# CRYO2016 – 53rd Annual Meeting of the Society for Cryobiology
## Ottawa, Canada

### Final Program

#### Saturday, July 23, 2016

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<th>Timing</th>
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<tr>
<td>09:00 – 17:00</td>
<td>Board of Governors Business Meeting <em>(Gatineau Room)</em></td>
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<tr>
<td>09:00 – 17:00</td>
<td>Meeting Registration <em>(Hotel Lobby)</em></td>
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<tr>
<td>19:00 – 21:00</td>
<td>President’s Reception <em>(Quebec Suite)</em></td>
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#### Sunday, July 24, 2016

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<tr>
<td>08:00 – 17:00</td>
<td>Meeting Registration <em>(Drawing Room Foyer)</em></td>
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<td>08:30 – 09:00</td>
<td>Welcoming Address <em>(Adam Room)</em></td>
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<tr>
<td>09:00 – 10:00</td>
<td><strong>Plenary #1</strong> – Cryopreservation and Stem Cell Therapy - Dr. David Courtman <em>(Adam Room)</em></td>
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<tr>
<td>10:00 – 10:30</td>
<td>Break <em>(Ballroom)</em></td>
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<tr>
<td>10:30 – 12:00</td>
<td><strong>Symposium #1</strong> – Cryopreservation and Cell Therapeutics <em>(Drawing Room)</em></td>
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<tr>
<td>12:00 – 13:30</td>
<td>Lunch – <strong>Buffet Lunch Provided</strong> <em>(French Corridor)</em></td>
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<tr>
<td>13:30 – 15:30</td>
<td><strong>Session #1</strong> – Submitted Cell Therapy Abstracts <em>(Drawing Room)</em></td>
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<td>15:30 – 16:00</td>
<td>Break <em>(Ballroom)</em></td>
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<tr>
<td>16:00 – 18:00</td>
<td><strong>Session #4</strong> – Transport Models in Cryobiology <em>(Drawing Room)</em></td>
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<tr>
<td>18:00 – 20:00</td>
<td>Poster Session #1 and Reception <em>(Ballroom)</em></td>
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#### Monday, July 25, 2016

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<tr>
<td>08:00 – 17:00</td>
<td>Meeting Registration <em>(Drawing Room Foyer)</em></td>
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<tr>
<td>08:30 – 10:30</td>
<td><strong>Plenary #2</strong> – Dr. Peter Mazur – A Tribute <em>(Adam Room)</em></td>
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<td>10:30 – 11:00</td>
<td>Break <em>(Ballroom)</em></td>
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<tr>
<td>11:00 – 12:00</td>
<td><strong>Session #7 - Student Crystal Award Presentations</strong> <em>(Adam Room)</em></td>
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<tr>
<td>12:00 – 13:30</td>
<td>Lunch <em>(not provided)</em> / Cryobiology Editorial Board Meeting <em>(Tudor Room)</em></td>
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</table>
| 13:30 – 15:30   | **Session #8 – Calling all Cryobiologists: Organ Cryopreservation as a Growing Research Priority** *(Adam Room)*  
|                 | **Session #9 – Cool Developments in Cryomedicine A – Cellular and Molecular Developments** *(Drawing Room)* |
|                 | **Session #10 - Conservation of threatened and endangered species - case studies** *(Laurier Room)* |
| 15:30 – 16:00   | Break *(Ballroom)*                                                              |
| 16:00 – 18:00   | **Session #11 – Mammalian Reproductive Biology** *(Adam Room)*                   |
|                 | **Session #12 – Cool Developments in Cryomedicine B – Cellular and Molecular Developments** *(Drawing Room)* |
| 18:00 – 20:00   | Poster Session #2 and Reception *(Ballroom)*                                    |

**Tuesday, July 26, 2016**

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<th>Timing</th>
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<tr>
<td>08:00 – 12:00</td>
<td>Meeting Registration <em>(Drawing Room Foyer)</em></td>
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<td>08:00 – 09:00</td>
<td><strong>Special Topic #2 – Asymptote Ltd.</strong></td>
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<tr>
<td>08:30 – 09:30</td>
<td><strong>Plenary #3 – Engineering Advances &amp; Cryotechnology - Dr. Utkan Demirci</strong> <em>(Adam Room)</em></td>
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<tr>
<td>09:30 – 10:00</td>
<td><strong>Session #13A - Presentation of Luyet Medal - Dr. John Bischof</strong> <em>(Adam Room)</em></td>
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<td>10:00 – 10:30</td>
<td>Break <em>(Ballroom)</em></td>
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<td>10:30 – 12:00</td>
<td><strong>Symposium #3 – Tools to Improve Cryopreservation</strong> <em>(Drawing Room)</em></td>
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<td><strong>Symposium #4 – Plant and antifreeze proteins in cryopreservation: From genomics to transcriptomics</strong> <em>(Laurier Room)</em></td>
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<td>12:00 – 13:30</td>
<td><strong>Session #14 – Thawing / Warming Submitted Abstracts</strong> <em>(Adam Room)</em></td>
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<td><strong>Session #15 – Submitted General Cryobiology Abstracts</strong> <em>(Drawing Room)</em></td>
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<td><strong>Session #16 – New Tools Submitted Abstracts</strong> <em>(Laurier Room)</em></td>
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<tr>
<td>13:30 +</td>
<td>Lunch – <strong>Box Lunches Provided</strong> <em>(French Corridor)</em></td>
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<td>13:30 +</td>
<td>Free Afternoon / Networking Activities</td>
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<tr>
<td>13:45 – 17:00</td>
<td>Diefenbunker Tour</td>
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<td>19:00 – 21:00</td>
<td>ICYR Activities</td>
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**Wednesday, July 27, 2016**

