

**PERSPECTIVES AND FUTURE DIRECTIONS:
NEUROETHICS IN CANADA**

A PROJECT LED

BY

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IN COLLABORATION WITH

NEUROETHICS PRINCIPALS IN CANADA

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EXECUTIVE SUMMARY

This report describes the present landscape of neuroethics in Canada as seen through the lens of Canadian principals working in the field. The Project was led by Dr. Judy Illes, Canada Research Chair in Neuroethics and Director of the National Core for Neuroethics at the University of British Columbia. In collaboration with Canadian colleagues, the goal was to identify areas of strength in neuroethics in Canada, define gaps and unmet opportunities in the field, and deliver recommendations for the growth of Canadian neuroethics in the coming years. Results are based on interviews and follow-up communication in person, by telephone, and via email.

Co-signatories of this report identify the following content and infrastructure priorities to sustain Canada's leadership in neuroethics on the world stage:

CONTENT AREAS

- Neuroethics programs of specific interest and value for Canada – for example, addiction and mental health, the aging brain, Aboriginal health issues
- International and global health neuroethics
- Neuroimaging and states of mind
- Clinical neuroethics
- Knowledge translation and knowledge exchange in neuroethics

INFRASTRUCTURE AND FUNDING

- Sustained support for both domestic and multi-national programs from CIHR-INMHA
- New support from CIHR from Institutes focused on health outcomes, genetics, aging, youth, and Aboriginal issues, and from other Canadian funding agencies
- Opportunities for academic tenure in neuroethics
- Creative opportunities that promote entry of young scholars and scientists in Canada into the field
- Career re-orientation opportunities for established investigators
- Opportunities for cross-disciplinary training and regular meetings of Canadian neuroethics minds on Canadian soil.

INTRODUCTION

This report describes the present landscape of neuroethics in Canada as seen through the lens of Canadian principals working in the field. The Project was led by Dr. Judy Illes, Canada Research Chair in Neuroethics at the National Core for Neuroethics, University of British Columbia (UBC), Vancouver, British Columbia. In collaboration with Canadian colleagues, the goal was to identify areas of strength in neuroethics in Canada, define gaps and unmet opportunities in the field, and develop recommendations for the growth and development of Canadian neuroethics for the coming years.

The timing of this report is coincident with the arrival of newly appointed Dr. Alain Beaudet, President of the Canadian Institutes of Health Research (CIHR), and the imminent departure of Dr. Rémi Quirion, the Scientific Director of the Institute of Neuroscience, Mental Health and Addiction (INMHA). This report was recommended by the International Advisory Board that serves the National Core for Neuroethics at UBC (www.neuroethicscanada.ca) of which Dr. Quirion is a member, but was not otherwise solicited.

A SHORT HISTORY OF MODERN NEUROETHICS

For neuroscience to be applied for maximum knowledge and public health benefit, it is critical to understand the interaction of research with ethics and society. This framework serves as the backdrop to the Project. Indeed, as Nobel laureate and Professor of Neurobiology Eric Kandel wrote in a *Trends in Neuroscience* paper on the history of modern neuroethics:

When thinking about ethical values in science, one is tempted to assume that these values are obvious; they are implicit in what we do. We believe that scientists who are well trained and serious about their work bring with them ethical values that allow them to think through, on their own, the social implications of their work and its consequences for others...

Following Galton, a common belief emerged among geneticists that one of the functions of genetics was to make the human race better [...] Eugenics was soon transformed from a belief into a pattern of action ...

Thus ethics in science is important because it is essential that the issues we confront in dealing with the mind be considered not only by the few narrow groups of individuals originally involved in delineating them, but by the larger group who can much better evaluate the ethical significance of these issues for society.

