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Please direct submissions and inquiries to Aryn Martin or Sofie Lachapelle, preferably by email (details below). Please note that submissions can be sent in either official language. The editors are grateful to York University for assistance in printing and mailing costs, and to the University of Guelph for providing the necessary software.

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RENEW YOUR CSHPS-SCHPS MEMBERSHIP FOR 2014!

SCHPS-CSHPS is offering electronic membership and renewal for 2014. The payment site can be reached through the CSHPS website and accepts major credit cards through PayPal. We also continue to accept payment by cheque. Members will receive renewal notices with this information in December or early January.

PAIEMENT ÉLECTRONIQUE DES AHDÉSIONS POUR CSHPS-SCHPS DISPONIBLE

SCHPS-CSHPS offre l'ahdésion et le renouvellement électronique pour 2014. Le site de paiement est accessible par le site web de la SCHPS et accepte les cartes de crédit par le système PayPal. Nous continuons aussi d'accepter les paiements par chèque. Les membres recevront un avertissement avec cette information en décembre ou début janvier.

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Many thanks to the Program Committee/Comité de programme (2013-2014):

Bryson Brown (University of Lethbridge), Chair
Debra Lindsay (University of New Brunswick)
Letitia Meynell (Dalhousie University)

Local Arrangements:
Elizabeth Neswald (Brock University)

CSHPS/SCHPS 2014 BROCK UNIVERSITY: FRIDAY MAY 23

18:00-20:00, Plaza 500A

Executive Council Meeting

CSHPS/SCHPS 2014 BROCK UNIVERSITY: SATURDAY MAY 24

8:45-10:45 Session / Séance I.1

Lowenberger Residence 134

Remaking The Past: History in 3D
3D Methods in HPS and STS
I. Record, University of Toronto
Recreating the Chambers' Micromanipulator
E. Weidenhammer, University of Toronto
Camera Obscura
D. Southwick, University of Toronto
Mesopotamian CN Tower
G. Resch, University of Toronto
Chair: **D. Orenstein**

Lowenberger Residence 201

Epistemology
A Hybrid Theory of Evidence
J. Michaud, Waterloo University
Contraction and the loss of true belief
T. Shear, University of California Davis & **K. Genin**, Carnegie Mellon University
Rational Rabbis? Menachem Fisch's Neo-Hegelian Integration of Science and Religion
Y. Fehige, University of Toronto
Inverse Strategies for Measurement
Greg Lusk, University of Toronto
Chair: **F. Banville**

Lowenberger Residence 209

Scientific Concepts
Concrete arguments against abstraction
D. Struck, University of Guelph
Synchronic Vs. Diachronic Emergence: A Reappraisal
O. Sartenaer, Columbia University
Hempel on Psychiatric Taxonomy
J. Tsou, Iowa State University
Methodological assumptions in the psychology of concepts
G. Beaulac, University of Western Ontario
Chair: **M. Frappier**

10:45-11:00 Coffee

11:00-12:30 Session / Séance I.2

LR 134

Geography & Imperialism
Niagara Falls: The Early Toronto-Based International Scientific Excursions
D. Orenstein, University of Toronto
Réseaux de contacts et mécanismes d'appropriation des curiosités d'histoire naturelle.
M. Lemonnier, Université de Québec A Montréal
Matthias Castrén and the Russian colonial science project
D. Mordvinov, University of British Columbia
Chair: **I. Record**

LR 201

Science and Policy Issues
Social Inquiry and Social Inquiry for Social Reconstruction in the post-1960s U.S
M. Solovey, University of Toronto
Historical perspectives on Canadian science policy and the rise of biotechnology
R. Moore, University of Toronto
Experts, Publics, and Lively Energy Projects
S. Cornwell, York University
Chair: **J. Hull**

LR 209

Modern Physics
(Quantum) Imaginary Experiments: Popper and Hermann on the Microscope
M. Frappier, University of King's College
Planck's Constant: Another Slat in the Bridge to Quantum Physics
E. Franke, MacEwan
Ontological dialogues within Paul Dirac's international correspondence network
A. Wright, University of Toronto
Chair: **C. Sawkins**

13:30-15:00 **Session / Séance I.3**		
Lowenberger Residence 134	***Lowenberger Residence 201***	***Lowenberger Residence 209***
Science and Film Session (OS=Organized Session) Activating Publics in the Co-production of Science: Psychology's Micromotion Films **A. R. Belliveau**, York University "Why should we care about these ferrets?": Wildlife Filmmakers on Production, Science, and Storytelling **E. Louson**, York University Telling Digital Stories about the Past **M. Charenko**, University of Wiscon sin, Madison. Organizer: **E. Louson**, York University	**(Re-)Placing Science And Technology (OS)** Science and Technology **I. Slater**, York University Science and Technology: Eloping After A Long Courtship **J. Hull**, University of British Columbia How Should We Collect Science and Technology In 2014? **D. Pantalony**, Canadian Museum of Science and Technology Organizer: **J. Hull**, University of British Columbia	**Explanation and Representation** Three sources of normativity in scientific explanation. **T. Murphy**, Washington University in St. Louis Explanations in the Principle Interpretation of the Special Theory of Relativity **C. Sawkins**, University of Guelph Scientific Representation: The problem of communicability **F. Banville**, University of Western Ontario Chair: **T. Shear**
15:00-15:15 Coffee		
15:15-17:15 Session / Séance I.4		
LR 134	***LR 201***	***LR 209***
Technologies Expertise and the Artificial Tympanum Controversy **J. Virdi-Dhesi**, University of Toronto Mathematical Values and Impersonal Bureaucracies in the Early American Republic **T.P. Thornton**, SUNY Buffalo The shared material culture of Wedgwood and Priestley's laboratories, 1780--1795 **K. Schranz**, University of Toronto The Chemists' War **A. Ede**, University of Alberta Chair: **I. Slater**	**Teaching & Communicating Science and History of Science** Publishing Britain's scientific sphere: Macmillan and Co. as publishers of science. **S. Nickerson**, University of Toronto William Whiston, experimental lecturing and the Royal Society of London **S. Snobelen**, U of King's College H.G. Wells-- Biology Crammer **J. Elwick**, York University Le programme de George Sarton pour l'histoire des sciences **E. Aurières**, Université de Paris I Chair: **D. Pantalony**	**Epistemology of Science I** The Epistemic Merits of Reichenbach's Pragmatic Defense of Induction **A. Kenna**, University of Utah Explanatory Power and Heuristic Power **M. King**, University of Guelph A Historical Look at Pragmatism and Logical Empiricism **M. Silk**, Waterloo University Considering Practice: On the Importance of Phonology to the Philosophy of Language **J. Life**, University of Western Ontario Chair: **Y. Fehige**
17:15-17:30 Break		

17:30-19:00
Room: Thistle 242

-- PLENARY --

Author Meets Critics:
Smolin's *Time Reborn: From the Crisis in Physics to the Future of the Universe*

Speakers: Richard Arthur, McMaster University; Kathleen Okruhlik, University of Western Ontario; Denis Walsh, University of Toronto; Lee Smolin, Perimeter Institute. Gordon McOuat, University of King's College (organizer)

9:00-10:30 Session / Séance II.1		
Lowenberger Residence 134	*Lowenberger Residence 201*	*Lowenberger Residence 209*
Microcomputers in Academia: This Time It's Personal (OS) The MCM/70 in Research and Education **Z. Stachniak**, York University Micro-What? Constructing microcomputers at the University of Waterloo **S. Campbell**, University of Waterloo Personal Astronomical Computing: Exchanges 1984-1994 **A. Olley**, Independent Scholar Organizer: **A. Olley**	**Social Sciences** Asymptotic Reasoning in the Social Sciences **W. C. Arbage**, **Y. Zhao** and **N. Fillion**, Simon Fraser University Deviant Case and Scientific Dynamics: Considerations from Recent economics **F. Claveau**, University de Quebec a Montreal Ultimatum Game as an Indicator for Altruism **Y. Zhao**, Simon Fraser University Chair: **S. Weaver**	**Scientific Models** Connectionist Models as Approximations, not Idealizations **D. Booth**, University of Western Ontario Measuring Generality in the Protein Universe **C. Lewis**, University of Toronto Fractal geometry is a geometry of nature **C. Belanger**, University of Toronto Chair: **M. B. Brown**
10:30-10:45 Coffee		
10:45-12:45 **Session / Séance II.2**		
LR 134	*LR 201*	*LR 209*
Science on The Emotions (OS) Vygotsky on emotion/affection/feeling **G. Toassa**, York University Pity: Epidemic encephalitis and the bureaucratic state in 1920s Britain **K. Kroker**, York University Testing Temperament in Interwar American Corporations **K. Lussier**, University of Toronto Konrad Lorenz on intuition and empathy in the study of animal behavior **M. Vicedo**, IHPST/University of Toronto Organizer: **M. Vicedo**	**Philosophy of Biology** Assessing the Economic Metaphor in Robert Trivers' Parental Investment Theory **S. Weaver**, Waterloo University Recent Philosophical Criticism of Natural Selection **D. McArthur**, York University The irreducibility of instinct **J. Collier**, KwaZulu Natal Chair: **G. Beaulac**	**Realism** Structural Realism and Category Mistakes **E. Landry,** University of California, Davis On the (im)possibility of a unified science of multiply realized kinds **A. Manafu**, Université de Paris I Laws of nature: the role of predicates in systematization **M. B. Brown**, University of Lethbridge Chair: **D. Booth**
12:45-13:00 Coffee		

13:00-15:00, Thistle 245
Annual General Meeting

15:00-17:00, South Block 203

-- STILLMAN DRAKE LECTURE --

Dr. Paul Israel, Rutgers University

Learning to Innovate: Thomas Edison and the Creation of the Electrical Industry

9:00-10:30 Session / Séance III.1		
Lowenberger Residence 134	***Lowenberger Residence 201***	***Lowenberger Residence 209***
History of Technology Robert J. Van de Graaff's High Voltage Engineering Corporation **E. Fenner**, York University Modeling and Renewable Energy under the Trudeau Government **H. Trim**, U.B.C. Electric power and the Emergence of Electric Vehicles **J Petrunic**, McMaster University Chair: **V.Boantza**	**Archaeology, Culture, Religion** Altars or the diluvium? Debating the formation of the Ohio Valley mounds **C. Burns**, Ryerson University The Fraser River: Where Epistemologies Collide **C. Sutherland**, York University The Arabs' Final Frontier: Transnational Astronomy and Space Science **J. M. Determann**, Virginia Common wealth University in Qatar Chair: **R. Bedford**	**Probability and Rationality** Carnap's Analysis of Probability versus Subjective and Frequentist Interpretations **P. Torfehnezhad**, U. de Montréal The Propensity Interpretation of Probability: A Re-evaluation **J. Berkovitz**, University of Toronto Thoughts On The Iterated Prisoner's Dilemma **K. Fradet**, Université de Montréal Chair : **I. Brigandt**
10:30-10:45 Coffee		
10:45-12:45 Session / Séance III.2		
LR 134	*LR 201*	*LR 209*
Health: History and Applications Biomedical Research and Models of Values in Science **A. Quinn**, U of Pittsburgh Risks of Empathic Care: Epistemology of Secondary Trauma in Healthcare Providers **E. Stergiopoulo**s, U. of Toronto Moving from the lab to the field in nutrition science **E. Neswald,** Brock University Canadian Entomology, Victorian Ideology and DDT **M. Berg**, Brock University Chair: **E. Koester**	**History: Modern Science, Mathematics** Locke on Induction **E. Rossiter**, University of Western Ontario Jean Senebier's Chemical Study of Light: From Observation to Experimentation in Eighteenth-Century Science **V.Boantza**, University of Minnesota The Development of the Riemann Integral in 1850-1900. **J.-P. Villeneuve**, Cégep de Rimouski What is the History of the Earth Sciences the History of? **E. Hamm**, York University Chair: **E. Fenner**	**Epistemology of Science II** Social Values Influence the Adequacy Conditions of Scientific Theories **I. Brigandt**, University of Alberta Incommensurability, Relativism, and the Epistemic Authority of Science **S. Bland**, U. of Western Ontario Comprehensive Empiricism and Our Scientific Knowledge **N. Ray**, Waterloo University The Wisdom of Multiple Models: An Epistemology of Climate Model Ensemble Methods **M. Vezér** and **W. Myrvold**, University of Western Ontario Chair: **J. Berkovitz**
12:45-13:45 *Lunch / Dîner*		
13:45-15:15 Session / Séance III.3		
Values: Social and Biomedical *LR 134* Vivisection Debates in the Early Writings of Friedrich Nietzsche **B. Mitchell**, York University Eugenics and the 1917 Ontario Royal Commission Into the care and Control of the Mentally Defective and Feeble-Minded **E. Koester**, University of Toronto The Woman's Christian Temperance Union of the United States and Ontario on Heredity and Social Reform, 1880-1910 **R. Bedford**, University of Toronto Assigning sex to infants with disorders of sex development **C. Clune-Taylor**, University of Alberta Chair: **E. Stergiopoulos**	**Observation and Measurement** *LR 209* Subject as Instrument: Galvanic Experiments, Organic Apparatus and Problems of Calibration **J. Steigerwald**, York University Scientific Instruments: Instrumentality and Performativity **O. Hatipoglu**, Cornell University New Data Analysis Techniques: Reassessing Neuroimaging **J. Wright**, University of Western Ontario Discovery of Hubble's Law: an Example of Type III Error **Ari Belenkiy**, Simon Fraser University Chair: **N. Ray**	

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ABSTRACTS

(organized alphabetically by first author, except organized sessions which are listed intact at the end, indicated by OS)

Asymptotic Reasoning in the Social Sciences
Wilfredo Contreras Arbaje, Yuting Zhao and Nicolas Fillion, Simon Fraser University

Not long after he was awarded the first Nobel Memorial Prize for Economic Sciences, Hayek claimed that economics had failed to guide policy more successfully due to its propensity to imitate as closely as possible the procedures of the "physical sciences." His rationale was that such a `scientistic' attitude "... is decidedly unscientific, since it involves a mechanical and uncritical application of habits of thought to fields different from those in which they have been formed." Unfortunately, this "scientistic" attitude has propagated across the social sciences, as each has hoped to secure the legitimacy and predictive power enjoyed by the physical sciences. While not universal (i.e., there are exceptions), the attitude manifests in the form of ever-larger and more complex mathematical models, made possible due to the increase in computing power and more advanced mathematical software. Such models are often derided as `black-boxes' that display impressive mathematics, but are of little practical use. The goal of this paper is two-fold: first, to make explicit how these models fall short of their explanatory and predictive promises; and second, to exploit the asymptotic methods developed in applied mathematics, thereby showing why those failures can be traced to placing too much faith on large datasets and computing power, while disregarding the critical role of simplifying assumptions.

Asymptotic reasoning can succeed where previous models have failed precisely because it grants greater prominence to the role of carefully-chosen assumptions, while employing simple, well-understood mathematics.

Le programme de George Sarton pour l'histoire des sciences
Elise Aurières, Université de Paris I - Panthéon-Sorbonne

Aux États-Unis, les premiers cours d'histoire des sciences émergent à la fin du XIXe siècle. Cette période a été qualifiée par Arnold Thackray de « préhistoire de l'histoire des sciences » la mesure où l'institutionnalisation de la discipline n'a lieu qu'au sortir de la Seconde Guerre Mondiale. Nous aimerions discuter du moment où l'histoire des sciences dans les universités américaines n'en était encore qu'à ses balbutiements. Cette communication présentera les conditions d'émergence de la discipline dans le champ académique en décrivant ses moyens de diffusion et la multiplicité des lieux qui la marquent. Elle donnera une idée de la complexité de son évolution tout en en soulignant les enjeux. Notre exposé visera à évaluer quel fut le rôle exact joué par le programme de George Sarton dans l'enseignement de l'histoire des sciences aux États-Unis. Il s'agira de comprendre comment Sarton a renouvelé le paysage intellectuel dans lequel il s'insère en 1915.

Scientific Representation: The problem of communicability
Frédéric-Ismaël Banville, University of Western Ontario

Empiricist structuralism (van Fraassen, 2008) is partly aimed at solving a problem that derives from the reliance of constructive empiricism on isomorphism. Since isomorphism depends on cardinality, the claim that a given model is instantiated in a set of objects can be trivial (Newman, 1928, Demopoulos, 2003). Van Fraassen claims that science represents phenomena (concrete objects) in an abstract mathematical formalism, but mathematical structures can only represent other mathematical structures. Van Fraassen's solution is to secure a link between phenomena and representations via the indexical, a pragmatic consideration that dissolves the distinction between a representation being empirically adequate to the phenomena and a representation being empirically adequate to the phenomena as they are represented. In this paper I argue that empiricist structuralism, which relies on "isomorphism plus pragmatic considerations", faces a problem accounting for the communicability of representations (intersubjective assessment in particular). One must either 1) define the indexical relative to science in general or 2) introduce a supplemental class of conceptual representations (Demopoulos, 2000; DiSalle, 2012). The first option renders the indexical argument ineffectual, and the second violates a core tenet of empiricist structuralism (theories are mathematical structures). In effect, on van Fraassen's view, conceptual representations can only be obtained by construing them as part of a rather large set of pragmatic considerations which ends up looking like a mysterious "black box". Without a more systematic account of pragmatic considerations that can accommodate conceptual representations, the outlook for empiricist structuralism is not promising.

Methodological assumptions in the psychology of concepts
Guillaume Beaulac, University of Western Ontario

This paper explores how a common approach in the psychology of concepts introduces bias that restricts the kind of body of information that comes under scrutiny.

One of the most famous and important objections to the classical theory of concepts is that definitions do not account for typicality effects. Typical members of a set are categorized more quickly than atypical members: central to these experiments, then, is participants' response-time. Under

the view that only one type of body of information can play the role of concepts (the natural kind assumption, cf. Machery 2009), and the view that experiments emphasizing reaction time are relevant to understand any cognitive process (the single-process view of the mind), such results show that definitions cannot be concepts.

By devising experiments where participants must respond very quickly, current experimental standards look at very small time differences between actions that participants must accomplish. This allows automatic processes to shine, and more importantly be studied, but this does not allow for a complete understanding of the bodies of information used by human beings to categorize. Slow and verbal categorization processes are at a disadvantage because of the very experimental methods used. Taking these other properties into account could reveal new phenomena relevant to our understanding of categorization processes. The defining characteristics of this (these?) other body of information would not only be processing speed, but also precision and accuracy; they will not only involve gut feeling, but also reflection and slower cognitive processing.

Heredity as Ideology: Ideas of the Woman's Christian Temperance Union (WCTU) of the United States and Ontario on Heredity and Social Reform, 1880-1910

Riiko Bedford, University of Toronto

As part of their crusade against the moral and physical dangers of alcohol, the Woman's Christian Temperance Union (WCTU) of the United States and Ontario created in the 1880's departments of work dedicated to the study and care of heredity. This paper examines the history of these departments and explores how the two organizations made differing use of the concept of heredity to advance their particular agendas and methods for social reform. Whereas for the Ontario WCTU, heredity was conceptualized as a God-given law with a very specific moral and religious meaning, in the American context, the nature of heredity, although understood to be a force, remained largely ambiguous and open for interpretation. By exploring how heredity functioned as a malleable resource for the WCTU, this comparative analysis also serves as a study of the cultural lives of scientific concepts.

Fractal geometry is a geometry of nature

Christopher Belanger, University of Toronto

In this paper I argue that we need to rethink the received philosophical consensus that fractals could not exist in nature. First I consider the two main objections to natural fractals, the constructivist objection and the atomic objection, and show that they can be challenged on several fronts. Since the literature on fractals and nature is often framed in terms of "the geometry of nature," I then argue that to be a geometry of nature is to be a set of tools and techniques for characterizing parts of nature. I then consider whether fractal geometry could characterize modal and spatial properties of natural systems. With reference to three models of increasingly realistic systems, I contend that the tools of fractal geometry are in fact often necessary to characterize important regions of a dynamical system's phase space. I then show that a dynamical system's spatial basins of attraction, defined as the cross-section of their phase-space basins of attraction with zero momentum, can have fractal boundaries. This makes it plausible that fully spatial aspects of nature could also be fractal.

