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Inquiry@Queen's

1st Annual

Undergraduate

Research Conference

Program

March 8 - 9, 2007

**Queen's Learning Commons,
Stauffer Library**

iatq.ca

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March 2007

Dear Conference Participants,

With this first conference showcasing undergraduate inquiry, I invite you to celebrate the achievements of students from across Queen's. The fruits of their inquiry have come from courses, senior theses and design projects, and from independent research efforts. Presenters have been supported in their efforts by fellow students, teaching assistants, faculty, the Queen's Learning Commons, and the Centre for Teaching and Learning.

The notion of *Inquiry@Queen's* is more than a conference; it is an approach to learning that focuses on discovery and scholarship, the things that are the very essence of this University.

I extend my congratulations to all of you who have participated and my thanks to all who have helped in bringing this most valuable activity to fruition.

To those of you who are picking up this *Inquiry@Queen's* program – I encourage you to read the abstracts! And revel in breadth and depth of student achievement.

A handwritten signature in black ink that reads "Karen Hitchcock". The signature is written in a cursive style with a large initial "K".

Karen R. Hitchcock
Principal and Vice-Chancellor

CONFERENCE AGENDA

Thursday, March 8, 2007

Speaker's Corner, Queen's Learning Commons, Stauffer Library

- 9:00 Coffee
- 9:30 Opening Remarks
Welcome from the University:
 Dr. John Dixon, Associate Vice-Principal (Academic)
 Dr. Joy Mighty, Director, Centre for Teaching and Learning
Keynote Address:
 The Excitement of Discovery, Dr. John Smol, Biology
- 10:30 Session I: Detecting and Learning from Perturbations
- 11:00 Poster Presentations, Queen's Learning Commons, Stauffer Library
- 12:00 Brown Bag Lunch with Principal Karen Hitchcock, Discussion of
perceived barriers to interdisciplinary teaching initiatives
Sponsored by the Centre for Teaching & Learning
- 1:15 Session II: Values and Choices
- 2:45 Nutrition Break
- 3:00 Session III: Values and Time
- 4:30 End of session
- 5:00 Inquiry@Queen's Reception, Fireplace Reading Room, Stauffer Library
Speaker: Dr. Gwynn Dujardin, English, Losing the Research Topic
- Door Prizes!

Thursday, March 8, 2007

Seminar Room 121, Queen's Learning Commons, Stauffer Library

- 1:15 Session IV: Quality of Life and Health
- 2:45 Nutrition Break
- 3:00 Session V: Values and Controversies
- 4:50 End of session
- 5:00 Inquiry@Queen's Reception
Fireplace Reading Room, Stauffer Library
Speaker: Dr. Gwynn Dujardin, English, Losing the Research Topic
- Door Prizes!

Friday, March 9, 2007

Speaker's Corner, Queen's Learning Commons, Stauffer Library

9:00	Coffee
9:30	Session VI: Sustainability
11:45	Address by Dr. Patrick Deane, VP (Academic)
1:30	Session VII: Micro- to Meso-Scale Materials (Seminar Room 121, Stauffer Library)
1:30	Session VIII: Values and Identity
3:15	Nutrition Break
3:30	Session IX: Listening and Learning
4:15	Closing Speaker: Johsa Manzanilla, Rector of Queen's University
	Door Prizes!

ORAL PRESENTATIONS

Session I: Detecting and Learning from Perturbations

Speaker's Corner, Queen's Learning Commons, Stauffer Library

Thursday, March 8, 10:30-11:30

Moderator: Dr. Vicki Remenda, Geological Sciences and Geological Engineering

Plants, Pollinators and Pests

Presenter: Mike Delorme, Math/Biology

It is well known that parasites and plants have complex interactions. It is not well known how parasites may affect pollinator preference. In the study I examined the plant Ox-Eye where it was with or without parasitic aphids. Different plant characteristics were measured as well as the amount of aphids on the plant. Number of pollinator visits and visit length were recorded to indicate a pollinator preference for each plant. The data suggests that although pollinators visited the plants with aphids, they spent significantly more time on the plants without parasites. Pilot follow up studies were also performed. The experiment took place in the summer of 2006 at the Kellogg Bird Sanctuary, part of Michigan State University's Biological Field Station.

Sedimentology of Surficial Cool-water Carbonates on the Continental Shelf of Tasmania, Australia

Presenter: Rowan Martindale, Geological Sciences & Geological Engineering

Faculty Supporter: Dr. Noel P. James, Geological Sciences & Geological Engineering

The continental shelf of Tasmania and Bass Strait is veneered by surficial carbonate and terrigenous sediment, which represents the coldest carbonate assemblage on the southern shelf of Australia. Three major facies are recognized based on dominant components, and are further separated into eight sub-facies. Quartzose sand is a nearshore facies, whereas Holocene biogenic sand and gravel is found outboard in deeper waters. Relict sand and gravel is located between these facies on the majority of the shelf, although it is rare on the narrow, eastern shelf. When Holocene biotic sediments are considered, five facies can be identified based on the abundance of bryozoans, molluscs, benthic foraminifer, sponge spicules, and coralline algae. Molluscs and bryozoans dominate the most widespread facies; molluscs are numerous nearshore, in large bays, and on granitic ridges, and bryozoans are abundant in deeper, or nutrient rich waters. Again, eastern and western shelves differ, in that molluscs, which are common in the east, only occur near rivers on the western shelf. The key factor controlling this distribution is the level of trophic resources available. Dominant bryozoan growth forms provide detailed resolution of the Holocene sediment and relative importance can be linked to water energy or substrate. In general, delicate branching forms are found in deeper water on the eastern and western shelves, as well as the eastern side of the Bass Strait, whereas articulated zooidal forms dominate higher energy waters and areas with unstable or fine substrate, such as the southern shelf and western Bass Strait.

