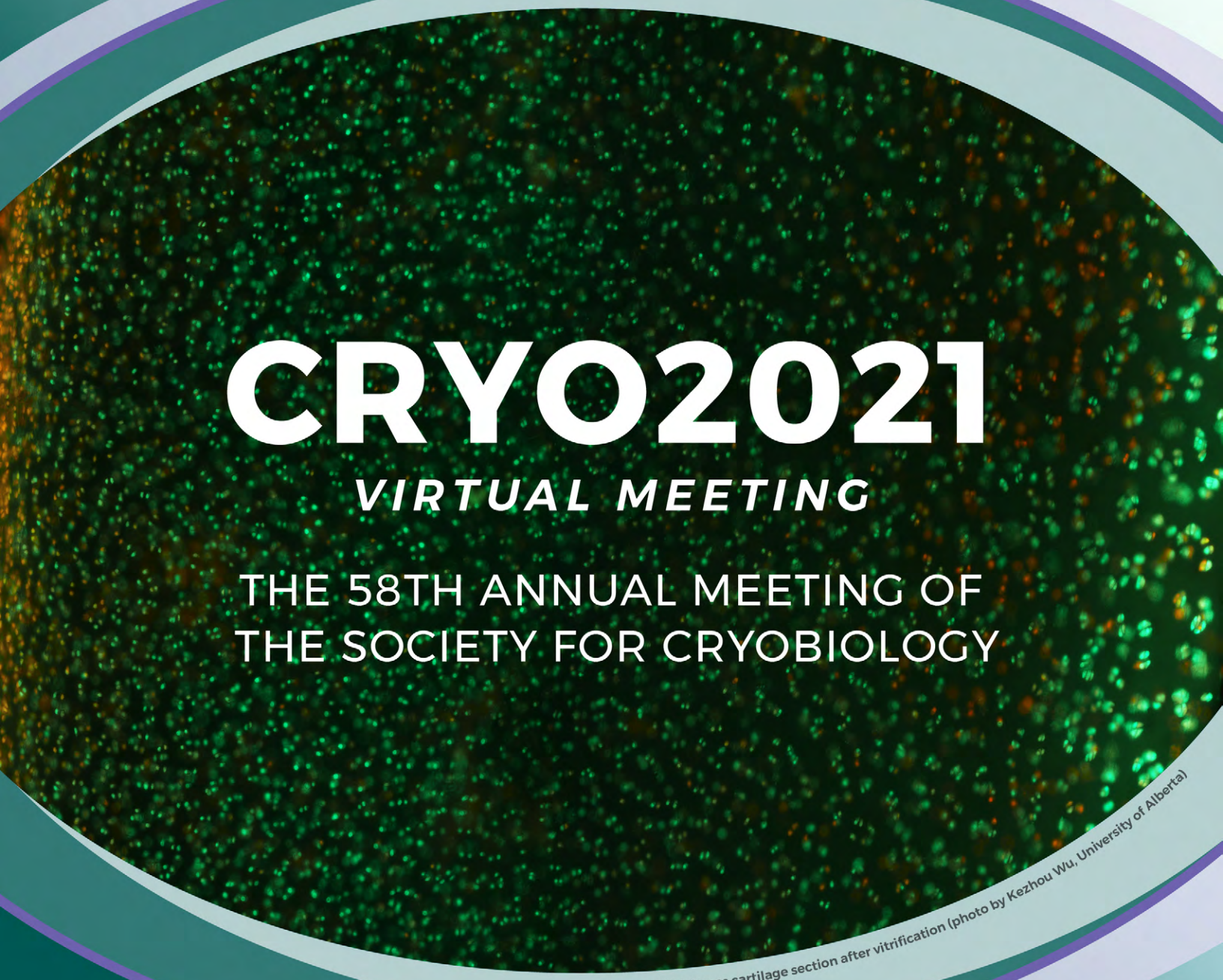
Society for Cryobiology

CRYO2021

VIRTUAL MEETING

THE 58TH ANNUAL MEETING OF THE SOCIETY FOR CRYOBIOLOGY



Stained full thickness cartilage section after vitrification (photo by Kezhou Wu, University of Alberta)

Program | July 20-23 , 2021

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WELCOME TO **CRYO2021**

Welcome from the President of the Society for Cryobiology

On behalf of the Society for Cryobiology it is my pleasure to welcome to you to CRYO2021, the 58th Annual Meeting of the Society for Cryobiology.

CRYO2021 marks the Society for Cryobiology's second virtual meeting, a format which both organizers and delegates are now more comfortable and familiar with as we traverse our second year of global pandemic conditions.

Although virtual meetings have made a fine replacement in the interim, nothing compares to the camaraderie of meeting old and new friends and colleagues for lively discussions during lunch, dinner, or a dedicated networking session. I know that many of you share the same sentiment, and I look forward to seeing you all again next year at CRYO2022 when we plan to return to face to face meetings.