Discovery of Hubble's Law: an Example of Type III Error

Ari Belenkiy, Simon Fraser University

Recently much attention has been paid to the discovery of Hubble's law – the linear relation between the rate of recession of the distant galaxies and distance to them. Though we now mention several names associated with this law instead of one, the motivation of each remains somewhat obscure. As it is turns out, two major contributors arrived at their discoveries from erroneous reasoning, thus making a case for a Type III error.

It appears that G. Lemaitre (1927) theoretically derived Hubble's Law due to his choice of the wrong scenario of the Universe's evolution. Hubble (1929) tested the linearity law not based on Lemaitre's non-static model, but rather a cumbersome extension of de Sitter's static theory proposed by H. Weyl (1923) and L. Silberstein (1924). Thus said, errors can still lead to progress. The errors made on the way to the discovery of the expanding universe by the pioneers of the modern cosmology did not prevent the cosmological community from "getting it right" eventually. In fact, they were crucial steps in our progress toward understanding the cosmic expansion. Science progresses by correcting errors, not by avoiding them altogether.

Bug Lords: Canadian Entomology, Victorian Ideology and DDT in Post-War North America

Michael Berg, Brock University

The reaction of the post-war Canadian entomological community to the proliferation of DDT has received little scholarly attention. Canadian entomologists acknowledged the efficacy of chemical insecticides and simultaneously sought to address the obfuscation of entomology's scientific base in biology. While historians have demonstrated how the institutions of post-war federal Canadian entomology safeguarded research interests in the insecticide era, the cultural aspects of those institutions have not been addressed. By examining the Entomological Society of Canada's journal "the Canadian Entomologist", this paper emphasizes the cultural influences on institutional

approaches and demonstrates a continuity of thought in Canadian entomology. The goals of this paper are to ascertain what the Canadian entomological communities' response to DDT says about the relationship between science and the state while also examining the influence of the state on the production of ideas about the natural world. I argue that the development of Canadian entomology in the late 19th and early 20th centuries created an entomological community that envisioned itself as a biological science and this fostered an institutional framework where biological means of insect control could find purchase at the federal level in post-war Canada.

The Propensity Interpretation of Probability: A Re-evaluation

Joseph Berkovitz, University of Toronto

Single-case and long-run propensity theories of probability are among the main objective interpretations of probability. There have been various objections to these theories, e.g. that it is difficult to explain why propensities should satisfy the probability axioms and even worse that propensities are at odd with these axioms, that the explication of propensities is circular and accordingly not informative, that single-case propensities are metaphysical and non-scientific and that the relationships between propensities and long-run frequencies are ill defined. In this paper, we consider in-depth various propensity theories of probability and their prospects in light of these and other objections. We shall argue that the above challenges are either largely unfounded or non-fatal, but that the propensity interpretation still faces some significant challenges. In particular, we shall argue that the most developed long-run propensity theories fail to provide a coherent notion of long-run propensity and briefly suggest a modification of it, and that current single-case propensity theories fall short of providing a satisfying explication of single-case propensity. Yet, our main conclusion is that these challenges do not undermine the validity of propensity theories as prospective interpretations of probability in science.

Incommensurability, Relativism, and the Epistemic Authority of Science

Steven Bland, University of Western Ontario

Our rational inquiries necessarily take place within conceptual and epistemic frameworks, including our rational inquiries into the frameworks themselves. This fact, together with the existence of incommensurable frameworks, is exploited by a Kuhnian argument for conceptual and epistemic relativism which can be used to threaten the epistemic authority of science. It will be argued, however, that this move can be blocked by means of dialectical arguments that provide non-circular rational support for scientific frameworks, both conceptual and epistemic. These arguments proceed by means of conceptual and methodological analyses that reveal the presuppositions that are shared by those who subscribe to incommensurable frameworks. The frameworks that are better able to capture these presuppositions are objectively better than their competitors, and it will be argued that the conceptual and epistemic frameworks of science have precisely this advantage.

Jean Senebier's Chemical Study of Light and the Path From Observation to Experimentation in Eighteenth-Century Science

Victor Boantza, University of Minnesota, Minneapolis

Swiss naturalist Jean Senebier (1742–1809) is best known for his contributions to plant physiology, especially his work on photosynthesis that combined the findings of Joseph Priestley and Jan Ingenhousz with the new discoveries of the Chemical Revolution. A careful consideration of the evolution of Senebier's work on plant growth and nutrition—going back to the early 1770 and his early methodological statements on natural history—reveals a richer picture. Influenced by Charles Bonnet and René-Antoine de Réaumur, Senebier advanced in his 1775 *Essai sur l'art d'observer* a philosophy of natural history (histoire naturelle) centered on the economy of nature and the interrelations between its parts. In a series of memoirs, published in the late 1770s, Senebier reframed these ideas along natural philosophical lines (la physique) by linking them to aspects of phlogistic chemistry and matter theory. Following this shift Senebier turned his attention to the chemical role of light and developed an experimental program (physique expérimentale) for studying the influence of light on matter, including plants. Tracing these conceptual and practical shifts, the paper investigates central themes in eighteenth-century science like natural history vs. natural philosophy; the physical vs. chemical nature of light; the tensions between scientific observation and intervention; and the changing relations between the collector, combiner, and manipulator of "natural facts"— or the historian, natural philosopher, and experimenter, respectively.

Connectionist Models as Approximations, not Idealizations: A defence of the use of connectionist models to explain cognitive phenomena

Daniel Booth, University of Western Ontario

John Norton (2012) draws a distinction between idealization and approximation when constructing models. Once this distinction is made he suggests that in most instances the model will in fact be an approximation, since approximations bear a resemblance to the relevant aspect of the world that we wish to explain. One type of model that appears to fall under the classification of idealization are connectionist models, also called parallel distributed processing or PDP models, used in cognitive science. Using

the distinction Norton draws I look at connectionist models to develop an account of why authors (e.g. Picinnini, 2004, or Eliasmith, 2007) are critical of the use of connectionist models. I suggest that these authors treat connectionist models as idealizations. I argue that this not the correct characterization of these models. In support of this claim I explore some of the assumptions that go into the construction of computational models. In light of the features I highlight I conclude that connectionist models are approximations, not idealizations, and so defend the use of some connectionist modelling.

Social Values Influence the Adequacy Conditions of Scientific Theories

Ingo Brigandt, University of Alberta

In addition to social and environmental values guiding the choice of research questions and the application of scientific knowledge, several philosophers have argued that social (and environmental) values can legitimately be used in the core part of science—the acceptance of theories by evidence. The idea is that if the social consequences of endorsing a false theory are grave, higher evidential standards are to be met before the theory is accepted. Heather Douglas dubs this a (merely) indirect role that social values can play, and an implication of this approach is that if more evidence accumulates, the role of social values converges to zero. In this talk I argue for a stronger role for social and environmental values in the context of theory acceptance. Beyond merely requiring more evidence, I maintain that such values contribute to determining a theory's conditions of adequacy. I develop this account based on feminist critiques of recent primatology and human evolutionary biology, which show that increasing the amount of observations (focussed on males) would still lead to biased (e.g., androcentric and sexist) theories, so that feminist and other social values influence the conditions of what an adequate theory of primate social behaviour and human evolution is. I argue that this point cannot be appreciated by (prior) accounts of the role of social values that frame theory acceptance exclusively in terms of a theory-evidence relation, and my approach remedies this by creating connections to the topic of scientific explanation and an explanation's standards of adequacy.

Laws of nature: the role of predicates in systematization

M. Bryson Brown, University of Lethbridge

The 'best theory' account of laws is generally seen as a rival to the CRU (contingent relations between universals) account. But the idea that predicate concepts and inferential connections between them are important to our understanding of laws of nature is compatible with a deductive systematization view of what makes particular families of properties, including inferential links between them, the 'right' properties to employ in describing (certain aspects of) the world. The CRU approach encounters grave difficulties due to a regress argument due to van Fraassen (1989) inference problem. Here we develop a parallel between van Fraassen's criticism of the CRU account and Dodgson's famous paper, 'What the Tortoise Said to Achilles'. Wilfrid Sellars' account of laws as material inference rules (cf. Sellars 1948, 1958, 1964) allows us to retain the intuitive attraction of the CRU account, solve van Fraassen's inference problem, and reconcile a predicate-centred account of laws with the long tradition of 'best systematization' accounts.

Altars or the diluvium? Examining a controversy over the artificial or natural formation of the Ohio Valley mounds in the 1840s

Conor Burns, Ryerson University

In this paper, I examine a scientific dispute that emerged in the 1840s U.S. regarding the formation of ancient non-funerary mounds found throughout the Ohio River valley. Edwin Davis was an Ohio physician and pioneering archaeological scholar who studied these structures systematically and worked out functional interpretations of them at a time when most attention was directed toward burial mounds. Edward Hitchcock—Amherst College Professor of Chemistry, Geology and Natural Theology who was a founder of the Association of American Geologists and Naturalists and responsible for the first geological survey of Massachusetts—maintained that the earthworks were too numerous to have been made by ancient humans and were instead largely the result of diluvial formation processes. On the one hand, this dispute may be read as a relatively straightforward conflict between an unproven, provincial field observer and a distant, elite scientific authority with a particular theoretical axe to grind. Through this lens, it provides an informative episode for examining how archaeological attitudes about aboriginal Americans were shaped by broader political contexts of Jacksonian Indian Removal and Manifest Destiny, at a time when natural theology still held some sway in the earth sciences. On the other hand, it provides a useful case study for critiquing a general tendency in the history of archaeology to dismiss as mere "antiquarianism" field practices pre-dating the emergence of modern excavation techniques in the early twentieth century. In this light, the episode raises questions about the use of disciplinary categories in the history of archaeology.

Deviant Case and Scientific Dynamics: Considerations from Recent economics

François Claveau, Université de Québec à Montréal

Philosophers of science have long recognized the importance of deviant cases in scientific change. For Popper, deviant cases falsify our theories, sending us back to the

drawing board. For many others, they are anomalies bearing the seeds of crisis.

This paper is a reflection on deviant cases and on deviant-case research (i.e., work done to address a deviant case). This reflection springs from a case study of the research on the deviant behavior of German unemployment during the 2008-09 economic crisis.

It is argued that this case study should lead us to reconsider our widely shared understanding of deviant cases in science – at least, in sciences like economics. Answers to three questions are offered. First, what makes a case deviant? The main point here is that, to be deviant, a case need not generate inconsistent beliefs, it needs only to be unexpected. Second, what is the primary epistemic goal of deviant-case research? Given the answer to the first question, this goal is not always to restore consistency among one's beliefs. In the case study, it is rather to formulate and justify a case-specific causal claim accounting for the unexpected. Third, how should research with this primary goal proceed? In answering this question, the last section of the paper fleshes out a causal epistemology that is sensitive to the types of background beliefs – i.e., beliefs about generic propositions and detailed descriptive propositions – and the community dynamics in sciences like economics.

"Most children with Sue's condition tend to follow along with that gender": Problematizing the use of statistical probabilities in assigning sex to infants with disorders of sex development (DSDs)

C. Clune-Taylor, University of Alberta

Both the revised treatment model for intersex conditions or disorders of sex development (DSDs) introduced by the American and European pediatric endocrine associations in 2006, and the clinical treatment model and handbook for parents produced by the former Intersex Society of North America (now the Accord Alliance) that same year advocate the use of statistical probabilities in assigning sex to infants with disorders of sex development. Specifically, they recommend basing sex assignment on the frequency of particular gender identities in adolescents or adults with specific diagnoses (for example, 63% of individuals age 12 and older with 5α-reductase-2 deficiency and 46 XY chromosomes identify as male (Cohen-Kettenis, 2005)). In this presentation, I want to raise three distinct problems with this practice. First, this practice assumes that gender identity is either biologically determined or so closely correlated with biology that an individual's diagnosis is a good (or even adequate) predictor of future gender identity. Second, this practice is problematically transphobic, predicting future gender identity on the basis of relative frequencies and then prescribing bodily intervention on the basis of this prediction to ensure that future an individual's future gender identity is cisgendered. Finally, drawing on Mary Beth Mader's work in her 2011 book *Sleights of Reason: Norm, Bisexuality and Development* I argue that this practice engages in a problematic sleight of reason by assuming that such relative frequencies can be reapplied or distributed to each individual in any given group and thus are useful as the basis of any particular sex assignment.

The irreducibility of instinct

John Collier, University of KwaZulu-Natal

The concept of instinct was used extensively by ethologists like Lorenz, Tinbergen and Audrey, but it fell into disfavour with the rise of scientific behaviorism. On the behaviorist account animals have certain behaviors that can be conditioned, and all behavior can be understood in terms of the relation between inputs (stimuli) and outputs (responses) under the control of reward and punishment. However, more recently, instinct has come back into favour, especially with anti-behaviorist work on language, like Steven Pinker's *The Language Instinct*, which develops Chomsky's idea that language capacity cannot be reduced to behaviorist terms.

Jean Piaget did much of his early work using a variant of the behaviorist model in which he postulated "circular reactions" that could be martialled and combined to produce more complex behaviours. By the late 1960s, however, he had decided that reflex arcs were not enough to explain behavior and learning, so he introduced instincts into his theory (Biology and Knowledge). These instincts are characterized by allowing patterns to be recognized and responded to that cannot be described solely in terms of inputs and outputs and their relations. I will explain Piaget's view of instincts and then use ideas from complexity theory and especially the theory of emergent properties to explain how this might be possible. This approach leads to the possibility that organisms can respond to novel inputs that they are neither preconditioned nor innately structured for. I will then briefly explain how this idea can enhance Piaget's theories of the origins of intelligence.

Misunderstood Materiality: Experts, Publics, and Lively Energy Projects

Steve Cornwell, York University

The recent influx of accounts on nonhuman materiality has borne many openings for studies in science and technologies. This paper will take up the notion that humans are not the only entities with the capacity to act, affect, and influence, and apply it to the instances of science and technology in the public sphere. Using insights from Bruno Latour (1988, 1992), Jane Bennett (2010), and Michelle Murphy (2006), I examine encounters between expert agencies and affected publics in Canada's history of resource

utilization. My hypothesis is that, from Ontario's hydro-electric boom to efforts to configure new and old pipelines for Alberta's tar sands, if we take nonhuman entities more seriously, then a different politics becomes visible. That is to say, if pipelines, diluted-bitumen, electricity, and transmission lines are not quite well-behaved instruments, but entities that contribute to the arrangement of our collectives, then we must develop ways to tend to a more heterogeneous web of efficacious entities. Drawing on submissions to environmental hearings and histories from H.V. Nelles (2005) and Andrew Nikiforuk (2008), I locate instances where authorities and affected publics clash over notions of safety and utilize a lens of vibrant materiality to illuminate what's more than just a misunderstood misunderstanding. In other words, by uniting questions of expert and public interactions with notions of lively nonhumans, I explore how negotiations between citizens and authorities might change if relevant nonhumans are understood to have the capacity to shape regional and national politics.

The Arabs' Final Frontier: Transnational Astronomy and Space Science

Jörg Matthias Determann, Virginia Commonwealth University in Qatar

For much of the twentieth century, studies on the history of the natural sciences in the Middle East have focused on the region's pre-modern scientific heritage. Yet, increasingly, scholars have also investigated the role of science in the modern Middle East. However, while these scholars have provided valuable insights into the social and political dimensions of science, they have focused on science in specific nation states, such as Egypt and Iran. Little research exists on the transnational development of science in the modern Middle East, even though science has been one of the most transnational human activities.

This paper responds to this lack of literature by investigating one of the most global fields of modern knowledge production: astronomy and space science. Astronomers from different nations have long cooperated in studying Earth's "single sky." At the same time, expensive space science ventures have long relied on contributions by multiple member states. This paper demonstrates the Arab contribution to these transnational ventures. I focus on the cases of Farouk El-Baz, the Egyptian-born head of NASA's astronaut training, Sultan bin Salman Al-Saud, the first Arab and Muslim astronaut, and the Qatar Exoplanet Survey, which has discovered planets such as Qatar-1b and Qatar-2b. Drawing on these cases, I argue that the Arab world has contributed to global science not just in pre-modern periods, but also in modern and contemporary times.

The Chemists' War: Chemistry, Big Science and a Higher Form of Killing

Andrew Ede, University of Alberta

The era of modern chemical warfare began at the Second Battle of Ypres in 1915, but it was founded on the industrial and scientific capacity that Germany had developed prior to the war. This capacity, including the creation of the Kaiser Wilhelm Institutes, was not initially developed for military purposes, but to address domestic issues. In turn, the British Empire and the United States had to change their scientific communities to respond to the changing situation on the battlefield. This paper traces the introduction of chemical warfare, arguing that the demands of war created the template for Big Science. As part of the hundredth anniversary of World War I, this examination will help our understanding of how war affected the structure of science in the modern world.

H.G. Wells-- Biology Crammer

James Elwick, York University

Online classes such as MOOCs (massively online open courses) are seen as increasingly for teaching both non-STEM and STEM (science, technology, engineering and mathematics) material. Yet claims about their 'revolutionary' potential often miss an important step: it is one thing for a person to learn about a topic like biology, but it is quite another for others to agree one has properly learned it. Examinations are one way for this formal recognition to be bestowed. To gain some historical perspective about this aspect of distance education, this paper uses a case study: H.G. Wells's little-known and pre-*Time Machine* career (1889-93) as a biology-tutor-by-correspondence. In other words, Wells was a leading "crammer" for students seeking to pass the University of London's feared biology exams. This episode lets us explore the late 19th century quest for credentials to advance one's career; what Wells described as a comical arms race between "piratical" crammers and university examiners; and even the ontological assumption that knowledge can be 'acquired', as shown by the gastronomically-inflected word "cram." But above all this paper uses Wells's exam experiences to explore the tension between knowledge on the one hand, and how a person is certified by others as trustworthily knowledgeable on the other: between learning, and being seen as learned.

Rational Rabbis? A Critique of Menachem Fisch's Neo-Hegelian Integration of Science and Religion

Yiftach Fehige, University of Toronto

Menachem Fisch argues that science and religion are not in conflict. He claims that both reflect a kind of rationality that only Neo-Hegelianism can account for. Only a Neo-Hegelian theory of rationality brings us into a position to make sense of 'scientific revolutions', which Fisch

claims to be a shift from one 'framework' to another. It is those frameworks that make a scientific practice rational in the first place. The big challenge for philosophy of science is to find a way of identifying these shifts as rational without favouring one framework over the other. According to Fisch, only Neo-Hegelianism can accomplish this challenging task. In other words, Fisch claims that there something like a frame-work independent rationality that transcends human rationality as reflected in 'frameworks'. Moreover, a careful analysis of religious and scientific discourse not only reveals that both reflect that framework-independent rationality; it also unearths the rationality that is inherent in the complex ways in which science and religion have been interacting over the centuries.

In my paper I will argue that there are good reasons to agree with Fisch that science and religion are not in conflict. I will also provide additional reasons to justify why I think that Fisch's commitment to Neo-Hegelianism is not far-fetched, but motivated well. The discussion of those reasons will lead to a disagreement with Fisch, however. Unlike Fisch, I don't see why Neo-Hegelianism fares better than naturalism when it comes to explain those periods in the history of science that are marked by radical and fundamental changes in the way we investigate the world scientifically. My proposal is to follow an interpretation of 'framework-dependence' in terms of sanctioning practices of a linguistic community. In response to new experiences with the world, open-ended 'I-Thou' encounters can undermine the sanctioning practices of the We, and thus undermine established conceptual spaces—even to a degree that more radical shifts occur, such as a 'scientific revolution'. That is to say, Fisch's model of relating science and religion depends logically on the assumption that realism and a social theory of meaning are irreconcilable. But, as I will argue, there are reasons to doubt the truth of this assumption.