Investigations into Fibre Optics and Polymer Coatings for Sensing of Groundwater Pollutants

Presenter: Michael Gretton, Chemical Engineering

Faculty Supporter: Dr. Hans-Peter Look, Chemistry

This presentation will cover a number of experiments undertaken by the author in the Look Group (Department of Chemistry, Queen's University), which contributed to an ongoing research project to develop a field deployable water sensor for monitoring of pollutants in ground water. The author's investigations involved collaboration with graduate students and scientists from three Chemistry research groups, using apparatus and instrumentation such as a refractometer for measuring the refractive index of polymer mixtures under different ambient conditions; long-period gratings (LPGs) 'written into' optical

fibre (125 µm diameter); an optical spectrum analyser; a dip-coating machine; as well as scanning electron microscope images of optical fibre samples. The focus of this research was the development and characterization of coatings that increase the sensitivity of the sensor head. Results and conclusions from tests of different polymer coatings on LPGs and coated as films on silica wafers, responding to different organic compounds, will be presented. The author's experiences and insights gained in the process of scientific inquiry will also be discussed.

Session II: Values and Choices

Speaker's Corner, Queen's Learning Commons, Stauffer Library

Thursday, March 8, 1:15-2:45

Moderator: Dr. Jill Scott, German

The Changing Nature of Academic Work: Canadian Universities and the Flexible Firm Model

Presenter: Josh Krushell, Geography

Faculty Supporter: Dr. John Holmes, Geography

Though much literature has been produced on the topic of academic restructuring, those works concerned with the Canadian context have mainly focused on issues of corporate-university linkages, the role of state coordination of public universities, and the disparity between funding and student enrollment. Very little work has been done in documenting or analysing the role of adjunct faculty, who now make up nearly half the university faculty, in Canadian universities. Statistics Canada has only once collected data on part-time faculty, and only one current analysis of this data has been conducted (Omiecinski, 2003). The Canadian Association of University Teachers, furthermore, only publishes data concerning full-time faculty members. The implications of an emerging division between the use of full-time and part-time faculty on the nature of academic work and the quality of post-secondary education has been yet unexamined. Drawing on labour market segmentation theory, this study presents the multiple ways in which the work of academic staff in Canadian post-secondary education has conformed to the principles of the flexible firm model, first observed of private business firms in the 1980s by John Atkinson. A series of semi-structured interviews with academic faculty and administrators, as well as a collection of current secondary source data, informed the basis of this research. It was found that the changing nature of academic work in post-secondary education is negatively affecting the quality of undergraduate education provided in Canada.

Flow Experience and Life Satisfaction

Presenter: Jared King, Psychology

Faculty Supporter: Dr. Jill Jacobson, Psychology

The present study aims to examine the relationship between experiencing flow in academic work and life satisfaction. The flow experience has been defined as a state of absolute absorption in an activity, often resulting in feelings of satisfaction (Csikszentmihalyi, 1975, 1990). However, it is unknown whether the satisfaction resulting from flow contributes to an enduring sense of satisfaction, or whether flow can be used as a tool to sustain increased levels of satisfaction over time. Thus, the goals of the present experiment are threefold: 1) to test the relationship between experiencing flow and life satisfaction, 2) to determine whether experiencing flow has a lasting effect on life satisfaction, and 3) to evaluate the utility of flow as an intervention strategy for increasing and sustaining levels of life satisfaction. Results are forthcoming.

TrueLife – Evolving the Game of Life

Presenter: Kent Fenwick, Computer Science

Faculty Supporter: Dr. Selim Akl, School of Computing

John Conway's Game of Life, published in Scientific American in 1970 is an attempt to model the behavior of life using a 2D cellular automaton. Although a breakthrough discovery for cellular automata and emergence theory, the game is restricted and incomplete due to its static, simplified rules. We will show that the game does not model life accurately and propose an alternative: TrueLife. TrueLife is a non-deterministic, non-local, evolving Game of Life variant that we believe is more complete than Life for several key reasons. TrueLife is unique since at each generation a rule is chosen randomly from a list and applied to the current state. This allows the game to be inherently non-deterministic since it is impossible to know which rule is being applied at a given iteration. TrueLife will also be a learning simulation where rules that produce better results will be applied more frequently. Another unique aspect of TrueLife is the motivation behind the rules. The original Life rules are Darwinian and selfish acting only on local inputs that lead to local outputs. TrueLife's rules will be non-local and act globally across the entire grid. TrueLife's rules were formalized by drawing on much broader areas of science such as ecology, psychology and quantum theory. We are currently in the process of finding a model system to which TrueLife would be best suited.

On the Rationality of Choice

Presenter: Thomas Simmons, Philosophy

This presentation aims to explore the ubiquity of rationality in how people make choices. Historically, rationality has been conceived of as a scheme of certain values and beliefs, most often those that are compatible with a 'scientific way of thinking'. Subsequently, those who hold a different set of beliefs and values are deemed 'irrational' or considered irreconcilably dissimilar from those who are 'rational.' What typically follows for the 'irrational' are unfavorable labels such as 'dogmatic', 'primitive', or even 'insane'. This presentation rejects these common views and offers an alternate model of rationality that depicts rationality as a template rather than a scheme of values. Rather than emphasize certain values as 'rational', this model emphasizes the role of value itself as the cornerstone of rationality. An advantage of this model is that the both the commonly considered 'rational' and 'irrational' are seen to be employing the same underlying structure in making choices; the divergence is in the values themselves and not the way of thinking. What underlies these arguments is an aim to show that human beings are more alike than different, no matter what kind of choices they make.

