

# Research Reporter

Scholarly, research and creative activity

Published by the Office of Research Services, Brock University  
St. Catharines, Ontario, Canada L2S 3A1



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## Issue 4 - August 2002 Celebrating Excellence



Dr. Michael Owen

Brock University initiated the Chancellor's Chairs in Research Excellence to recognize faculty members who are outstanding and active scholars, who have demonstrated excellence or the promise of excellence in their research, and who will contribute to the advancement of their field of scholarship or creative activity. Created in the winter of 2001, the Chancellor's Chairs have been awarded to

seven outstanding faculty members – three in the Humanities, three in the Sciences, and one in the Social Sciences.

As a university that values equally the scholarship of teaching and the scholarship of research, the Chancellor's Chairs program provides resources to individuals whose research has made a difference in their discipline and has the promise of continuing to make significant contributions to scholarship. This program is open to individuals at any stage in their scholarly career.

The Chancellor's Chairs for Research Excellence is a rigorously peer reviewed competition. The adjudication committee reviews individual scholars' dossiers, which include a letter of nomination from two Brock colleagues, the candidate's curriculum vitae, a statement of the candidate's research program for the three years of the appointment, samples of the candidate's scholarly contributions, and a minimum of three external referees.

The breadth and depth of the scholarship, not only of those selected as Chancellor's Chairs but of all candidates, demonstrate the exceptional scholarship of our colleagues and their contributions to a wide range of research and creative activities.

In this issue of *Research Reporter*, Erin Kaipainen concentrates on the research and accomplishments of two of our Chancellor's Chairs. Profiles of other Chancellor's Chair holders will be published in *Brock Research* and future issues of *Research Reporter*.

Please join with me in recognizing and celebrating the outstanding contributions of our colleagues.

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Prof. Ian Brindle

## Chemist's research is an "expression of his commitment to solving societal problems"

The research of chemistry professor and recently appointed Dean of Mathematics and Science, Ian Brindle, continues to respond to social and environmental problems both on local and international levels. In May, he was awarded a Chancellor's Chair for Research Excellence, in recognition of his contributions as one of the most influential scholars in the Faculty of Mathematics and Science. The award also acknowledges Brindle's commitment to developing research projects that benefit society and the environment. Over the next three years, he will conduct two research programs that clearly demonstrate this commitment.

As an analytical chemist, Brindle is particularly interested in trace element analysis, particularly the detection and precise quantification of extremely small amounts of elements such as arsenic and mercury. The Chancellor's Chair award also recognizes his research accomplishments in the development of new, more sensitive analytical chemistry methods.

The first research program addresses the presence of arsenic in drinking water, which is a problem that plagues many developing countries including Bangladesh, Chile, China, and Thailand.

"Chronic exposure to arsenic causes significant health effects and shortens life spans," Brindle explains, "and yet, people in many of these countries have no choice but to drink the contaminated water."

The World Health Organization has proposed an arsenic standard of 10 parts per billion in drinking water, but these levels are extremely difficult to measure without sophisticated reagents and instruments, Brindle says.

"In Argentina and in other countries, the levels in drinking water are not high enough to cause acute toxicity, but they are high enough to induce cancer."

Drinking water in Bangladesh has

levels of arsenic around 100 parts per billion, and, as Brindle explains, "Canada has a particular interest in this case because it invested in well-development programs there when surface water was found to be contaminated with bacteria, which caused people to get sick with diseases such as cholera."

Many nations experiencing high levels of arsenic in their drinking water are "crushingly poor" and, in cases such as this, Brindle asks, "how do you address the problem when you cannot deal with it in a typical way? The typical Western engineering solution might cost millions of dollars so these solutions will not work in the Third World."

To solve this problem, Brindle hopes to extend some of his research from a local project in Niagara-on-the-Lake on constructed wetlands. He already knows that constructed wetlands can remove phosphorous from water, and because this element shares similar characteristics with arsenic, Brindle has proposed that constructed wetlands could help remove the toxic chemical from drinking water, both here at home as well as in the developing world.

"In the preliminary stages, this part of the project looks promising," Brindle says. However, the system is not as simple as it appears. The difficult part, "is knowing when the system becomes saturated or breaks down."

This problem is intensified by the fact that in order to be a practical solution for the developing world, Brindle says, "someone with little or no education must be able to do a simple test to determine the level of arsenic at the very low concentrations that can cause cancer. Most people measure arsenic with very scientific methods, using systems that cost a quarter of a million dollars to buy, and \$1,000/month to run."

Brindle's project faces several challenges. First, he must develop a method for

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removing the arsenic, and second, he needs to develop an inexpensive method for the measurement of trace amounts of the chemical. He also needs to develop reagents that can be produced without great expense. In addition, users of the technology must be able to obtain replacement material and equipment cheaply.