Smashing Atoms and Making Money: Robert J. Van de Graaff's High Voltage Engineering Corporation – Methods and challenges of marketing peaceful uses for particle accelerators during the Cold War

Edward Fenner, York University

Pioneering American physicist Robert J. Van de Graaff's High Voltage Engineering (HVE) Corporation produced and sold over 500 accelerators used worldwide and made millions of dollars in the process. Who owned HVE? Why was HVE the vanguard of high-tech venture capitalism. Who was their market and how did it change? Who was their competition? What kind of entrepreneurial science was going on? How did they go about selling one of the most expensive factory-made physics instruments on the market?

Using ephemera from the estate of Robert J. Van de Graaff, the Smithsonian Institution Archives, the National Museum of American History Library, previously-unheard recordings with his associates, oral histories from the American Institute of Physics, and other research, I intend to shed light on the methods and challenges of marketing used by the once world-leading mass-manufacturer of particle accelerators.

Rational Decisions And Paradoxes: Some Thoughts On The Iterated Prisoner's Dilemma

Karine Fradet, Université de Montréal

The prisoner's dilemma is a game well known for its paradoxical resolution: both agents' rational decision is to defect, however they both would be better off if they had achieved mutual cooperation. This result is embedded in the game's definition. However, when it comes to iterated games, the prisoner's dilemma seems to find a satisfying resolution: if the number of rounds is unknown (to eliminate the possibility of a backward induction), both players will tend to cooperate in order to achieve a better global payoff, and this is self-enforced by the fact that any deviation from this tacit pact will likely be punished in the following rounds. While this folk theorem seems obvious, it seems at odds with the very definition of this game. I argue that not all the so-called iterated prisoner's dilemmas are well labeled. Game theory studies the decision of an agent at a given time and their decision matrix should reject all the consequences including those that will occur at future rounds. This formal detail should not be overlooked since the prisoner's dilemma is used by a wide variety of scientific disciplines to model cooperative behavior. In this presentation, I will introduce two parameters that should be taken into account when modeling the prisoner's dilemma and identify the limits within which the decision problem is still a prisoner's dilemma.

Planck's Constant: Another Slat in the Bridge to Quantum Physics

Eric Franke, McEwan University

Max Planck, and his postulation of 'Planck's Constant,' is often credited in popular science with a revolution in science from a continuous understanding of energy to a discrete understanding of energy involving the quanta. Planck himself, in his Scientific Autobiography, claims a revolutionary understanding of scientific progress in which new discoveries that contradict the theories of the established body of science invalidate that body of science and elicit an entirely new scientific body in it's place. I argue that, due to the relationship of Planck's work in thermodynamics to the work of Boltzmann and Wien which predated him, a characterization of Planck's work as revolutionary is untenable. Instead an interpretation of a series of gradual shifts that retain the core concepts of the work, as in the gradualist position, is more appropriate.

In an effort to demonstrate the relationship between the varying interpretations assumed by each, I conduct an

examination of the work that these three physicists generated in the late 19th century in the field of black-body radiation and thermodynamics. In tracing the foundations of Planck's work from that of Boltzmann and Wien to his assumption of a constant in order to deal with inconsistencies generated by the mathematics that are involved with Wien's theory, as well as observing the ability of Planck's assumption to confirm the predictive elements of Wien's formulae at high energies, I posit that a single transition event is not able to explain the shift in understanding from continuous mechanist to quantum. The fact that Planck's constant both gives rise to a new understanding of physics in the quanta, as well as confirming the findings of his colleagues working within the continuous mechanist understanding of physics indicates not a wholesale revolutionary gestalt shift, but a minor gradual change among a series of changes in the theory of physics.

New Thoughts on the Use and Misuse of (Quantum) Imaginary Experiments: Popper and Hermann on the Microscope Thought Experiment

Melanie Frappier, University of King's College

While thought experiments have been essential to the development of physics, their use in quantum mechanics is controversial. We simply do not possess an epistemic theory that would enable us to confidently use them to shed light upon quantum phenomena. As McAllister (1996) suggests, without a proper interpretation of quantum physics, the use of thought experiments must be limited to cases where the "mechanisms" at play behind quantum transitions are hidden behind impenetrable "black boxes." This suggests that, as long as thought experiments make no assumption as to the fundamental nature of quantum transitions, their use in quantum mechanics should, prima facie, be legitimate, a guiding principle enthusiastically adopted by many early quantum physicists, such as Heisenberg.

Yet, as I show using the short 1934-35 exchange between Karl Popper and Grete Hermann on Heisenberg's microscope thought experiment, the practical application of this principle is far more sensitive to methodological, epistemic, or interpretative rules than suggested by a cursory reading of McAllister's argument. True, the Popper-Hermann debate shed light on a number of fundamental notions (like measurement or causality). However, I argue that it also exemplifies the ambiguity of the classical analogies so often embedded in quantum thought experiments by showing how, already in 1935, Heisenberg's microscope experiment was implicitly interpreted as leading to not one, but three different uncertainty relations.

What is the History of the Earth Sciences the History of?

Ernst Hamm, York University

The history of the earth sciences has largely been understood, at least implicitly, as a concatenation of disciplinary histories: the history of geology, paleontology, geophysics, plate tectonics, meteorology, mining, geography, archaeology, etc. Indeed, the very notion of the history of the "earth sciences" reflects relatively recent changes in universities: where there were once geology departments these have often given way to Earth science departments. Yet many historians of the earth sciences have in recent years avoided the artificial restrictions of "tunnel history," the sort of history that examines the past in terms of the boundaries established by present practices within a scientific discipline. The local, the particular and the contextual are integral parts of the historian's craft, and this is true for much that would count as the history of the earth sciences. This then raises the question: does the emphasis on the historically specific necessarily undermine the whole practice of disciplinary history of science. I will argue that it does, but it does not and need not vitiate the project of studying the history of any particular science, or branch of a science. On the contrary, it raises very salutary questions about what, in this case, the earth sciences are and what it means to write the history of them.

Scientific Instruments: Instrumentality and Performativity

Ozum Hatipoglu, Cornell University

In "Reengaging with Instruments", Liba Taub (2011) refers to Francis Bacon's description of the notion of instrument in *Novum Organum* (1676): "Neither the Hand alone, nor an Understanding left to itself, can do much. Things are performed by instruments and helps, which the Understanding needs as much as the Hand." (691, emphasis mine) Similarly, Albert Van Helden and Thomas L. Hankins (1994) in "Instruments in the History of Science" point out that Bacon conceived of instrument to be both a material tool and an intellectual method. (4) By foregrounding instrumentality in the notion of performativity, this article demonstrates that a scientific instrument is in itself a network of relationality, which is simultaneously material and conceptual. While theorizing the relationship between the notions of instrumentality and performativity, I will revisit Michel Callon's and Bruno Latour's actor-network theory. My critical intervention in this paper is my incorporation of the notion of performativity into the studies of scientific instruments.

The Epistemic Merits of Reichenbach's Pragmatic Defense of Induction

Aaron Kenna, University of Utah

In Sec. IV, Part ii of *An Enquiry Concerning Human Understanding*, David Hume purports to demonstrate we are not rationally justified in making forecasts on the basis of observed regularities. Hume's problem of induction has vexed

logicians for over two centuries and engendered responses that have filled volumes.

Philosophers invariably emphasize the unique role inductive inference plays in scientific reasoning, indicating thereby the necessity of a theoretically satisfying response. Deductivists accept Hume's results and instead contend scientific inference does not rely upon induction. Foundationalists (e.g. Strawson, [1952]) insist Hume's problem goes awry since it is impossible cogently to demand a rational justification of induction given induction serves as the rational foundation for standards of rational justification. Others (e.g. McGrew [2001]) take Hume's challenge head on and attempt to provide either deductive or a priori defenses, with more fashionable renditions employing Bayesian machinery (e.g. Howson & Urbach [2006]). Neither of these strategies, however, have met with majority acceptance and scholarly opinion has it Hume's problem remains (Lange [2008]).

Not satisfied with the impasse, herein I advance a modification of Hans Reichenbach's pragmatic defense of induction. In brief, I argue that, though induction – understood as an asymptotic sampling method – dominates any other non-inductive predictive method and is thereby rationally justified on decision theoretic grounds, we may further justify the defense on epistemic grounds. I situate my argument against two traditional criticisms of Reichenbach: (a) BonJour's (1998) 'no good grounds' criticism and (b) the underdetermination criticism as exposited in Salmon (1967).

Explanatory Power and Heuristic Power
Martin King, University of Guelph

It is becoming increasingly accepted that scientific models invariably involve some degree of idealization. Accordingly, the literal truth of a model is not likely to count as a good candidate for a criterion of explanation. In recent work, Bokulich has developed a clear account of which idealizations, which fictions, ought to count as explanatory. She argues that structural models which are isomorphic to the counterfactual structures of the target system are explanatory. Her account intends to capture precisely the kinds of structural, i.e., non-causal, models omitted by Woodward's manipulationist account of explanation. Bokulich argues that a justificatory criterion is needed to distinguish explanatory from phenomenological models. However, this paper argues that Bokulich has set the bar too low for explanation by including semiclassical models that are not genuinely explanatory. This essay will argue that even on her own terms semiclassical mechanics should not be considered explanatory. It will also draw on work from De Regt to argue that the appeal of classical structures in modelling quantum phenomena is not due to explanatory power, but to heuristic power and the intuitive understanding we have of classical mechanics. A careful analysis of these notions will reveal that the heuristic power and tractability of semiclassical models is not sufficient to render them explanatory.

"An Evil Hitherto Unchecked": Eugenics and the 1917 Ontario Royal Commission Into the Care and Control of the Mentally Defective and Feeble-Minded
Elizabeth Koester, University of Toronto

An Ontario Royal Commission into the Care and Control of the Mentally Defective and Feeble-Minded, established in 1917 at the height of the international eugenics movement, might be expected to provide a gold mine of information about how eugenics was interpreted in Ontario. Since concerns about the "feeble-minded" and "mentally defective" were major preoccupations of that campaign, I anticipated that the Commission's Report would shed light on how eugenics was understood closer to home, provide insight into the thinking of its local leaders who would surely have testified before the Commission, and even make recommendations for implementing a eugenics program in the province. I also expected it to address the issue of sterilization, often considered the high-water mark of eugenics policy-making, and thereby illuminate an interesting puzzle in the study of eugenics in Canada: why did some provinces (Alberta and British Columbia), but not Ontario, pass legislation permitting the sterilization of "mental defectives." To my surprise, the Report did none of these things. In fact, the word "eugenics" appears only three times within its pages, and "sterilization" only once. As a result, rather than tracing the direct impact of the Commission on eugenics in Ontario, my paper takes an alternative tack, focusing on two more fundamental questions. First, was the Commission, whose title seems to place it squarely within the concerns of the eugenics movement, a eugenic instrument at all (and if not, what does that reveal about the power of that movement's central concepts?); and, second, does the Report, despite (or because of?) its omissions, nevertheless contribute answers to the debate about why Ontario never passed sterilization legislation?

Structural Realism and Category Mistakes
Elaine Landry, University of California Davis

While there might be good reasons to suppose that category theory can offer a better framework for an account of the structure of scientific theories (see Halvorson, forthcoming) this use is distinct from that needed by the structural realist to account for the structure of the world. For the structural realist, simply replacing a set-theoretic formal framework with a category-theoretic one is a category mistake. If we appreciate, contra French (2010), that as structural realists we ought to be focused on the "object-

level of scientific practice" and not on the "meta-level of the philosopher of science", then we can better see where our mistakes lie. To this end, I will critically consider more recent claims by Bain (2013) and argue that he too falls victim to a similar category mistake; the uses of category theory that he considers are concerned with the mathematical structure of a scientific theory and not with the physical structure of the world. And consequently, are of little help to the structural realist, whether he be an advocate of Bain's preferred radical structural realism (ROSR) or Lam&Wüthrich's (2013) more balanced view (BOSR). However, along the way, and against the claims of Lam&Wüthrich, I will show, as Bain himself intends, that at a mathematical level one can use category theory to answer Psillos' (2006) question: How we can have relations without relata, structures without objects? Moreover, I will also argue that category theory so considered can be used collapse the distinction between Bain's ROSR and Lam&Wüthrich's BOSR.

Réseaux de contacts et mécanismes d'appropriation des curiosités d'histoire naturelle dans la correspondance du cabinet du Roi durant la seconde moitié du XVIIIe siècle.
Marie Lemmonier, Université de Québec à Montréal

Si la question des savoirs dans les contextes coloniaux intéresse les historiens depuis les années 1960 [Basalla 1967], depuis une décennie, des historiens comme François Regourd soulignent plus spécifiquement le rôle des collections et des collectionneurs dans l'enrichissement des savoirs naturalistes. Au XVIIIe siècle, les collectionneurs contribuent à concentrer à Paris un nombre important de spécimens animaux et végétaux provenant des colonies [Regourd 2008]. Dans ce contexte, il est pertinent de s'intéresser à la riche correspondance entre l'administration royale et les voyageurs, qui nous renseigne sur les mécanismes de l'appropriation des objets de collection dans le cas spécifique du cabinet du roi: un sujet encore peu exploré par cette historiographie.

L'importation en France d'objets « exotiques » nécessite l'intervention d'un réseau d'acteurs complexe et étendu, tant en nombre et type d'intervenants que sur le plan géographique. En se penchant sur la correspondance du cabinet du Roi, on perçoit les tensions, les réseaux d'acteurs et les stratégies, de même que l'expertise mise en place pour acheminer les objets vers le cabinet royal. Les motivations derrière cette avidité à enrichir la collection du roi restent aussi à explorer, de même que la question de cette "curiosité" qui se glisse partout dans le discours. Les voyageurs, à la fin du XVIIIe siècle, sont si occupés à envoyer à Paris des « curiosités », destinées à la collection, au divertissement ou à l'ornement, que certains des acteurs impliqués dans la correspondance se plaignent même du peu d'attention accordée à l'utilité économique et scientifique des voyages.

Measuring Generality in the Protein Universe
Cory Lewis, University of Toronto

Everyone wants our scientific models which cover 'more cases', but it is not always clear what that means. Does it mean 'a greater number' of cases, as it is often put? In systems with real-valued variables that reading becomes difficult to maintain, because covering even a small fraction of the value of a single variable entails covering an uncountably infinite number of cases. In this paper I present an alternate account of generality based on measure theory, which is familiar to most philosophers of science as the foundation of probability theory.

In order to illustrate how assessments of generality outstrip the resources of cardinality I will look at modeling in the protein universe, the set of all possible proteins. Specifically, I will use ongoing work in Structural Genomics, an international effort to build models of the three-dimensional structure of sequenced proteins. Looking at the various ways models can be said to apply to the protein universe reveals that counting cases is insufficient as a way of determining their generality, but that measure theory is up to the job.

Considering Practice: On the Importance of Phonology to the Philosophy of Language
Jonathan Life, University of Western Ontario

Since the generative revolution in linguistics arising from Chomsky 1965 and subsequent publications, many philosophers of language have attempted to inform their philosophical work through the technical work of linguists. Somewhat curiously, however, this attention to linguistics has been restricted almost entirely to work in syntax and semantics, while phonology has been almost universally ignored. Natural languages have grammatical structure not merely at the formal level and the level of meaning, but also at a level relevant to sound articulation and perception. The failure to take account of phonological grammar has lead many philosophers of language to an untenable view of what languages are and how they should be studied. In particular, the paradigm of 'Linguistic Platonism' (Katz, 1981), which takes languages to be abstract objects to be studied mathematically, collapses immediately when all of practicing theoretical linguistics is taken into account. Due to the intimate relation that phonological kinds bear to linguistic articulation and perception, a Platonistic account of phonology itself is impossible. Further, because of the interfaces through which phonological grammar relates to syntax and semantics, these traditional aspects of languages cannot be made sense of under Platonism either.

Inverse Strategies for Measurement
Greg Lusk, University of Toronto

Recent philosophical scholarship has emphasized

that measurement is a process of information production where, in particular, the building of reliable measuring devices involves finding a reliable way of inferring the state of the system under measure from the behavior of the device. The standard strategy of ensuring that a device can be used to reconstruct the state of the system is calibration: an instrument is made to reproduce measurement values of known objects, which allows scientists to map individual indications of the device to particular values. This mapping is then interpolated into a continuous curve – the so-called calibration curve – which tells scientists how to interpret the indications of a device in terms of the states of the system being measured.

In this talk I show that, for emerging areas of measurement (remote sensing and imaging, for example), the standard strategy of creating a calibration curve cannot be used because there are confounding factors that fluctuate from measurement to measurement, and thus no stable curve can be determined. To remedy the problem, I propose a measurement strategy that estimates the physical state of the system under measure by simulating the measuring device under various conditions. If the simulation of the measuring device can yield the observed state of the physical device, then it can be inferred that the states which led to the successful simulation are in fact the states of the physical system. Examples from remote sensing will demonstrate how the strategy can be implemented.

Natural Selection and the Philosophers: Recent Philosophical Criticism of Natural Selection

Dan McArthur, York University

In recent writings and public presentations both Thomas Nagel and Jerry Fodor have advanced criticism of the so-called Neo-Darwinian materialist conception of evolution and natural selection. While neither claims to advance anti-scientific arguments (Indeed, the actually believe themselves to be helping evolutionary science improve) or something like creationism, both focus on incompatibilities between their preferred philosophical theses and the materialist understanding of the world that they find implicit in most understandings of natural selection. In Nagel's case he finds neo-Darwinism wanting in its inability to accommodate the non-physical reality of mental entities. In Fodor's case he finds certain readings of natural selection impossible to square with the innate concepts that he insists exist and claims must have predated any selection pressures for or against. In my paper I will examine certain basic features that these two arguments have in common with a view to responding to criticism of natural selection made along these lines. While I will not accuse either philosopher with the basic intellectual dishonesty that characterizes creationism I will argue that certain argumentative moves and the treatment of evidence echos, to an extent, the sorts of mistakes found in creationist work. Simply put, I will focus on how both writers point towards difficulties they perceive with natural selection rather than offering a rebuttal of the evidence for natural selection in its current form, or offering comparable evidence for their preferred alternatives.

On the (im)possibility of a unified science of multiply realized kinds

Alex Manafu, Université de Paris I Panthéon-Sorbonne

Jaegwon Kim (1992, 2010) has argued that if the kinds that the special sciences talk about are realized by wildly disjunctive and nonnomic lower-level kinds, then they themselves must be equally heterogeneous and nonnomic. Kim's argument uses a couple of principles, including the Principle of Causal Individuation of Kinds, which claims that "objects and events fall under a kind, or share in a property, insofar as they have similar causal powers" (Kim 1992, p. 17). If sound, Kim's argument threatens not just the possibility of a unified science of psychology, but that of the other special sciences as well, including chemistry. Kim's argument has been criticized by a number of philosophers, including Fodor (1997) and Shapiro (2005). But none of these critics takes issue with the principles on which Kim's argument is based. In this paper, I challenge Kim's argument by calling into question Kim's interpretation of the Principle of Causal Individuation of Kinds. In the first part of the paper I argue that Kim's formulation of the principle is equivocal; depending on how "similar causal powers" is to be interpreted, Kim's formulation is compatible with two readings (a strong one and a weak one). I also argue that if the weak interpretation is favoured, Kim's argument does not succeed. In the second part, I use a number of examples from chemistry to argue that the weak interpretation is more justified, and thus it should be preferred.

A Hybrid Theory of Evidence

Janet Michaud, University of Waterloo

In the literature on doxastic evidence, the phenomenon is regarded as either internal (Plantinga 1993, Feldman and Conee 2001, Turri 2009) or external (Armstrong 1973, Collins 1997, BonJour 2008). However, these views face various criticisms. Internalists claim that external evidence ignores relevant mental processes. Externalists claim that internal evidence is weak given its subjective nature.

I will argue that evidence is internal, external, and social — i.e., there are three types of evidence: mental states, states of affairs, and that which has been produced by a rigorous social process. I will extract Helen Longino's method for establishing social knowledge (2002) and apply it to evidence. The social component of evidence is aimed towards strengthening internal and external theories of evidence by responding to worries raised by the internalists

and externalists.