Session III: Values and Time

Speaker's Corner, Queen's Learning Commons, Stauffer Library

Thursday, March 8, 3:00-4:30

Moderator: Dr. Robin Dawes, Computing Sciences

Temporal Structure and the Sacred in Woolf's To the Lighthouse

Presenter: Katie Gemmill, English

Faculty Supporter: Dr. Gabrielle McIntire, English

Critics frequently agree that in the "Time Passes" section of *To the Lighthouse*, Woolf transcends linear time. In his article "History, Time and the Novel: reading Woolf's *To the Lighthouse*", however, Dominick LaCapra proposes a more complex theory of temporality, arguing that time has a two-dimensional structure made up of a horizontal diachronic dimension, and a vertical synchronic dimension. The diachronic dimension comprises discrete "epochmaking events", while the synchronic dimension seemingly immobilizes a particular moment in defiance of linear time. Woolf's narrative focuses on the synchronic dimension of time, thus subverting the traditional narrative structure that focuses on plot-driving events that occur on the diachronic temporal plane. I believe that the thematic prominence of time and the sacred in "Time Passes" is not arbitrary; in fact, I argue that it is Woolf's innovative conception of

temporal structure that allows her to engage so profoundly with themes of the sacred. The synchronic dimension of time provides an escape from the limitations that linear time imposes on our experience of the sacred; in other words, the synchronic dimension is what allows Woolf seemingly to immobilize an experience, to meditate on it in depth, and to convey more effectively the sacred nature of that experience. Throughout this section of *To the Lighthouse* Woolf suggests that by reframing how we exist in time, we can more readily feel the sacred that permeates everyday experience, and thus connect more intensely with existence.

Parts of Speech in Kinyarwanda

Presenter: Vanessa Crandall, Linguistics

Faculty Supporter: Dr. Mireille Tremblay, French Studies

Traditional grammar holds that parts of speech have broad semantic definitions: verbs are actions, nouns are entities, adjectives are states of being, and prepositions denote locations (Baker, 2003). This view is problematic, however, given that semantic concepts are lexicalized differently across languages.

For example, through my field work with a native speaker of Kinyarwanda (Bantu family, spoken in Central Africa), I have found that in this language, states can be lexicalized as adjectives, nouns, or verbs:

- | | | |
|-----------------------|--------------------|-----------|
| (1) umugabo ni munini | “The man is big” | ADJECTIVE |
| MAN | IS LARGE | |
| (2) imbwa n’ umweru | “The dog is white” | NOUN |
| DOG | IS WHITE | |
| (3) imbwa yera | “The dog is white” | VERB |
| DOG | BE.WHITE | |

The state of “being big” appears as an adjective, while the state of “being white” can be both a noun (2) and a verb (3). The difference in category is appears to be motivated by the relative permanence of the state in question. A changing (or changeable) state is encoded as a verb (3). To reflect a permanent/unchanging state, an adjective or noun is used (1-2). Because the inventory of adjectives in Kinyarwanda is extremely limited, many “adjectival” permanent states are encoded as nouns. This alternation demonstrates the central role of Aspect (defined as a linguistic function that “characterizes the relationship of a predicate to the time interval over which it occurs” (Chung and Timberlake 1985:213)) in the lexicalization process. Aspect in Kinyarwanda takes the form of a verbal suffix, thereby necessitating the use of a verb when the state undergoes some sort of change. This phenomenon provides evidence that parts of speech are defined at least in part by a language’s syntactic requirements above and beyond broader semantic generalizations.

Repairing Trust: the Effect of Kindness of Others on Willingness to Forgive Trust Violations

Presenter: Leah Dietrich, Psychology

Faculty Supporter: Dr. Susan Brodt, School of Business

The purpose of this study is to examine the extent to which an individual who is not involved in a trust violation can help repair trust. I will be looking at whether an act of kindness toward the victim of a trust violation can facilitate trust repair by increasing the victim’s willingness to forgive the perpetrator. I predict that kindness increases positive affect, decreases negative affect and reduces tendency to retaliate, creating a willingness to forgive, which will then increase the likelihood of a benevolent interpretation of a trust violator’s ambiguous apology.

Sir Gawain Hits the Radio Waves

Presenter: Rachel Manno, English

Faculty Supporter: Dr. Scott-Morgan Straker, English

This research project examines some of the complexities of the Medieval work “Sir Gawain and the Green Knight” from the perspectives of both world-renown scholars and laymen interviewees. The study uses professional in-studio equipment to record responses to research questions asked of academics by long-distance phone interview. In the same way, the researcher asks questions of a randomly selected public group and records the commentary with portable equipment. The researcher then compiles raw material from interviews in bricolage format. The result juxtaposes the original views of both prominent researchers and the public on controversial issues within the “Gawain” text. The study likens the complex issues of gender, public morality, community and capitalism occupying medieval audiences to the types of challenges society faces today. This comparison of medieval and modern issues show that historical literary works are of enduring value to the contemporary reader; works, like “Sir Gawain”, deal with a complex set of social issues in a way that encourages a multiplicity of readings and engages with various different audiences. As a way of reaching the broad audience concerned with these issues, the project arranges the interview feedback into a radio program format complete with medieval musical segue-ways. The program originally aired on CFRC, Queen’s Radio in two parts on March 28th and April 6th, 2006, respectively, and remains available on-line via www.chatterbook.ca. Professors from Canada, the United States and Europe have requested permission to use the project as a teaching aid.