I would like to thank the CRYO2021 Program Committee, who have assembled a stimulating program which shines a particular spotlight on oncofertility and the ethical issues that result from the preservation of human fertility. In addition the Society for Cryobiology has partnered with the American Society of Transplantation in an organ preservation session and roundtable discussing clinical needs, barriers, and how research can overcome these. The program also focuses on many of the fundamental and novel aspects of cryobiology, with a wide variety of sessions devoted to cryoprotection, cryoinjury, vitrification, lyophilization, ice active molecules, modeling, and novel tools and technologies.

I trust that you will enjoy the meeting, and I look forward to seeing you all again in person soon.

Best Wishes,

Adam Higgins
President, Society for Cryobiology
Oregon State University

Welcome from Society for Cryobiology Executive Director

At a time when virtual meetings have become *de rigeur* and opened up a wider world of conference content than travel budgets may have previously allowed for, I am pleased and honored that you have chosen to take part in the Society for Cryobiology's Annual Meeting.

While I, like many of you, am looking forward to returning to in person meetings, it's important to recognize and celebrate that virtual meetings have allowed a much wider range of delegates to participate than at a traditional meeting. I am proud to say that true to the Society for Cryobiology's stated mission "to promote scientific research in low temperature biology, to improve scientific understanding in this field, and to disseminate and apply this knowledge to the benefit of mankind" we have once again been able to waive the meeting registration fee for delegates residing in low and lower-middle income countries. This has meant a large uptick in the number of delegates from a number of countries in Africa, as well as parts of Asia and Eastern Europe. As an international Society it is a joy and privilege to extend a warm meeting welcome to delegates from these countries.

One of the reasons we are able to offer these waived registrations is thanks to support of our sponsors and exhibitors. I urge you to support the sponsors and exhibitors who support our meeting by stopping by their booths at the dedicated exhibition times.

Until we are able to meet again in person, I wish you all the best for the year ahead.

Sincerely,

Nicole Evans
Executive Director
Society for Cryobiology

CRYO2021 ORGANIZERS

Executive Chair

Adam Higgins, Ph.D
President, Society for Cryobiology;
Oregon State University, USA

Society for Cryobiology Organizers

Nicole Evans
Executive Director, Society for Cryobiology, USA

Amelia Hanson
Administrator, Society for Cryobiology, USA

Program Committee

Jason Acker, Ph.D
University of Edmonton/Canadian Blood Services, Canada

Yuksel Agca
University of Missouri, USA

Daniel Ballesteros, Ph.D
Royal Botanic Gardens, Kew, UK

John G. Baust, Ph.D
University of Alaska, USA

John M. Baust, Ph.D
CPSI Biotech, USA

James Benson, Ph.D
University of Saskatchewan, Canada

Robert N. Ben, Ph.D
University of Ottawa, Canada

John Bischof, Ph.D
University of Minnesota, USA

Ido Braslavsky, Ph.D
The Hebrew University of Jerusalem, Israel

Greg Fahy, Ph.D
President-Elect, Society for Cryobiology; 21st Century Medicine, USA

Erik Finger, Ph.D
University of Minnesota, USA

Dayong Gao, Ph.D
Immediate Past-President, Society for Cryobiology; University of Washington, USA

Eric James, Ph.D
Sanaria Inc., USA

Steven Mullen, Ph.D
Cook Regentec, USA

Estefania Paredes, Ph.D
University of Vigo, Spain

Zhiquan "Andy" Shu, Ph.D
Washington State University, USA

Mehmet Toner, Ph.D
Massachusetts General Hospital and Harvard Medical School, USA

Korkut Uygun, Ph.D
Massachusetts General Hospital and Harvard Medical School, USA

Willem Wolkers, Ph.D
Institute of Multiphase Processes, Leibniz University Hannover, Germany

International Scientific Review Committee

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University of Alberta, Canada

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IRD, Benin

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Augusta University / Medical College of Georgia, USA

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University of Minnesota, USA

Adam Higgins, Ph.D
Oregon State University, USA

William Holt, Ph.D
University of Sheffield, UK

Charles Hunt, Ph.D
Retired, UK

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University of Vigo, Spain

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USDA ARS NLGRP National Animal Germplasm Program, USA

Barbara Reed, Ph.D
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Ramon Risco, Ph.D
National Accelerators Center-CSIC; University of Seville, Spain

Alinz Schneider Teixeira, Ph.D
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Zhiquan Shu, Ph.D
University of Washington Tacoma, USA

