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**UNIVERSITY OF TORONTO**

# Institute for Human Development

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## Proposal

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## **SUMMARY OF THE PROPOSED UNIT**

The goal is to establish an inter-divisional and -institutional Institute for Human Development at the University of Toronto. The lead collaborating Divisions are Medicine, OISE and University of Toronto Mississauga (UTM), in partnership with University of Toronto Scarborough (UTSC) and the Faculty of Arts & Science. This will be an Extra-Departmental Unit Type C where the core faculty members will be cross-appointed from their primary University Departments.

The interplay between genes and environment is critically important for the promotion of health and wellbeing across the lifespan. Efforts to optimize development in early childhood in particular, and promote life-long health require early identification and effective interventions routed in geographic, cultural, social, linguistic and educational contexts. Understanding this complexity requires expertise from many disciplines. Faculty members who engage in this trans-disciplinary institute will learn from each other to create new knowledge about developmental trajectories, and mobilize that knowledge for societal improvement. The University of Toronto is one of the few research-intensive universities in the world with the breadth and depth of expertise necessary to engage in this complex scholarly endeavour. The outcomes of this institute will promote optimal development leading to increased well-being overall: healthier people, healthier communities and a healthier world.

The Institute will achieve global recognition for improving human well-being and potential through trans-disciplinary research and knowledge mobilization. The aims of the Institute are to contribute to improved human health, learning, social and emotional functioning, including effective approaches to prevention, early identification and intervention to maintain and promote health and wellbeing over the life course. It will attract outstanding scientists, scholars, postdoctoral fellows and graduate students. The outcomes of the research will be disseminated broadly not only to the scientific community but also to stakeholders such as government agencies, education leaders, professionals and the public.

The Institute will apply trans-disciplinary approaches to address complex questions that cannot be answered by any single existing discipline. The leadership of the Institute will recruit core faculty members across the University of Toronto to form new collaborating teams that will use a multi-faceted approach to identify the mechanisms underlying human development trajectories and use these discoveries to improve learning, health and society. Research questions, informed by societal needs, will focus on the interactions between genes and the natural, social and cultural environments to determine developmental trajectories, and how those trajectories are modified and contribute to major disorders such as childhood obesity and developmental difficulties in cognitive, emotional and social functioning. Discovery science interacting with human subject research will ultimately result in new diagnostic and interventional approaches, as well as prevention and promotion approaches, including effective education models and improved treatment support

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for physical, social and mental health. Knowledge from this research will be mobilized and impact measured by tracking the application of new knowledge in the health care and education as well as in innovative public policy that will drive change toward improved health and learning. Through its novel collaborative education programs, the Institute will prepare the next generation of researchers who will lead trans-disciplinary teams that merge discovery and translational research while continuing to address complex questions relevant to human development.

## **DESCRIPTION OF THE INSTITUTE**

The health, learning and well-being of all our children are central to the fabric of our society. Over the past 3 decades, research evidence has revealed that adverse developmental trajectories over the lifespan and particularly during the perinatal period and early childhood increase the risk of socio/cognitive and learning disabilities, cardio-metabolic illness, mental health problems, emotional dysfunction, and limiting opportunities and choices for individuals, communities and peoples. Creating strategies to promote healthy developmental outcomes and optimal learning present some of the most important local and global challenges and opportunities that we face.

The University of Toronto and its fully affiliated hospitals/research institutes and centers have established world-class research in maternal-child health, neuro-cognitive function and learning, social and emotional processes, early childhood education, geographic, cultural and linguistic contexts of development, and in both the basic and social sciences relevant to understanding developmental trajectories and to optimizing development and learning through innovative interventions and policies. The scientists and scholars in these programs work in inter-disciplinary groups established within their own Departments or Research Institutes and centers that collaborate nationally and internationally with similar groups. (The appendix describes some examples of these groups and their leaders.)

Over the past year, and with the encouragement of the Provost and President, scholars from Medicine, OISE and UTM with their Deans and Vice President Research have worked together to conceptualize this proposal.

Across the Faculty of Arts & Science, UTM, UTSC, the Faculty of Medicine and OISE, and many of the fully affiliated hospitals/research institutes, including Mt.Sinai Hospital and the Hospital for Sick Children, a breadth and depth of research capacity in the field of human development has been established that is truly world class. The University of Toronto is in a position to catalyze innovation and enable global impact by establishing a new level of integration across its spectrum of expertise.