Session IV: Quality of Life and Health

Seminar Room 121, Queen’s Learning Commons, Stauffer Library

Thursday, March 8, 1:15-2:45

Moderator: Dr. Allan Baer, Physiology

Paradoxical modulation of the pain reducing properties of morphine

Presenter: Katharine Tuerke, Psychology

Faculty Supporter: Dr. Richard Beninger, Psychology

Classic pharmacological theories predict that opioid antagonists should block the neurochemical and behavioural effects of opioids. Surprisingly, this relationship does not hold true when the antagonist is administered in very low doses (i.e., nanograms instead of milligrams/kg). Co-administration of ultra-low doses of naltrexone (antagonist) and morphine (agonist) enhanced morphine’s analgesic effects, which have been attributed to the activation of mu opioid receptors. Morphine induced-catalepsy, characterized by muscular rigidity and inhibition of postural support systems, is also mediated by mu opioid receptors and can be blocked by standard doses of naltrexone. Our study investigated the hypothesis that ultra-low doses of naltrexone will enhance morphine-induced catalepsy. Rats (N = 56) were randomly assigned to six different groups: saline, morphine (10 mg/kg), co-treatments of morphine (10 mg/kg) plus naltrexone (molar ratios of 1 000 000:1, 500 000:1 or 100 000:1) or naltrexone alone. For seven consecutive days, rats were administered one injection daily. Each day, catalepsy and analgesia were assessed 30 and 60 min post injection using the bar-test and tail-flick test, respectively. Ultra-low doses of naltrexone co-administered with morphine did not potentiate catalepsy or attenuate tolerance. In contrast, ultra-low doses of naltrexone co-administered with morphine significantly and dose-dependently attenuated tolerance to morphine’s analgesic effect in comparison to morphine alone. These data suggest that the enhancement of opioid analgesic effects and attenuated tolerance by ultra-low doses of opioid antagonists are not the result of changes in morphine-induced catalepsy. (Funded by NSERC)

A Novel Mechanism of Inflammation in the Esophagus

Presenter: Daniel Mulder, Physiology

Faculty Supporter: Dr. Chris Justinich, School of Medicine

The esophagus, long considered an inactive bystander in the digestive tract, is now known to be involved in monitoring food intake by various mechanisms. This active observation can lead to various disease states, one of which is esophagitis, that is, inflammation of the esophagus. Esophagitis can have various causes. One culprit appears to be the presence and activation of white blood cells called eosinophils in the esophagus. This study proposed that eosinophils release a chemical known as major basic protein (MBP) that causes esophageal inflammation. Experiments involving a living cell model of the lining of the esophagus and biopsies taken from pediatric patients confirmed this mechanism. Specifically, gene induction and gene silencing experiments confirmed that a cellular receptor in the esophagus binds to the MBP that is released from eosinophils. Further restitution and proliferation experiments suggest that certain genes, when induced by MBP stimulate growth and migration of the cells that line the esophagus.

Characterizing Chiral Molecules Deposited onto a Silicon Surface

Presenter: Stephen Gauthier, Chemistry

Faculty Supporter: Dr. Hugh Horton, Chemistry

We report here on the characterization of two types of chiral molecules deposited onto a silicon surface. Chiral molecules are non-superimposable mirror images of each other. Other than the way they interact with biological systems, chiral molecules have the same physical properties which make them hard to separate. Since many important drug molecules are chiral, effective separation methods are required by industry. We are building a model system to study one separation method called chiral chromatography. In chiral chromatography, separation is achieved by immobilizing a chiral compound along a column and passing the desired chiral mixture through. One of the mirror image molecules of the mixture has a higher attraction to the immobilized phase which causes it to exit the column at a later time. In the model being studied, propranolol is the sample drug molecule and phenylethylpropylurea (PEPU) is the selector molecule. Derivatives of these compounds were deposited onto a flat silicon surface. The resulting samples were studied in order to gain insight into the surface morphology and characteristics of the assembled layers. Using a combination of infra red (IR) spectroscopy and computational analysis it was possible to infer the average bulk molecular orientation of the deposited propranolol molecules. Atomic force microscopy was used to ensure a uniform deposition as well as to quantify the surface roughness. Through X-ray photoelectron spectroscopy (XPS) analysis it was shown that an average layer thickness of four molecules was deposited onto the silicon

Emergency Salbutomal Inhaler

Presenter: Matthew Hill, Engineering

Asthma is thought by most to be a benign health issue, but the statistics say otherwise. In Canada there are over 146 000 emergency room visits and 500 deaths each year from asthma. An estimated 80% are preventable. These hospital visits cost the Canadian government over \$135 million a year. A solution is needed and that solution is the Emergency Salbutomal Inhaler. I have designed a small, easy-to-carry, two-dose, dry-powder asthma inhaler, with patent pending. The device can easily be attached to a keychain or necklace for carrying ease, and will be quickly accessible in the event of an asthma attack. When an asthmatic has an attack and goes to a hospital, they are given a maximum of 2 doses of the rescue drug Salbutomal. The device carries two doses. Thus, in a sense I have invented a hospital on a keychain for asthmatics. During an asthma attack there is no time to fumble with an inhaler; my easy-to-use design ensures relief will be provided.

Session V: Values and Controversies

Seminar Room 121, Queen's Learning Commons, Stauffer Library

Thursday, March 8, 3:00-4:50

Moderator: Dr. Doug Babington, Writing Centre

The Battle of the Dubyas: Romantic vs. early modern version

Presenter: J. Rosel Kim, English

Co-Presenter: Lucas Tingle, English

Faculty Supporter: Dr. Maggie Berg, English

A creative assignment for an Introductory Literary Theory and Criticism course, The Battle of the Dubyas: Romantic vs. early Modernist version depicts a fictional dialogue between the Romantic poet William Wordsworth and modern writer Virginia Woolf. The informal nature of a dialogue allows for a heated debate between the two theorists, where their distinct style of speaking—Woolf with her many dashes and Wordsworth with his complete sentences—convey the periodical and ideological differences. The first subject of the debate is the topic of androgyny, where Woolf explains the demerits of confining writing to a single-sexed medium—whether it be an overtly direct writing, or covertly complicated one—and chides Wordsworth for being too masculine in his thought. The second topic arrives at the issue of material conditions needed for literary genius—where Wordsworth's notion of the Poet transcending all physical obstacles is debunked and silenced by Woolf's fictional account of Shakespeare's sister, Judith. Between the opposing stances of each theorist's views on gender divide in writing and nature vs. nurture in breeding genius, Woolf's ideals of androgyny and material necessity for genius triumph that of Wordsworth's arcane and masculine views on natural genius of the Poet.

