International Exchange Course

Developmental and Perinatal Biology 2022

Program

A Joint Course between:

University of Toronto & Karolinska Institutet
Welcome

Welcome to Developmental & Perinatal Biology 2022! This is the 24th Annual Exchange in developmental and perinatal biology between The University of Toronto and The Karolinska Institute. The research course has been developed to provide a broad-based interdisciplinary training for graduate students, research fellows, clinical fellows and residents in the area of developmental biology from both basic science and clinical perspectives. The workshop combines a lecture/seminar program with an active research component.

This year we have experienced similar enthusiasm, with 4 Faculty and 12 Trainees attending from Sweden along with 22 Trainees from The University of Toronto. In addition, a large number of Faculty from across the University of Toronto will contribute to the course.

The organization of this type of course requires a considerable input of energy. Therefore, we would like to take this opportunity to thank those on the organizing committee for helping to put the exciting course program together, and to Fredrik Lanner for co-ordinating the Swedish side of the exchange. We would also like to thank Victoria De Luca, Bona Kim, and Christopher Casciaro who have provided invaluable organizational support. Finally, we would like to express our gratitude to the Department of Physiology (University of Toronto), our sponsors, many of whom have provided continuous support over the last 24 years, and who have made Developmental & Perinatal Biology 2022 possible.

Please accept our warmest welcome to what we hope will be an exciting academic and social experience.

S. G. Matthews
Professor
Physiology, Ob/Gyn & Medicine
University of Toronto

Brian Cox, PhD
Associate Professor
Department of Physiology
University of Toronto
Local Organizing Committee:

Stephen Matthews (Chair)
Brian Cox
Evelyn Lambe
Stephen Lye
Cristina Nostro
Victoria De Luca
Christopher Casciaro (trainee)
Bona Kim (trainee)
Aya Ragheai (trainee)

Co-Sponsors:

Department of Physiology, University of Toronto
Lunenfeld-Tanenbaum Research Institute, Sinai Health System
Department of Obstetrics & Gynaecology, University of Toronto
Hospital for Sick Children, Research Institute
Faculty of Medicine, University of Toronto
Heart and Stroke/Richard Lewar Centre of Excellence in Cardiovascular Research
Create
Mats Sundin Foundation

Location:

Registration: August 18 – Room 2172, Medical Sciences Building, University of Toronto

Lectures: August 18-24 – Room 2172, Medical Sciences Building, University of Toronto

Practical Workshops: TBC

Social Activities:

August 17 Art Gallery of Ontario/Pub Night
August 18 Ripley’s Aquarium/Axe Throwing
August 19 Toronto Island Picnic
August 20 Niagara Falls
August 21 CN Tower and Royal Ontario Museum
August 22 Course Welcome Reception - Faculty Club, University of Toronto
August 23 Canadian National Exhibition
FACULTY—University of Toronto:

<table>
<thead>
<tr>
<th>Name</th>
<th>Department</th>
<th>Location</th>
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<tbody>
<tr>
<td>Brian Cox</td>
<td>Physiology</td>
<td>University of Toronto</td>
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<tr>
<td>Paul Delgado Olguin</td>
<td>Molecular Genetics</td>
<td>Hospital for Sick Children</td>
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<td>Stephen Lye</td>
<td>Ob/Gyn and Physiology</td>
<td>Lunenfeld-Tanenbaum Research Institute</td>
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<td>Stephen Matthews</td>
<td>Physiology and Ob/Gyn</td>
<td>University of Toronto and LTRI</td>
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<td>Patrick McGowan</td>
<td>Biological Sciences</td>
<td>University of Toronto at Scarborough</td>
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<td>Alison McGuigan</td>
<td>IBBME</td>
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<td>Lubna Nadeem</td>
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<td>Cristina Nostro</td>
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<td>Martin Post</td>
<td>Translation Medicine</td>
<td>Hospital for Sick Children</td>
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<td>Stephanie Protze</td>
<td>Molecular Genetics</td>
<td>McEwen Stem Cell Institute</td>
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<tr>
<td>Amy Ramsey</td>
<td>Pharmacology &amp; Toxicology</td>
<td>University of Toronto</td>
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<tr>
<td>Janet Rossant</td>
<td>Molecular Genetics &amp; Ob/Gyn</td>
<td>Hospital for Sick Children</td>
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<td>Greg Ryan</td>
<td>Medical Imaging</td>
<td>Lunenfeld-Tanenbaum Research Institute</td>
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<td>Michael Seed</td>
<td>Paediatrics</td>
<td>Hospital for Sick Children</td>
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<tr>
<td>Sridevi Venkatesan</td>
<td>Physiology</td>
<td>University of Toronto</td>
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<tr>
<td>Amy Wong</td>
<td>Laboratory Medicine and Pathobiology</td>
<td>Hospital for Sick Children</td>
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Karolinska Hospital/Institute:

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<th>Name</th>
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<tr>
<td>Ola Hermanson</td>
<td>Neuroscience</td>
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<td>Fredrik Lanner</td>
<td>Clinical Science, Intervention and Technology</td>
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<tr>
<td>Kristiina Tammimies</td>
<td>Neuropsychiatry</td>
</tr>
<tr>
<td>Pauliina Damdimopoulou</td>
<td>Clinical Science, Intervention and Technology</td>
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Thursday, August 18