- Eric Kandel¹

The opportunity to merge aspects of research, ethics and society under the umbrella of neuroscience was first recognized as modern neuroethics in 2002 by attendees of the *Neuroethics: Mapping the Field* Conference in San Francisco, California. From this gathering, topics related to (1) *brain science and the self*, (2) *brain science and social policy*, (3) *ethics and practice of brain science*, and (4) *brain science and public discourse* developed as early pillars of inquiry in the field. These themes drew upon age-old debates of mind, brain, and behaviour and raised broad philosophical questions about the self, autonomy, and decision-making. Modern clinical ethics challenges relevant to neurology, neurosurgery, and mental health were also recognized as an integral part of neuroethics research due to the significant impact of neurological disease on quality of life. Since the 2002 meeting, neuroethics has gained considerable traction around the world, most notably in North America and Europe. Canadians, pioneers in neuroscience from the early days of Wilder Penfield and Herbert Henry Jasper, have been quick to appreciate the neuroethics imperative. Indeed, Penfield's work "foreshadowed current areas of inquiry both in neuroscience and neuroethics"².

The Canadian Institutes of Health Research (CIHR) has demonstrated strong and consistent support for research in the neurosciences, devoting nearly 20% of its total budget to neuroscience³. Similarly, the Institute for Neuroscience, Mental Health and Addiction (INMHA) has made a substantial commitment to cross-disciplinary research – under which neuroethics is classified – funding in excess of CAD \$600,000 in 2008 to the sector⁴. This generous funding, with partnership of the Ethics Branch of CIHR, has allowed Canada to firmly assert its position among the top funders of neuroethics research worldwide. Representing 8% of INMHA's total budget for the year 2008, this contribution exceeds the roughly 1% contribution of CIHR to research in biomedical ethics⁵. INMHA has allocated over CAD \$4 million to neuroethics research to date and, because of this solid commitment, INMHA has brought to the foreground support for team grants in neuroethics, partnered in the creation of a Canada Research Chair in Neuroethics, and ushered in several research programs devoted to neuroethics across the country. Additional funding for neuroethics initiatives has largely derived from multinational collaborations, including a Finland-Germany-Canada Trilateral Initiative in Neuroethics.

Reflecting these vital commitments is the substantial contribution by Canadian scholars to the pool of peer-reviewed neuroethics literature (Table 1). Many of these papers have been published in prestigious journals such as *Science*, *Nature*, *Nature Neuroscience*, *Nature Biotechnology*, *Nature Clinical Practice Neurology*, *Lancet Neurology* and the *Journal of Law, Medicine and Ethics*.

Aside from striking increases in the number of neuroethics publications since 2002⁶, the growth of the field has also been supported by the formal establishment of its own professional organization – the Neuroethics Society – that has a membership of nearly 500 to date worldwide. Professor Steven Hyman, Provost of Harvard University, serves as the Society's first President. Professor Illes is a member of the Executive Committee, along with other distinguished scholars: Professors Henry T. Greely (Stanford University), Barbara Sahakian (Cambridge University), Turhan Canli (State University of New York), Martha Farah (University of Pennsylvania) and Julian Salevescu (Oxford University). The Society benefits from the generous support of The Dana Foundation

and The Greenwall Foundation, among others. It held its first annual meeting at the American Association for the Advancement of Science (AAAS) in Washington, DC in November 2008. Professor Eric Racine (Institut de Recherches Cliniques de Montréal) served on the Program Committee for this event, which drew more than 200 scholars from around the world. It was standing room only on both days with a program that covered topics ranging from ethics challenges in deep brain stimulation and cognitive enhancement, to neuromarketing and policy-making in the neurosciences.

COUNTRY	FREQUENCY (%)	PAPERS PER MILLION PEOPLE (POPULATION-ADJUSTED FREQUENCY)
USA	342 (35.4%)	1.2
Canada	30 (3.1%)	1.0
UK	41 (4.2%)	0.7
Germany	49 (5.1%)	0.6
France	28 (2.9%)	0.5

Table 1: Number of publications, percent of data set, and number of publications adjusted by population per country for the top five countries publishing in neuroethics from 1989-2007, based on original data for 1989-2005 (Lomber and Illes, 2008⁶) and updated through 2007. The unweighted arithmetic mean of national populations as reported on census data from 1989-2007 for each country was used for the adjustment.

Of the more than 295 journals publishing neuroethics papers⁶, two scholarly journals are dedicated entirely to neuroethics: the *American Journal of Bioethics – Neuroscience*, first published in 2006, and *Neuroethics*, launched in 2007. The *Journal of Cognitive Neuroscience* also maintains a dedicated neuroethics track.