Visions of Community in the Writings of John Locke

Presenter: Quia Mou, History

Faculty Supporter: Dr. Jeffrey Collins, History

Liberal political theory is often accused of hindering the development of communities because it encourages people to be individualistic. As one of its founding fathers, critiques of liberalism date back to the writings of John Locke in the seventeenth century. This research project looks at the writings of Locke within their historical context. In examining Locke's views on religious toleration, social policy and economics, this project proposes to show how Locke envisioned a particular form of community. This study also incorporates contemporary debates on liberalism. Specifically, it addresses communitarian critiques put forth by Michael Sandel and Charles Taylor, and invokes liberal defences, articulated by Will Kymlicka and Alan Buchanan. It proposes that many of today's defences of liberal political theory can be applied to the writings of John Locke to support and sustain the development of communities within his own time. A second claim against liberal theory is that it favours particular communities instead of granting fair procedural rights to all communities. To test this objection, this project will also look at the biases from Locke's religious, political and social backgrounds and how they impacted his beliefs.

Theatre of the Inescapable and Single Thread Theater Company's "Everyman"

Presenters: Alex Dault & Liam Karry, Drama

Faculty Supporter: Dr. Jenn Stephenson, Drama

The presentation will present the hypothetical and practical application of "Theatre of the Inescapable", a new and experimental theory of theatre developed by Alex Dault. The theory is concerned with the use of theatre as a tool for social change and the vitality of the live theatrical experience. The presentation will examine the manifesto of the Theatre of the Inescapable; this includes the purpose of the theory and its basis in the writing of Antonin Artaud and Friedrich Nietzsche. The Theatre of the Inescapable relies upon the isolation and terror of the individual audience member in order to create the sensation of being within a vivid waking dream devoid of "attentive escapes". The audience member must accept the conditions of the

theatrical world as real in order to function within it. The presentation will explore many of the questions and answers arising from documented experimentation with actors. Finally, the presentation will look at the recent production "Everyman" and its forty performances for one audience member. Special focus will be given to the perspective of the actors involved and their observations on performing for one audience member. The presentation will include photographs and video footage from this production.

Paracelsus' 16th Century Philosophy Applied to Current Evolutionary Genetics

Presenter: Jenna Kewin, Biology/Philosophy

Paracelsus contributed greatly to medical philosophy in the early sixteenth century, yet his reputation was so tainted by his hypocrisy that he left few followers and is often forgotten. Many aspects of his teachings, however, can be applied to current theories governing evolutionary genetic research. His claim, "Where diseases arise, one can also find the roots of health" hints at the intimate relationships between health and disease that are the foundations of fascinating research. In many devastating medical cases, it has been found that expression of one genetic disease can confer resistance for another. Sickle-cell anemia sufferers have an increased resistance to malaria, cystic fibrosis is associated with decreased susceptibility to influenza, tuberculosis and cholera, and even the human immunodeficiency virus (HIV-1) is theorized to have stemmed from a selection for resistance to the Bubonic Plague. These examples demonstrate the ambiguities in distinguishing between health and disease. While scientists today would likely scoff at Paracelsus' dated medical rants, when they discover a disease favoured by natural selection, one of the first questions is how it could have conferred a benefit ancestrally. Applying Paracelsus' theories to a discipline as contrary to evolutionary genetics demonstrates both the robustness of his claims, and the potential impact philosophy can have on medical, scientific and sociological questions surrounding challenging epidemics.

Chicken-Egg Question of Chinese Economic Growth with Financial Development

Presenter: Jialiang (George) Liu, Economics

An analytic study reviews on the chicken-egg question, the causality relationship of financial development and economic growth in the particular case of Chinese economy. The research reviews the past theoretical studies on the causality relationship of financial development and economic growth, and empirical studies on the Chinese economic growth pattern in respect to financial industry. The research then further presents recent data to empirically re-analyze the question. The study sheds new lights into previously ignored bond market and mistaken public enterprise investment return.

Session VI: Sustainability

Speaker's Corner, Queen's Learning Commons, Stauffer Library

Friday, March 9, 9:30-11:45

Moderator: Dr. Jackie Davies, Philosophy, Women's Studies

Producing Electricity from Oceanic Waves

Presenter: Kaveh Fallah-tafti, Engineering Physics

Faculty Supporter: Dr. James Stotz, Physics

This feasibility study examines the production of electricity by harnessing the energy of oceanic waves. The study includes a proposed design of a wave conversion device and compares the efficiency, cost, advantages and disadvantages to other renewable sources of energy, mainly wind power. Practical challenges such as underwater cabling, device safety and matching to the electrical grid system are considered. Design aspects such as ideal generator type and size, ideal dimensions and structural requirements of the wave-energy conversion device are examined.