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<tr>
<td>08:00 – 12:00</td>
<td>Meeting Registration <em>(Drawing Room Foyer)</em></td>
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<tr>
<td>07:30 – 08:30</td>
<td>CRYO2017 Planning Meeting / Handoff Meeting <em>(Laurier Room)</em></td>
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<tr>
<td>08:30 – 09:30</td>
<td><strong>Plenary #4</strong> – Biological Stress Response - Dr. David Denlinger <em>(Adam Room)</em></td>
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<tr>
<td>09:30 – 10:00</td>
<td><strong>Session #13B</strong> - Presentation of Luyet Medal - Dr. Greg Fahy <em>(Adam Room)</em></td>
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<td>10:00 – 10:30</td>
<td>Break <em>(Ballroom)</em></td>
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<tr>
<td>10:30 – 12:00</td>
<td><strong>Symposium #5</strong> – Nature’s Way: Molecular, Gene, Cell Signaling, Underpinnings of cold and freeze tolerance in animals <em>(Adam Room)</em></td>
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<tr>
<td>12:00 – 13:30</td>
<td>Lunch <em>(not provided)</em></td>
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<tr>
<td>13:30 – 15:00</td>
<td><strong>Session #17</strong> – Nature’s Way Part B <em>(Drawing Room)</em></td>
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<td>15:00 – 15:30</td>
<td>Break</td>
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<tr>
<td>15:30 – 17:30</td>
<td><strong>Session #19</strong> – Nature’s Way Part C <em>(Drawing Room)</em></td>
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<tr>
<td>17:30 – 18:30</td>
<td>Society for Cryobiology Annual General Meeting <em>(Adam Room)</em></td>
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<td>19:00 – 23:00</td>
<td>Gala Banquet / Awards Presentations <em>(Canadian Room)</em></td>
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<td><strong>Session #18</strong> - Ice Physics and Antifreeze Submitted Abstracts <em>(Laurier Room)</em></td>
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<td><strong>Session #20</strong> – Reproductive Biology Submitted Abstracts <em>(Laurier Room)</em></td>
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SESSION SUMMARIES

**Plenary #1** – Advances in Cryopreservation of Cellular Therapeutics  
*Chair: Dr. Erik Woods*

*Dr. David Courtman*, Canada – Clinical Trials of Cell Based and Cell Based Gene Enhanced Therapies: The Ottawa Experience *(AB 261)*

**Plenary #2** – Dr. Peter Mazur – A Tribute  
*Chair: Dr. John G. Baust*

08:30 – 09:00  *John G Baust*, USA - Reflections on the Society's Formative Years with Peter Mazur *(AB 256)*

09:00 – 09:30  *Jason Acker*, Canada - The Two-factor Hypothesis – A Foundation for First Generation Cryobiology Research *(AB 263)*

09:30 – 10:00  *Adam Higgins*, USA - Intracellular Ice Formation, Ice Recrystallization and the Importance of Warming Rate *(AB 251)*

10:00 – 10:30  *John G Baust*, USA - Emergent Directions in Cryobiology *(AB 257)*

**Plenary #3** – Engineering Advances and Cryotechnology  
*Chair: Dr. Jason Acker*

*Dr. Utkan Demirci*, USA - Microfluidic Technologies for Selection of Cryopreserved or Unprocessed Sperm *(AB 245)*

**Plenary #4** – Biological Stress Response  
*Chair: Dr. Ken Storey*

*Dr. David Denlinger*, USA – Adapting to Antarctica: Insights from an Insect *(AB 260)*

**Symposium #1** – Cryopreservation and Cell Therapeutics  
*Chair: Dr. Jason Acker*

*Session Summary*: An essential pre-requisite to the commercial and clinical application of stem cells is the development of cryopreservation methods to allow long-term storage. Whilst effective methods for cryopreservation have been developed for haematopoietic stem cells, embryonic stem cells, iPS and MSC have proved more refractory. This symposium will review the current state of emerging and commercial cells therapeutics. This session is being co-sponsored by the International Society for Cellular Therapies (ISCT).

10:30 – 11:00  *Alireza Abazari*, USA – Biopreservation Considerations in the Evolving Field of Cellular Therapies *(AB 264)*
11:00 – 11:30  **Mike Halpenny**, Canada – Challenges and Opportunities in the Biological Manufacturing of Cellular Therapies: A Canadian Blood Services Perspective

11:30 – 12:00 **Erik Woods**, USA - Establishing Cryopreserved Cell Therapeutic Shelf Life: Historical Perspective and Clinical Application (**AB 259**)

**Symposium #2 – Plant Cryopreservation Technology**  
*Chair: Dr. Barbara Reed*

*Session Summary:* Advances in plant cryopreservation have made it a useful technology for the long-term storage of many types of plants, however there remain many plants that are recalcitrant to liquid nitrogen exposure. Continuing research into the physiology of the plant materials is needed to allow storage of these remaining plant groups. These studies provide insights into the physiological processes of the plants as well as developing improved protocols for the storage of plant cells and tissues.

10:30 – 11:00  **Praveen Saxena**, Canada – Cryopreservation of Plants: Stress and Antioxidants (**AB 244**) – *Invited Speaker*

11:00 – 11:30  **Valerie Pence**, USA - Cryopreservation and the Challenge of Preserving Endangered Exceptional Species (**AB 217**) - *Invited Speaker*


**Symposium #3 – Emerging Tools to Improve Cryopreservation**  
*Chair: Dr. Janet Elliott*

*Session Summary:* This symposium focuses on the new and advanced engineering methods, instruments, BioMEMS/microfluidic systems and novel technologies for the cryopreservation of cells and tissues and their applications.