Nucharin Songsasen, Ph.D
Smithsonian Institution, USA

Wendell Sun, Ph.D
University of Shanghai for Science and Technology, China

Kenneth Storey, Ph.D
Carleton University, Canada

Michael Taylor, Ph.D
SylvaticaBiotech Inc; Carnegie Mellon University, USA

Lindong Weng, Ph.D
Sana Biotechnology, USA

Willem Wolkers, Ph.D
University of Veterinary Medicine Hannover, Germany

Erik Woods, Ph.D
Ossium Health, USA

Brian Wowk, Ph.D
21st Century Medicine, USA

Marc Yeste, Ph.D
University of Girona, Spain

Gang Zhao, Ph.D
University of Science and Technology of China, China

GENERAL MEETING INFORMATION

Conference Hours

The meeting will take place at:

PDT (USA)	EDT (USA)	BST (UK)	CEDT (Europe)	GST (UAE)	CST (China)	JST (Japan)	AEST (Australia)
8:00AM	11:00AM	4:00PM	5:00PM	7:00PM	11:00PM	12:00 Mdn.*	1:00AM*
9:00 AM	12:00PM	5:00PM	6:00PM	8:00PM	12:00Mdn.*	1:00AM*	2:00AM*
10:00 AM	1:00PM	6:00PM	7:00PM	9:00PM	1:00AM*	2:00AM*	3:00AM*
11:00 AM	2:00PM	7:00PM	8:00PM	10:00PM	2:00AM*	3:00AM*	4:00AM*
12:00 PM	3:00PM	8:00PM	9:00PM	11:00PM	3:00AM*	4:00AM*	5:00AM*
1:00 PM	4:00PM	9:00PM	10:00PM	12:00 Mdn.	4:00AM*	5:00AM*	6:00AM*
2:00 PM	5:00PM	10:00PM	11:00PM	1:00AM*	5:00AM*	6:00AM*	7:00AM*

**Following day*

When you are logged into Whova the platform will display session times in your local time.

Virtual Platform

There are two platforms in use for CRYO2021.

Whova is the primary event app, where delegates can log in to view the schedule, access live and recorded content, exhibitor listings, forums and more.

You will receive an email inviting you to download **Whova**, or you can search '**Whova**' and download it directly from your app store. To log into the meeting on your computer you can use the direct link **https://whova.com/portal/webapp/cryo_202107/**

Spatial.Chat will be used for poster sessions, for exhibitor virtual booth hours, and the virtual coffee breaks/networking. You can log in to Spatial.Chat at **https://cryo2021.spatial.chat/**.

Exhibition Booth Hours

The dedicated exhibition booth hours are:

Tuesday July 20 11:15 AM – 12:00 PM US/Pacific
Wednesday July 21 12:15 PM – 1:00 PM US/Pacific
Thursday July 22 10:45 AM – 11:30 AM US/Pacific
Friday July 23 12:15 PM – 1:00 PM US/Pacific

Virtual Coffee Break/Networking

Virtual Coffee Breaks will take place at the exhibitor booth hours as detailed under 'Exhibition Booth Hours' below.

Poster Presentations

Poster Presentation live sessions will take place at

Tuesday July 20 1:00 – 2:00 PM US/Pacific
Wednesday July 21 8:00AM – 9:00 AM US/Pacific
Thursday July 22 8:00AM – 9:00 AM US/Pacific
Friday July 23 8:00AM – 9:00 AM US/Pacific

Certificates of Participation

Certificates of participation will be emailed to all delegates following the conclusion of the meeting. For presenting authors the certificate will include your presentation type (oral or poster).

NOTIFICATION OF ANNUAL BUSINESS MEETING

11:00 AM - 12:00 PM US/PT August 2, 2021

All Society members in good standing are warmly invited to attend the 2021 virtual Annual Business Meeting.

SESSION DESCRIPTIONS

CRYO2021 features the following session types:

Live Sessions

These sessions feature live and live-streamed presentations and live Q&A/discussion.

The following session types are live/live-streamed:

- Plenary Speakers
- All Symposia
- Roundtables
- Some submitted abstract sessions
- Special Presentations
  - 2020 Arthur W. Rowe Cryobiology Best Paper Award
  - Dayong Gao Young Investigator Award
  - CryoFellow Presentation

On the day following the session, the recording will be made available to view "on demand".

Live Summary Sessions

These sessions feature pre-recorded video presentations which will be available in the week leading up to the meeting. Each "on demand" session has a corresponding short live summary session. During the live summary session the chair will stream a 2 minute summary video of each presentation for the benefit of delegates who may not have had the chance to watch the full presentation in advance. The chair will then lead live Q&A.

The following session types will feature pre-recorded content:

- Most submitted abstract sessions
- Peter L. Steponkus Crystal Award for Best Student Oral Presentation

On the day following the session the recording will be made available to view "on demand".

Poster Sessions

Poster presentations will be available to view in **Spatial.Chat** at any time throughout the meeting. During the designated poster sessions poster presenting authors will be stationed by their poster and able to answer questions. Each poster presenting author is required to attend one live poster session in **Spatial.Chat**.

Delegates may also submit written questions to poster presenting authors at any time outside of poster sessions by navigating to the relevant poster while logged into **Whova**.