Feeding Our Affinities: Looking for Alternatives to Food Security in a World of Unsustainable Global Agribusiness

Presenter: Aaron Lemkow, Sociology
Faculty Supporter: Dr. Richard Day, Sociology

This focus of this undergraduate thesis is how alternatives to industrialized agriculture are necessary given that current global agribusiness is unsustainable and susceptible to collapse. My presentation will explore the social logic of alternative forms of food security and how the emerging interrelationships affect the development of these alternatives. The presentation begins with a brief description of how global agribusiness functions and why it is unsustainable. In an effort of making my research as relevant to this issue as possible, I construct a theoretical base which underscores the commonalities between food security and relevant social and political theory. The rest of my presentation focuses on three alternative forms of food security: small-scale markets, urban agriculture and intentional communities. This continuum is a way of arranging the aforementioned alternatives into a way in which the relationships between the alternatives can be comprehensively studied in an accessible manner. Throughout this part of the presentation, I identify some of the practices and events in both the Kingston area and academic literature which highlight the currency of my theoretical base and arguments. Small-scale markets are introduced as a progressive involution from global agribusiness towards more sustainable forms of food security. Urban agriculture is embodied in the ways individuals and groups attempt to grow their food within seemingly uninviting urban environments, occurring through three interrelated practices: household gardening, community gardening and guerrilla gardening. The last of the explored alternatives, intentional communities, are developed as self-sustaining means of independence from outside forces.

Application Of Scenario-Based Testing To A Land Development Project In Kingston, Ontario

Presenter: Richard Zavitz, Geological Engineering
Faculty Supporter: Dr. Robin Harrap, Geography

Dense urban development can have a dramatic effect on the local water resources and must be evaluated during the planning stages of any new development. This can be done through a Geographic Information System (GIS) that can spatially analyze the effects of an urban development on the hydrologic features of a proposed area including: groundwater resources, impact on wetland environments, effects on lakes, effects on existing drainage patterns, and potential for contamination. By analyzing these features in advance, the development can be planned in such a way that the impact can be minimized. Because future conditions are unknown and predictions accompany risk how can these be accounted for and minimized? Through scenario-based design the impact and risk of a proposed development will be assessed through changes in land use, water consumption, population density, and development rate. An ArcGIS extension tool, CommunityViz, allows users to incorporate scenarios into the design procedure to test a proposed development spatially and temporally. This analysis will be performed on a property in Kingston, Ontario that is currently being developed along the Rideau Canal for a small community of about 50 houses. The houses will be single-family dwellings with individual wells and septic systems though will be connected to the Kingston Utility grid for hydro, gas, telephone and cable. Using this location the applicability of the scenario-based design will be critically examined in assessing and managing urban development and expansion.

The Tea Room: Challenges and Rewards of Developing a Sustainable Business Model

Presenters: Michele Romanow, Engineering
Co-Presenters: Josh Workman; Faye Pang; Alan Fidler; Ashley Widdes

The Tea Room is a unique environmental initiative striving to be North America's first zero consumer coffee shop. This student-run café embodies the values of environmental change, and education through a sustainable business model. The long-term goal of the Tea Room is to operate as an environmentally and

fiscally sustainable business. In its first four months of operation the Tea Room has learned an enormous amount about the sacrifices and balances required to operate a sustainable business, the response of customers, and implementing environmental initiatives. The presentation will cover the motivation and philosophy behind the project, our environmental plan and key initiatives, and our challenges and successes.

Implementing a Successful Sustainability Plan at Queen's University

Presenter: Blake Anderson, Environmental Science

Over the past decade universities from around the world have begun recognizing their need and responsibility to incorporate sustainable ideals into their teaching practices and daily operations. This same recognition has taken place at Queen's University where over the past several years a sustainability movement has been gathering momentum. Individuals from every stakeholder group are beginning to explore how Queen's can implement a successful campus wide sustainability plan. It is however unclear how exactly this commitment should be approached. In spite of the large number of universities making similar commitments there appears to be no 'cookie cutter' model for success. Every university has its own unique challenges and opportunities that must be addressed early in the planning phases. By combining the lessons learned at other institutions of higher education with the challenges and opportunities at Queen's this paper lays out a strategy for how Queen's should approach sustainability.

Session VII: Micro- to Meso-Scale Materials

Seminar Room 121, Queen's Learning Commons, Stauffer Library

Friday, March 9, 1:30-2:30

Moderator: Dr. John Holmes, Geography

Differences in the Solid-State Structures of Single-Site and Ziegler-Natta Linear Low-density Polyethylenes as Revealed by Molecular Dynamics Simulation

Presenter: Fanny Yuen, Engineering/Chemistry

The correlations between molecular structure and mechanical properties of linear low-density polyethylenes are introduced. The program, procedures and conditions for the molecular dynamics simulations of single-site and Ziegler-Natta linear low-density polyethylenes are presented. Resulting structures of the two polymers formed after the low-temperature equilibrations are illustrated. Findings with regards to system order, stem length, branch distribution and concentration of tie-chains are discussed. The results are found to be consistent with experimental findings.

Compact Tension Testing of Asphalt Binders at Low Temperatures

Presenter: Michelle Edwards, Chemical Engineering

This presentation will document and discuss the development of a compact tension test for the grading of asphalt binders at low temperatures. The geometry was chosen because it provides an easy way to obtain the plane-strain fracture toughness, fracture energy, and crack tip opening displacement in brittle failure on a small sample. It is believed that the method will allow for a better ranking of binders in regard to their low-temperature fracture resistance. Compact tension specimens were prepared in different sizes with varying notch depths. Fracture toughness was found to be constant, regardless of the notch depth or specimen width for both straight and modified binders. Fracture energy was found to decrease with notch depth, which is thought to be the result of energy-absorbing mechanisms away from the crack-tip. Deeper notches or an energy correction is able to account for that issue. Reproducibility of the fracture test was found to be good with a standard deviation of five to ten percent for fracture toughness and fifteen to twenty percent for fracture energy, which is typical for such tests. Given the fact that brittle fracture properties can vary by orders of magnitude for binders of the same Superpave grade, it is concluded that the test method has a high ability to reveal statistically significant differences in toughness.