10:30 – 11:00  **Katie Pollock**, USA – Algorithm Optimization of Cryopreservation Protocols to Improve Mesenchymal Stem Cell Functionality (**AB 23**) – *Invited Speaker*

11:00 – 11:15  **Rob Ben**, Canada – Novel Approaches for Cryopreservation – Meeting the Needs for Cellular Therapy, Tissue and Organ Preservation (**AB 241**) – *Invited Speaker*


Symposium #4 – Plant and Antifreeze Proteins in Cryopreservation: From Genomics to Transcriptomics

Chair: Dr. Diana Averill-Bates

Session Summary: The field of plant cryobiology seeks to understand the molecular and physiological processes that allow plants to survive cryopreservation. Cryoprotectants are essential for survival of biological material such as cells, plants and seedlings during cryopreservation, whereas high concentrations can cause oxidative stress and toxicity. Successful recovery from cryopreservation appears to be dependent on the presence of antioxidant protection against damaging effects of reactive oxygen species that are produced during cryopreservation. High cellular antioxidant status is associated with tolerance to cryoinjury, which suggests that diminishing oxidative damage could be an effective way to improve recovery after cryopreservation. Transcriptional profiling will be discussed as a means of improving cryopreservation protocols and to reveal mechanisms of plant cell response to oxidative stress incurred during cryopreservation. Ice-binding proteins (IBPs) are found in freeze-avoiding organisms such as fish, insects, diatoms, plants, molds, and bacteria. IBPs can bind to ice surfaces and modify their growth. IBPs can block recrystallization and some are also termed ice recrystallization inhibitors (IRIs). Antifreeze proteins (AFPs) are a subset of IBPs. Freeze-tolerant hardy plants have evolved efficient mechanisms to tolerate extreme freezing winter conditions. Recent discoveries in the genetic pathways leading to cold acclimation and freezing tolerance suggest the involvement of key cold-regulated genes in the acquisition of cold tolerance in plant tissues. AFPs have the potential for use in cryopreservation of cells, tissues and organs, for production and storage of food, and protection of crops from frost. The physiological functions and mechanisms of action of these proteins will be discussed.

10:30 – 11:00 Xiao-Hui Shen, China – Transcriptomic Profiling Revealed the Regulatory Mechanism of Arabidopsis Response to Oxidative Stress from Cryopreservation (AB 279) – Invited Speaker

11:00 – 11:20 Diana Averill-Bates, Canada – Plant Proteins as Efficient Cryoprotectants for Mammalian Cells (AB 79) – Invited Speaker

11:20 – 11:40 Ido Braslavsky, USA and Israel – Ice-Binding Proteins and Their Possible Roles in Cryopreservation (AB 248) – Invited Speaker


Session Summary: Cold hardiness and cold adaptation are closely interconnected. Both phenomena determine the ability of plants and animals to grow and survive in low temperatures, affect the geographical distribution of the ecological system and as a result affect food security, environmental diversity and human health. The events involved in cold and freeze tolerance are a complex of molecular, biochemical and physiological processes that are not wholly understood. This symposium will discuss recent advances in determining the nature and function of gene regulation present in signaling cascades, transcriptional control, protection of membranes and proteins, water and ion uptake during cold acclimation as well as the role of carbohydrate metabolism.

10:30 – 11:00 Kyle Biggar, Canada – Insight into Temperature-Dependent MicroRNA Targets: Anoxia-Responsive MicroRNA Expression (AB 53) – Invited Speaker

11:00 – 11:30 Peter Davies, Canada - Rapid Characterization of New Antifreeze Proteins - And Why This is Important (AB 189) – Invited Speaker

11:30 – 11:45 Samantha Logan, Canada - Response of the JAK-STAT Pathway to Mammalian Hibernation in 13-Lined Ground Squirrel Striated Muscle (AB 59) – Invited Speaker

11:45 – 12:00 Childers, C. et al. Regulation of EGFR, MAPK, HSPs and Anti-Apoptosis Pathways in the Heart of the Mammalian Hibernator, Ictidomys Tridecemlineatus (AB 96) – Submitted Abstract

Session #1 – Submitted Cell Therapy Abstracts
Chair: Dr. Erik Woods; Trainee Co-Chair: Tony Zhang

Session Summary: Presentation of submitted papers on development of cryopreservation technologies or protocols for cellular therapeutics.


13:45 – 14:00 Saeb-Parsy, K. et al. A Novel Cryoprotectant for Preservation of Human Haematopoietic Stem Cells (AB 124) – Submitted Abstract

14:00 – 14:15 Cincotti, A. et al. Analysis of the Osmotic Behaviour for Optimal Cryopreservation of hMSCs from UCB (AB 133) – Submitted Abstract

14:30 – 14:45  James, E. et al. Liquid Nitrogen Vapor Phase Cold Chain Distribution of Cryopreserved Malaria Vaccine (AB 190) – Submitted Abstract

14:45 – 15:00  Mutsenko, V.V. et al. The Impact of Sucrose Pretreatment on Survival of Mesenchymal Stromal Cells, Cryopreserved in Suspension and Adherent State (AB 212) – Submitted Abstract

15:00 – 15:15  Chatterjee, A. et al. Cryopreservation Alters the Histone Post-Translational Modifications of Stem Cells (AB 224) – Submitted Abstract


Session #2 – Tissues and Organs A
Chair: Dr. Jelena Holovati; Trainee Co-Chair: Sanoji Wijenayake

Session Summary: This session provides a forum for disseminating information to scientists and clinicians involved in the preservation research, clinical banking and transplantation of tissues. Several different biopreservation approaches will be discussed, including hypothermic storage; cryopreservation; and vitrification of tissue allografts for transplant, such as heart valves, skin, and orthopedic tissues.