Numerous conferences and meetings on neuroethics have been held around the world. Canadians have provided leadership and direction and have contributed to virtually every major such initiative in the field. Just preceding the meeting of the Neuroethics Society in 2008, for example, the inauguration of the National Core for Neuroethics at UBC drew an audience of more than 160 people from around the world. UBC President and Vice Chancellor Stephen Toope opened the event with the following remarks:

Today, we embrace a new challenge. We wade into the very seat of social, cultural and physical understanding – the human brain – and we contemplate the ramifications of meddling with that most precious organ.

Of course, “meddling” is a loaded word, but as the ethicists among you will attest, every word comes with its own baggage, with suppositions and preconceptions. And I think it is important – or at least highly relevant – to acknowledge how charged the public conversation could become if we were to pursue advances in neuroscience without considering the social, cultural, personal and, indeed, the religious implications.

We have had lessons in this before. In Canada, for example, our abilities to perform what were once considered miracles in reproductive health quickly outstripped any social or national consensus about whether those new skills were positive or even acceptable. In 1989, the UBC medical geneticist Patricia Baird led a Royal Commission on New Reproductive Technologies that was charged with coming to grips with those issues...⁷

If governments are imperfect vehicles for advancing complex social conversation – and they are – I would have to argue that universities are the best alternative. University researchers are not immune to the temptations of power, privilege or personal financial gain, but contrary to some of the alternative venues, those are not our main objectives. Our institutions are open and accountable, transparent and closely monitored – from within and without. As the optimal locus for a robust dialogue, we are best positioned to bring together scientists, ethicists, representatives from government and business and, most importantly, the public at large.

In a best case – in this case – we can do that proactively. The National Core for Neuroethics is embedded – another loaded word; perhaps I should say, fully integrated – in the UBC Brain Research Centre. We have the ability to keep pace with the issues, to ensure the highest level of professional self-regulation. And at the same time, we offer the promise of leading a global conversation about neuroethics – one that I hope could ultimately result in a set of ethical findings that would be as broadly applicable as possible.

- Stephen Toope, President, UBC⁸

Others in attendance at the inauguration were the Dean of the Faculty of Medicine at UBC, Gavin Stuart, M.D., Professor Max Cynader, Ph.D., O.C., Director of the Brain Research Centre, UBC, Jon Stoessl, M.D., O.C., Acting Head, Division of Neurology, UBC, and local philanthropists with significant interests in neuroscience, mental health and addiction. An international neuroethics meeting, *Brain Matters*, will be hosted in Halifax, Nova Scotia, in September 2009. Professor Timothy Caulfield (University of Alberta) and Professor Illes are working closely with the National Judicial Institute, including Appellate Judges and Supreme Court Justices in British Columbia, Alberta and throughout Canada, to bring together the Canadian neuroscience and law communities on a number of initiatives, including a major conference in 2010. This activity will ideally leverage the USD \$10 million investment that the MacArthur Foundation has made in law and neuroscience in the United States (www.lawandneuroscienceproject.org).

The explosive growth of the field has stirred the interests of scholars in a broad range of disciplines, leaving some surprised by how neuroethics has so effectively and articulately carved itself off from bioethics as a separate scholarly pursuit. Critiques of the field have surfaced from scholars who suggest that neuroethics fails to pay sufficient heed to centuries of thinking in philosophy of mind. However, with publications from noteworthy authors such as Eric Racine in Canada, Patricia Churchland and Adina Roskies in the

United States, and Thomas Metzinger in Germany, such a claim can be challenged. Some others, such as scholars from the neurosciences, remain unconvinced of the practicality of neuroethics. Many have discussed the difficulties of incorporating ethics seamlessly into daily neuroscience practice^{9,10}.

The ongoing pressure on the field to achieve a mature identity, sustainability, and acceptance, coupled with the vigour with which neuroethics has surfaced and the attention it has gained in both the academic and public spheres, form both the basis for this review and rich material for further discussion.