Session VIII: Values and Identity

Speaker's Corner, Queen's Learning Commons, Stauffer Library

Friday, March 9, 1:30-3:15

Moderator: Dr. Caroline Baillie, Applied Sciences

Examining Ethnic Differences in the Relationship Between Perfectionism and Emotional Adjustment

Presenter: Lucille Faye Ling, Psychology

Faculty Supporters: Dr. Kate Harkness, Psychology

Perfectionists are people who set excessively high standards for their own performance, adhere to these standards rigidly, and define their self-worth in terms of achieving these standards. Research has shown that perfectionism is linked with emotional and psychological maladjustment. This study is aimed at examining potential differences in perfectionism and emotional adjustment across two ethnic groups: Caucasian and Asian. Previous literature has shown that Eastern cultures are more self-criticizing than Western cultures, thus we may expect to see differences in perfectionism across these two cultures. Also, researchers have found that individuals from Eastern cultures may manifest depression in physical symptoms (e.g., headaches) while individuals from Western cultures may express depression in more emotional symptoms (eg, sadness). Thus, differences in how Asians and Caucasians express their emotional maladjustment will be examined. Finally, acculturation may be an important factor because perfectionism in a Western context may have more adverse consequences than in an Eastern context. Method: Asian and Caucasian undergraduate students completed self-report measures of perfectionism, emotional adjustment, and acculturation. Expected results: First, we expect that Asians will score higher than Caucasians on perfectionism measures. Secondly, there will be a positive correlation between perfectionism and poor emotional adjustment. Thirdly, emotional adjustment will be expressed more physically in Asians and more emotionally in Caucasians. Finally, within the Asian group, level of acculturation will moderate the relationship between perfectionism and emotional maladjustment. Discussion: These results will be discussed in terms of how perfectionism is conceptualized, assessed, and treated.

Educating the Heart: Fostering Hope Through Theatre in the AIDS Crisis in South Africa

Presenter: Meghan Ward, Drama

Faculty Supporter: Dr. Jenn Stephenson, Drama

With approximately 5.3 million people living with HIV/AIDS, South Africa has the highest HIV-prevalence rate in the world. HIV tends to strike the most vulnerable people in society, and is often associated with high-risk behaviours, which inevitably leads to stigmatization. Through an integration of theatre and development theory, I propose to investigate the potential of using theatre as a community event that raises awareness of collective issues and that offers new hope to people living with HIV. I suggest that theatre can educate the heart and put a human face on HIV/AIDS, thus catalyzing a healing process at the community level. By targeting township youth, those who are currently driving the virus, an interactive theatre style, such as participatory methodology, can effectively move beyond didactic education. In participatory theatre, the target group is incorporated into the theatrical representation of their circumstances through the performance of personal testimonies associated with HIV. Here, the power of theatre lies in its ability to produce individual reactions in the audience, which ultimately result in a collective experience and elevated consciousness through the discussion that ensues. The community is thus empowered to engage in a new approach to HIV/AIDS. Can such a performance prevent further infections by exposing the consequences and realities of living with AIDS? While a test-case would be ideal in the affirmation of these ideas, I hope to bring a new approach to community theatre through a combination of theories from both theatre and international development studies.

Identity Propaganda: An Examination of Native Estonian and Canadian Estonian Art Practices in Response to the Soviet Occupation

Presenter: Lehti Mairike Keelmann, Art History

The response to the Soviet Occupation in Estonia was arguably one of the strongest examples of nationalism in our modern day. This nationalism was expressed in many ways, but became a lasting symbol in the art leading up to and after the collapse of the Soviet Union. This presentation examines the relationship artists in Estonia had with the stirrings of nationalism which occurred during the latter half of the Soviet Occupation, as well as the response of some of the artists belonging to the largest group of Estonians outside Estonia in Canada. Both sets of artists offer compelling examples of nationalism with a nostalgic return to folk art; this proves to be interesting when looking at the case of emerging multiculturalism in both Canada and Estonia. Some of the artists discussed include members of The Society of Estonian Artists in Toronto (E.K.K.T.), as well as three prominent late-Soviet Estonian women artists- Kaja Karner, Aili Vint, and Karin Luts.

Genocide as Foundation of Identity

Presenter: Olga Sokolova, Geography

Faculty Supporter: Dr. Audrey Kobayashi, Geography/Women's Studies

The presentation will show that effects of the Armenian Genocide of 1915-1923 on Canadian Armenian and Turkish communities serve as foundation of their identities and permeate daily life concerns in Canada. In multicultural society with diverse ancestral origins, those ancestral places may still be the centre of one's moral, emotion, and intellectual universe. An outlook on life formed by a shared historical identity will affect adaptation to the new lifestyle and the new country and can be passed on to further generations. The original framework for viewing the world can form as a result of cultural upbringing or an event affecting the entire community influenced by such things as the status of the diaspora or relations with the government. The impact of the Genocide on Armenian-Canadian identity will be investigated via analysis of Armenian and Turkish literature sources in Canada and determining if they correspond to psychological consequences of the Armenian Genocide. The literature will reflect the profound impact of the Genocide on both communities that continues today.

Session IX: Listening and Learning

Speaker's Corner, Queen's Learning Commons, Stauffer Library

Friday, March 9, 3:30-4:15

Moderator: Dr. Susan Wilcox, Centre for Teaching & Learning, Education

Enhancing Understanding in Interdisciplinary Communication

Presenter: Dilmini Peiris, Chemical Engineering

Over the years we see that interdisciplinary teams are increasingly common in industry, government, and society in general. It is critical to be able to integrate knowledge and skills from several disciplines in order to evolve toward a state of "collective intelligence," which entails functioning more like a coherent, intelligent organism than like a collection of disassociated, independent thinkers. This presentation will introduce a new model for communicating effectively. It will describe ways in which the communication modalities interact. It will present strategies for capitalizing on the potential of each modality to enhance communication among different discourse communities.