Exhibitor Hours

Virtual exhibition booths will be available to visit any time during the meeting in the "exhibit hall" in **Whova**. Exhibit staff will be available at their booths in **Spatial.Chat** during the scheduled exhibition hours.

ACKNOWLEDGEMENTS

The Society for Cryobiology acknowledges the American Society of Transplantation (AST) for collaborating to present the session and roundtable Organ Preservation: New Research and Clinical Needs.

AST | RECOVERY AND PRESERVATION COMMUNITY OF PRACTICE

Founded in 1982, the American Society of Transplantation (AST) is an organization of more than 4,000 professionals dedicated to advancing the field of transplantation and improving patient care by promoting research, education, advocacy, and organ donation.

SPONSORS

The Society for Cryobiology thanks the following sponsors who have helped to make CRYO2021 possible.

Dayong Gao Young Investigator Award Sponsor

Gold SIM Cellular Science LLC, founded in 1995, is a global cell technology company, focusing on intelligent cell science solutions and the development and production of automated equipment, reagent, consumables for cryogenic cell medicine, cell therapy and stem cells. Gold SIM is a global leader in total solutions for cell therapy research and automated intelligent cell factories.

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BioLife Solutions is a leading supplier of cell and gene therapy bioproduction tools. Our proprietary CryoStor® freeze media and HypoThermosol® shipping and storage media are highly valued in the regenerative medicine, biobanking and drug discovery markets. These biopreservation media products are serum-free and protein-free, fully defined, and are formulated to reduce preservation-induced cell damage and death. Our ThawSTAR® family of automated cell thawing products and evo® cold chain management system can mitigate economic risk for cell and gene therapy developers by reducing the potential of administering a non-viable dose.

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Bluechiip understands that every cryosample is critical. Our objective is to manage them efficiently without loss of quality.

Traditional tracking solutions are not keeping up with increased handling requirements of valuable samples. Bluechiip is the only solution providing sample temperature with ID in cryogenic environments to deliver confidence in every sample.

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EXHIBITORS

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AWARDS AND SPECIAL PRESENTATIONS

Arthur DeVries Cryofellow Presentation

July 23 - 9:00AM US/Pacific;
12:00 Noon US/Eastern;
6:00PM Central European;
12:00 Midnight China Standard

Dr. Arthur L. DeVries is an Emeritus Professor of Evolution, Ecology and Behavior at the University of Illinois at Urbana-Champaign (UIUC), where he was previously a Professor of Molecular and Integrative Physiology and a Professor of Animal Biology. He received his B.S. in Zoology in 1960 from the University of Montana and his Ph.D. in Biology from Stanford University in 1968 and thereafter worked at UCSD and UC Davis before settling at UIUC.

Dr. DeVries was the first to discover the seemingly impossible properties of antifreeze proteins. His work was recognized by the American Association for the Advancement of Science, which made him a Fellow of the American Association for the Advancement of Science (AAAS), and by the National Science Foundation, which gave him the seventh position in their "Nifty 50" lineup of notable scientists on the occasion of their 50th anniversary in 2000.

He received the Lifetime Achievement Award at the First International Ice-Binding Protein Conference in 2011 as well as two awards from the Italian National Antarctic Programme and Italian Committee for Antarctic Research in 2005 and an honorary Doctorate of Science degree at Roskilde University in Denmark in 2014. He was chosen in 2015-2016 to give prominent lectures for the American Physiological Society, Novo Nordisk Foundation, and the Institute of Arctic Biology. He even had a new Antarctic fish, *Paraliparis devriesi*, named after him in 1980.

His work has received continuous funding from the NSF since 1971, and he has published 194 scientific papers on antifreeze proteins and given 61 invited lectures and seminars. His work has been cited over 9400 times and led to a large variety of derivative studies published in Cryobiology, including studies on the facilitation of vitrification. Art's discovery with Boris Rubinski and Amir Arav that AFPs stabilize membranes and block chilling injury has provided a new dimension to these molecules and another tool for applied research and was awarded a US Patent in 1994.

Art's discovery of and further studies on antifreeze proteins and their properties and evolutionary origins and implications has forever changed our understanding of cold adaptation, ice physics, and membrane protection at low temperatures.

2020 Arthur W. Rowe Cryobiology Best Paper Award

July 22 - 9:00AM US/Pacific;
12:00 Noon US/Eastern;
6:00PM Central European;
12:00 Midnight China Standard

Join corresponding author Janet A.W. Elliott (University of Alberta) for a special presentation on the winning paper of the Arthur W. Rowe Award for Best Paper published in Cryobiology in 2020.