PROJECT PARTICIPANTS

The participants in this project include principal investigators based in Canada who possess at least one grant specifically in the area of neuroethics, who have provided significant scholarship in the field through publication or other means, or who meet a combination of these criteria. Participants were identified either through personal knowledge of activity in neuroethics or by the knowledge and recommendations of the other participating investigators (Table 2). Moving from Canada's east to west coast, in Nova Scotia, Professors Françoise Baylis and Jocelyn Downie each hold a CIHR Team Grant for network building in neuroethics. In Ontario, Professor Abdallah Daar holds a Team Grant in Regenerative Medicine, which includes a major neuroethics component. In Ontario and Québec, Dr. Abraham Rudnick, Dr. Elena Moro, and Professor Eric Racine each hold individual investigator-initiated grants from CIHR or provincial sources, a CIHR grant that is a component of the trilateral Canada-Finland-Germany funding for neuroethics, or combinations of these. In Alberta, Professor Timothy Caulfield also holds a trilateral Canada-Finland-Germany neuroethics grant, and Professor Walter Glannon, a collaborator on the Baylis Team Grant, has contributed a landmark volume on neuroethics (*Defining Right and Wrong in Brain Science: Essential Readings in Neuroethics*, Dana Press, 2007). In British Columbia, in addition to the Canada Research Chair in Neuroethics, Professors Reiner and Illes maintain several grants from both federal and provincial sources, including the CIHR Establishment Grant in Neuroethics, as well as grants from the National Institutes of Health and other research sponsors in Canada and the United States. Illes and Racine each direct a centre focused entirely on neuroethics; all other participants conduct neuroethics research or theoretical work as part of larger scale programs in psychiatry, bioethics, health law, philosophy, or neurology. Together, project participants and their research groups represent more than 40 faculty, postdoctoral fellows, graduate students, trainees, and research staff working in the area of neuroethics in Canada.

We gratefully acknowledge the contributions and invaluable input of all participants (Table 2). Eight are co-signatories on this report.

Project Participants

Judy Illes, Ph.D. (Project Chair)	Canada Research Chair in Neuroethics, Professor of Neurology	University of British Columbia
Françoise Baylis, Ph.D.	Canada Research Chair in Bioethics and Philosophy, Professor of Bioethics	Dalhousie University
Timothy Caulfield, LL.M.	Canada Research Chair in Health Law and Policy, Professor of Law and Public Health	University of Alberta
Abdallah Daar, Ph.D.	Professor of Public Health Sciences and of Surgery	University of Toronto
Jocelyn Downie, LL.B., LL.M., S.J.D.	Canada Research Chair in Health Law and Policy, Professor of Law and Medicine	Dalhousie University
Walter Glannon, Ph.D.	Canada Research Chair in Biomedical Ethics and Ethical Theory, Associate Professor of Philosophy	University of Calgary
Elena Moro, M.D., Ph.D.	Assistant Professor of Neurology	University of Toronto
Eric Racine, Ph.D.	Director, Adjunct Professor of Social and Preventive Medicine	Institut de Recherches Cliniques de Montréal, Université de Montréal
Peter Reiner, V.M.D., Ph.D.	Professor of Psychiatry	University of British Columbia
Abraham Rudnick, M.D., Ph.D.	Associate Professor of Psychiatry and Philosophy	University of Western Ontario

Table 2: Project participants.

COLLECTION OF EXPERT OPINIONS

The Project Chair conducted one-on-one telephone interviews with each participant in November and December of 2008. Although members of the project generally agreed that meeting as a group in person would be preferable to enable an open and interactive exchange of ideas, scheduling was not possible in the short timeframe desired for completion of this report.

The Project Chair took responsibility for designing the interview guide and contributed independent responses to this report. The interview guide consisted of a series of open-ended questions that were provided electronically to participants in advance of the interview. Interviews ranged from 20 to 50 minutes. The findings that follow are based on the analysis of the written notes taken and feedback on an earlier draft. The assistance of the Core's Administrator for Finance and Research, Mr. Neil Chahal, and Ms. Sofia Lombera, Manager for Research and Global Partnerships and of the International Neuroethics Network headquartered at the National Core for Neuroethics, are gratefully acknowledged.