I thought university was supposed to be different!

Presenter: Jessica White, Alma Mater Society

Why am I involved with I@Q? What is Inquiry Learning? Why is inquiry important to me? What I have learned about myself through inquiry learning? Why should you care about inquiry learning? What need do

I have that inquiry learning might fulfill? That need is to feel passionate about learning and living my life. In this presentation I will have a conversation with my imaginary friend about why I have become personally invested in this project. I will discuss the core elements of inquiry learning and the conference. As well as delving into the personal meaning inquiry holds for me and how I think it applies to all university students and faculty. I will attempt to answer several of my own questions and through doing so offer a greater understanding of the importance of the conference and a new appreciation for questions.

Session X: Poster Presentations

Queen's Learning Commons, Stauffer Library

Presenters will be present at posters Thursday, March 8, 11:00-12:00

Posters will be on view March 8 – 9

Fractal-like Microreactor for Hydrogen Production

Presenter: Jonas Gerson, Chemical Engineering

A catalyst micro-channel reactor using Cu/Alumina as the catalyst was designed in order to produce hydrogen from methanol in order to provide a fuel source to a hydrogen fuel cell to meet a power demand of 100W. To do this a branched channel micro-reactor design was employed. The reasoning for this was that the increased pressure drop due to the branching network and increased surface area of the reactor would produce a greater hydrogen yield than that of a straight channel reactor. The branched channel reactor showed a 10% greater hydrogen yield than that of the straight channel under three different conditions which the initial flow rate of methanol was varied. The final design of the reactor to meet the 100W power demand was a stack of 48 single branch disk units, each 17.5 mm in diameter, 1 mm thick, a constant channel depth of 250 μm , and a outlet channel width of 100 μm .

Using heat as a potential groundwater Tracer through Stratigraphically Complex Media at the Victor Diamond Mine Site

Presenter: Cara Walker, Geological Engineering

Faculty Supporter: Dr. Vicki Remenda

The Victor Diamond Mine site near Attawapiskat, Ontario will begin mine development in the fall of 2007. The area around the site is characterized by two to three meters thick patterned peatland, which in turn is underlain by sand and silt, variable marine clay, and a large limestone bedrock aquifer. Bioherms, which are large, fractured limestone rocks that extend upward from the bedrock, to the surface in some cases, are complicating features to consider in the mine development planning. There is concern that dewatering the aquifer for open pit mining may lead to disruptions in the surface peatlands due to draining through the bioherms. Dewatering the aquifer could impact the hydrological and ecological balance of the peatland, but the magnitude of the effect depends on the characteristics of the connections between the peatland and the underlying materials, which are currently unknown. A five year research program has commenced at the site to gain insight to the material behaviour and to study changes at the site as development progresses. This project will analyze the potential to use heat as a tracer for groundwater movement, and to integrate the findings into the long-term monitoring plan. Heat tracing may be used to test hypotheses for water movement at the site, and to detect areas of particular concern during dewatering. It is expected that collecting information about the site in this way and implementing monitoring plans will prevent, or at least anticipate, significant changes in the peatland ecosystem.

Body Modification and Popular Culture

Presenter: Tarah Hogue, Art History

Faculty Supporter: Dr. Robb MacKay

Contemporary North America is obsessed with the body. Popular culture abounds with references to the body: from products for the body (hair care, teeth whitening products, clothing, etc.), to representations of the body (the black body, the gay body, the thin body). All of these things combine to create discourses surrounding the body, which are appropriated and then commodified in Western culture (a process known as hegemony). This is hugely significant to the formation of identity because the body underscores identity, and to modify the body is to negotiate in some way with identity. Plastic surgery, piercing, and tattooing are all practices of body modification that have been appropriated hegemonically by popular culture. The film *Western Eyes* explores the practice of plastic surgery within popular culture, and deals with the ways in which two women negotiate the discourses surrounding the practice. Tattooing and piercing are practices that mark the body in a different way than plastic surgery, and although they have been appropriated by popular culture, can still be discussed as important signifiers of identity and the body. Other more extreme practices, such as suspension, may completely resist the narratives of popular culture that surround the body. In any case, it is clear that body modification is a complex issue that entwines discourses of identity, the body, and popular culture. Although body modification is largely wrapped up in the production of ideal norms, there are ways to disrupt these narratives, which are important places of resistance of popular culture.

An Analysis of WNT5A expression in Wilms' Tumour

Presenter: Nicholas Laughton, Biology

Wilms' tumour is a pediatric tumour of the kidney that appears to be the result of aberrant embryonal renal development. The paired-box (PAX) gene family has previously been implicated in Wilms' tumorogenesis. In this study, Nickel-Agarose Chromatin Enrichment (NACE) was used to identify genes whose expression is regulated by the transcription cofactor Pax2. Of the genes identified by NACE, the extracellular signal metabolite WNT5A was chosen for further study. The expression of WNT5A was measured in a set of tumour samples using quantitative real time polymerase chain reaction (qRT-PCR) and compared to a human fetal kidney control. Of the 38 samples tested, 76% showed significantly lower levels of cytosolic messenger RNA (mRNA). This data, in conjunction with published data on Pax2 expression, suggests Pax2 inhibits the expression of WNT5A. When compared with histological reports for the tumours we examined, the expression data implies that WNT5A may have a role in regulation of tubule growth in the developing kidney.

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Novel Idea

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