Nadia Shardt, Zhirong Chen, Shuying Claire Yuan, Kezhou Wu, Leila Laouar, Nadr M. Jomha, Janet A.W.Elliott (2020). Using engineering models to shorten cryoprotectant loading time for the vitrification of articular cartilage. Cryobiology, 92, 180–188. **https://doi.org/10.1016/j.cryobiol.2020.01.008**

Dayong Gao Young Investigator Award Winner, sponsored by GoldSim

July 22 - 9:30AM US/Pacific;
12:30PM US/Eastern;
6:30PM Central European;
12:30AM China Standard

The Dayong Gao Young Investigator Award, sponsored by GoldSim, is an early career award for researchers in the first 10 years of their post-PhD career. The award carries a prize of $5,000.

This year's winner is Victor Gallego (Universitat Politècnica de València, Spain).

In 2013 Dr. Victor Gallego was awarded his Ph.D (cum laude) in fish biology and conservation from the Aquaculture and Biodiversity Group (UPV, Spain). Following his Ph.D he completed research posts in the UK, Brazil, and Japan.

Currently Dr. Gallego is the recipient of a prestigious Marie Curie Fellowship, leading the CRYO-FISH project at the Centre of Marine Sciences at the University of Algarve (Portugal). CRYO-FISH aims to progress basic knowledge of the reproductive biology of endemic freshwater ichthyofauna, and to develop new techniques for gamete assay and protocols for species' fertility cryopreservation for the purpose of creating a genetic resource bank for biodiversity preservation.

Dr. Gallego also presents his current research on July 22 in Symposium 4: Cryopreservation of Aquatic Organisms.

STUDENT AWARDS

Critser Award for Best Extended Student Abstract

The winner of the 2021 Critser Award for the top ranked student extended abstract is Li Zhan (University of Minnesota) for "Cryopreservation method for Drosophila melanogaster embryos". Thank you to the Critser family who support this award with a prize of $1,500.

Peter L. Steponkus Crystal Award for Best Student Oral Presentation

July 22 - 9:45AM US/Pacific; 12:45PM US/Eastern; 6:45PM Central European; 12:45AM China Standard

Join the cryobiology leaders of tomorrow as they compete to win the Peter. L Steponkus Crystal Award for the best student oral presentation. The award carries a $1,000 prize.

FINALISTS

Raffaele Brogna - *University of Veterinary Medicine Hannover, Germany*
Dry biobanking of human plasma using trehalose as lyoprotective agent for disease diagnostics and transfusion

Dhanusha Schwan - *University Hospital Essen, Germany*
Cold- and low chloride-induced alterations in mitochondrial morphology and ultrastructure, a study in endothelial cells

Pablo Heres - *University of Vigo, Spain*
Mollusk larval cryopreservation for establishment of basis for spat production from cryopreserved larvae

Li Zhan - *University of Minnesota, USA*
Cryopreservation method for drosophila melanogaster embryos

Shen Ren – *University of Washington, USA*
Successful vitreous cryopreservation of rabbit jugular vein using magnetic nanoparticles enhanced single_mode electromagnetic resonance rewarming system

PROGRAM AT A GLANCE

All times below are US/Pacific.

Key

Live Sessions

Full Presentations live or livestreamed + Q&A – Just what you'd expect from a face to face meeting.

Live Summary

Full Presentation pre-recorded and available on demand in Whova. Live summary session includes 2 minute summary video + live Q&A.

Tuesday July 20

08:00-09:30	**Plenary Session 1** Plenary Speaker: Francesca Duncan Plenary Speaker: Lisa Campo-Engelstein *Co-Chairs – Adam Higgins and Steven Mullen*		
09:30-11:15	**Symposium 1** Current Status and Challenges in Oncofertility *Co-Chairs – Steven Mullen and Mary Zelinski*	**09:30-11:15**	**Symposium 2** Surviving The Frost When You Cannot Escape: Cryobiology Lessons From Plant Natural Adaptations To Low Temperatures *Chair – Daniel Ballesteros*
11:15-12:00	**Exhibition Hall and Coffee Break**		
12:00 – 12:30	**Roundtable 1** Ethical Considerations Arising from Cryopreservation of Human Fertility *Co-Chairs – Steven Mullen and Mary Zelinski*	**12:00-13:00**	**Session 1** Lyophilization for Preservation *Chair - Nilay Chakraborty*
12:30-13:00	**Session 2** Novel Tools and Technologies for Cryopreservation and Cryoresearch *Chair - John M. Baust*		
13:00-14:00	**Poster Session 1**		

Wednesday July 21

08:00-09:00	**Poster Session 2**		
09:00-09:45	**Plenary Session 2** Plenary Speaker: Daniel Ballesteros *Chair – Adam Higgins*		
09:45-11:45	**Symposium 3** Organ Preservation: New Research and Clinical Needs *Co-Chairs Korkut Uygun and Erik Finger*	**09:45 – 10:30**	**Session 3** Recent Advances in Plant Cryopreservation and Biobanking *Chair – Daniel Ballesteros*
		10:30 – 11:30	**Session 4** Preservation of Aquatic Gametes *Co-Chairs – Estefania Paredes and Dominic Olver*
11:45 – 12:15	**Roundtable 2** Organ Preservation: New Research and Clinical *Co-Chairs Korkut Uygun and Erik Finger*	**11:30 – 12:15**	**Session 5** Modeling to Optimize Cryopreservation 1 *Chair - James Benson*
12:15 – 13:00	**Exhibition Hall and Coffee Break**		