First, I will argue that a theory that accommodates both internal and external evidence can absolve the worries raised for either theory alone. Moreover, a theory that can accommodate social evidence will be stronger insofar as a rigorous social process will add a further qualification which can only strengthen our evidence. Second, I will argue that social evidence is not reducible to either external or internal evidence. The external view cannot account for the mental processes that are evidently a part of the justification process and is therefore weak.

Finally, though the internal view is compelling, it does not account for evidence which supports our usage of automatic, non-conscious mental processes (Bargh and Shartrand (SP?) 1999; Aarts and Dijksterhuis 2000).

The Curare Arrow of Knowledge: The Vivisection Debates in the Early Writings of Friedrich Nietzsche

Benjamin Mitchell, York University

The antivivisectionist movement in Germany began in earnest in the late 1870s, and came to full fruition in the 1880s. The movement's most radical branch was led by the Baron Ernst von Weber, who drew inspiration from the writings of Arthur Schopenhauer. He later found a prominent supporter in the composer Richard Wagner. Yet even before the two met, Wagner had been critical of vivisection, and had encouraged his young protégé, the philosopher Friedrich Nietzsche, to critique the practice. The "cultural atomism" that Nietzsche attacked during the 1870s blurred the lines between the scholarly "vivisection" of history and historical actors and the physical vivisection of living beings. In his early writings he condemned proponents of both practices for their poverty of feeling and inability to make the "miraculous leaps" required to perceive the unities at the root of all thought and life. Yet as can be seen in the discrepancy between his published and unpublished writings, Nietzsche was profoundly equivocal about this position. He eventually made his misgivings known with the 1878 publication of *Human, All Too Human*. Exploring his antivivisectionist context opens up new ways of understanding what he meant by nature, necessity, innocence, and the relationship between suffering and knowledge.

Scientific possibilities and commercial realities: Historical perspectives on Canadian science policy and the rise of biotechnology

Rebecca Moore, University of Toronto

Biotechnology, particularly the development of recombinant DNA technology in the 1970s, emerged during a period of debate in Canada regarding the structure and purpose of science and technology (S&T) policy. Debate centered on what type of scientific research the Government of Canada should support, and to what end. In this paper I profile how the federal government's changing perspective on S&T policy impacted its approach to the emerging field of biotechnology. As the function of science and technology in Canadian society was distilled from serving the public good to fostering a strong economy, biotechnology was identified as a key economic driver and was identified as a crucial component of Canada's knowledge economy. Government support came in the form of direct funding for biotechnology research, as well as infrastructure incentives. I examine the Government of Canada's support of biotechnology, while focusing on the discussions held in government agencies regarding how best to provide intellectual property (IP) protection for some of the new products of biotechnology – living organisms. I argue that the government's simultaneous economic and institutional support of biotechnology, and lack of IP strategy, forced the products of biotechnology into the patent system, which had dramatic impacts on the privatization of living organisms.

On knowing an empire: Matthias Castrén and the Russian colonial science project

Dmitri Mordvinov, University of British Columbia

The Russian Empire had reached its largest geographical extent in the nineteenth century, and with an increased drive for colonisation came an increased drive for scientific understanding of the colonised imperial spaces. A demand and need for better scientific progress, a more efficient government and the rhetoric and practice of nation-building all converged in the Russian colonial science project, which is the focus of the proposed paper. The paper starts by analysing a particular enterprise which formed a part in this project, Matthias Castrén's expeditions to Lapland, Karelia, Northern Russia and later Siberia from the late 1830s to the late 1840s. A Russian and Finnish ethnographer and linguist, Castrén undertook his expeditions in the time when scientific expedition was the norm, but had only limited support from the Russian Empire. Looking at his scientific output, the paper argues that we find Castrén's science on the intersections of the imperial and the national.

The paper than proceeds to analyse Castrén's project in a comparative and diachronic manner, arguing that his was a vision that was soon to be endorsed and practised by the Russian Imperial Geographical Society. Created in 1845, it became the foremost scientific organisation of the Empire, being the prime actor of the Russian imperial colonial science. The paper concludes by describing this project in terms of scientific expeditions intimately bound with colonisation, science interwoven with the military, that coalesced in the late Russian Empire occupied with colonisation, empire-, and nation-building.

Three sources of normativity in scientific explanation.
Taylor Murphy, University of Washington at St. Louis

The causal-mechanical view of scientific explanation is popular, and for good reason. But recently there has been a flurry of interest in the limitations of the causal-mechanical picture (Brigandt, 2014; Chirimuuta, 2014; Rice, 2013; Rohwer and Rice, 2013; Weiskopf, 2011; Silberstein and Chemero, 2012; Batterman, 2013). Among much else, this counterpoint highlights explanations that gain explanatory traction by how they are essentially idealized and use abstraction, particularly for the use of mathematical models to explain phenomena without an aim of representing the actual causes, or for explanations that are universal in that they explain patterns without representing a particular causal process.

A useful next step will be to integrate these insights together in a systematic framework that everybody can agree on. In this paper, I propose to cut along the 'sources of normativity' for explanatory success, and argue that there are three such sources, generally speaking. The normativity may come from the situated, representational, or ontic aspects of a scientific explanation. Whereas the first two have both been called 'epistemic' and 'phenomenal' and are rarely carefully distinguished, I argue that in this debate each should be seen as importantly different sources of explanatory traction. So after an illustrative taxonomy of existing example cases by their source(s) of normativity, I concentrate on a common thread about abstraction and idealization in so-called minimal models and the explanation of universality. By distinguishing the sources here, we can gain a much clearer picture of the causal-mechanical view, its limitations, and its alternatives.

Moving from the lab to the field in nutrition science
Elizabeth Neswald, Brock University

In the 1860s Carl Voit, Theodor Bischoff and Max Pettenkofer established fundamental approaches and methods for the laboratory study of human (and animal) nutrition. Using intake-outgo models, precision measurement and complex apparatus, they aimed to determine the amount of basic nutrients a body needed to maintain itself on different diets and in different states of physical activity, in order to set dietary norms and standards. From the mid-1870s onwards, European and American nutrition researchers went into the field to test and elaborate on these laboratory results in a variety of settings. This paper explores the diffusion and adaptation of laboratory methods for field settings and their convergence with the developing methods of social surveys in the later decades of the nineteenth century. As they moved from the laboratory to the quasi-experimental site of residential institutions with their controlled feeding regimes and then to the study of "wild" dietary practices in populations defined by regional, ethnic and economic characteristics, nutrition researchers integrated and collaborated in the development of investigative methods in the human and social sciences.

Publishing Britain's scientific sphere: Macmillan and Co. as publishers of science, 1870-
Sylvia Nickerson, University of Toronto

Founded in 1843, Macmillan and Co. became one of Britain's largest publishers of science and mathematics in the late nineteenth century. In 1858, Alexander Macmillan expanded the Cambridge based publishing company by opening a London office. This move brought Macmillan into London's intellectual sphere, where his weekly social gatherings the 'Tobacco Parliaments' brought together men of science, artists, and writers of fiction. T. H. Huxley, William Sharpey and Herbert Spencer were regular attendees, with the topic of conversation frequently revolving around 'Darwin and conundrums with general jollity pleasantly intermixed' (Charles Morgan, The House of Macmillan, p. 52). Macmillan's scientific publications reflected the attendees and topics of conversation at these events. Using internal documents from Macmillan and Company's nineteenth century operations, this paper will explore how the publishing house overlapped with late nineteenth century Britain's scientific sphere. In particular, it will demonstrate how the authors, publisher's readers, and choice of topics Macmillan selected for their future scientific publications reflected Macmillan's network of friends and acquaintances, and demonstrate how this social network embedded itself in the list of Macmillan's scientific publications of the 1870s, 80s and 90s.

Niagara Falls: the early Toronto-based international scientific excursions
David Orenstein, University of Toronto

Between 1889 and 1924 the University of Toronto hosted six major international scientific congresses: the American Association for the Advancement of Science (1889 and 1921), the British Association for the Advancement of Science (1897 and 1924), the International Mathematical Congress (1924) and the International Congress of Geology (1913). Excursions to the Niagara Region and their preparation were a component of all six Toronto scientific assemblies.

This region has a long history as a tourist attraction, locus of energy, transportation and industrial development, and a site of great scientific interest: geological, botanical and anthropological. These interests were actively pursued when swarms of international scientists descended on Toronto, for the renowned Niagara was only a short day trip away, whether by steamer across Lake Ontario or by train by way of Hamilton. These excursions were well subsidised and throughly planned with finely illustrated and detailed itineraries. Adam Beck, at a plenary session of the 1921 AAAS, spoke on hydroelectric power development. At the 1924 BAAS, A. P. Coleman

lectured to the Geology Section on Niagara stratigraphy and land forms. In 1913, he and F. B. Taylor had led the IGC's special examination of the Quaternary at Iroquois Beach and Niagara, in addition to the general Niagara excursion on August 12. After the 1897 BAAS, the great anarchist, Prince Kropotkin reported on his visit in the British journal *Nineteenth Century*. The substantial two volume *Proceedings of the IMC* presented a major photo essay on the Canadian hydroelectric installations at Niagara Falls. The encounter with Niagara was a major component of the attraction and enjoyment of these congresses. It was also a significant part of their scientific work and legacy.

Electric power and the Emergence of Electric Vehicles
Josipa Petrunic, McMaster University

As a technology aimed at generating motive power, electric vehicles first hit the "marketplace" in Britain in the late-19th century. By the 1880s, electric motor vehicles and steam engine vehicles constituted nearly two-thirds of the automotive market (the other third being constituted by internal combustion engine (ICE) vehicles). Yet, even as consumers increasingly adopted electrified motive power as a regularized means of getting around, scientists and engineers still debate the theoretical means by which such machines functioned.

Oersted's demonstration that electric currents could be caused by magnetic fields initiated the first developments of "electric motors" in the first-half of the nineteenth century. Over the next five decades, a combination of British empirical and theoretical mathematical-physics – i.e. in the works of Faraday, Thomson, and Maxwell as they related, respectively, to the concepts of "energy", "heat engines", "electromagnetism", "electric motors" and "generators" – along with German mechanical and electrical engineering and business practices, led to the production of prototypical electric motive power. By the 1880s, electric bicycles, electric carriages, electric locomotives, and electric cars had been built in Britain, Europe and the USA, basing their designs upon electric motors produced both by professional scientists and amateur enthusiasts. German entrepreneurs, primarily, began the process of producing and selling electric vehicles to a burgeoning middle class in Europe and North America.

This paper maps the empirical, theoretical, experimental and commercial insights that created prototypical electric vehicles in the mid- to late-19th century. It then explores how business interests combined with the development of public utility services and mass electrification of urban centres to generate a burgeoning marketplace for electric motive power in the last decade of the 19th century –well before the concept of the "electron" had come into scientific discourse or popular parlance.

Biomedical Research and Models of Values in Science
Aleta Quinn, University of Pittsburgh

Business models for biomedical research prescribe decentralization due to market selection pressures. I argue that decentralized biomedical research does not match four normative models of the role of values in science. Nonepistemic values affect the internal stages of biomedical science, contra the externalist model. Decentralization precludes application of Douglas' (2009) model because there is no person to whom responsibility for harm resulting from methodological choices could attach. Success in the marketplace is incompatible with Longino's (1990) four criteria for enabling objectivity, and with Elliot's (2011) prescription that values informing science must be those of the general public.

The disconnect in respect to the proper role of values results from structural issues ultimately linked to the distinct goals of business versus applied science, and so it seems likely that disconnects will also be found in other dimensions of attempts to combine business and science. Applied science aims to identify causal levers that effect change in a specified property or set of properties – in the case of medicine, health. Change in the property of health is not the direct aim of business, which concerns itself with distinct causal levers and may employ entirely distinct concepts.

The volume and integration in the publishing community of decentralized biomedical research imply that the entire community of biomedical research science cannot match the normative criteria of community-focused models of values in science. Several proposals for changing research funding structure (Brown 2008, Reiss 2010) might successfully relieve market pressures that drive decentralization.

Comprehensive Empiricism and Our Scientific Knowledge
Nicholas Ray, University of Waterloo

What is the relationship between our common sense and scientific views of the world? The logical empiricists provided one prominent answer, maintaining that normal discourse and scientific discourse are factual in nature, both based on a theory of verification or confirmation that finds its roots in normal observation. While the logical empiricists' unified account of all factual discourse was rightly criticized for its reductionism, and while their specific attempts to develop a logic of confirmation encountered numerous difficulties, their commitment to comprehensivism (the view that common sense and scientific knowledge rely on the same principles and constraints) has received too little attention in the recent literature. I argue that this commitment is attractive in its own right, and divorcible from other logical empiricist theses regarding reductionism, physicalism, verificationism, and anti--metaphysicalism. Using a new theory of the

rational contribution of experience to knowledge (based on the work of Anil Gupta), and an under- recognised form of conceptual analysis (that uncovers the principles presupposed by the application of concepts in empirical contexts), I will outline a promising new comprehensive empiricism that is a competitor to existing comprehensive projects in the neo--Kantian/Sellarsian and Quinean naturalist traditions.

Locke on Induction

Elliot Rossiter, University of Western Ontario

In this paper I provide an account of Locke's changing attitude toward the use of induction in scientific practice. I argue that while Locke eventually adopts a more positive attitude toward the use of induction in natural philosophy, he is ultimately pessimistic about the prospects of natural philosophy becoming a proper science. In Locke's early medical writings, he develops an account of method in medical practice that consciously avoids the use and formation of hypotheses and that relies on the method of natural history. Indeed, in the *Essay concerning Human Understanding*, he describes natural history as the best insight that we can have into the natural world. But while he favours the experimental approach to nature captured in natural history, he does not give any place to inductively-derived hypotheses in the *Essay* or any other prior works. It is only in the *Conduct of the Understanding*, a work written in the 1690s and envisioned as the final chapter of the Essay, that we find Locke recommending the use of induction in natural philosophy. And in a journal entry written around the same time, Locke sets out some brief thoughts on the method of choosing between empirically undetermined theories that bear some affinities with Newton's rules of philosophizing. But while Locke is impressed with Newtonian physics, and its use of hypotheses justified by matters of fact, he is ultimately pessimistic about the possibility of Newton's system achieving the status of a proper science given our epistemic limitations.

Synchronic Vs. Diachronic Emergence: A Reappraisal

Olivier Sartenaer, Columbia University

In this paper, I put forward a benchmark account of emergence that proves to be faithful to the mainstream classical and contemporary construals of the concept, and explicate the relationship that exists between its synchronic and diachronic declinations. To this purpose, I set the stage by providing working definitions of synchronic and diachronic emergences in terms of constitutive and etiological non-explainability, respectively. I then develop a threefold argument devoted to showing that we have good reasons to believe that synchronic emergence entails diachronic emergence, and vice-versa. Consequently, the account of emergence I propose turns out to be "two-faceted", i.e. it always encapsulates both synchronic and diachronic dimensions, hence always making sense of both what I refer to as constitutive and historical construals of the notion of qualitative novelty. Finally, I compare this account with alternative recent accounts – respectively endorsed by thinkers like Achim Stephan, Paul Humphreys or Alexander Rueger – that characterize (diachronic) emergence in terms of unpredictability (in the context of chaos theory and computer science) and topological non-equivalence (in the context of classical physics).

Explanations in the Principle Interpretation of the Special Theory of Relativity

Corey Sawkins, University of Guelph

Idealized high-level theories in physics are widely considered to be nonexplanatory. Harvey Brown (2005) for instance argues that only dynamical physical theories that cite the lower-level causal-mechanisms and laws can be explanatory. In particular, he argues that only a dynamical interpretation of the special theory of relativity (STR) can explain relativistic effects. Such an interpretation is opposed to both the geometric interpretation and the principle interpretation. The principle interpretation of STR is an idealized high-level theory and is constructed from two basic principles, the principle of relativity and the light postulate. In this paper I argue that the principle interpretation of STR explains relativistic effects, in particular length contraction. To do so, I first show that length contraction is derived from the principle interpretation of STR by citing the principles and high-level laws as restrictions on the behavior of upper-level objects. I then argue that by citing these principles and high-level laws, it also sets restrictions on the fundamental theory that Brown supports. By specifying such restrictions these basic principles and laws can be considered a stand-in for the lower-level laws, causal structures and other physical features that would be required for the fundamental theory to explain the same phenomena. I then conclude that by deriving relativistic phenomena from the basic principles, STR explains length contraction.

Manufacturing and modifying useful chemical wares: The shared material culture of Wedgwood and Priestley's laboratories, 1780--1795

Kristen Schranz, University of Toronto

The operations of Josiah Wedgwood's pottery workshop and Joseph Priestley's experimental l laboratory appear bifurcated to the twenty--first century historian who assumes a necessary division between late--eighteenth--century practical technology and natural philosophy. As Ursula Klein has argued, however, early modern usage of the term 'laboratory' was generous, encompassing academic institutions of natural philosophy, personal spaces of inquiry and experimentation, pharmaceutical workshops and even pottery industries. Engaging this definition, both

Wedgwood's Potteries and Priestley's private experimental space can be considered laboratories. The purpose of this paper is to demonstrate how Wedgwood and Priestley's laboratories were both necessary knowledge--making spheres in the production of Wedgwood's ceramic retorts and tubes.

The movement of letters and materials between Wedgwood and Priestley's workshops fostered understanding of each other's spheres of object manipulation and developed a common language to impart findings. I argue that the success of Wedgwood's ceramic chemical vessels was bound up in the timely and instructional reciprocation of ideas and material objects between Wedgwood's Etruria industry and Priestley's Birmingham laboratory. Therefore, these artisanal and philosophical laboratories cannot be seen as distinct spheres of knowledge and production when the form and function of the objects they respectively manufactured and utilized were intimately connected to both workshops.

Contraction and the loss of true belief

Ted Shear, University of California Davis and **Konstantin Genin**, Carnegie Mellon University

When faced with inconsistency, a real agent typically does not know which of her beliefs are false. It might have seemed plausible that if she had access to an oracle for truth, the agent could resolve her inconsistency by dropping all and only her false beliefs. But the truth values of an agent's beliefs may be sensitive to the way in which she contracts. We construct a scenario, based on the paradox of the surprise examination, in which the truth of an agent's beliefs is bound up with the way she revises in such a way that any contraction that re-establishes consistency necessarily forfeits a true belief. We draw lessons both for the norms of belief revision and for resolutions of the paradox of the surprise examination.

A Historical Look at Pragmatism and Logical Empiricism

Matt Silk, University of Waterloo

The received view of scientific philosophy in the 20th century is that the logical empiricists arrived in North America in the 1930s and within thirty years had supplanted the pragmatists as the dominant philosophy there. The explanation for this is that pragmatism was wrong and logical empiricism was correct. Philosophers such as Alan Richardson have challenged this view, and have argued instead that the line between the two movements was blurred. One example of this is the work of Rudolf Carnap, which Richardson argues contains elements from both movements. I argue that there were some sharp distinctions between the two movements, the most important being the fact-value distinction. I point out that as the pressure during the Cold War mounted on scientific philosophy to focus less on values and politics, the pragmatists were unable to adapt to this environment because discussion of values is what made their program unique. Alternatively, the logical empiricists' belief in the fact-value distinction was more consistent with the direction that philosophy of science was heading as an epistemic and logical project.

Reconstructing Social Inquiry and Social Inquiry for Social Reconstruction in the post-1960s U.S.: Marcus Raskin and the Institute for Policy Studies

Mark Solovey, University of Toronto

Starting in the 1960s, critical liberal and more committed leftist scholars in the social sciences acquired support from the Institute for Policy Studies (IPS), which, arguably, became the most influential think tank on the ideological left in the U.S. in the following decades. In his 1971 study *Think Tanks*, the prolific journalist Paul Dickson noted that though the Institute was not even a decade old, its impact on the political Left was already "considerable." A decade later, the distinguished writer and outspoken critic of U.S, imperialism Gore Vidal suggested that while for many Americans it was a point of pride that they lacked a political ideology, the IPS was encouraging scholars to revive American politics with their creative ideas. And of special interest to the present paper, in the early 1990s the historian James A. Smith claimed that the IPS's efforts to link ideas to action helped to mark the emergence of a new orientation in the world of think tanks and social science, one that rejected a stance of disinterestedness and a commitment to apolitical, objective analysis in favor of explicitly partisan and value-laden inquiry. This paper examines the effort by IPS architects to reconstruct social inquiry in a manner that would facilitate the social reconstruction of society along lines they favored. Though various scholars were involved in this effort, the most important figure in my analysis is Marcus Raskin, one of the Institute's founders and long-time leaders.