Brindle's second research program also looks at the fields of analytical chemistry and public health. It will develop methods for measuring pyrazines - naturally occurring compounds that are sometimes found in drinking water. Through this project, Brindle hopes to discover whether or not pyrazines are endocrine disrupters, chemicals

that, when absorbed into the body, either mimic or block hormones, thereby disrupting some of the body's normal functions. The literature on this topic is scarce, but one study by a group of Israeli scientists indicates that pyrazines can affect endocrine function in chickens. Brindle hopes to determine whether these same compounds have an impact on human health.

From developing methods for teaching chemistry to disabled students, to defining a chemical procedure for distinguishing authentic icewines, to finding an effective and economical instrument for detecting trace amounts of arsenic in drinking water in developing countries, Brindle's research always seems to address pressing social and

environmental problems. One of his nominators for the Chancellor's Chair award explained, "the research he proposes to do as part of this program is an expression of his commitment to using his professional expertise to solve societal problems."

Dr. Ursula Franklin of the University of Toronto, a Quaker and a personal friend and mentor to Brindle, has frequently declared that it is the responsibility of the scientist to use his/her skills for the good of others. Brindle concurs, and adds, "this should be part of our fabric as human beings. I can't think of what I do as part of my research without considering how my expertise could benefit others."●

Article by Erin Kaipainen



## Stories waiting to be told: Dimand on the history of economic thought

Dr. Robert Dimand

Professor Robert Dimand completed his PhD at Yale University, where he studied under the late James Tobin, winner of the 1981 Nobel Prize in Economics. Throughout his career, his research has focused on the history of economic thought in the areas of Game Theory, Women in Economics and the Efficient Market Hypothesis. Dimand explains that his fascination with his field of expertise comes from the fact that he finds the history of economics to be "full of good stories." Dimand has shared his fascination in these areas through his teaching as well as through many publishing accomplishments.

The historical context of economic thought demonstrates to students that "patterns of thinking change" and studying the history of economics helps students to consider alternative ways of looking at economics.

"Students should learn competing theories and where they come from. They should never take theories as being carved in stone as they always continue to change. You really don't want a student to graduate thinking that how s/he learned economics at Brock in 2002 is the only way of thinking," says Dimand.

Dimand is an authority on the history of economics and he has published extensively in his field. In 1996, Dimand published the first volume of *A History of Game Theory* with Mary Ann Dimand. He has also edited three volumes of *The Foun-*

*dations of Game Theory*.

Dimand has been described as a pioneer in a new area of the history of economics -- the historical study of women in the discipline. He is the co-editor of two vol-

umes on the subject, *A Biographical Dictionary of Women Economists* and *Women of Value: Feminist Essays on the History of Women in Economics*. Eventually, there will be a third volume, a collection of essays on what classical economists of the 18<sup>th</sup> century thought of gender issues, as well as an extended version of the biographical dictionary.

His Chancellor's Chair program will concentrate on addressing the origins of the Efficient Market Hypothesis developed by economist Alfred Cowles in the 1930s. Cowles proclaimed that it is impossible to make profitable predictions about the stock market, a statement that continues to influence economic thought today. Dimand chuckles, "if all the people publishing financial advice really knew what they claim to know, they wouldn't sell you that information for a million dollars."

"It is important to look at the Efficient Market Hypothesis in its entire context, including historical developments, because something like this has implications for almost anyone – certainly for other disciplines such as Management and Finance, but also for anyone who has savings to invest, or anyone who is saving for a house or for retirement," says Dimand.

He has already begun work on a paper in conjunction with William Veloce, an econometrician in Brock's Economics Department, in which he will redo some of Cowles's early statistical studies using

modern statistical techniques, unavailable to economists in the 1930s. This procedure will allow Dimand to conclude whether or not Cowles was right.

In another paper, he focuses on the collaboration between Cowles and Irving Fisher, who held "diametrically opposed views on stock markets but worked together closely to promote a quantitative, theoretically based approach to economics through the Econometric Society."

He is working on additional papers that will "examine the contributions to the formation of the sub discipline of econometrics in the 1920s and 1930s by a group of statisticians associated with Fisher and Cowles and he has also begun work with Professor Evelyn L. Forget of the University of Manitoba, on Louis Bachelier's mathematical formulation of the Efficient Market Hypothesis, written in 1900.

An important part of his research program is to investigate those who contest this theory. Dimand is interested in discovering the origin of this doubt as the claims of market randomness have serious implications for financial advisors. Those who argue the randomness of the market suggest that an individual throwing darts at the stock pages of a newspaper, has just as good of a chance of succeeding at the stock market as does an investor who carefully selects his/her portfolio.

"This idea," Dimand says, "is not warmly received by those selling financial advice," Dimand says.●

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