13:00 – 14:15	**Session 6** Vitrification for Organ and Tissue Preservation *Chair – TBA*	**13:00 – 13:45**	**Session 7** Fundamental Cryobiotechnology Research to Understand and Improve Plant Preservation at Low Temperatures *Chair – Daniel Ballesteros*
		13:45 – 14:15	**Session 8** Modeling to Optimize Cryopreservation 2 *Chair - Janet A.W. Elliott*

Thursday July 22

08:00-09:00	**Poster Session 3**		
09:00-09:30	**Plenary Session 3** 2020 Arthur W. Rowe Award for Cryobiology Best Paper *Chair – David Rawson*		
09:30-09:45	**Dayong Gao Young Investigator Award - Sponsored by GoldSim** *Co-Chairs – Estefania Paredes and Adam Higgins*		
09:45-10:45	**Peter L. Steponkus Crystal Award for Best Student Oral Presentation** *Co-Chairs – Estefania Paredes and Jason Acker*		
10:45-11:30	**Exhibition Hall and Coffee Break**		
11:30-13:15	**Symposium 4** Cryopreservation of Aquatic Organisms *Co-Chairs – Estefania Paredes and Kieran Smith*	**11:30-13:15**	**Session 9** Cryopreservation of Cells for Cellular Therapy *Co-Chairs – Zhiquan "Andy" Shu and Peter Kilbride*
13:15-14:00	**Session 10** Molecular Effects of Low Temperatures *Chair – John M. Baust*		

Friday July 23

08:00-09:00	**Poster Session 4**		
09:00-09:30	**Plenary Session 4** 2020 CryoFellow Presentation - Arthur L. DeVries *Chair – Adam Higgins*		
09:30-11:30	**Session 11** Novel Tools and Technologies for Cryopreservation and Cryoresearch 2 *Chair –John M. Baust and Ben Wilks*	**09:30-10:45**	**Symposium 5** Anti-Freeze Proteins *Chair – Ido Braslavsky*
		11:00-11:15	**Session 12** Ice Active Molecules *Chair - Ido Braslavsky*
11:30 – 12:15	**Session 13** Recent Advances in Sperm Cryopreservation *Chair - Budhan Pukazhenthi*	**11:15-12:15**	**Session 14** Recent Advances in Cell and Tissue Cryopreservation *Chair – Jason Acker*
12:15-13:00	**Exhibition Hall and Coffee Break**		
13:00-14:00	**Session 15** Novel Protectants for Biopreservation *Co-Chairs –Neda Ghousifam and Ben Wilks*	**13:00-13:45**	**Session 16** Recent Advances in Cryopreservation of Oocytes, Ovarian and Testicular Tissue *Chair – Yuksel Agca*
14:00-14:05	**Closing Remarks** | *Chair – Adam Higgins*		