The concept of an Institute for Human Development is a “big idea” that fits into the strategic research and educational directions across the University as delineated in the [Towards 2030](#) initiative, and in the collective academic plan for 2012. Each of

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the research groups has achieved national and international prominence. A successful collective enterprise, as envisioned by this Institute, has the capacity to lead this field of research and education to position Toronto as the global leader in human development research and its translation into society.

### ***Units/departments/divisions involved***

The Institute for Human Development will be an inter-disciplinary extra-departmental unit (EDU) Type C, with the capacity to emerge as an independent unit over time. The Departments, Faculties and Research Institutes that will contribute to the Institute for Human Development must identify and commit to their inter-disciplinary contributions as top strategic academic priorities. Hence, the Institute will be composed of faculty members and students who will engage in spearheading research strategically integrating and aligning their expertise and interests to create leading-edge discovery and its application.

The Institute for Human Development will be composed of ***core faculty members*** with primary appointments in existing university departments and Faculties who, with the recommendation and support of their Department Chairs and Deans, will devote a significant proportion of their academic responsibilities to the goals, vision and mission of the Institute. ***Associate faculty members*** will be individuals who, with the recommendation and support of their Department Chairs and Deans, will devote part of their academic responsibilities to the Institute.

The following University Departments, Institutes and Schools have been consulted and they, and others, are anticipated to be involved as the Institute evolves:

**Faculty of Medicine:** Physiology; Paediatrics; Obstetrics & Gynaecology; Psychiatry; Family and Community Medicine; Nutritional Sciences; Institute for Health Policy Management and Evaluation; Dalla Lana School of Public Health

[*Note:* Faculty members in contributing fully-affiliated hospitals/research institutes including the Mt. Sinai Hospital, Hospital for Sick Children, Holland Bloorview and the Centre for Addiction and Mental Health have primary University of Toronto appointments in the above Departments]

**Ontario Institute for Studies in Education:** Adult Education and Counselling Psychology; Human Development and Applied Psychology; Sociology and Equity Studies in Education; Curriculum, Teaching and Learning; Theory and Policy Studies in Education; Dr. Eric Jackman Institute of Child Study; Atkinson Centre for Society and Child Development; Dr. R.G.N. Laidlaw Centre.

**UTM:** Anthropology, Biology; Mathematical and Computational Sciences; Psychology; Philosophy

**UTSC:** Biology; Psychology; Social Sciences

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**Faculty of Arts & Science:** Ecology & Evolutionary Biology; Sociology; Cell Systems Biology; School of Public Policy & Governance

## **LOCATION OF THE INSTITUTE FOR HUMAN DEVELOPMENT**

The Institute for Human Development will have an on-campus core administrative hub, located at OISE, serving as a home for the Director, administrative staff and any other senior academic leaders that may be recruited to serve in leadership positions based on the strategic academic plan. Workshops, seminars, lectures and other major academic activities will be disseminated among the lead academic units, including hospitals/research institutes, to foster integration and networking.

## **ACADEMIC AIMS**

### **Research Aims**

The Institute will provide an environment for convergence of faculty members from across Divisions and hospitals/research institutes and centers into new collaborative research teams. In the first instance, the Institute will deploy ongoing strategic communication across the University to inform scientists and scholars in disciplines related to human development. The intent is to foster catalytic collaboration among the core research faculty. Workshops, seminars and invited lectures will be held for both faculty and students focused on the role of trans-disciplinary approaches to address complex questions in human development and the means by which answers to these questions can be moved into society. The themes in which the majority of faculty members will have interest and expertise will include (but not be limited to):

1. Enhancing learning potential;
2. Promoting trajectories for life-long health and well-being;
3. Optimizing social, cognitive and emotional functioning.

Visionary leadership will be required to identify the novel and urgent questions requiring trans-disciplinary research approaches. **Theme Coordinators** will be recruited by the Director (see Page 8) to assist in the organization of the communication among faculty members and to contribute to identifying those questions.

For example, the epidemic of childhood obesity, diabetes and consequent cardiovascular disease is considered as major issues affecting population in Canada and across the world. The etiologies are unclear but recent research in the field of health sciences, social sciences and education has revealed possible underlying contributors related to adverse developmental trajectories. Increased

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understanding of the associated developmental trajectories and the development of effective interventions early in life would have enormous benefits to individuals and societies around the world.