William Whiston, experimental lecturing and the Royal Society of London

Stephen Snobelen, University of King's College

This paper recovers elements of the culture of experimental lecturing in early eighteenth-century London. The paper begins by discussing the commercialisation of natural philosophy and the related rise of experimental lecturing in this period. It then outlines some of the characteristics of early eighteenth-century newspaper advertising—the most important of the sources on which this essay is based. Following this, the paper considers some of the entrepreneurial marketing strategies used by the lecturers, including descriptions of experimental apparatus and the quantity of experiments. The paper then goes on to make some tentative suggestions about the social and gender identities of the audience for experiment based on various types of surviving evidence. The paper also discusses examples of satirical literature directed

against experiment, helping to reveal the existence of an oppositional culture. The paper uses as a special case study William Whiston, who made the pilgrimage to London in 1710 after being expelled from Cambridge for heresy. As a public heretic and ordained clergyman who no longer could depend on clerical appointments or income, but as a one-time pulpit preacher and experienced undergraduate lecturer with privileged knowledge of the new Newtonian natural philosophy, Whiston helps illustrate how the metropolis was more accommodating of an enterprising former university scholar who, although a heretic, had a flair for trading in natural philosophical goods.

The Subject as Instrument: Galvanic Experiments, Organic Apparatus and Problems of Calibration
Joan Steigerwald, York University

Galvanic experiments promised new techniques for investigating the phenomena of muscular contraction, and the respective roles of nerves and muscle fibers in effecting contractions. Frog legs capable of reacting to stimuli were also used as sensitive instruments for detecting weak forms of electricity. But galvanic experiments seemed to indicate new forms of electricity, related to and yet distinct from mechanically generated electricity and naturally occurring electricity. Galvanic experiments were also productive of chemical changes in organic parts and metals, and thus suggestive of relationships between chemistry, electricity and organic processes. Because galvanic experiments intersected with such a variety of phenomena and interests, it was not always clear in these experiments what was being studied. In basic galvanic experiments, involving organic parts, metals and liquids, what constituted the phenomena being investigated, what was the apparatus generative of phenomena, and what was the instrument reading phenomena?

The human subject intervened into galvanic experiments not only as the subject trying to make sense of phenomena, both empirically and conceptually, but also as corporeal parts of experiments, as a sensitive instrument capable of reading phenomena. This paper explores the galvanic experiments of Alexander von Humboldt and Johann Wilhelm Ritter around 1800. Both developed sophisticated understandings of how their own body could be used as legitimate instruments for reading nature alongside other modes of instrumentality, confirming their reading of experiments and their calibration of frogs as instruments. They also extended the instrumentality of their experiments into the subject, reconfiguring relationships between the tools and the subject and object of experiments.

The Risky Business of Empathic Care: Epistemological Foundations of Secondary Trauma in Healthcare Providers
Erene Stergiopoulos, IHPST University of Toronto

What are the consequences of caring for traumatized individuals? While post-traumatic stress disorder (PTSD) — the pathological reaction to direct trauma — is a well-defined construct in the psychiatric literature, the effects of exposure to indirect trauma are less well-documented. Secondary trauma is a condition described since 1990, primarily within populations of healthcare providers, in which listening to the traumatic narratives of patients can elicit a pathological response. This response includes intrusive thoughts, avoidance, and hyperarousal, thus mirroring the symptoms of PTSD. While neither an officially recognized disease, nor a well-defined or stable condition, the term "secondary trauma" nevertheless describes a well-known response to listening to traumatic narratives. In this paper, I address three epistemological issues facing secondary trauma as a medical category. First, it has been described using several similar but non-interchangeable terms; these include "secondary traumatic stress," "compassion fatigue," and "vicarious trauma." While these terms describe similar constellations of symptoms, their theoretical bases remain distinct. Second, the existing scales for measuring this phenomenon lack congruity, and demonstrate divergent conceptualizations of the condition and its symptoms. Third, the degree to which secondary trauma can be considered a "disease" remains unclear and subject to debate, particularly within a medical literature that wishes to avoid labeling empathic care as potentially pathological. In taking stock of these epistemological issues, I ask how these different conceptualizations of the condition affect its status as a medical phenomenon, and its social ramifications for clinical care.

Concrete arguments against abstraction
David Brooke Struck, Guelph

In *Substance and Function* (1910) and *Determinism and Indeterminism in Modern Physics* (1936), Ernst Cassirer presents his arguments against Aristotelian abstractionism and outlines his own theory of concept formation. In contemporary debates, proponents of ontic structural realism have attempted to co-opt Cassirer to their cause, expressing the wistful hope that his attractive, structuralist conclusions about science can simply be detached from his Neokantian project. In this presentation, I intend to present Cassirer's 5 arguments against abstractionism, and give a brief summary of his positive position, to show that OSR's wistful hope just doesn't stand a chance of ever being fulfilled. Cassirer's arguments against abstraction speak strongly against ontic structural realism: as a result, OSR is left in a position of either having to show why Cassirer's arguments shouldn't be allowed to leave the station in the first place, or having to explain why we should get off the bus before it reaches the terminus—critical idealism.

The Fraser River: Where Epistemologies Collide
Callum C.J. Sutherland, York

While the decades-long decline of Fraser River sockeye salmon is disconcerting for many British Columbians, the 2009 fisheries collapse is of particular concern for First Nations. This collapse raised the spectre of the extinction of sockeye, a fish whose significance differs markedly from one social world to the next. As a boundary object (Star & Griesemer, 1989), in other words, sockeye mean different things to different people. For the Harper government, sockeye are but mere economic commodities. For Department of Fisheries and Oceans ("DFO") scientists, on the other hand, sockeye are abstract biological entities that exist within statistical models. My talk will explore how these conceptions of sockeye are legitimated by what Bruno Latour (1993) calls the Great Divide – the conviction that Western civilization exists outside of nature. So too will it explore how the Great Divide delegitimates the First Nations view of sockeye, as essential transgenerational carriers of aboriginal knowledge, culture, and identity. This conception of sockeye is inseparable from its local contexts, problematizing the participation of First Nations in the judicial inquiry established to investigate the 2009 collapse. My essay explores in-depth these failures of translation, both within and outside the context of this judicial inquiry. In so doing, my essay will ask: Can the Great Divide be scaled, penetrated, or demystified? If so, what might the unification of these seemingly disparate social worlds look like? By synthesizing transcripts of evidentiary hearings with secondary sources, my essay provides a unique perspective on these important questions.

Blank Forms and Interchangeable Parts: Mathematical Values and the Creation of Impersonal Bureaucracies in the Early American Republic
T. P. Thornton, SUNY Buffalo

William J. Ashworth has drawn our attention to a cohort of individuals he terms "business astronomers"—such as mathematician-actuary Charles Babbage and stockbroker-astronomer Frances Baily--active in Britain in the 1820s and 1830s. This paper introduces a parallel community in the United States and considers the relationship between their mathematical training and their influence on the world of practical affairs. It focuses on two individuals: Nathaniel Bowditch (1773-1838), author of the *New American Practical Navigator*, translator of Laplace, president of the American Academy of Arts and Sciences, and chief executive of a Boston insurance and trust concern; and George Bomford (1780-1848), West Point graduate, member of the Military Philosophical Society, head of the army's Ordnance Department, and overseer of federal arms production and arsenal operations. It argues that what they brought to their work in financial and military affairs was not their substantive mathematical knowledge but the working practices and values of their discipline. The sophisticated calculations required for actuarial tables and artillery operations did not come into play. What did instead was the premium each placed on quantification and systematization. The impersonal bureaucracies they created were imagined as clockwork mechanisms and took material form in accounting practices, office procedures, and manufacturing techniques, from standardized quarterly reports to printed blank forms to interchangeable parts. The paper thus lies at the intersection of the histories of science and business, and draws as well on insights in the new history of paperwork.

Carnap's Analysis of Probability versus Subjective and Frequentist Interpretations
Parzhad Torfehnezhad, Université de Montréal

The goal of this paper is to evaluate what, in today's literature, are considered to be two incompatible interpretations of probability, namely the frequentist and subjective interpretations, with respect to Carnap's probability theory, in particular, and his linguistic analysis, in general. In conclusion, it will be shown that, contrary to popular belief, and according to Carnap's analysis they not only are not incompatible but also complement each other in delivering the whole meaning of probability.

Technologies of Persuasion: Modeling and Renewable Energy under the Trudeau Government
Henry David Trim, University of British Columbia

On July 4th, 1978, Alastair Gillespie, the Canadian Minister of Energy, Mines and Resources, announced a five year $380 million (1.2 billion in today's dollars) incentive program for solar and biomass. Going further, he suggested these programs would create 39,000 "man years of work" and lead to the development of a solar heating industry with annual sales of between $400 and $800 million by 1990. Solar technology had been unknown in Canada at the beginning of the 1970s making the ambitious program doubly intriguing. In writing the Trudeau government's astonishing commitment to renewable energy into Canadian history, my paper examines the Trudeau government's rationalistic ideology and mechanistic approach to policymaking and the emergence of simulation as a tool of political discourse. In particular, I bring Mary Morgan's and Donald Mackenzie's recent work on modeling and performativity, into dialog with the literature examining quantification and the rationalization of policymaking to show how simulation shaped policy within the Trudeau government, including it's surprising commitment renewable energy

This paper makes two arguments. First, it is impossible to removing politics from policymaking. Rather attempts at rationalization simply shifted the balance of power

by privileging the influence of the technically sophisticated, such as those scientists and environmentalists who advocated renewable energy. Second, the centrality of modeling to policy discussions suggests that scholars of state power and environmentalism can gain a more detailed understanding Canadian politics and environmentalism in the Trudeau years by drawing upon the study of simulation analyze government decisions.

Hempel's Account of Psychiatric Taxonomy: Its Historical and Contemporary Interest

Jonathan Y. Tsou, University of Iowa

In the 1950s and 1960s, Carl Hempel articulated an account of psychiatric taxonomy in the context of a broader discussion concerning what constitutes a good scientific taxonomic system. This paper examines Hempel's analysis in order to motivate an argument—in the context of contemporary debates concerning the *Diagnostic and Statistical Manual of Mental Disorders* (DSM)—in favor of a theoretical and causal approach to psychiatric classification. Hempel argues that a good taxonomic system should: (1) reliably describe objects of classification with operational definitions, and (2) provide projectable classificatory concepts that possess explanatory import. For this second function to be achieved, Hempel maintains that the classificatory concepts of taxonomic systems should be organized in terms of more general causal theories. Hempel's analysis is highly relevant for recent debates in philosophy of psychiatry concerning whether the DSM should adopt a purely descriptive or a causal approach to psychiatric classification. Since the publication of the third edition of the DSM in 1980 (DSM-III), the DSM has favored a purely descriptive and 'atheoretical' approach to classification that excludes information regarding the causes of mental disorders. From a neo-Hempelian perspective, some of the largest drawbacks of the DSM could be addressed by integrating causal information into the DSM's purely descriptive categories. In particular, I argue that a theoretical and causal approach to psychiatric classification could provide a more effective means for providing valid diagnostic categories ('natural kinds'), formulating testable classificatory concepts, and allowing the DSM to be a reflexive and self-correcting manual.

The Wisdom of Multiple Models: An Epistemology of Climate Model Ensemble Methods

Martin A. Vezér & **Wayne C. Myrvold**, University of Western Ontario

Ensemble approaches to climate modelling employ a mode of reasoning that is analogous to a simpler, well-understood case of combining measurements from multiple sources. Our account will detail a set of conditions under which multiple measurements or multiple model simulations of a target is more reliable than ones obtained from a single measurement or simulation. We will focus on climate model ensemble case studies that attempt to identify and reduce uncertainties in estimates of climate variables by comparing and combining simulation results. An analogy between the climate model ensemble studies and the simpler case highlights some potential benefits of ensemble methods, while also underscoring some of the ways of improving on this mode of inference.

The Development of the Riemann Integral in 1850-1900: New Techniques, New Definitions, New Proofs

Jean-Phillipe Villeneuve, Cégep de Rimouski

In 1854, Riemann introduced a new way of characterizing the integrability of a function. Instead of using continuous functions, as did Cauchy, he was interested in bounded functions. Based on Riemann's researches, Darboux introduced in 1875 a new way of defining the integral and started moving from the intuitive limit to the epsilon-delta terminology. In 1883, Peano gave a simpler integrability criterion as well as a new way of defining the limit, using the least upper bound. In 1887, Peano developed a theory of content to interpret the integral in the context of functions of several variables. Jordan did the same in 1892.

These researches provide innovations in the development of the Riemann integral: Riemann's innovations about integrability, Darboux' innovations about integral, Peano's and Jordan's innovations about definitions. We will see that the new definition (or the new technique or the new proof) replaces the old one or not and the old one can vanish or become a particular case of the new one or an equivalent way of defining the notion (or solving the problem). So generalization produces innovation or can be a heuristic, but how?

Cotton-Wool vs. Vulcanized Rubber: Expertise and the Artificial Tympanum Controversy

Jaipreet Virdi-Dhesi, University of Toronto

The artificial tympanum is a device used to remedy a perforation in the membrane of the eardrum that prevents it from functioning properly, by maintaining air pressure and preventing excessive discharge. Throughout the centuries, various types of materials were proposed for constructing an artificial membrane, including pig's bladder, lint, fishskin, egg membranes, and foil. These were mainly popular folk remedies that required little expertise in its construction beyond trial-and-error. In 1848, the aural surgeon James Yearsley published an article in The Lancet introducing his new technological marvel: an artificial tympanum made of cotton-wool and affixed with a silver wire stem. Yearsley's innovation received modest attention until 1850, when the aural surgeon Joseph Toynbee presented his own artificial tympanum, made of

vulcanized india rubber, at a meeting of the Provincial Medical Association, without making any reference to Yearsley.

In addition to debates about priority, Yearsley and Toynbee's disagreements over the device raises questions about the issue of expertise, particularly in the selection of materials: Yearsley chose the cotton-wool based upon his case studies, whereas Toynbee went with vulcanized rubber after rigid anatomical investigations of the ear and experimenting with theories of bone conduction. Both practitioners boasted their selection of materials made for a more superior device in restoring hearing loss. This paper examines the debate between the two surgeons in the context of broader issues of legitimacy within medical and surgical practice, as well as the contesting boundary lines between what constituted as "scientific practice" in the making of early non-electric air conduction devices.

Assessing the Economic Metaphor in Robert Trivers' Parental Investment Theory

Sara Weaver, University of Waterloo

Within evolutionary theory, the dynamics of evolutionary processes are thought to be metaphorically akin to the dynamics of a market economy. In a larger project, I worry that a strict adherence to this metaphor causes serious theoretical and methodological problems for evolutionary research. Such problems include: narrowing of focus, confirmation bias, privileging of certain research questions, skewed interpretations of results, and ignoring and/or not entertaining alternative explanations.

This paper presents a small piece of this larger project. I use Paul Bartha's normative approach to the assessment of analogical reasoning to evaluate Robert Trivers's analogical use of the economic metaphor in his famous Parental Investment Theory. My analysis has 3 parts. First, I reconstruct his theory of how natural selection acts on the sexes into an analogical argument. Second, I use Bartha's articulation model to examine, systematically, where the dissimilarities lie between his source (market economy) and target (natural economy) domains. Third, I argue that Trivers' analogical argument does not stand up against the assessment criteria of Bartha's model. In light of my assessment, I discuss, on a final note, how Triver's theory is an outdated and simplistic way to conceptualize the evolution of parenting and mating behaviour.

Space/Time/Vacuum: Ontological dialogues within Paul Dirac's international correspondence network.

Aaron Wright, University of Toronto

Paul A.M. Dirac was one of the twentieth century's most influential physicists. Personally, he is renowned for being taciturn and withdrawn---a biographer christened him the ``strangest man.'' Dirac thought on his own, making calculations on loose papers, and tended to publish sole-author publications. However, he also thought as part of an elite network of physicists spanning Europe. His correspondents included Bohr, Heisenberg, Iwanenko, Tamm, and Fock; they referred to Gamow, Klein, Pauli, and others. This paper explicates an ontological debate within this communication network, based on materials from Dirac's archive. This network included informal letters, talks, the circulation of preprints, and formal published papers. The spark for this debate was Dirac's at-first informally-circulated ideas on the relativistic theory of the electron. At issue was the status of new quantum states in Dirac's theory that represented electrons with positive charge. These ideas spurred Dirac and his correspondents to re-consider the nature of space, time, and the vacuum. I position this episode not as a controversy in the sense of Science and Technology Studies, but rather as a moment of indecision---a moment when the fundamental notions underlying our physical theories were at play.

New Data Analysis Techniques: Reassessing the Evidence in Neuroimaging

Jessey Wright, University of Western Ontario

Philosophers of science have debated about whether the use of functional magnetic resonance imaging (fMRI) in cognitive neuroscience can advance our understanding of the cognitive functioning of the brain (e.g. Bogen 2001, Uttal 2001, Hardcastle & Stewart 2002, Roskies 2010, Klein 2010). These debates have centered around the technology as combined with univariate data analysis strategies, such as the subtraction method (e.g. van Orden & Paap 1997). In response to the limitations of univariate analysis neuroscientists have started using more powerful data analysis techniques such as multivoxel pattern analysis (MVPA). However, no philosopher has yet carefully analyzed fMRI in light of these new techniques. That is my aim here.

I argue that data analysis is not a purely objective process, and that the choice of a data analysis technique entails assumptions about the target system. To show this, I contrast MVPA with the traditional data analysis techniques used in cognitive neuroscience. I argue that, since these techniques are sensitive to different patterns in the data, and the assumptions that must hold about the target system (i.e. the brain) differ, they can be treated as partially independent detection techniques. While this does not eliminate all criticisms of fMRI (and introduces new ones), it does suggest that a more complete analysis of how this methodology fits within the larger context of neuroscience is required for any assessment of the epistemic value of the methodology to be made.

Ultimatum Game as an Indicator for Altruism
Yuting Zhao, Simon Fraser University
Contrary to traditional game theory, where players are assumed to be ideally rational and egoistic, recent developments in evolutionary game theory tend to take agents as evolutionarily programed to be altruistic and cooperative. This paper examines the Ultimatum Game (UG) paradigm as a case study. In the Ultimatum Game, the first player, the "dictator", proposes a ratio at which two players divide a certain amount of money. The second player then decides whether to accept or reject the offer. Once accepted, the money is divided at the proposed ratio. Both players lose their money if the offer is rejected. The (subgame perfect) Nash equilibrium occurs when the dictator makes the smallest non-zero offer, which the second player then accepts. In laboratory experiments, subjects usually behave radically differently from the expected behaviors at Nash equilibrium. Such deviations are usually taken as indicators of altruism, and consequently evidence in support of evolutionary game theory. An offer higher than the minimum possible unit is taken to indicate the dictator's altruistic act, and a rejection of an offer greater than 0 is taken to reflect the second player's desire to punish the dictator for an unfair offer. The degrees of deviations are taken to reflect degrees of altruism (for examples, see Nat, 2008; Bosco, 2012; Guney& Newell, 2013). This paper aims to challenge this interpretation by questioning the assumptions required for the game to be taken as a measurement of altruism. Specifically, we will examine the type of altruism capable of producing evolutionary advantage and the type of altruism that is required to support evolutionary game theory. We aim to show that taking charitable proposals of monetary divisions and rejections of unfair offers to be indicators for evolutionarily induced altruism are both assumptions far from unproblematic.