PROGRAM IN FULL

Tuesday July 20

Start	End	Session Title and Presentation Titles	Session Chair/ Speaker
8:00 AM	**9:30 AM**	**LIVE - PLENARY SESSION 1: CRYO2021 OPENING AND WELCOME**	***Chair: Adam Z. Higgins***
8:00 AM	8:05 AM	Welcome/Opening Remarks	*Adam Z. Higgins, United States*
8:05 AM	8:45 AM	**INVITED SPEAKER:** S1 THE ONCOFERTILITY CONSORTIUM: MAXIMIZING THE FERTILITY PRESERVATION POTENTIAL OF COMPLEX TISSUES	*Francesca Duncan, United States*
8:45 AM	9:30 AM	**INVITED SPEAKER:** S2 ETHICAL CONSIDERATIONS IN CRYOBIOLOGY	*Lisa Campo-Engelstein, United States*
9:30 AM	**11:15 AM**	**LIVE - SYMPOSIUM 1: CURRENT STATUS AND CHALLENGES IN ONCOFERTILITY**	***Co-Chairs: Steven Mullen and Mary Zelinski***
		INVITED SPEAKER: S3 NAVIGATING PATIENTS AND FAMILIES WITHIN A MATURE ONCOFERTILITY PROGRAM	*Olivia Jaworek Frias, United States*
		INVITED SPEAKER: S4 GONADAL TISSUE CRYOPRESERVATION IN A COORDINATED NETWORK OF ACADEMIC CENTERS AND PROSPECTS FOR FUTURE USE OF THOSE TISSUES IN THE FERTILITY CLINIC	*Kyle Orwig, United States*
		INVITED SPEAKER: S5 FUNCTIONAL EVALUATION OF OVARIAN TISSUE CRYOPRESERVED BY VITRIFICATION	*Mary B. Zelinski, United States*
9:30 AM	**11:15 AM**	**LIVE - SYMPOSIUM 2: SURVIVING THE FROST WHEN YOU CANNOT ESCAPE: CRYOBIOLOGY LESSONS FROM PLANT NATURAL ADAPTATIONS TO LOW TEMPERATURES**	***Chair: Daniel Ballesteros***
		INVITED SPEAKER: S6 INVESTIGATING THE ROLE OF THE CELL WALL IN PLANT FREEZING TOLERANCE	*Heather Knight, United Kingdom*
		INVITED SPEAKER: S7 COLD ACCLIMATION, ANTIFREEZE PROTEINS, AND PROSPECTS FOR COLD-RESILIENT CROPS	*Virginia Walker, Canada*
		INVITED SPEAKER:: S8 STAYING GREEN DURING WINTER; PHOTOPROTECTIVE STRATEGIES OF EVERGREENS	*Amy Verhoeven, United States*
		INVITED SPEAKER: S9 WHY DOES POLLEN NUCLEATE ICE?	*Nina Kinney, United Kingdom*
11:15 AM	**12:00 PM**	**VIRTUAL EXHIBITION HALL & COFFEE BREAK**	
12:00 PM	**12:30 PM**	**LIVE - ROUNDTABLE 1: ETHICAL CONSIDERATIONS ARISING FROM HUMAN FERTILITY CRYOPRESERVATION** **PANELISTS:** *Francesca Duncan; Lisa Campo-Engelstein; Olivia Jaworek Frias; Kyle Orwig; Mary Zelinski*	***Co-Chairs: Steven Mullen and Mary Zelinski***
12:00 PM	**1:00 PM**	**LIVE SUMMARY - SESSION 1: LYOPHILIZATION FOR PRESERVATION**	***Chair: Nilay Chakraborty***
		S10 DRY PRESERVATION OF MACROMOLECULAR ASSEMBLIES, CELLS, AND TISSUES	*Willem Wolkers, Germany*
		S11 USE OF FOURIER TRANSFORM INFRARED SPECTROSCOPY COMBINED WITH MACHINE LEARNING TO DETECT OXIDATIVE DAMAGE IN FREEZE-DRIED HEART VALVE SCAFFOLDS	*Dejia Liu, Germany*

Tuesday July 20 (cont.)

Start	End	Session Title and Presentation Titles	Session Chair/ Speaker
		S12 EFFECT OF PROTECTANTS MADE FROM SUCROSE AND ANTIOXIDANT BLENDS ON THE STABILITY OF FREEZE-DRIED LACTIC ACID BACTERIA	*Ruodan Cao, Japan*
12:30 PM	**1:00 PM**	**LIVE SUMMARY - SESSION 2: NOVEL TOOLS & TECHNOLOGIES FOR CRYOPRESERVATION AND CRYORESEARCH 1**	***Chair: John M. Baust***
		S13 DESIGN OF A MICROFLUIDIC DEVICE FOR CRYOPROTECTANT WASHING, RELEVANT IN CELL THERAPY	*Manuel Gonzalez-Vazquez, Spain*
		S14 WITHDRAWN	
		S15 COMPARATIVE ANALYSIS OF CRYOABLATION IN NANO-PHANTOM AND NORMAL-PHANTOM	*Prashant Srivastava, India*
		S16 WHAT FACTORS AFFECT THE PRESENCE OF MICROORGANISMS IN CRYOTANKS? - A CULTURE-INDEPENDENT APPROACH TO ASSESS POTENTIAL MICROBIAL COLONIZATION OF LIQUID NITROGEN STORAGE TANKS	*Felizitas Bajerski, Germany*
1:00 PM	**2:00 PM**	**LIVE - POSTER SESSION 1**	