FINDINGS

CANADA'S STRENGTHS IN NEUROETHICS

Participants viewed the investment in domestic and international neuroethics, the establishment of world leadership in neuroethics, and the promotion of a culture for growth and innovation in the field as three formidable strengths of neuroethics in Canada.

Canada's exceptional investment in the field is reflected in CIHR's commitment to funding large team grants, a dedicated Canada Research Chair in Neuroethics, international funding opportunities for partnership, and resources for continued expansion and leadership. Due in large part to this steadfast direction and support, many current Canadian researchers and scholars are viewed on the international scene as pioneers in the field – responsible for shaping neuroethics, providing leadership, and modeling high quality knowledge and intellectual capacity. The Canadian environment is highly regarded as collaborative and hospitable to cross-disciplinary research, due in large part to the well-established health research infrastructure.

Canada's strengths in neuroethics also draw upon the variety of perspectives represented by scholars in the field, the diversity of methodological tools in play, and the willingness of Canadian researchers to hit the ground running in a field still actively asserting its independence. Neuroimaging, states of mind, global health with an emphasis on developing countries, and outreach are expressly considered to be content strengths on the Canadian landscape.

A Plurality of Views on the Need for a Strategic Vision

The collective responses to the question about the benefits of a common strategic vision for neuroethics in Canada represent the individuality, diversity, and plurality of perspectives at play in the field. Half of respondents (five) reported that a common strategic vision would confer both benefits and risks; three stated that adopting such a vision should be done unequivocally; and two answered that a common vision should be rejected. Those supportive of a national coordinated vision for neuroethics identified clinical neuroethics – with linkages between neurology, mental health, and other health subspecialties – as a top priority.

As a group, we are generally supportive of a unified long-term vision by CIHR for sustaining existing competitive neuroethics programs and promoting new ones across a range of disciplines represented by the various CIHR Institutes. Past Canadian initiatives involving stem cells and regenerative medicine, for example, and the ethical, environmental, economic, legal and social issues programs related to genomics (GE³LS) have proven that such an approach can be fruitful. In adopting such an integrated approach for neuroethics, researchers would be able to draw upon the strengths of a trans-disciplinary community of peers with differing interests as far reaching as medical anthropology and history, and break out of traditional structural silos in an effort to shed new light on ongoing and emerging challenges.

Any vision adopted by CIHR should be empowering, not restricting, and should seek to capture the unparalleled degree of innovation and originality found in Canadian neuroethics. A national funding vision will ensure the sustainability of ongoing programs that provide adequate capacity for student training, career opportunities for junior faculty, and career transition opportunities for established investigators wishing to complement their portfolio with neuroethics research.

We generally encourage revisiting the possibility of a long-term national vision through a visioning exercise in the future.

Training and Career Development

Every participant of the Project articulated development of new training and career opportunities as key priorities for neuroethics in Canada. Specifically, we call for opportunities for increased training of scholars in neuroscience, bioethics, law and other disciplines in innovative, inter-disciplinary, multi-site/multi-institutional programs that capitalize on the unique strengths identified at our centres across the country. A current study of ethics training in neuroscience graduate programs being led by the Project Chair and Ms. Lombera, in collaboration with INMHA and the CIHR Ethics Branch, will further inform the educational needs in ethics and neuroscience in the country. Results of this study will be released to neuroscience and Strategic Training Initiative in Health Research (STIHR) program directors at a workshop planned for the 2nd Annual Meeting

of the Canadian Association for Neuroscience in Vancouver, BC, in May 2009. Recommendations based on data gathered via telephone interviews with directors will be published as a white paper, downloadable in portable document format (PDF) from www.neuroethicscanada.ca and, ideally, will be published in a Canadian peer-reviewed journal as a resource for development and dissemination.

We also highlight the importance of opportunities for senior investigators from faculties such as medicine and law to reorient to or respecialize in neuroethics. In doing so, these new-to-the-field investigators would fill a significant void by not only conducting research, but also leading seminars in neuroethics, supervising graduate students and postdoctoral fellows, and providing clinical education (e.g., ethics rounds in neurology, neurosurgery, and psychiatry).