II. Organized Sessions (alphabetically by organizer):

(RE-)PLACING SCIENCE AND TECHNOLOGY
James Hull, University of British Columbia, Organizer
The papers in this session each examine "science", "technology" and "science and technology". They examine the definitions of, boundaries of and relations between science and technology in specific contexts. Each paper presents a general argument on an aspect of this important topic and instantiates it with a focussed case study, one dealing with industry, one with academia and one with museology. Together they illustrate how the meaning(s) of science, of technology and of science & technology are constructed not just in time but, crucially, in place, be it the industrial research laboratory, the classroom or the museum.

Science and Technology
Ian Slater, York University
Modern science is industrial; science used to create material goods. Every historian knows technology is not "just" applied science, but as the neo-liberal consensus has swept through industrialized nations, applying science as technology has become common. Conceptually separable but still intertwined, scientific theories, models and practices are manifested in physical form by technology. The microscope is intermeshed with optical theory, the electron microscope with atomic theory, etc. So to ask about the relationship between science and technology in the modern world is to ask about how science, instantiated in technology, develops. Scientific research programs, grant applications, theses, courses offered, institutional areas of research concentration, etc., are all shaped by what technologies are being produced, and what areas of science are needed to develop and improve these technologies. Through a discussion of the Canadian railway industry and the Canadian nuclear industry, I will argue that neo-liberalism pushes us towards short-termism, a focus on immediate returns and profits to ensure shareholder loyalty and investment. With respect to technology, this leads to neglect and even outright cessation of long term activities like repair and maintenance, to save short term costs and remain "competitive". In this neo-liberalism forces us to ignore the physicality of technology, as repair and maintenance are acknowledgements of the extension of physical objects through space and time, and neo-liberalism is about the present. In science intensive industries this manifests in the form of directing research towards established technologies and their improvement rather than creating new technologies (so-called "static productivity gains"), an inability to bring prototypes to market, and a failure to address long term physical concerns associated with technological innovation (the sustainability gap).

Science and Technology: Eloping After A Long Courtship
James Hull, University of British Columbia
From the 1960s to the 1990s historians of science and even more so historians of technology fretted over and debated the meanings of those terms and, consequentially, the accurate characterization of the relationship between science and technology. Perhaps the defining moment in the debate, was Ed Layton, Jr.'s 1971 "Mirror Image" twins paper in Technology and Culture – a staple of graduate readings lists for years after. In the 1990s however that debate seemed to lose its urgency. To an extent the interest in those and associated words and phrases has been revived, as in the Isis special Focus section on applied science in a recent issue but the terms of the debate have changed. This paper offers first a review of these debates and suggests how an account of the changing nature of the relationship between science and technology

can be used in the classroom as a pedagogical heuristic.

How Should We Collect Science and Technology In 2014?
David Pantalony, Canadian Museum of Science and Technology

Museums of science have played a role in reinforcing neatly packaged, but often confused uses of science and technology. We have been overly reliant on professional disciplinary categories and preoccupations, as well as histories based on textual sources. These traditions share a strong immaterial bias; our adherence to them raises pressing questions - what exactly have we been collecting? And how has this shaped the kinds of stories we tell? In an effort to rethink our subject framework for collecting and research, my colleagues and I at the Canada Science and Technology Museum have found that the best inspiration comes from the study of objects on their own terms. Our annual Reading Artifacts workshop is an example of this kind of activity. Deep immersion in our collection points to an expansive material realm beyond traditional boundaries; Decades of parallel work in the history and philosophy of science and technology also point to the independent workings of the material world within science and technology. Davis Baird (2004), for example, describes scientific instruments as "Thing Knowledge." We can collect this form of material knowledge by looking at the production, refining and transmission of instrumentation; we can study makers, their training, workshop culture and networks; we can follow the trail of basic material resources and production; we can examine objects for wear and use; we can study and replicate an instrument's workings in practice. In this talk I will provide examples of how we could realign our collecting, research and exhibit-making to fit this material perspective. A true material turn in collecting will tell us new things about the nature of, and relations between science and technology.

SCIENCE AND FILM: PRODUCTION, STORYTELLING, AND PUBLIC ENGAGEMENT

Eleanor Louson, York University, Organizer

Activating Publics in the Co-production of Science: Psychology's Micromotion Films
Arlie R. Bellieau, York University

Historically, psychologists rarely used film to engage non-client or non-academic publics. "First wave" pre-WWII motion pictures were amateur recordings of ongoing projects produced by researchers in laboratories or asylums. They documented phenomena for individual use. "Second wave" psychology films were truncated replications of established practices. Publication companies produced and distributed these professional visual aids alongside undergraduate textbooks. The "first-wave" Micromotion study films of American industrial psychologists Frank and Lillian Gilbreth present a unique exception. Micromotion film production was contingent upon blue-collar engagement with the science (as film subjects, creators, and benefactors). Reciprocally, once produced, the films functioned as a translation device bridging two-way communication across academic, language, and class borders. Drawing from archival and cultural history sources, in this paper I consider Micromotion films as a boundary object evoking engagement from a resistant public.

Why should we care about these ferrets?": Wildlife Filmmakers on Production, Science, and Storytelling
Eleanor Louson, York University

Despite their significant role in the public perception of biology, wildlife films have escaped much scholarly attention in either science studies or film studies. Although film theorists have begun taking documentary filmmakers' attitudes seriously, as part of an empirical turn in documentary scholarship (Nash 2011), interviews with filmmakers are infrequent within that body of literature and have yet to be implemented for the wildlife genre. I will present preliminary, qualitative results of research on Canadian wildlife filmmakers' attitudes about their filmmaking experiences: the challenges of locating and filming animals, the logistics of securing funding, the conventions of representing animal behaviour, the permissibility of artifice, the role of scientific authorities, and the public reception of their work. The results so far suggest that wildlife filmmakers understand themselves to be telling stories about unreliable subjects. This informs their individual responses to the constraints and opportunities afforded by the production requirements of wildlife film.

Telling Digital Stories about the Past
Melissa Charenko, University of Wisconsin, Madison

Dipesh Chakrabarty (2009) argues that "climate change challenges not only the ideas about the human that usually sustain history, but the analytic strategies that postcolonial and postimperial historians have developed in past two decades in light of ecolonization and globalization." As historians of science seek to analyze climate change and other global issues, they will need to find ways to overcome some of the challenges that Chakrabarty describes. Film, I argue, offers one tool for historians to circumvent some of the difficulties presented by global issues that span vast time scales and bring together the human and nonhuman. Through an examination of an environmental film class taught at the University of Wisconsin-Madison in the fall of 2013, my paper looks at the opportunities and challenges that film presents to historians of science looking to engage with this medium. It suggests that different questions, narratives, and ways of knowing become available through film, which is demonstrated in film clips on paleoecology and conservation

in national parks created by graduate students in the class. At the same time, introducing students to film production is not without difficulty.

MICROCOMPUTERS IN ACADEMIA: THIS TIME IT'S PERSONAL
Allan Olley, Organizer

The MCM/70 in Research and Education
Zbigniew Stachniak, York University

The MCM/70 microcomputer was arguably the earliest microprocessor-based computer designed by a Canadian company Micro Computer Machines (MCM) specifically for personal ownership. At the time when the personal computer paradigm had not yet been defined, the company identified academic research and education as one of the main application areas for its "personal"computers. In this talk I present and analyze the argument for academic research and post-secondary education use of the MCM/70 computer put together by MCM in 1973 and 1974. I also discuss the academic roots of the MCM/70 concept.

Micro-What? Computer scientists constructing microcomputers at the University of Waterloo, (1979-1982)
Scott Campbell, University of Waterloo

The standard historical narrative of microcomputers often highlights the revolutionary and personal aspects of the new generation of inexpensive, microprocessor-based computers that were powerful and flexible enough for individuals to run a business or play games. In this talk, I will discuss an example from the world of academia that reveals an alternative account. Starting in the late 1970s, computer scientists at the University of Waterloo designed two microcomputers for use in their teaching labs. Ostensibly, they chose to build and not buy an existing microcomputer to improve the experience of undergraduates learning to program. But they also designed the new computers to cheaply expand the reach of the existing centralized mainframe. In short, they went out of their way to avoid the novel or personal aspects of microcomputers, and instead chose to buttress the dominant "cathedral" paradigm. Ultimately, my talk is about the relationship between scientists and their tools, and of computer scientists confronted by an instrument that was being transformed from an expensive scientific device to cheap consumer commodity before their eyes.

Personal Astronomical Computing: Exchanges 1984-1994
Allan Olley, Independent scholar

This talk will examine the adoption of the personal computer in astronomy through the lens of the first decade of the Astronomical Computing department of *Sky and Telescope* magazine. *Sky and Telescope*, a publication serving amateur astronomy, began its monthly Astronomical Computing section in 1984. This section along with a service on the Compuserve computer service marked a an effort by the magazine to promote the use of personal computers by its readers in their astronomical pursuits, enabling the exchange of information, and informed readers about the uses other had made of computers. The section grew out of existing coverage of computers and calculation in the publication and existing practices such as aiding the sharing of programmable calculator routines. The section often shared programs by printing listings of Basic language computer code. While aimed at an amateur audience contributors and readers often included academics and institutional astronomers and often adapted or reported on work in research astronomy. Some of the items even explicitly advocated more collaboration between the amateur and research astronomy community. The items printed suggest the deep interest of amateur astronomers in comparing the capabilities of microcomputers to those used at research institutions and those that had performed historic calculations. The emphasis of section on detailing applications in areas such as celestial mechanics and calendrical problems was partly dictated by the limitations of the section's format, but also gives insight into the implications of adopting the microcomputer into astronomy.

REMAKING THE PAST: HISTORY IN 3D
Isaac Record, University of Toronto, Organizer

3D Methods in HPS and STS
Isaac Record, University of Toronto

I consider the role of emerging technologies like 3D scanning and printing (3D) in HPS and allied fields. I explore the potential of 3D scans to transform access to artifacts and I evaluate the status of 3D printed artifacts as stand-ins for originals or as potential museum appropriations. I investigate the limits of digital fidelity and contemplate how we might reshape disciplinary boundaries to incorporate new research methods like 3D. I argue that 3D makes possible certain kinds of investigations that should now be considered necessary for making certain kinds of arguments within HPS/STS. The chief argument in favour of 3D is that it may provide new evidence for HPS/STS.

The principled argument against 3D in HPS/STS amounts to boundary policing: Because HPS/STS doesn't train its practitioners to use or evaluate 3D evidence, it should not be used. I argue that HPS/STS has always benefitted from a strongly interdisciplinary set of methods, so rather than reject 3D, we should instead focus our concerns on recalibrating our evidentiary standards to handle 3D evidence. I consider precedents for adopting new technologies as appropriate for disciplinary research and propose a cost--benefit analysis for adopting3D, weighing the capital, training, and infrastructure

investments against the potential research dividends. I argue that even if 3D loses out at present, it promises lower costs and greater benefits in the future, which should shim the balance.

Recreating the Chambers' Micromanipulator
Eric Weidenhammer, University of Toronto

The Chambers' micromanipulator is among the historical instruments inherited by the Institute for the History and Philosophy of Science and Technology (IHPST.) This instrument, first produced in the mid--1920s, it was likely purchased by the Toronto School of Hygiene shortly after it opened in 1927. Based around a simple mechanism permitting the precise movement of glass microtools, its purpose was to permit the dissection of living tissue, even individual cells, under magnification.

The University of Toronto instrument is missing a number of components. Over the past year, I have worked to recreate the instrument's original state cosmetically. I have also explored the possibility of bringing it to a working condition such that it could be used in a scientific recreation. The lack of similar instruments and surviving photographs has made this an interesting challenge.

This talk will discuss the problems, technologies, and skills behind the process of "remaking" the Chambers micromanipulator. Of particular interest are the possibilities and limitations of new "maker" technologies such as 3D printing and scanning, especially in contrast to traditional skills such as glass working and machining.

Camera Obscura
Dan Southwick, University of Toronto

The discourse around 3D printing has tended to centre on the technology's ability to produce detailed physical manifestations of digital files. By focusing on the end product, however, the aspects. 3D printing is a process that is mediated through both imperfect machinery and the variable skills of the user operating it. The printed objects are imprinted with signs that inherently link them to context in which they are created. This paper explores the material aspects of 3D printing technology through the production and comparison of three different cameras.

The first is a simple mass--produced DIY--kit for a pin--hole camera. This non--printed kit provides a framework for understanding the processes and necessary skills needed to build a camera. The second camera is a model downloaded from a shared online 3D printing repository. In assembling this camera issues of tacit knowledge of the user as well as the characteristics of individual printers come into focus. The final camera is one designed using CAD (computer--aided design) software based in part on patents now in the public domain.

By creating and printing a camera in this fashion the process of translating a design file to meet the specifications of a printer can be examined. By engaging with these cameras and demonstrating the manner in which 3D printers and the user shape the experience, this research seeks to highlight the material aspects of the technology.

Mesopotamian CN Tower
Gabby Resch, University of Toronto

Over the past few decades, a gradual paradigm shift has (arguably) disrupted the image of the cultural heritage museum as an authoritative memory institution and replaced it with one of an open, interactive, and participatory cultural hub. Concomitant with this shift, a debated movement away from the object as focal point, toward the experience, both promises exciting and provocative challenges to how museums teach history, as well as a potentially troubling new emphasis on ephemeral, spectacle--oriented, and, some would argue, trivial interaction.

Technologies like 3D printing and mobile augmented reality feature prominently in contemporary discussions about digital methods museums might employ to engage their publics in a re--envisioning (and re--making) of the past. These technologies promise opportunities to present anachronistic and atemporal narratives, alternative history, as well as live, dynamic, participatory imaginings of "new pasts" that cultural heritage museums could be well--situated to curate and display. This talk will describe a recent collaborative project between members of the University of Toronto's Critical Making Lab and a group of partners, including the Royal Ontario Museum, to use 3D printers and iPad—based 3D design software to facilitate a collective disruption of how a Mesopotamian cityscape can and should be represented.

SCIENCE AND THE EMOTIONS
Marga Vicedo, University of Toronto, Organizer

Emotions have become a subject of considerable research in the last thirty years. Historians, philosophers, and scholars in literary and cultural studies have contributed extensively to a growing body of literature exploring different conceptions of emotions in different periods. Historians of science have not participated as fully in this emotional turn yet. In the history of science, most of the work has focused on the role of emotions in shaping science and the scientific self. The participants in this session aim to explore further how science has also played a key role in shaping views about the emotions. Examining scientific research on emotions will help uncover how different societies conceptualized the emotions and the influence of scientific ideas on changing views about different emotions. Scientific knowledge of the emotions has been put to work in diverse ways: shaping the moral and social valuations of different emotions, influencing social debates about the relationship between individual personality and

social order, and, generally, influencing changing conceptions of human nature.

Vygotsky on emotion/affection/feeling: theoretical ideas
Gisele Toassa, York University

This paper presents Lev Semionovich Vygotky´s ideas about emotion/affection/feeling (emotsia/affekt/tchuvstvo), especially those developed in his "cultural-historical" works written from 1927 up to 1934. Its main goal is to highlight Vygotsky´s core ideas on emotions (synonymous with affection and feeling) as higher mental functions, which conveys two main features: 1. Development of "special" higher mental functions (voluntary attention; logical memory; thought; perception, emotions etc.); 2. Usage of techniques plus language internalization, transforming the person´s nature (objectively and subjectively). These "special mental functions" are based on elementary (or biological) functions, but Vygotsky has not considered possible, in his lifetime, to determine them in the realm of emotion. What emotions do we share with other species? The author could not answer precisely to that question. However, he valued Arts and language (spoken or written) as cultural means that transform our elementary emotional life from its impulsive, immediate, and involuntary outset. Emotions as diverse as the animals' fear and the love of Dante for Beatrice ought to be highlighted by the same theory, which should be developed upon Benedictus de Spinoza´s materialist philosophy. Vygotsky considered that emotions appear in new relations with other elements of mental life, new systems develop, new alloys of mental functions and unities of a higher order appear within special patterns, demolishing barriers between affect and intellect in a systemic set of phenomena. This paper aims to explain the ideas above mentioned, seeking to determine their methodological implications to an historical-cultural analysis on emotions.

Pity: Epidemic encephalitis and the emotional reconfiguration of the bureaucratic state in 1920s Britain
Kenton Kroker, York University

Empathy, sympathy, love, compassion, grief, hatred, and a host of other emotions have long been important components of social, psychological, and biomedical research. Pity, in comparison, has been roundly ignored. This absence squares poorly with the key role pity played in the emergence of the modern bureaucratic state. The framing of post-encephalitic children as objects of pity in 1920s Britain offers a case in point. Few in number and often deprived of even the most rudimentary forms of personal agency, the plight of post-encephalitic children became a biomedical and political flashpoint. Despite a mass of recent reforms, these children simply did not fit in. Anywhere. Their plight found its political culmination in the 1927 repudiation of the eugenist orientation of earlier mental deficiency legislation. But while liberal politicians exploited the post-encephalitic child's pitiful situation to advance their reforms, they were merely working with what had already been constructed by Britain's bureaucracy. The well-known processes of administrative rationalization can account for the creation of the post-encephalitic child. What needs acknowledgment (and what the archival record shows) is a complex process of bureaucratic emotionalization, which ultimately helped determine how ordinary Britons were to feel, not just about post-encephalitic children, but about each other.

Emotions at Work: Testing Temperament in Interwar American Corporations
Kira Lussier, University of Toronto

"Do you like to meet people and make new friends?" was the first of 308 questions on the Humm-Wadsworth Temperament Scale, an interwar psychological test designed to evaluate the emotional and social disposition of workers. The test's creators heralded their test as a scientific, objective tool that could reveal subjective emotional traits to help companies predict job-seeker's behaviour at work. They further promised that hiring well-balanced, temperamentally "normal" workers—those who could properly regulate and manage their emotions—would result in a well-balanced, harmonious workplace. This particular test is a case study of a broader story of the intersection of psychological testing and personnel management at a moment of acute corporate concern over labour relations. Astute marketers, the test's creators drew on the cultural authority of science and the values of corporate America, particularly the emerging managerial approach of "human relations," which emphasized the social and psychological dynamics of the workplace. The theoretical, methodological, and political assumptions undergirding the practice of temperament testing in interwar American workplaces contributed to a widespread managerial assumption that labour unrest in the workplace could be explained through the emotional maladjustment of workers.

Outside or inside the animal? Konrad Lorenz on intuition and empathy in the study of animal behavior
Marga Vicedo, IHPST/University of Toronto

Can we reach a better understanding of another subject by putting ourselves in the other's place? How can one "enter into another being?" What is the role of cognition, feelings, and emotional identification in this process? These have been important -and still disputed- epistemological questions in many areas of inquiry that try to understand the actions and emotional states of other sentient beings.

After WWII, these questions became central in ethology, or the comparative study of animal behavior that Austrian zoologist Konrad Lorenz and Dutch zoologist Niko

Tinbergen had launched in the 1930s. In this presentation, I examine Lorenz's views on empathy. First, I look at Lorenz's views about the role of observation in research about animal behavior and show that he believed the researcher should remain an outside observer in order to develop objective knowledge about animals. I then turn to a discussion among several students of behavior about the nature of intuition. Here Lorenz argued that an ethologist should not use empathy in the study of animal behavior. I then show how Lorenz's scientific authority in the public realm was, nevertheless, founded upon his ability to enter into the lives of the animals. However, Lorenz continued to reject empathy as an epistemological tool to study animal behavior. I argue that this position was grounded upon his views about animal nature and his vision of science.

PLENARY SESSION

Author Meets Critics: Lee Smolin, Time Reborn: From the Crisis in Physics to the Future of the Universe

Gordon McOuat, University of King's College, Organizer

This session will explore Lee Smolin's *Time Reborn: From the Crisis in Physics to the Future of the University,* with three leading Canadian historians/philosophers of physics, each presenting critical commentary on the book followed by a critical response by Dr. Smolin. The style of the session will draw on past successes in organizing CSHPS/SCHPS "author meets critics" events.