13:30 – 14:00  Wim Wolkers, Germany – Freeze-Dried Decellularized Heart Valves for Heart Valve Replacement (AB 90) – Invited Speaker

14:00 – 14:30  Kelvin Brockbank, USA – Ice-free Cryopreservation of Natural and Engineered Tissues (AB 45) – Invited Speaker

14:30 – 15:00  Jelena Holovati, Canada – Quality and Immunogenicity of Skin Tissue Allografts for Transplant (AB 208) – Invited Speaker


15:15 – 15:30  Sumida, S. et al. RFTCIVIVSCM for Cryopreservation of Human Adipose Tissue and Mesenchymal Stromal Cells (AB 197) – Submitted Abstract

Session #3 – Submitted Plant Abstract Session
Chair: Sandhya Gupta; Trainee Co-Chair: Dr. Peter Kilbride

Session Summary: The processes of cryopreservation are constantly changing and improving, with basic techniques altered to provide better plant response as well as providing other high value results. A range of topics from cryotherapy, to antioxidant treatments, to protocol development for specific plants will be addressed in this session.
13:30 – 14:00  Gupta, S. et al. Cryopreservation of Shoot Tips of Fragaria spp. and Virus Elimination through Cryotherapy (AB 219) – Submitted Abstract

14:00 – 14:15  Liu, Y. et al. Oxidative Stress is Closely Related to the Pollen Viability Reduction After Cryopreservation (AB 15) – Submitted Abstract


14:30 – 14:45  Liu, Y. et al. Protective Effect of Exogenous MDH on Cryopreserved Pollen from Magnolia Denudate (AB 41) – Submitted Abstract

14:45 – 15:00  Funnekotter, B. et al. Assessing Antioxidant Status During Cryopreservation of Australian Native Plant Species (AB 115) – Submitted Abstract


Session #4 – Transport Modeling in Cryobiology
Chair: Dr. Adam Higgins; Trainee Co-Chair: Lothar Lauterböck

Session Summary: Heat and mass transport problems are central to cryobiology. Equilibrating cells, tissues, and organs with cryoprotectants is a complicated mass transport problem that requires accounting for multiple solutes in high concentrations in intra-, inter- and extracellular spaces as well as the associated chemical and mechanical stresses. After equilibration, heat and mass transport are coupled during cooling and warming: cooling generated solidification in turn drives changes in concentration that influences solidification rates. Classical heat and mass transport models can be applied, but the two hundred Kelvin temperature change and concomitant large increase in concentration require careful consideration for accurate prediction and relevant optimization. In this session, a number of aspects of these critical transport problems are addressed.

16:00 -16:30  Paul Macklin, USA – New Open Source Simulation Tools for 3-D Multicellular Systems Biology (AB 164) (via Skype) – Invited Speaker

16:30 – 17:00  Janet Elliott, Canada - Transport in Cryopreservation of Articular Cartilage: A Lesson in Spatial Distribution (AB 243) – Invited Speaker

17:00 – 17:15  James Benson, USA – Investigating Assumptions in Single Cell Cryobiological Modeling (AB 171) – Invited Speaker

17:30 – 17:45  Zhang, Y. et al. A Multiscale Thermal Dynamical Model for Vitrification of Cells (AB 39) – Submitted Abstract

Session #5 – Tissues and Organs B  
Chair: Dr. Jelena Holovati; Trainee Co-Chair: Dr. Navid Manuchehrabadi

Session Summary: This session provides a forum for disseminating information to scientists and clinicians involved in the preservation research, clinical banking and transplantation of tissues. Several different biopreservation approaches will be discussed, including hypothermic storage, cryopreservation and vitrification of tissue allografts for transplant, such as heart valves, skin, and orthopedic tissues.

16:00 – 16:30  Birgit Glasmacher, Germany – Cell and Tissue Encapsulation in Alginate for Safe Cryopreservation (AB 258) – Invited Speaker

16:30 – 17:00  Greg Fahy, USA – Elimination of Most Damage after Perfusing Rabbit Kidneys with M22 Solutions (AB 204) – Invited Speaker

17:00 – 17:30  Barry Fuller, UK – Ovarian Tissue as an Exemplar of Tissue Cryopreservation: Challenges and Successes (AB 255) – Invited Speaker

17:30 – 17:45  Elliott, J.A.W. et al. Cryopreservation of HUVECs, Porcine and Human Corneal Endothelial Cells (AB 36) – Submitted Abstract


Session #6 – Aquatic Species / Algae Cryopreservation  
Chair: Dr. Tiantian Zhang; Trainee Co-Chair: Dr. Krishna Mahbubani

Session Summary: Cryopreservation of gametes and embryos of aquatic animals is potentially important for conservation measures and aquaculture. Methods of sperm cryopreservation are in routine use, while egg and embryo cryopreservation has only been successfully practiced in invertebrates. This session will focus on describing recent advances in the preservation of reproductive and somatic cells of aquatic species.

16:00 – 16:30  John Day, UK – Algae as Biological Resources – Can genotypic and function stability be guaranteed? (AB 206) – Invited Speaker

16:30 – 16:45  Paredes, E. et al. Cryopreservation of Marine Microalgae Assemblages (AB 57) – Submitted Abstract

16:45 – 17:00  Kasa, E. et al. Vitrification of Fish Sperm: Investigation of the Supposed Positive Effect of Trehalose (AB 72)
17:00 – 17:15  Karlsson, J.O.M. et al. Cryomicroscopic Observation of Chilling Injury in Stage V Zebrafish Oocytes (AB 114)

17:15 – 17:30  Eroglu, E. et al. Cryoprotectant and Water Transport in Immature and Mature Zebrafish Oocytes (AB 174)

17:30 – 17:45  Eroglu, E. et al. Chorion-free Fertilization and Development of Zebrafish Oocytes (AB 178)

17:45 – 18:00  Yang, H. et al. Germplasm Preservation for Molluscan Shellfish Aquaculture and Restoration (AB 218)

**Session #7 - Student Crystal Award Presentations**
*Chair: Dr. James Benson*

*Session Summary:* Submitted student papers selected for competition for the Peter L. Steponkus Crystal Award are showcased in this dedicated session.