Similarly, the consequences of adverse early environments on children's physical, social, emotional, and cognitive development are a major concern around the world. Research shows that early adversity contributes to lower educational achievement, reduced social skills and problems with mental health.

Understanding the environmental, neural, and epigenetic mechanisms underlying these effects is essential for developing intervention strategies to eliminate and ameliorate them. Achieving that goal would improve the lives of millions of people.

Current existing nodes of research and scholarly expertise include: UTM's Departments of Psychology and Biology; OISE's Dr. Eric Jackman Institute of Child Study and its parent department, Human Development and Applied Psychology; Medicine's Departments of Physiology, Obstetrics & Gynaecology, Paediatrics, and Psychiatry; Mt. Sinai Hospital's Lunenfeld Research Institute; and the Hospital for Sick Children's Research Institute.

The emergence of new research teams composed of scientists from different Departments, Institutes and Schools will be coordinated and supported by the leadership of the Institute. In addition to the resources (including in-kind) provided by the contributing Departments, Institutes and Schools, the Institute for Human Development will work closely with Deans and the Vice President Research and the Vice President Advancement to seek out new sources of financial support for the novel research aims of the Institute.

Specific platforms for trans-disciplinary research will be available to the teams. These include (but are not limited to) the:

- Ontario Birth Cohort Study (coordinated by Professor Stephen Lye at Mt. Sinai Hospital and the Department of Obstetrics & Gynaecology);
- Advanced genetic and epigenetic analysis of model organisms and humans (coordinated by Professor Marla Sokolowski, UTM Department of Biology);
- Neuroendocrine and epigenetic translational animal models (coordinated by Professor Stephen Matthews, Department of Physiology);
- Neurocognitive analysis using combined psychometrics and brain imaging (members of the Departments of Paediatrics and Psychiatry);
- Emotional and cognitive development in the context of family, educational and cultural environments (members of Human Development and Applied Psychology; coordinated by Professors Alison Fleming [UTM Psychology] and Jennifer Jenkins [OISE]);
- Innovations in early childhood and supports for parenting with knowledge mobilization for policy change (members of the Dr. Eric Jackman Institute of

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Child Study and Human Development and Applied Psychology and community contributors, coordinated by Carl Corter).

### **Educational Aims**

The Institute for Human Development will develop new courses for undergraduate and graduate students in collaboration with the participating units. It is envisioned that a new collaborative graduate program in human development, involving all of the participating faculties and departments, will be established in the first 2 years. Opportunities for trans-disciplinary learning by students, postdoctoral fellows and faculty members through workshops, seminars and invited lectures will be a central aim. The Institute will seek out lead graduate departments in which core faculty members are appointed to partner in creating the collaborative program. It will also work to infuse new human development knowledge into professional training in fields ranging from education to pediatrics.

### **Knowledge Mobilization Aims**

A key success factor for the Institute for Human Development, in the long term, will be to demonstrate measurable impact on promoting healthy developmental outcomes and optimal learning and well-being for all our children. In the mid-term success will be measured by the impact of knowledge on practice, programs and policies in the health care system, the education system and the social service sector. At the outset of any new basic or translational research or education project, experts in knowledge mobilization will be engaged to ensure that the goals and objectives of the research teams and education leaders include strategies to optimize consultation and dissemination of ideas, questions and relevant outcomes. In addition to engagement of all academic stakeholders within the University, the Institute will aim to engage and partner with key external stakeholders including government, education leaders, professional bodies, not-for-profit charitable foundations and public policy leaders. As new discoveries and their application emerge from the Institute, knowledge mobilization will be central to enabling local and global impact.

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## **ESTABLISHMENT OF THE INSTITUTE FOR HUMAN DEVELOPMENT**

### **Appointment of Faculty Members to the Institute**

The appointment of core and associate members will be approved and periodically reviewed by the Executive of the Institute for Human Development. The Director will provide a time-limited appointment letter, with specific terms describing the expected contributions of each faculty member with approval by their Department Chair or Dean. The Director will provide to the Department Chair or Dean an annual written report on academic activity for each faculty member.