Training initiatives that include hands-on experience, such as local clinical consultation and policy building, are indispensable to ensure the preparedness of neuroethicists for real-world decision-making. Opportunities for face-to-face meetings at professional conferences between graduate students, postdoctoral fellows, and clinical trainees such as postgraduates in neurology and psychiatry will also create venues for promoting the advancement of students by way of enhancing their connection to the field through direct collaboration and support. The formation of these professional relationships will be facilitated by the availability of established faculty for training and mentorship.

When asked specifically about participating in a STIHR coordinated by faculty at UBC, eight members of the project responded that they would be enthusiastic to participate; two were not in favour. Identified benefits of such a program are increased human capital and the creation of a dedicated network and community of neuroethics scholars and scientists from a wide range of disciplines. Project members generally felt that the objectives of a STIHR would be supported by the diversity of talents brought forward by investigators at centres nationwide. Cautions about a neuroethics STIHR focused on the readiness of the field and maturity of the climate to embrace such a program. Of the several members participating in this project who have been involved in STIHRs in the past, two reported that the labour intensiveness of the training program outweighed the volume and quality of candidates brought forward.

Joint Initiatives

The development of new joint and multi-centre projects is highly desirable for the continued development of neuroethics in Canada. The full range of possibilities for relationships with clinicians in neurology, neurosurgery, psychiatry, and palliative care, for example, has not yet been realized in Canada, despite the many benefits of forging such alliances. Established, robust networks in neuroethics are a testimony to the benefits of such collaborations, as are initiatives such as a textbook co-authored by Professors Downie and Caulfield on law and policy, and other programs explicitly integrating multiple disciplines (e.g., science and health policy).

Knowledge Translation and Outreach

In the area of knowledge translation and outreach, many of us identified the need to scale up the visibility of Canadian neuroethics both nationally and internationally and to engage more with the media, not only as a high priority but as an unmet opportunity. This effort could build on groundwork on public and political engagement laid by Illes and Racine^{11,12,13}. Further efforts in these areas will enhance the profile of neuroethics and lead to the dissemination of meaningful and accurate knowledge about intersections between neuroscience and ethics.

Sustaining and Growing Neuroethics in Canada

The Canadian investment in neuroethics has enjoyed substantial positive returns. To continue to promote benefits from this investment, sustained funding for competitive ongoing efforts, seed grants for new scientists and scholars, and funds to build capacity at the level of tenured faculty positions are considered priorities. Many members of the group urged an increased investment in neuroethics, even in this difficult economic climate. A designated pool for neuroethics funds within the broader CIHR portfolio is one approach to address this call. The creation of a truly cross-disciplinary Canadian agenda for neuroethics, such as neuroethics in the context of Aboriginal peoples and innovative approaches to addiction treatment, represent enormous opportunity waiting to be met specifically for Canada. New and expanded funding from a wider range of Canadian agencies would enable investigators to close this gap.

CONCLUSIONS AND A LOOK TO THE FUTURE

The future for neuroethics in Canada lies largely in the hands of its leaders in the federal health research system. By all measures – leadership, internationalization, and scholarship – the investment in neuroethics to date has yielded positive results.

In looking to the future, and to sustain Canada's leadership on the world stage, co-signatories of this report identify the following as content and infrastructure priorities:

Content Areas

- Neuroethics programs of special interest and value to Canada – for example, addiction and mental health, the aging brain, Aboriginal health issues
- International and global health neuroethics
- Neuroimaging and states of mind, given proven successes in these domains
- Clinical neuroethics
- Knowledge translation and knowledge exchange in neuroethics

Infrastructure and Funding

- Sustained support for both domestic and multi-national programs from CIHR-INMHA
- New support from CIHR Institutes focused on health outcomes, genetics, aging, youth, and Aboriginal issues, as well as from the Social Sciences and Humanities Research Council (SSHRC), the Natural Sciences and Engineering Research Council of Canada (NSERC), and the Canadian Institute for Advanced Research (CIFAR), among others
- Opportunities for academic tenure in neuroethics
- Creative opportunities that promote entry of young scholars and scientists in Canada into the field
- Career re-orientation opportunities for established investigators
- Opportunities for joint programs, cross-disciplinary and cross-institutional training, and regular meetings of Canadian neuroethics minds on Canadian soil.

Respectfully submitted,

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