In *Time Reborn*, Lee Smolin challenges what he considers the "scientific orthodoxy", namely that time is merely a "stubbornly persistent illusion" and that the laws of physics are fixed or "eternal". In contrast, Smolin holds that "time" is real, and that the laws of physics are not fixed, but that they evolve, in real time. For Smolin, time and our experience of it passing are truly real. All the laws and everything else evolves within it. For Smolin, this hypothesis suggests solutions to some of the very big open questions in physics today (eg. the nature of the quantum world and its unification with spacetime and cosmology). Moreover, it provocatively places profound importance on human agency, on how our social, political, economic and environmental choices directly affect the range of possible outcomes for the future of this planet. As Smolin stated in his Royal Society Lectures (May 2013), if time is real and the future is open, we can summon the imaginative power to invent the communion of political organizations, technology and natural processes essential if we are to thrive sustainably beyond this century. A tall order.

The session will have three papers commenting on Dr. Smolin's thesis, followed by a response by Dr. Smolin.

Lee Smolin is founding and senior faculty member at Perimeter Institute for Theoretical Physics, Waterloo. His main contributions have been so far to the quantum theory of gravity, to which he has been a co-inventor and major contributor to two major directions, loop quantum gravity and deformed special relativity. He also contributes to cosmology, through his proposal of cosmological natural selection: a falsifiable mechanism to explain the choice of the laws of physics. He has also contributed to quantum field theory, the foundations of quantum mechanics, theoretical biology, the philosophy of science and economics. He is the author of more than 150 papers and four books which explore philosophical issues raised by contemporary physics and cosmology: *Life of the Cosmos* (1997), *Three Roads to Quantum Gravity* (2001), *The Trouble with Physics* (2006) and *Time Reborn* (2013).

Richard Arthur (Philosophy, McMaster University) works on the philosophy of time and space, philosophy of time and space, the history of philosophy (primarily 17th C.), and the history and philosophy of math (primarily issues concerning the infinite and the infinitely small). He is co-authoring a book with Steve Savitt (UBC) and Dennis Dieks (Utrecht), **The Now in Physics**. His publications include, *Leibniz: The Labyrinth of the Continuum* (Yale University Press, 2001), "Leery Bedfellows: Newton and Leibniz on the Status of Infinitesimals", "Time Lapse and the Degeneracy of Time: Gödel, Proper Time and Becoming in Relativity Theory", "Beeckman, Descartes and the Force of Motion", etc.

Kathleen Okruhlik (Philosophy, University of Western Ontario), Kathleen Okruhlik did her graduate work in HPS (History and Philosophy of Science) at Pittsburgh and began her career working on fairly traditional problems concerning laws of nature, space and time, matter and motion. She maintains a strong interest in such "mainstream" topics but has also been greatly influenced by various feminist analysis of science that have effectively called into question many of the presuppositions that shaped philosophy of science during the later half of the twentieth-century (including post-Kuhnian philosophy of science). In particular, she investigates the ways in which even "good science" is shaped by choices and by values that have traditionally been considered external to the scientific enterprise.

Denis Walsh (Philosophy, University of Toronto). Denis Walsh is a philosopher of biology at the University of Toronto. His work focuses primarily on evolutionary theory and scientific explanation. He has written in defense of the statistical interpretation of the modern synthesis in biology, which explains evolutionary change by appeal to statistical features of populations rather than causes. He has also worked on a naturalistic approach to the role of teleology in biology and folk psychology.

LOCAL INFORMATION

BROCK UNIVERSITY CAMPUS INFORMATION

GETTING TO BROCK
(thanks to Elizabeth Neswald for the inside scoop)

Avoid Hamilton **Airport** unless you are prepared to rent a car or spend a couple of hundred dollars on a taxi or livery car. Niagara Airbus services Buffalo and Pearson with shuttles, Hamilton only with very expensive hired cars. The airbus must be booked in advance.

There are few **trains** to St. Catherines (one a day, maybe). For anyone in the region and not driving, **Megabus** is the way to go, and book in advance to get really low rates.
Megabus website: ca.megabus.com
Megabus drops you off at the central bus terminal. The #16 and #116 buses go to Brock - every 30 minutes during the summer at quarter past and quarter to the hour. There may be a Megabus or two a day dropping off at Brock.

For anyone staying at the three motels from the conference site - there is a **bus stop** at the mall that will take you to the terminal, where you can transfer to the #16 (ask for a transfer when you get on). Local buses cost $2.50 exact change, or a bit less with a 5 or 10 ride pass (which can be purchased at the terminal or at most convenience stores). The conference shuttle, which will also go to these hotels, costs $5. It is pretty easy to walk to a #16 bus stop from the Holiday Inn too.

Brock University has ample **visitor parking** available at a daily rate of $7.00 (one permit required per day). Daily parking passes can be purchased in the Congress Centre during registration hours.

Residence guest: Complimentary parking passes will be available upon check-in, for individuals staying in on-campus accommodations. Parking lots M and S are reserved for residence parking.

Short-term parking: Numerous pay and display machines and meters are conveniently located around campus for short-term parking. Hourly rates apply. Cash and credit cards are accepted at most machines.

Accessible parking: Attendees with provincial or other government recognized accessibility permits may park in any Brock University accessible parking spaces on campus with the exception of Lot H, by displaying the accessibility permit and a valid pay receipt or parking pass.

BUS TRANSPORTATION
Brock University is a major transit hub in the community. All St. Catharines Transit and Niagara Region Transit buses are wheelchair and scooter accessible and are equipped with front racks to hold bikes.

St. Catharines Transit
www.yourbus.com
Provides city-wide transit. Visit the St. Catharines Transit website for fares, schedules, and maps.

Niagara Region Transit
www.niagararegion.ca/transit
Provides intra-regional transit for the Niagara Region. Operates Monday to Saturday (no Sunday service). Visit the Niagara Region Transit website for fares, schedules, and maps.

TAXI
5-0 Taxi: 905-685-5464 or 1-800-268-7429 (toll free)
Central Taxi: 905-685-7343
(ask for a receipt at the beginning of your ride; taxis here aren't usually metered)

BICYCLE RENTAL
Canal City Cycle
www.canalcitycycle.com
905-964-8056
23 Front Street South, Thorold ON
Distance from campus: 5 km

WHERE TO EAT (near CSHPS site)
A full listing is available in the Congress Guide.

Jubilee Courtyard
Knowledge on Tap (Beer Tent) – 11:00 to 18:00 – Offering items such items as bourbon and white meadows maple pulled pork, balsamic and rosemary marinated grilled vegetables served with Niagara VQA

wines and hand crafted Niagara beers

Congress Centre (Walker Complex, Building 22)
Corks & Forks Expo Café – 7: 30 to 15:30 – Offering coffee and baked goods, packaged salads, cheese plates, sandwiches and of course local Niagara wines and beers
Tim Hortons – 8:00 to 15:00
Teriyaki Experience – 8:00 to 15:00
In House Pizza and Subs – 8:00 to 15:00
Walker Courtyard BBQ – 11:00 to 14:00

Arthur Schmon Tower (Building 1)
Tim Hortons – 7:30 to 15:00
Guernsey Market – 8:00 to 15:00
Common Grounds Café – 10:00 to 16:00

Thistle Complex (Building 2)
Tim Hortons – 7:30 to 15:00

Lowenberger Residence (Building 23)
Lowenberger Dining Hall

OFF CAMPUS EATING

Recommended Restaurants:
Pow Wow (American), 165 St. Paul Street (not cheap)
Toi (Vietnamese fusion), 12 Queen Street
Strega (American), 19 King Street
Dani's Bistro (American), 174 St. Paul
Amakara (Japanese), 19 Geneva Street (this place is tiny)
Spicy Thai, 208 Church Street (this is a bit of a walk)
Office Tap and Grill, 22 James Street

Pubs:
The Merchant Ale House (on-site brewery), 98 St. Paul
Sheehans, 101 St. Paul St.

Cafes:
Fine Grind, 37 James Street
Mahtey, 241 St. Paul St.

CAMPUS RECREATION
The Walker Complex (Building 22) houses a 50 m pool, a 200 m indoor track, squash courts, outdoor tennis courts, fitness centre, and gymnasia. These facilities are available to Congress attendees at a rate of $5.00 per day. Congress badges must be presented upon entry.

Walker Complex (Building 22)
905-688-5550 ext 4060
www.brocku.ca/recreation-services
- May 24 to 25 – 8:30 to 17:00
- May 26 to 30 – 7:00 to 22:00

CHILD MINDING
Brock University is pleased to offer child minding services to registered attendees of Congress 2014. Two child minding services have been developed in order to cater to the age of your children, one for children 6 months to 6 years of age and the other for children 7+ years of age. Both programs will be available on Brock's campus for the convenience of Congress attendees starting Friday, May 23 through to Friday, May 30 from 8:00 to 17:30 each day. Congress attendees who require child minding services will need to pre-register their children in advance and also, remain on campus during the period(s) their child(ren) is (are) registered. Drop-in child minding services are not available during Congress 2014.

Hours of service
Friday, May 23 to Friday, May 30 – 8:00 to 17:30
Drop-in service not available.

Cost
$60 per child, per day
What's included?
- Morning snack
- Lunch

- Afternoon snack
- Age appropriate morning and afternoon programming
- Convenient, on campus drop off and pick up location
- Licensed staff

Children 6 months to 6 years of age
Working with the Rosalind Blauer Centre for Child Care, Brock University will have licensed staff available during Congress 2014 for the child minding service. Staffing levels will be maintained based on age group ratios of the children who arepre-registered. As such, drop-in service will not be available. Age appropriate programming will be implemented each day, along with nutritious snacks and lunches. We are working with the Rosalind Blauer Centre for Child Care in creating the programming and what a "typical day" would look like for your child(ren) and hope to have that information available soon.

Children 7+ years of age
In partnership with Youth University, Brock University is pleased to offer enrichment programming for children seven + years of age. Youth University is a premier educational resource for pre-university aged youth dedicated to helping children meet their greatest potential – socially, emotionally and academically. Children must be pre-registered as drop-in service will not be available.

Pre-register
Congress attendees who require child minding services must pre-register their child(ren) prior to April 30, 2014. To register please complete the Registration Form and return by email to Marie Reimer at mreimer@brocku.ca by April 30, 2014. Registrations received on or after May 1, 2014 will be reviewed however, cannot be guaranteed space. Drop-in child minding services are not available during Congress 2014.

Medical conditions and special care
Should your child have any known medical conditions, require prescription medication, have special care needs and any allergies or food sensitivities, please state this on the registration form accordingly. Please note, prescribed medication should be brought with you at the time of drop off and be in the original container stating the child's name and dosage information. There is also an opportunity on the registration form to inform us of any other information you feel we should know about your child while in our child minding service during Congress 2014.

Cancellation policy
In order to plan accordingly and provide adequate provisions/staffing levels, the following cancellation policy is in effect:

- Cancellations received on or before Wednesday, April 30, 2014 will receive a 50% refund
- Cancellations received on or after Thursday, May 1, 2014 will NOT receive a refund
- Cancellations must be sent and received via email to Marie Reimer at mreimer@brocku.ca

For registered children
We will email all attendees who register their child(ren) with our child minding service closer to the Congress dates with further child minding information. This will include the location on campus of where to drop off your child during Congress 2014.

For further information, please contact Marie Reimer atmreimer@brocku.ca or 905 688-5550 ext 3860.

-SELECTED SPECIAL EVENTS AT CONGRESS-

more info at http://brocku.ca/congress2014/

BIG THINKING SERIES
(Hosted by the Federation for the Humanities and Social Sciences and Brock University)

May 24, 12:15 to 13:20 (Welch Hall - David S. Howes Theatre
Borders without boundaries: Whose stories are ours?
Lyse Doucet

May 25, 12:15 to 13:20 (Welch Hall - David S. Howes Theatre)
Children's voices have power: Ending inequalities affecting First Nations children and families
Cindy Blackstock

May 26, 7:45 to 8:55 (Welch Hall - David S. Howes Theatre)
The borders between life and death: Stories of the supernatural and uncanny among Canada's Great War soldiers
Tim Cook

May 26, 12:15 to 13:20 (Welch Hall - David S. Howes Theatre)
"Servitude and Grandeur" of the University \Lise Bissonnette

May 27, 7:45 to 8:55 (Welch Hall - David S. Howes Theatre)
Fast, cheap, and out of control: How the Internet has made journalism better than it's ever been
David Plotz

May 28, 12:15 to 13:20 (Welch Hall - David S. Howes Theatre)
The end of settler societies and the new politics of immigration
Catherine Dauvergne

May 29, 7:45 to 8:55 (Welch Hall - David S. Howes Theatre)
If Mayors ruled the world: Is the city democracy's best hope?
Benjamin Barber

May 29, 12:15 to 13:20 (Welch Hall - David S. Howes Theatre)
Blood: The Stuff of Life
Lawrence Hill

CAREER CORNER
(Hosted by the Federation for the Humanities and Social Sciences and Brock University)

May 24, 17:00 to 18:00 (location TBD)
Canada/US connections interdisciplinary panel: The mobility of global talent and networking

May 25, 13:00 to 14:30 (location TBD)
Ideas matter: Telling your research story

May 26, 9:00 to 10:30 (location TBD)
Brave new world: Digital publishing, reach, and tracking impact

May 26, 14:30 to 16:00 (location TBD)
Find work and let work find you: Advanced LinkedIn strategies

May 27, 9:00 to 10:30 (location TBD)
Beyond scheduling

May 27, 13:00 to 14:30 (location TBD)
Publishing and marketing your scholarly book

May 27, 17:00 to 18:00 (location TBD)
Canada/US connections interdisciplinary panel: Comparisons of the crisis of PhD surplus, cross border research, and talent mobility

May 28, 9:00 to 10:30 (location TBD)
Telling your teaching story: Documenting your experience in a teaching dossier

May 28, 10:30 to 12:00 (location TBD)
The e-portfolio: Going digital

May 28, 13:00 to 14:30 (location TBD)
Beyond research: Maximizing your benefits as a research assistant

May 29, 9:00 to 10:30 (location TBD)
The "skinny" on "soft" skills

May 29, 10:30 to 12:00 (location TBD)
Putting learning into practice - Putting knowledge to the test

May 29, 13:00 to 14:30 (location TBD)
Spare time, rare talent: Mobilize your community researcher skills

May 29, 14:30 to 16:00 (location TBD)
Researcher's Development Framework (RDF): An online professional planning tool

May 29, 17:00 to 18:00 (location TBD)
Canada/US connections interdisciplinary panel: Cross border research collaboration

- ANNOUNCEMENTS -

WORKSHOPS AND CONFERENCES

The 14th annual **Philosophy of Logic, Math and Physics (LMP) Graduate Student Conference** will be taking place on June 5-6, 2014 at Western University in London, Ontario. The LMP Graduate Student Conference will bring together philosophers of logic, mathematics, and physics for two days of presentations and discussions with some of the leaders in these fields.

Contact information for conference organizers: uwolmp@gmail.com
Western University's Philosophy Department also hosts an annual Philosophy of Physics Conference prior to, or following the Graduate Student LMP Conference. More information on this year's conference, Metaphysics Within and Without Physics, taking place June 7-8, can be found here: http://logicmathphysics.ca/philosophy-physics-conference/.

Socially Relevant Philosophy of/in Science and Engineering, Waterloo, ON
The first meeting of SRPoiSE will be held at the University of Waterloo on June 9-12, 2014. SRPoiSE is a relatively new international consortium which supports high-quality philosophical work related to science and engineering that contributes to public welfare and collective wellbeing. (See our website, www.srpoise.org, for more information, and to apply to become a member.) The SRPoiSE Consortium aims to improve the capacity of philosophers of all specializations to collaborate and engage with scientists, engineers, policy-makers, and a wide range of publics to foster epistemically and ethically responsible scientific and technological research. As part of this aim, we plan to hold annual meetings where scholars can disseminate and discuss their work; this is the first of those meetings.

The meeting will take the format of a workshop, allowing everyone to present their work to the whole group. In addition, SRPoiSE will be held as part of a larger meeting of "Communities of Integration," in conjunction with two or three other workshop groups. These include STIR (Social-Technical Integration Research) and SEE (Studies of Experience and Expertise). (See http://stiworkshop.weebly.com/communities.html and click on "Communities" for descriptions of these groups.) During the conference, these groups will have the opportunity to come together and share their work, identifying connections and potential collaborations among them.

Please contact Katie Plaisance at srpoise2014@uwaterloo.ca with any questions.

Annual Meeting of the History of Economics Society, Montreal, QC
The next annual meeting of the History of Economics Society will be held on June 20-22nd, 2014, at the Université du Québec à Montréal (UQAM), Montreal, Canada. The conference will begin on the Friday afternoon, with an opening reception that evening, and close on the Sunday evening with the Presidential address, awards ceremony and conference banquet. For more information, see http://historyofeconomics.org/Conference2014/Home.html

Science, Technology and Gender: Challenges and Opportunities, Waterloo, ON
A joint meeting of the The Association for Feminist Epistemologies, Methodologies, Metaphysics, and Science Studies (FEMMSS) and the Canadian Society for Women in Philosophy (CSWIP) wil be held at the University of Waterloo, August 10 to 13, 2014. FEMMSS is a multidisciplinary organization. For more information, see https://uwaterloo.ca/science-technology-society/conferences/science-technology-and-gender-challenges-and-opportunities

JOB POSTINGS

University of King's College - one-year sessional position in HOST
The University of King's College invites applications for a one-year sessional position in the History of Science and Technology programme (HOST) at the rank of assistant professor, starting on 1 July 2014. Candidates must have a Ph.D and teaching experience in history of science and technology or a related field (philosophy of science, science studies, etc.). Experience in interdisciplinary teaching or research would be an asset.
The successful candidate is expected to teach a) HSTC 1801 Engineering and Technology: From the Industrial

Age to the Cybernetic Age, b) part of HSTC 4000 Nature and Science in the Modern Period, as well as c) three other half-credit HOST electives. The ability to teach courses in the History of Chinese Science, Modern Science (especially physics and chemistry), or Science and Religion would be an asset. Please consult the academic calendar entries for the programme on the King's website for a list of possible classes.

Applications, including a cover letter containing a statement of teaching interests, curriculum vitae, three letters of reference, and evidence of effective teaching should be sent (in hard copy) by 27 April 2014, to:

Sharon Brown, Administrative Secretary
History of Science and Technology Programme
University of King's College
Halifax NS B3H 2A1
Canada
email: Sharon.Brown@ukings.ca
tel: 902.422.1271, ext. 204

Although candidates of all nationalities are encouraged, priority will be given to Canadian citizens and permanent residents. The University of King's College is an equal opportunity employer; women, visible minorities and members of other under-represented groups are particularly encouraged to apply. Information on the History of Science and Technology Programme can be found at www.ukings.ca

Department of Philosophy at UBC - 2-year* limited-term position

The Department of Philosophy at UBC invites applications for a 2-year* limited-term position at the rank of Assistant Professor Without Review to commence July 1, 2014. *The initial appointment will be for a 12-month period and may be renewed for another year, subject to satisfactory performance appraisals, compliance with UBC agreements and policies, and availability of funds.

Area of Specialization: ethics/social/political philosophy. Areas of competence: Other areas in value theory such as philosophy of law, applied ethics (biomedical, environmental, business), aesthetics.

The successful candidate must hold a Ph.D. (or expect to have successfully defended prior to 1 July 2014) and have demonstrated accomplishments in scholarship. S/he will be expected to maintain an active program of research and teaching, and to undertake service duties as assigned by the Head. The teaching load will be four 3-credit courses per year.