11:00 – 11:15  Baumann, K. et al. Potential Contributions of Autophagy to Pancreatic Cancer Cell Viability after Thermal Exposures (AB 148) – *Submitted Abstract*

11:15 – 11:30  Pan, J. et al. Development of an Electromagnetic Resonance System for Rapid and Uniform Rewarming of Cryopreserved Biomaterials (AB 74) – *Submitted Abstract*

11:30 – 11:45  Poisson, J. et al. - Ice Recrystallization Inhibitors as Novel Cell-Permeating Cryoprotectants (AB 56) – *Submitted Abstract*

11:45 – 12:00  Zhang, M. et al. Combining Endocytic and Freezing-Induced Trehalose Uptake for Cryopreservation of Mammalian Cells (AB 125) – *Submitted Abstract*

**Session #8 – Calling All Cryobiologists: Organ Cryopreservation as a Growing Research Priority**
*Chair: Jedediah Lewis; Trainee Co-Chair: Dr. Peter Kilbride*

*Session Summary:* In recent months considerable momentum has developed around the challenge of banking complex tissues and whole organs. Key governmental bodies have begun to take note of the immense potential of this area to change the landscape of transplantation and regenerative medicine, with organ and tissue preservation cited as a key U.S. research priority by the White House and the release of six different new government grant solicitations targeted toward tissue banking and preservation in the course of just over a year. Meanwhile, new cross-disciplinary efforts have been launched to meet organ and tissue preservation needs, and leading scientists from cryobiology and other fields have come together to define and codify the remaining scientific challenges that must be met in order to achieve whole organ cryopreservation. In this session we cover the key scientific challenges in organ and complex tissue cryopreservation, immense public health needs,
opportunities for funding and support, and ways that researchers from many areas of cryobiology can play a transformative role in this growing research area.


13:50 – 14:15  **Sebastian Giwa**, USA - An Avalanche of Support for Organ and Tissue Cryopreservation (AB 253) – *Invited Speaker*

14:15 – 14:35  **Shannon Tessier**, USA - Promising Approaches to an Integrated Organ Banking Effort (AB 250) – *Invited Speaker*

14:35 – 14:55  **Jason Acker**, Canada - Interrelationships Between Organ Cryopreservation and Other Applications of Cryobiology (AB 262) – *Invited Speaker*

14:55 – 15:15  **Jedediah Lewis**, USA - The Organ Preservation Alliance: Launching New Initiatives to Empower Cryobiologists (AB 254) – *Invited Speaker*

15:15 – 15:30  Interactive Q&A with Panel

**Session #9 - Cool Developments in Cryomedicine A – Cellular and Molecular Developments**

*Chair: Dr. John M. Baust*

*Session Summary:* Cryomedicine encompasses the use of a host of techniques and technologies to treat a variety of clinical indications ranging from cancer and cardiac arrhythmia ablation to cell therapy and organ transplantation. As such, the application of cryobiological principles in the clinical arena impacts a wide breadth of clinical and health-related sub-disciplines on a daily basis. As medicine moves more and more towards treatment personalization, there is a pressing need for the development of new cryo-based strategies, techniques and devices to enable cryomedicine to keep pace with the ever-evolving clinical landscape. Further, as evidence-based medicine is now the norm clinically, an in-depth understanding of the cell and molecular impact/response of cells and tissues to low temperature manipulations is now imperative. This session will focus on new developments in cryomedicine from lab bench discovery to device development and clinical implementation. In particular, session 9 includes a series of presentations focusing on recent cell and molecular based studies which are leading to new developments and strategies in the areas of tissue preservation and cryoablation.

13:30 – 14:00  **John M. Baust**, USA - Advances in Cryomedicine – How Molecular Based Discoveries are Driving the Development of New Approaches and Devices (AB182) – *Invited Speaker*

14:00 – 14:30  **Bradley Weegman**, USA - Oxygen Considerations for the Preservation of Pancreata and Culture of Pancreatic Islets (AB 242) – *Invited Speaker*
14:30 – 15:00 QI SHAO, USA – Cryosurgery with Vascular and Immune Adjuvants to Address Local and Systemic Cancer (AB 192) – Invited Speaker

15:00 – 15:30 KRISTI SNYDER, USA – Human Esophageal Smooth Muscle Sensitivity to Thermal Exposure (AB146) – Invited Speaker

Session #10 – Conservation of Threatened and Endangered Species – Case Studies
Chair: Dr. Tiantian Zhang; Trainee Co-Chair: Julia Meyer

Session Summary: This session will highlight advances being made to utilize cryopreservation technologies to advance efforts to protect against biodiversity loss and aid global conservation efforts. A focus on the development of protocols for the cryopreservation of both animal and plant species will be highlighted in this session.

13:30 – 14:00 Valerie Pence, USA – Two Decades of Storage in Liquid Nitrogen: Cryostorage as a Tool for Ex Situ Conservation (AB 172) – Invited Speaker

14:00 – 14:15 Lujić et al. Slow-Rate Freezing of Brown Trout Gonadal Tissue for Improved Population Management (AB 225) - Submitted Abstract

14:15 – 14:30 Salama, A. et al. Micropropagation and Cryopreservation of Golden Paintbrush (Castilleja Levisecta), an Endangered Canadian Plant (AB 166) – Submitted Abstract

Session #11 – Mammalian Reproductive Biology
Chair: Dr. Yuksel Agca / Dr. Ali Eroglu; Trainee Co-Chair: Dr. Bradley Weegman

Session Summary: This session will cover comparative ovarian tissue cryobiology animal modelling and its impact on women’s infertility treatment. The audience will receive comprehensive general information with regards to ovarian structure, cryobiology and research findings about the current status of representative species.