### **Timeline for Divisional and Governing Cycle Approval**

This proposal, approved in principle by the Provost, will proceed to the Faculty Councils of the Faculty of Medicine, OISE and UTM in the fall of 2011. The Vice Provost Relations with Health Care Institutions will establish agreements with the lead hospitals/research institutes as major contributors to the joint research, education and knowledge mobilization aims of the Institute.

**September 2011**– Agreement with fully-affiliated hospitals/research institutes

**October 2011** – Faculty Councils' approval

### **Director and Executive Committee**

The Director will be appointed by, and report to, an **Executive Committee** composed of the Deans (or their delegates) of the Faculty of Arts & Science, the Faculty of Medicine, OISE, UTM and UTSC, and the Associate Vice President, Research. The affiliated hospital/research institutes will be represented on the Executive by the Vice Presidents Research of Mt. Sinai Hospital and the Hospital for Sick Children. The **Chair or Co-chairs of the Executive Committee** will be appointed by the Provost. The Director will be an *ex officio* member of the Executive.

The Director will be responsible for all academic and administrative activities of the Institute including appointment of and oversight of the Theme Coordinators. Within the first 6 months of appointment, the Director will prepare a comprehensive 5 year strategic academic plan that will be approved by the Executive Committee and the Provost. Annual review of the Director and the Institute will be focused on the fulfillment of the goals and objectives of the strategic plan. Annual goals will be updated according to new opportunities.

### **International Scientific Advisory Council**

An **International Scientific Advisory Council** will be struck by the Executive Committee and approved by the Provost. This Council will meet periodically, and not less than every two years, to provide guidance from a global perspective to the Director and Executive Committee. The Council will report in writing to the

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Executive Committee and the Provost about the achievement of the stated strategic goals and objectives of the Institute and provide advice about future directions and tactics.

### **Financial Support and Fund-Raising**

The Institute will attract new funding from both public and private sources, significantly increasing the resource to support the trans-disciplinary research and education in human development. As part of the strategic planning for the Institute an initial academic business plan will be prepared by the Interim Director and the Executive Committee to be approved by the Provost. This will include, but not be limited to, shared revenues from the major contributing Faculties and affiliated hospitals/research institute aligned with academic and administrative expenses that will support the start-up of the Institute's goals and objectives. In-kind support for faculty remuneration and research infrastructure will be recognized. Overhead on research grants held by core faculty members that contribute to inter-disciplinary research of the Institute will also be considered as stakeholder contribution. Fund-raising by the University for the Institute will commence immediately led by the Vice President of Advancement in collaboration with the advancement teams of the major contributing Faculties and affiliated hospitals/research institutes.

## APPENDIX

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The following describes some of the core faculty member team leaders and their world-class research programs that will contribute to the Institute for Human Development.

**Professor Marla Sokolowski**, Department of Biology, UTM, is a University Professor and Co-director of the Canadian Institute for Advanced Research *Experience-Based Brain and Biological Development Program* with collaborations extending across the globe among the top-ranked scientists in this field. She conducts integrative, ground-breaking research in behavior genetics. Her own laboratory focuses on the genetic, molecular, neurobiological and environmental underpinnings of behavioural variation in the fruit fly. She studies the mechanistic and evolutionary significance of genes affect larval behavior by isolating, identifying, cloning and sequencing these genes and also by understanding how variation in gene expression can affect fitness of the organism. Gene discovery in the fruit fly has proven very useful in understanding how similar genes function in humans. Among her many collaborators are included Professors James Kennedy and Robert Levitan, scientists in the Department of Psychiatry at the University of Toronto who study the genetic and developmental causes of mental illness such as schizophrenia, depression and eating disorders.

**Professor Stephen Lye**, Department of Obstetrics and Gynecology, Faculty of Medicine is a senior investigator and associate director of the S. Lunenfeld Research Institute at Mt. Sinai Hospital, full affiliated with the University of Toronto. He is a recognized leader in the field of women's and infants' health and leads an international study that examines the impact of genetics and a baby's environment inside the womb to understand how these factors lead to major diseases later in life. His lab has designed a new blood test to differentiate women who are predisposed to delivering babies prematurely from those who won't. Premature babies with low birth weight are particularly susceptible to risk of later-life cardio-metabolic disease. Professor Lye and his colleagues at the University of Toronto including Professor Stephen Matthews, he collaborates with a large study group in Australia that has recruited 3,000 pregnant women and has recorded their birth parameters and followed their offspring for 20 years, studying their growth, physiology and psychosocial development. He is now genotyping the children and parents in this study – a process that will reveal important data about the complex interplay if genetic and environmental factors involved in health and susceptibility to illness. Professor Lye will now launch the *Ontario Birth Study* at Mt. Sinai Hospital that will be world's largest and most comprehensive study of the impact of development on an individual's health, learning and social functioning.

