries themselves, who take pride in being unique vis-à-vis their neighbours, but who may, in the end, discover important similarities and quite probably benefit from those discoveries. The other portion of her audience is here in North America, where recollection of the process of democratization is, perhaps, sorely needed.

The research experience has spawned further interesting queries. Each country seeks a constitution that is not only fair, but durable, and one to which the citizens will willingly adhere. Does this differ from country to country, or are there necessarily some commonalities in the process that assure a successful outcome, or at least increase the chances of it?

Above all, Bejarano's research offers a fascinating and valuable window into the growth of democracy, and very useful tools for those nations that are just beginning to travel down that path.

-Nancy Morris



## UNIVERSITY OF TORONTO MISSISSAUGA RESEARCH & INNOVATION 2 1 1 - 2 1 1 6

Devin Kreuger

Writina:

Nadeem Basaria Carla DeMarco Bruce Gillespie **Nancy Morris** 

Photography: Adrian Chan Alison Dias **Christine Shaw** 

Published November 2008 by the University of Toronto Mississauga Research Affairs Office 3359 Mississauga Road North South Building #2035 Mississauga Ontario L5L 1C6

www.utm.utoronto.ca/research