16:00 – 16:30 Mary Zelinski, USA – Advances in Vitrification of Ovarian Tissue and Follicles for Female Fertility Preservation (AB 179) – Invited Speaker

16:30 – 17:00 James Benson, USA – Cell Based Modeling and Optimization of Ovarian Follicle Cryopreservation (AB 163) – Invited Speaker

17:00 – 17:30 Yodo Sugishita, USA / Japan – Recent Advances in Vitrification of Human Ovarian Tissue and Tandem IVM Oocytes (AB 252) – Invited Speaker

17:30 – 18:00 Yuksel Agca, USA – Restoration of Body Composition and Bone Integrity Following Cryopreserved Ovarian Tissue Auto-Grafting in a Rat Model (AB 141) – Invited Speaker

Session #12 - Cool Developments in Cryomedicine B – New Devices and Strategies
Session Summary: Cryomedicine encompasses the use of a host of techniques and technologies to treat a variety of clinical indications ranging from cancer and cardiac arrhythmia ablation to cell therapy and organ transplantation. As such, the application of cryobiological principles in the clinical arena impacts a wide breadth of clinical and health-related sub-disciplines on a daily basis. As medicine moves more and more towards treatment personalization, there is a pressing need for the development of new cryo-based strategies, techniques and devices to enable cryomedicine to keep pace with the ever-evolving clinical landscape. Further, as evidence-based medicine is now the norm clinically, an in-depth understanding of the cell and molecular impact/response of cells and tissues to low temperature manipulations is now imperative. This session will focus on new developments in cryomedicine from lab bench discovery to device development and clinical implementation. This session includes a series of presentations focusing on recent developments in devices and strategies designed to enhance tissue response to low temperature exposure in the areas of tissue preservation and cryoablation.

16:00 – 16:30 Adam Cates, USA - Cryoablation Devices and Techniques for Minimally Invasive Cardiac Surgeries (AB 240) – Invited Speaker

16:30 – 17:00 Harishankar Natesan, USA – A Micro-Thermal Sensor for Focal Therapy Applications (AB 150) – Invited Speaker

17:00 – 17:30 Anthony Robilotto, USA - Cryosurgical Ablation in the Gastrointestinal Tract: Development of a Novel Cryosurgical Platform (AB 169) – Invited Speaker

17:30 – 17:45 Thirugnanam, A. et al. A Novel Strategy to Enhance the Cryosurgical Outcome in Gel Phantoms (AB 12) – Submitted Abstract

17:45 – 18:00 Zhou, T. et al. Less is More: A New Cryoablation Strategy in Lung Cancer Management (AB 201) – Submitted Abstract

Session #13A – Presentation of Luyet Medal to Dr. John Bischof
Moderator: Dr. Jason Acker

Session #13B - Presentation of Luyet Medal to Dr. Greg Fahy
Moderator: Dr. Jason Acker

Session #14 – Thawing / Warming Submitted Abstracts
Chair: Dr. Rob Ben; Trainee Co-Chair: Magda Guedes Teixeira

Session Summary: Presentation of submitted papers covering advances in the development of technologies and techniques for the rapid warming of cell and tissue systems.

12:00 – 12:15 Jin, Bo. et al. Ultra-rapid Warming Technology with a Laser Pulse for Vitrified Mouse/Human Oocytes and Embryos (AB 232) – Submitted Abstract

12:30 – 12:45  Paredes, E. Vitrification and Ultra-Rapid Laser Warming of Yeast Saccharomyces Cerevisiae (AB 58) – Submitted Abstract

12:45 – 13:00  Manuchehrabadi, N. et al. Nanowarming of Tissues (AB 123) – Submitted Abstract

13:00 – 13:15  Bischof, J. et al. Ultrarapid Inductive Rewarming of Vitrified Bulk Biomaterials with Metal Foams (AB 26) – Submitted Abstract

Session #15 – Submitted General Cryobiology Abstracts
Chair: Dr. David Rawson; Trainee Co-Chair: Trong Nguyen

Session Summary: Presentation of submitted papers on a variety of cryobiology topics.


12:30 – 12:45  Mahbubani, K. et al. Hypothermic Treatment to Alter the Rate of Cell Proliferation (AB 233) – Submitted Abstract


Session #16 – New Tools Submitted Abstracts
Chair: Dr. Birgit Glasmacher; Trainee Co-Chair: Dr. Andy Picken

Session Summary: Presentation of submitted papers on novel tools or techniques used in the study of, or application of cryobiology.

12:00 – 12:15  Stevens, C. et al. Using Microfluidics to Study Biofilm Formation and Disruption with an Ice-Binding Bacterium (AB 186) – Submitted Abstract

12:15 – 12:30  Gurrruchaga, H. et al. Cryopreservation of Microencapsulated Cells with Low-Molecular-Weight Hialuronan (AB 32) – Submitted Abstract

12:45 – 13:00  Chakraborty, N. et al. Quantification of Residual Water in Desiccated Samples Using Raman Microscopy (AB 173)


Session #17 – Nature’s Way Part B
Chair: Dr. Ken Storey; Trainee Co-Chair: Harishankar Natesan

Session Summary: This session is a continuation of Symposium #5 and will highlight advances being made in understanding the molecular basis of cold and freeze tolerance in animals and the application of this knowledge to cell, tissue and organ preservation.