8:30  Registration  
Room 2172, Medical Sciences Building, University of Toronto  
1 King's College Circle, Toronto

8:45  Welcome/Introduction  
Stephen Matthews  
International Exchange Program for Developmental and  
Perinatal Biology, University of Toronto

Stem Cells, Early Embryonic Development and Disease
Co-ordinator: Cristina Nostro

9:00  Stephanie Protze: Pluripotent stem cells as tool to study human heart development

9:40  Alison McGuigan: Tissue engineering strategies to build multicellular structures for  
modelling disease and regeneration

Coffee

10:40  Amy Wong: iPSC-based models of human lung to understand development, disease and  
therapies

11:20  Cristina Nostro: Using hESC differentiation to model pancreatic development

Trainee Presentations (Orals 1-3)

12:00  Matthew Guo¹: A CRISPR screen of somatic cell reprogramming reveals novel biphasic  
regulation of fate by cell cycle genes

12:15  Sheila Kwok²: An Extended Culture System Mimicks Early Human Embryo Development in  
vitro
12:30  Tim (Ka Ki) Tam³: Elucidating trophoblast differentiation potential

13:00  Lunch - MSB Cafeteria

Research Workshops: TBC

18:00  Social Activity: Ripley’s Aquarium/Axe Throwing
Friday, August 19

Placenta and Organoids
Co-ordinator: Brian Cox

9:00  Janet Rossant: Making the blastocyst- lineage formation and stem cell origins

9:40  Fredrik Lanner: Embryonic stem cells, pluripotency and totipotency

Coffee

10:40  Brian Cox: The placenta, a neglected organ

11:20  Ola Hermanson: Stem cellish cells as targets for treatment of brain tumor patients

Trainee Presentations (Orals 5-6)

12:00  Sarah Debebe: A novel surgical mouse model of maternal vascular malperfusion

12:15  Aphrodite Demetriou: Estrogen receptor beta modulates microglia activation in Alzheimer’s disease pathology (TBC)

12:30  Lunch - MSB Cafeteria

Research Workshops: TBC

18:00  Social Activity: Toronto Island Picnic
Monday, August 22

Fetal Development
Co-ordinator: Stephen Lye

9:00  Lubna Nadeem: Mechanism of Myometrial Progesterone Withdrawal and Labour Onset in Humans

9:40  Greg Ryan: Fetal Therapy

Coffee

10:40  Michael Seed: The Artificial Placenta

11:20  Martin Post: Cell therapy for lung disease

Trainee Presentations (Orals 7-9)

12:00  Henry Quach: Leveraging human pluripotent stem cells to understand fetal lung development and CF disease

12:15  Baoshan Liao: AAV-CRISPR/Cas9-mediated Rhodopsin knock-in effectively rescues photoreceptor degeneration in the mouse models of autosomal dominant retinitis pigmentosa

12:30  Akram Ahmed: A brain precursor atlas reveals the acquisition of developmental-like states in adult cerebral tumours

13:00  GROUP PHOTO: please assemble outside on steps of MSB facing King’s College Circle

13:15  Lunch - MSB Cafeteria

14:00  Poster Session - Stone Lobby, MSB 2171

18:30  Course Welcome Reception - Faculty Club, University of Toronto, 41 Willcocks St, Toronto
Tuesday, August 23

Developmental Origins of Health and Disease
Co-ordinator: Stephen Matthews

9:00 Pauliina Damdimopoulou: How environmental pollutants impact the early germline/ovary

9:40 Sophie Petropoulos: Environmental influences on the early embryo

Coffee

10:40 Paul Delgado-Olguin: Fetal programming of heart disease

11:20 Patrick McGowan: Early programming of the brain

Trainee Presentations (Orals 10-12)

12:00 Christina Neofytou: Epigenetic Landscape and transcriptome in human neural progenitors after irradiation/lithium exposure: Implications for treatment of Cognitive Defects After Brain Radiotherapy

12:15 Dominyka Batkovskyte: A hypomorphic variant in the translocase of the outer mitochondrial membrane complex subunit TOMM7 leads to syndromic short stature and developmental delay

12:30 Bona Kim: Differential DNA Methylation Following Antenatal Corticosteroids in Newborn Brain

13:00 Lunch - MSB Cafeteria

Research Workshops: TBC

18:00 Social Activity: Canadian National Exhibition
Wednesday, August 24

The Developing Brain
Co-ordinators: Evelyn Lambe

9:00  Amy Ramsey: Convergent and divergent phenotypes of GRIN Disorder mouse models

9:40  Sridevi Venkatesan: Mechanisms of hyperexcitability in a mouse model of epileptic encephalopathy

Coffee

10:40 Kristiina Tammimies: iPSC and brain organoids for modeling autism and neurodegenerative disorders

11:20 Karun Singh: Investigating neurodevelopmental disorder disease mechanisms using stem cell models

12:30 Lunch - MSB Cafeteria

End of Course