Applicants should send a curriculum vitae, a sample of their publications, a statement of teaching philosophy, and evidence of teaching ability and effectiveness. In addition, they should arrange for three confidential letters of reference to be sent directly to:

Search Committee
c/o Simone Dharmaratne, Administrator
Department of Philosophy
The University of British Columbia
Buchanan E370 - 1866 Main Mall
Vancouver, B.C., Canada V6T 1Z1
Phone: 604-822-3292 / Fax: 604-822-8782

Completed applications must be received by May 1, 2014. This position is subject to final budgetary approval. The University of British Columbia hires on the basis of merit and is strongly committed to employment equity and diversity within its community. We especially welcome applications from members of visible minority groups, women, Aboriginal persons, persons with disabilities, persons of minority sexual orientations and gender identities, and others with the skills and knowledge to engage productively with diverse communities. We encourage all qualified persons to apply; Canadian citizens and permanent residents of Canada will, however, be given priority. For more information see: http://philosophy.ubc.ca/

York University - three-year postdoctoral Fellowships in science and religion studies

York University announces two, three-year postdoctoral Fellowships in science and religion studies, funded by the Templeton Religion Trust grant 'Clash Narratives in Context: Uncovering the Social and Cultural Drivers of Contemporary Science vs. Religion Debates'

This multidisciplinary social sciences and humanities research project run in partnership with Coventry University (UK) and in association with the British Library and British Science Association will employ four intersecting approaches: qualitative social science field research; oral history, historical and media

discourse analysis; social psychology experimental research; and a large scale quantitative survey of public perceptions, attitudes and identity formation in the UK and Canada. The research team will be co-directed by principal investigators Dr Fern Elsdon-Baker (Coventry University, UK) and Prof. Bernard Lightman (York University).

Postdoctoral Fellowship Strand 1: Qualitative Social Sciences research into the drivers for Contemporary Science vs. Religion Debates'

This strand of research will seek to build a more comprehensive understanding of scientists and publics' lived experiences of the relationship between evolution and personal belief in Canada. The post holder will be expected to work collaboratively with the whole Canada and UK based team including Co-Investigator Dr Rebecca Catto and two UK based postdoctoral research fellows who will be undertaking related comparative social science/social psychology research in the UK. In addition to engaging in research as part of the 'Clash Narratives in Context' project, the Fellow will be expected to contribute to team meetings, dissemination and networking activities for the grant network in the UK and USA, including contributing the project based website and helping to plan the workshop to take place at York in Spring 2015. The successful applicant is expected to have completed his/her Ph.D. in social studies of science, and/or of religion or an STS or sociology related field, within the last five years and before taking up the fellowship.

Postdoctoral Fellowship Strand 2: Historical analysis of drivers for Contemporary Science vs. Religion Debates'

This strand of research will include historiographical analysis and archival research, which seeks to reframe and revisit existing historical discourse in light of overall project findings. In particular it will examine the role of the scientific naturalists[1] in the 19th and 20th centuries. This core piece of analysis will build a more coherent understanding of the origins of the 'clash narratives' between science and evolution. The post holder will be expected to work collaboratively with the whole Canada and UK based team including Principal-Investigator Dr Fern Elsdon-Baker, a UK based postdoctoral research fellows conducting recent history research in the UK and Canada and an oral history researcher working within the National Life Stories project team at the British Library. In addition to engaging in research as part of the 'Clash Narratives in Context' project, the Fellow will be expected to contribute to team meetings, dissemination and networking activities for the grant network in the UK and USA, including contributing the project based website and helping to plan the workshop to take place at York in Spring 2015. The Fellow will also work collaboratively with the John Tyndall Correspondence Project centred at York University. The successful applicant is expected to have completed his/her Ph.D. in history, philosophy, or social studies of science, or an STS related field, within the last five years and before taking up the fellowship. Preference will be given to candidates whose work focuses on nineteenth or twentieth century British science.

These awards provide a stipend equivalent to $33,500 plus limited benefits. Questions about the research project and the application procedure should be directed to Bernard Lightman: lightman@yorku.ca

Full applications will contain a cover letter that includes a description of current research projects, an academic cv, a writing sample, and at least three letters of reference. Applicants must also articulate how their research projects fit within one of the two strands of the grant. Applications (digital only please) should be sent to Michael Anderson, Administrative Assistant, Institute for Science and Technology Studies at: m_ander@yorku.ca.

Deadline: Applications must be received by May 1st, 2014. The successful applicant will begin their appointment on October 1st, 2014.

NASA Historian - 3 year position

The Hubble Space Telescope (HST) Project, located at NASA's Goddard Space Flight Center, is seeking an historian to document the operational phase of HST, which was launched in April 1990 and remains the world's premier space observatory. Dr. Robert Smith in his monograph, 'The Hubble Space Telescope,' summarized the development of the observatory. Now a follow-up study is desired of the operational phase of the mission. As an example for future science endeavors, we wish to document the motivation and efforts of a large, diverse

community--from technicians to engineers, managers, astronauts and astronomers--that led to extraordinary scientific advances which continue today.

The period of performance will be three years from award. Proposers should provide a cover letter, a curriculum vita, a plan and schedule for carrying out this project, a proposed budget, and endorsement by a sponsoring institution.

The deadline is June 30, 2014. A full description of the activity can be obtained through the Acquisition Notice Posting of solicitation number NNG14500087Q at the Federal Business Opportunities website:
https://www.fbo.gov

The point of contact is Tamika R. Seaforth, email:
Tamika.R.Seaforth@nasa.gov

CALL FOR APPLICATIONS

EDITOR - Scientia Canadensis
The Canadian Science and Technology Historical Association / Association pour l'histoire de la science et de la technologie seeks applicants for the position of Editor-in-Chief of the journal Scientia Canadensis beginning with the 2015 issues. The term is typically for five years and is a volunteer position.

Scope of the Journal: Scientia Canadensis, CSTHA/AHSTC's official journal, aims at building understanding of the history of science, technology, and medicine in Canada. (See http://cstha-ahstc.ca/scientia-canadensis/) In addition, the journal is opening its pages to international, comparative articles (for example, a recent special issue includes articles on circumpolar science and technology in Greenland, the USSR, Norway, and Canada). A scholarly, refereed journal since 1981, it includes original research and historiographical articles, shorter research notes, critical book reviews, and bibliographies. In 2009, the journal became available online through Érudit (http://www.erudit.org/revue/scientia), and beginning with Volume 37 (2014), it will be published only in an online format.
Qualifications: recognized expertise in the history of science, technology or medicine in Canada; managerial, organizational, editorial, and computer skills to oversee the editorial cycle; a compelling vision for the future of the journal; the ability to attract established and new scholars to publish in the journal; tact in communicating with authors; membership in CSTHA/AHSTC; and institutional support for the duration of the appointment. Bilingualism is an asset but is not mandatory.

Major responsibilities: In general, the editor-in-chief is responsible for the intellectual content, quality, and timeliness of the journal issues as well as the overall success of the journal. Specific duties may include but not be limited to: providing a clear vision for the direction of the journal, representing the journal in outside venues and conferences, soliciting high-quality manuscripts from potential authors, selecting a sufficient pool of competent peer-reviewers and managing the peer review process of manuscripts, deciding which manuscripts to publish, assisting authors in seeing their manuscripts to publication, and representing the journal in outside venues and conferences. The editor-in-chief is a member of the Executive Committee. Upon appointment, the Editor-in-Chief will select 8-10 scholars to join the Editorial Advisory Board of Scientia Canadensis, to provide advice and counsel, and to be nominated by the CSTHA / AHSTC Executive Committee
The Editor-in-Chief will work in cooperation with the Managing Editor, Dr. Stéphane Castonguay (who is responsible for the digital production of the journal), and the Book Review Editor, Dr. Jennifer Hubbard.

Search procedure: Applications will be reviewed by the CSTHA/AHSTC Executive Committee following the submission deadline. An application should be no more than five pages (not including the cv) and include: a) cover letter, which includes the applicant's name, affiliation, and other relevant information, and evidence of the applicant's ability and experience; b) vision statement of no more than two pages, which outlines the applicant's perspective on challenges and opportunities; future plans for the journal; expected tasks and objective milestones; etc. c) statement of institutional support, if any. Candidates should address the feasibility of serving as editor in light of the institutional resources likely to be available. CSTHA/AHSTC does not pay for office space, clerical assistance, or release time; and d) curriculum vitae. The cv should include publications and

any editorial experience.

Deadline: 31 July 2014. Applications should be sent via e-mail preferably as a single pdf file (filename: lastname-Scientia-Canadensis-editor.pdf) to Dr. Eda Kranakis, President CSTHA / président, AHSTC, Department of History, University of Ottawa, Ottawa, Ontario, K1N 6N5 (kranakis@uottawa.ca).

Postdoctoral Scholar Position - University of Calgary

Area:	History of Medicine (history of neuroscience & psychiatry)
Duration:	2 Years (potential for 3rd year)
Start Date:	September 1, 2014
Salary:	Commensurate with Experience

The Department of Community Health Sciences in the Faculty of Medicine at the University of Calgary is accepting applications for a Postdoctoral Fellow in the History of Neuroscience & Psychiatry for a research project funded by the Canadian Institutes of Health Research (CIHR).

Job Description:
The UofC has an active research and educational community in the wider field of the science studies (programs in the History of Medicine and Health Care, History and Philosophy of Science, as well as Science and Technology Studies). The successful applicant will work with a team of historians and science scholars based in the Faculty of Medicine with strong links to the Faculties of Arts/Science/Nursing, the Calgary Institute for the Humanities, the Hotchkiss Brain Institute, and the Institute for Public Health. The applicant will help to advance the groups' historiographical research program and engage with (inter)national collaborators to examine the impact of émigrés physicians and researchers in North American neuroscience. The research program is aligned with current work to investigate the impact of the forced migration of German-speaking émigré psychiatrists, neurologists and basic brain researchers in Canada and the USA (see: www.homhcp.ucalgary.ca).

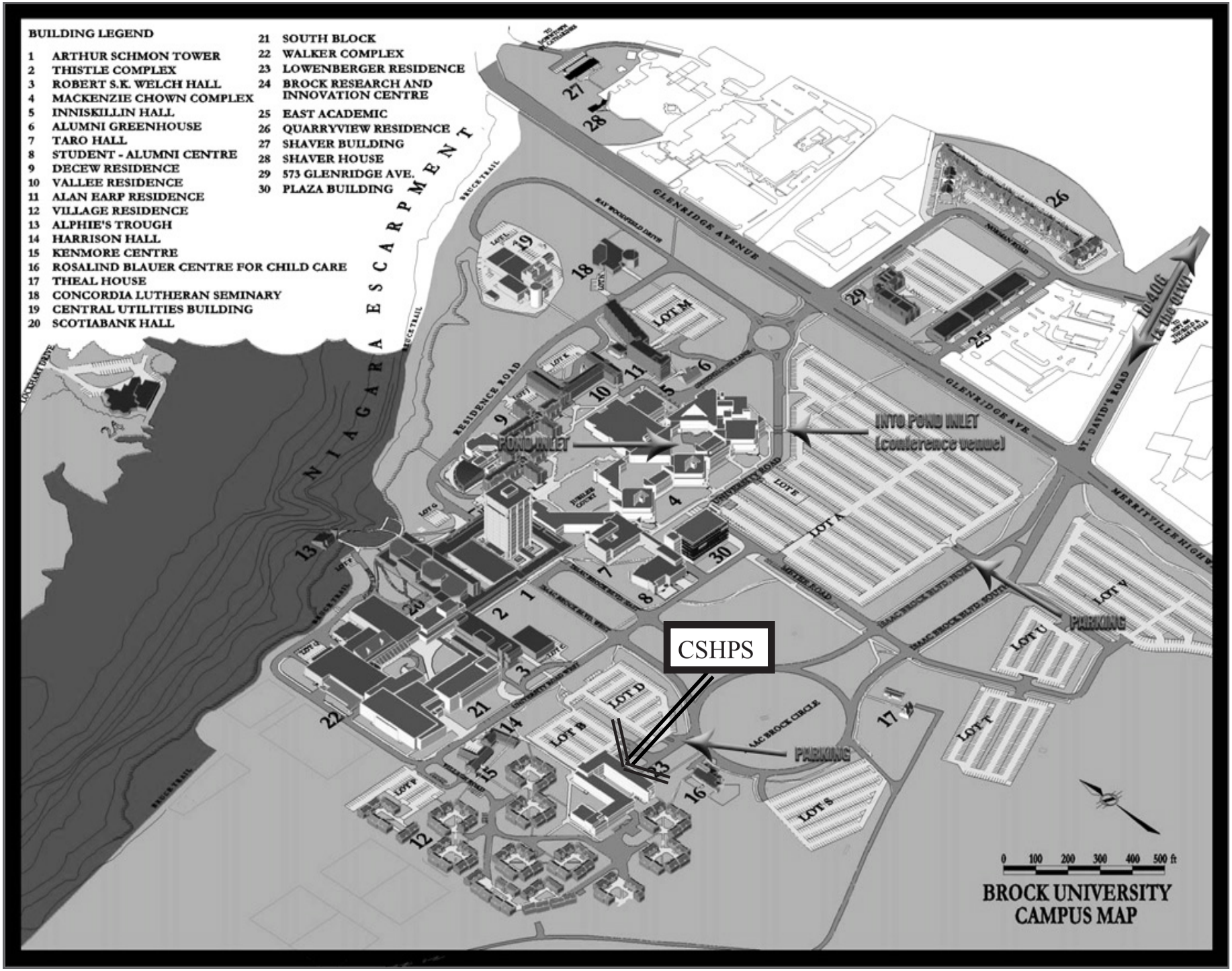
The successful candidate will teach 1 course per term in an area related to the History of Medicine/History/History and Philosophy of Science and contribute 40% of her/his time to research, data-banking, and publication activities of the research program. Participation in the ongoing seminars and lecture series of the program is also required. All other time, she/he can devote to her/his grant-writing activities, publications, and collaborations.

Qualifications:
Applications are invited from recent PhD graduates (<3 years from degree) in history/sociology/STS/philosophy/anthropology/classics with a demonstrated background in history of medicine/science/neuroscience and interest in the subject of the local research program. International applications are likewise strongly encouraged. Data-banking experience and additional knowledge of German, Hebrew, Polish, or French is appreciated; and demonstrated experiences with oral history methodology would be an advantage.

Application details:
Review of applications will begin April-30, 2014 continuing until successful recruitment (anticipated start date: Sept-1, 2014). Applicants should submit a CV, a cover letter with statement of research experience, 2 writing samples (articles or books chapters), a brief outline of personal research interests along with 2 reference letters to:

Dr. Frank W. Stahnisch, Associate Professor AMF/Hannah Professorship in the History of Medicine and Health Care Department of Community Health Sciences & Department of History TRW Building, Room 3E41, 3280 Hospital Drive NW Calgary, AB, Canada T2N 4Z6

Email applications (with all supporting materials) are preferred. Applicants wishing more information are encouraged to contact Dr. Frank W. Stahnisch (fwstahni@ucalgary.ca) or Mrs. Beth Cusitar (bcusitar@ucalgary.ca).


BUILDING LEGEND
1 ARTHUR SCHMON TOWER
2 THISTLE COMPLEX
3 ROBERT S.K. WELCH HALL
4 MACKENZIE CHOWN COMPLEX
5 INNISKILLIN HALL
6 ALUMNI GREENHOUSE
7 TARO HALL
8 STUDENT - ALUMNI CENTRE
9 DECEW RESIDENCE
10 VALLEE RESIDENCE
11 ALAN EARP RESIDENCE
12 VILLAGE RESIDENCE
13 ALPHIE'S TROUGH
14 HARRISON HALL
15 KENMORE CENTRE
16 ROSALIND BLAUER CENTRE FOR CHILD CARE
17 THEAL HOUSE
18 CONCORDIA LUTHERAN SEMINARY
19 CENTRAL UTILITIES BUILDING
20 SCOTIABANK HALL
21 SOUTH BLOCK
22 WALKER COMPLEX
23 LOWENBERGER RESIDENCE
24 BROCK RESEARCH AND INNOVATION CENTRE
25 EAST ACADEMIC
26 QUARRYVIEW RESIDENCE
27 SHAVER BUILDING
28 SHAVER HOUSE
29 573 GLENRIDGE AVE.
30 PLAZA BUILDING
NIAGARA ESCARPMENT
GLENRIDGE AVENUE
RESIDENCE ROAD
POND INLET
INTO POND INLET (conference venue)
ST. DAVID'S ROAD
MERRITTVILLE HIGHWAY
ISAAC BROCK BLVD. NORTH
ISAAC BROCK BLVD. SOUTH
ISAAC BROCK CIRCLE
PARKING
CSHPS
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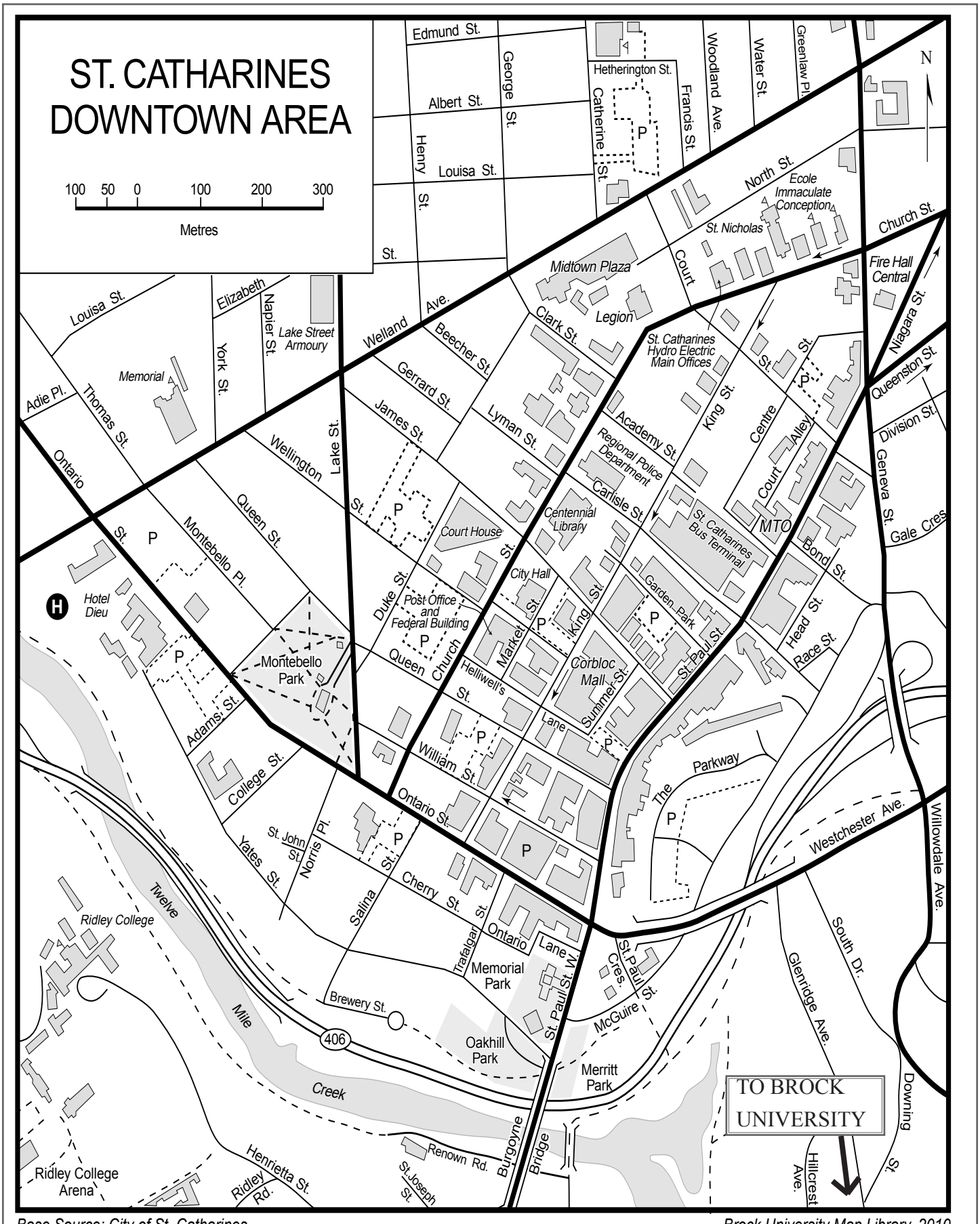
BROCK UNIVERSITY CAMPUS MAP



Base Source: City of St. Catharines

Brock University Map Library, 2010