13:30 – 14:00  Pier Morin Jr, Canada – MicroRNAs: Small Molecules with Big Impact in Cold Adaptation (AB 34) – Invited Speaker

14:00 – 14:30  Shannon Tessier, USA – From Nature to Bedside: Whole Blood Preservation for Cancer Diagnostics (AB 177) – Invited Speaker

14:30 – 14:45  Hanane Hadj-Moussa, Canada – Micromanaging Freeze Tolerance: The Role of MicroRNAs in Regulating Brain Cryoprotection (AB 145) – Invited Speaker


Session #18 – Ice Physics and Antifreeze Submitted Abstracts
Chair: Dr. Rob Ben; Trainee Co-Chair: Jessica Poisson

Session Summary: During the past forty years the field of cryobiology has seen tremendous advances in understanding how ice formation and growth affects biological systems. Much of this early work focused on understanding how cells are affected by ice nucleation and ice growth during freezing and/or warming. While many novel strategies have been developed, the cellular injury associated with cryopreservation is often decreased, but not prevented. This session will examine various strategies to mitigate cellular damage as a result of ice growth.


13:45 – 14:00  Vu, H. et al. Increased Survivorship in Cryopreservation Assays with Insect and Plant Antifreeze Glycolipids (AB 176) – Submitted Abstract
14:00 – 14:15  Meyer, J.E. et al. Investigating Microparticle Formation with Novel Ice Recrystallization Inhibitors (AB 98) – Submitted Abstract


14:45 – 15:00  Drori, R. et al. Inhibition of Ice Growth by a Supramolecular Assembly (AB 102) – Submitted Abstract

Session #19 - Nature’s Way Part C
Chair: Dr. Ken Storey; Trainee Co-Chair: Thomas Whale

Session Summary: This session is a continuation of Symposium #5 and will highlight advances being made in understanding the molecular basis of cold and freeze tolerance in animals and the application of this knowledge to cell, tissue and organ preservation.

15:30 – 16:00  Robert Tanguay, Canada – Importance of the Mitochondrial UPR in Aging (AB 239) – Invited Speaker

16:00 – 16:30  Ken Storey, Canada – Life on Pause: Epigenetic Mechanisms Underlie Metabolic Stasis in Cold-Adapted Animals (AB 113) – Invited Speaker

16:30 – 16:45  Rasha Al-Attar, Canada – Surviving Winter: NFATs Regulate Cryoprotection in Freeze-Tolerant Rana Sylvatica (AB 105) – Invited Speaker

16:45 – 17:00  Luu, B. et al. Hibr-miRs: Cold-Sensitive Novel microRNA in the Hibernating 13-Lined Ground Squirrel (AB 103) – Submitted Abstract

17:00 – 17:15  Anufriev, A. et al. Observations of Carnivorous Mammal Hibernations of North-Eastern Eurasia (AB 140) – Submitted Abstract

Session #20 - Mammalian Reproductive Biology Submitted Abstracts
Chair: Dr. Yuksel ACGA; Trainee Co-Chair: Dr. Estefania Paredes

Session Summary: Presentation of submitted papers on the cryobiology and/or cryopreservation of mammalian reproductive cells and tissues.

15:30 – 15:45  Moawad, A. et al. Beneficial Effects of Glutathione Supplement During Vitrification of Mouse Oocytes at the Germinal Vesicle Stage on Their Preimplantation Development Following Maturation and Fertilization In Vitro (AB 183) – Submitted Abstract
15:45 – 16:00  Edashige, K. et al. Cold-Sensitive Ion Channels Are Involved in Chilling Injury of Pig Oocytes (AB 73) – Submitted Abstract

16:00 – 16:15  Nishijima, K. et al. Vitrification of Mouse Zygotes: Effect of Rapid Warming (AB 83) – Submitted Abstract


16:30 – 16:45  Eimani, H. et al. Effects of Static Magnetic Field on Vitrified and Warmed Mouse Ovarian Tissue (AB 22) – Submitted Abstract

16:45 – 17:00  Sharafi, M. et al. Findings for Methyl- β-Cyclodextrin in Rooster Semen Cryopreservation (AB 220) – Submitted Abstract

17:00 – 17:15  Miah, A. et al. Effect of Nigella Sativa Oil on Motility of Cryopreserved Ovine Spermatozoa (AB 18) – Submitted Abstract


NOTE: Sessions and session descriptions are subject to change as speaker confirmations are received.
Poster Presentations

*Note:* Odd numbered presentations will be presented on July 24 and even-numbered presentations will be presented on July 25.

**P1** Tanaka et al. Cryopreservation of Duckweed (Lemna Minor) by Cryo-Plate Method

**P2** De Godoy et al. Extenders Addition Prolongs Spermatozoa Lifespan in Brycon Amazonicus During Cryostorage

**P3** Eskandari et al. Cryopreservation of HUVECs in Monolayers Versus Suspension in the Presence of Me2SO (*Student Poster*)

**P4** Green et al. Regulation of Liver Glutamate Dehydrogenase Activity in Response to Freezing in the Wood Frog (Rana Sylvatica) (*Student Poster*)

**P5** Zheng et al. A Study on Vitrification of HUVECS at a Low Concentration of Cryoprotectants in a Quartz Capillary (*Student Poster*)

**P6** Huang et al. Development of a Simple and Cost-Effective Cooling-Rate- Controlled Instrument with Real-Time Temperature Recording for Cell/Tissue Cryopreservation (*Student Poster*)

**P7** Mutsenko et al. Cryopreservation of Biomimetic Bone Matrix with Non-Human Primate Mesenchymal Stromal Cells

**P8** Anil et al. In-Vitro Culture Protocol Development for Early Stage Zebrafish Ovarian Follicles

**P9** Ponomarev et al. Hypothermic Preservation with Xenon: Impact of the Energy Pathways (*Student Poster*)

**P10** Idda et al. Evaluation of Gene Expression During 48 Hours Post-Thawing in Cryopreserved Ovine Fibroblasts (*Student Poster*)