**Professor Stephen Matthews**, Chair Department of Physiology, Faculty of Medicine leads a research team on the St. George campus that studies the developmental origins of health and disease with particular interest in the regulation and plasticity

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of neuroendocrine systems during development. His group studies the role of internal and external, e.g., maternal nutrition, exposure during gestation and fetal development and future neuroendocrine function and behavior. His research is focused on the complex molecular mechanisms by which the fetal environment interacts with the genome. At the molecular level, he has identified that specific proteins in the placenta and developing brain in the human and mouse, may protect the fetus from toxins and drugs. He was founding co-director of the MAVAN (maternal adversity vulnerability and neurodevelopment) program, which follows the neurocognitive development of infants and children following adverse early experience. He also collaborates extensively within the MACS program that is following neurocognitive and cardiometabolic development in infants and children exposed to glucocorticoids in pregnancy. He collaborates widely across Canada, with Professor Michael Meaney at McGill University, and in the UK.

**Professor Carl Corter**, Department of Human Development and Applied Psychology, OISE has collaborated with several other researchers on the Toronto First Duty: Early Learning and Care for Every Child project (TFD). TFD is a universal early learning and care program model for every child that simultaneously: meets the developmental needs of children to ensure they reach their full potential; supports parents to work or study; and, supports parents in their parenting role. Not only does this model bring together kindergarten, childcare and parenting supports into a single program, but it also guarantees that parents are able to access the full range of child and family supports available in their community. Professor Corter's research interests include: early childhood development and education; parenting; and, school, family and community partnerships.

**Professor Jennifer Jenkins**, Department of Human Development and Applied Psychology, OISE, holds the Atkinson Chair in Early Child Development & Education. Her main area of work is about understanding emotion processes in children and in family life that help us to understand psychopathology in children. She is presently co-directing the Kids, Families & Places Study where she works alongside a team of expert researchers to conduct a study where the goals are first to examine the simultaneous influence of neighbourhood, family and childcare contexts on preschool children's development and second, to identify biological and behavioural characteristics of children that modify how they react to these environments. This is the first study worldwide to examine children's development in a nested, multilevel framework, going from the biology of the individual to the neighbourhoods and schools in which they grow up.

**Professor Kang Lee**, Department of Human Development and Applied Psychology OISE, holds a University of Toronto Distinguished Professorship in Developmental Neuroscience and Education. He is a developmental psychologist who studies the emergence and development of social cognition and social behaviour, and the underlying cognitive-cultural-neural mechanisms (e.g., EEG and fMRI). Over the last 15 years, he has mainly focused on two major issues. The first is the development of moral cognition and action with a specific focus on verbal deception from cross-

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cultural perspectives; how children from different cultural backgrounds come to grips with the concept and moral implication of lying and truth-telling, whether children are able to detect others' lies, and whether children can tell convincing lies in various social situations. The second focus of his research is on the development of social perception with a specific focus on face processing; how children and adults with differential social cultural experiences process both stable and dynamic social information in a face.

**Professor Alison Fleming**, Department of Psychology, UTM, is a Tier 1 Canada Research Chair and Fellow of the Royal Society of Canada who is an expert on the neurobiology of mothering in humans and in animal models. Fleming studies how the maternal brain processes information relating to infants. She analyzes the neural mechanisms behind maternal responsiveness in healthy women and in those suffering from postpartum depression, a condition that affects about one in five new mothers. Fleming also explores the genetics and epigenetics of mothering in humans by studying both rats and humans and identifying and characterizing the genetic markers relating to maternal behaviour. Through her investigations of the expressions of these genes and their proteins (in rats), she is providing us with a clearer perspective on individual differences in maternal behaviour and their corresponding brain mechanisms. Finally, Fleming has explored the mechanisms underlying the effects of early prenatal and postnatal adversity on the development of mothering, focusing on an animal model of adversity and exploration of populations of women who are at risk because of early abuse and neglect. Included among these are teenage mothers and depressed mothers