**P11** Morin et al. CryomiRs: Identification of microRNAs Modulated at Low Temperatures in Cold-Hardy Insects

**P12** Mercado et al. Increased Cryosurvival of Osteosarcoma Cells Using an Amphipathic Polymer for Trehalose Uptake (*Student Poster*)

**P13** Aros et al. Freezability Analysis of Black Friesian Bull Semen Stored Long Term at -196 °C

**P14** Xiaoli et al. Alginate Microencapsulation Increases Cell Viability after Low-CPA Cell Vitrification (*Student Poster*)
Williamson et al. Changes in DNA Methyltransferase Expression in Epiblema Secuderiana and Eurosta Solidaginis (Student Poster)

Watts et al. Lysine Methylation Regulates Transcriptional Control During Hibernation in Ictidomys Tridecemlineatus (Student Poster)

Sugawara et al. Regulation of Desiccation Tolerance and Long-Term Preservation of Suspension-Cultured Cells of Citrus

Zhang et al. Expression of Nuclear Factor of Activated T Cells (NFAT) and Downstream Muscle-Specific Proteins in Ground Squirrel Skeletal and Heart Muscle During Hibernation (Student Poster)

Sharbatoghli et al. Expression Profile of Spermatogenic Genes in Vitrified Rat Testis After Culture (Student Poster)

Yue et al. Comparative Proteomics Analysis of Chorispora Bungeana in Response to Cold Stress

Tao et al. BYPASS1-LIKE Regulates Cold Tolerance in Arabidopsis

Adam et al. Carbohydrate-Based Surfactants as Photocontrollable Inhibitors of Ice Recrystallization (Student Poster)

Charlton et al. Sulfated Alditol Derivatives as Novel Ice Recrystallization Inhibitors (Student Poster)

Musca et al. The Importance of the C1 Heteroatom in Aryl Glycoside Ice Recrystallization Inhibitors (Student Poster)

Nguyen et al. Regulation of Skeletal Muscle Glutamate Dehydrogenase from the Freeze Tolerant Rana sylvatica (Student Poster)

Ren et al. Determination of the Temperature-Dependent Specific Heat Capacity of Various Vitrification Solutions by Differential Scanning Calorimetry (DSC) (Student Poster)

Mattice et al. Regulation of Muscle Pyruvate Kinase During Freezing in Wood Frogs, Rana Sylvatica (Student Poster)

Szereszewski et al. The Importance of Fats – PPAR Regulation During Hibernation (Student Poster)

Hawkins et al. Changes in Histone Methyltransferases During Freezing Stress in the Wood Frog (Student Poster)
P30  Yu et al. Effects of Disaccharide Supplementation in Glycerol-Free Tris on Dog Sperm Cryopreservation

P31  Sirotinskaya et al. Investigation of Ice Binding Proteins Applications for Cryopreservation of Biological Systems *(Student Poster)*

P32  Hezavehei et al. Sublethal Oxidative Stress to Increase Resistance of Sperm: New Findings For Cryobiology *(Student Poster)*

P33  Solomonov et al. Hypobiosis States of Mammals and Humans in Yakutia

P34  Kirillin et al. Wintering Siberian Newt Salamandrella Keyserlingii in Central Yakutia

P35  Tomalty et al. Novel Method for Renal Preservation at Subzero Temperatures *(Student Poster)*

P36  Connolly et al. Toward the Cryopreservation of Zebrafish Embryos: Tolerance to Osmotic Dehydration *(Student Poster)*

P37  Burgess et al. Glass Transition Temperatures of Mixtures of Sugars, Polymers and Penetrating Cryoprotectants *(Student Poster)*

P38  Santos et al. Cryopreservation of Embryonic Axes of Poncirus Trifoliata by Encapsulation-Dehydration

P39  Tomalty et al. Identification of Ice-Binding Activity in the Gall Fly and Its Goldenrod Host *(Student Poster)*

P40  Yang et al. Cryopreservation of Isolated Plant Roots: Hypericum Perforatum as a Model System

P41  Santucci et al. Assessment of Smartthaw: A Novel Dry Thawing System for Cryopreserved Cell Products

P42  Teixeira et al. JC-1: A New Method to Evaluate Fresh and Cryopreserved Rabbit Embryo Functionality *(Student Poster)*


P44  Haleva et al. Microfluidic Cold-Finger Device for the Investigation of Antifreeze Proteins *(Student Poster)*

P45  Sarmiento et al. Rat Spleenocytes Cryopreservation Using Me₂SO Media and Two Experimental Approaches
P46  Chakraborty et al. Raman Microspectroscopic Investigation of Extracellular Ice Upon Addition of Trehalose to Me₂SO (Student Poster)

P47  Funnekotter et al. Cryo-mesh: A Simple Alternative Technique for Cryopreservation

P48  Germogenov et al. Features of the Spatial Distribution and Reproduction of Birds in Cold Climates (with Bird Fauna of Yakutia / East Siberia as Examples)

P49  Germogenov et al. The Adaptation of the Sedentary Birds of Yakutia to the Dwelling Under the Annual Amplitude Temperature from +38 to –71 °C (NE Russia)

P50  Germogenov et al. Siberian Jay Cractes infaustus (AVES, Passeriformes, Corvidae) as a Model for Studying the Adaptations of Birds to Cold

P51  Marinovic et al. Slow-Rate Freezing of Tench and Goldfish Testicular Cells and Tissue

P52  Weegman et al. The Organ Preservation Alliance: Accelerating Research to Enable Breakthroughs in Organ Cryopreservation

P53  Guan et al. A Simple and Efficient Vitrification Procedure for Freezing Mouse Embryos and Oocytes Using Plastic Semen Straws

P54  Marques et al. Vitrification of Piracanjuba (Brycon Orbignyanus) Ovarian Tissue Containing Immature Oocytes