Wednesday July 21

8:00 AM	**9:00 AM**	**LIVE - POSTER SESSION 2**	
9:00 AM	**9:45 AM**	**LIVE - PLENARY SESSION 2**	***Chair: Adam Z. Higgins***
		INVITED SPEAKER: S17 TIME LIMITS OF CRYOPRESERVATION	*Daniel Ballesteros, Spain*
9:45 AM	**11:45 AM**	**LIVE - SYMPOSIUM 3: ORGAN PRESERVATION: NEW RESEARCH AND CLINICAL NEEDS** ***This Session is Presented in Association with the American Society of Transplantation***	***Co-Chairs: Korkut Uygun and Erik Finger***
		INVITED SPEAKER: S18 WHAT DO ORGAN PROCUREMENT ORGANIZATIONS NEED PRACTICALLY?	*Susan Gunderson, United States*
		INVITED SPEAKER: S19 A CLINICAL PERSPECTIVE IN TRANSLATIONAL ORGAN PRESERVATION TRIALS	*Malcolm MacConmara, United States*
		INVITED SPEAKER: S20 THE INTERPLAY BETWEEN PRESERVATION AND REJECTION/TOLERANCE	*Gerald Brandacher, United States*
		INVITED SPEAKER: S21 TBD	*Erik Finger, United States*
		INVITED SPEAKER: S22 HIGH SUBZERO PRESERVATION OF DONOR ORGANS FOR TRANSPLANTATION	*Reinier de Vries, United States*
9:45 AM	**10:30 AM**	**LIVE SUMMARY - SESSION 3: RECENT ADVANCES IN PLANT CRYOPRESERVATION AND BIOBANKING**	***Chair: Daniel Ballesteros***
		S23 CRYOPRESERVATION OF EXCEPTIONAL PLANTS: WHAT WE DO AND DON'T KNOW	*Valerie Pence, United States*
		S24 CRYOPRESERVATION IN HAWAII, ADAPTING AN EX-SITU MICROPROPAGATION FACILITY TO INCLUDE CRYOPRESERVATION IN AN EXTINCTION HOTSPOT	*Devon Gordon, United States*
		S25 CRYOSTORAGE OF MACADAMIA NUT EMBRYONIC AXES USING DROPLET-VITRIFICATION	*Lyndle Hardstaff, Australia*
		S26 CRYOPRESERVATION OF CORAL SYMBIOTIC DINOFLAGELLATES (FAMILY: SYMBIODINIACEAE)	*Jessica Bouwmeester, United States*

Start	End	Session Title and Presentation Titles	Session Chair/ Speaker
		S27 EXPLANT PRECONDITIONING : A KEY FACTOR FOR IMPROVING CRYOPRESERVATION OF PLANT TISSUES	*Mukund Shukla, Canada*
10:30 AM	**11:30 AM**	**LIVE SUMMARY - SESSION 4: PRESERVATION OF AQUATIC GAMETES**	***Co-Chairs: Estefania Paredes and Dominic Olver***
		S28 DEVELOPMENT OF COOLING PROTOCOLS FOR FISH EMBRYOS AND EVALUATION OF LARVAL QUALITY	*Christian L. Macoretta, Argentina*
		S29 SODIUM ALGINATE HYDROGEL ENCAPSULATION EFFECTS ON ZEBRAFISH OVARIAN TISSUE VITRIFICATION	*Thaiza Rodrigues de Freitas, Brazil*
		S30 CRYOPRESERVATION OF SPERMATOPHORES AND FERTILITY POTENTIAL OF SPERM IN THE WHITELEG SHRIMP, LITOPENAEUS VANNAMEI (BOONE, 1931)	*Selvakumar Narasimman, India*
		S31 CRYOPRESERVATION PROTOCOLS FOR SHARK SPERM CRYOBANKING	*Pablo García-Salinas, Spain*
		S32 CRYOPRESERVATION PROTOCOLS FOR RAYS AND SKATES SPERM CRYOBANKING	*Pablo García-Salinas, Spain*
		S33 SEA URCHIN CRYOPRESERVATION: FROM SPERM TO LARVAE	*Estefania Paredes, Spain*
		S34 LEVELS OF ATP IN FRESH AND CRYOPRESERVED SEX-REVERSED FEMALES RAINBOW TROUT SPERM ARE HIGHLY INFLUENCED BY REPRODUCTIVE SEASON	*Sylwia Judycka, Poland*
11:30 AM	**12:15 PM**	**LIVE SUMMARY - SESSION 5: MODELING TO OPTIMIZE CRYOPRESERVATION 1**	***Chair: James Benson***
		S35 MATHEMATICAL MODEL OF CRYOPROTECTANT TOXICITY FOR PREDICTING PROMISING MIXTURES FOR VITRIFICATION	*Adam Z. Higgins, United States*
		S36 CRYOBIOLOGICAL IMPLICATIONS AND MEASUREMENT OF OSMOTIC BEHAVIOR OF HUMAN HEPATOMA HepG2 CELLS	*Iqra Azam, Canada*
		S37 MAY SMALLER SPECIMENS EXPERIENCE LARGER THERMOMECHANICAL STRESSES DURING VITRIFICATION?	*Prem Solanki, United States*
		S38 A STUDY OF THERMAL STRESS GENERATION DURING THE REWARMING PROCESS OF CRYOPRESERVED LARGE BIOMATERIALS	*Ruidong Ma, United States*
11:45 AM	**12:15 PM**	**LIVE - ROUNDTABLE 2: ORGAN PRESERVATION: NEW RESEARCH AND CLINICAL NEEDS** ***This Session is Presented in Association with the American Society of Transplantation*** **PANELISTS:** *Korkut Uygun, Erik Finger, Susan Gunderson, Malcolm MacConmara, Gerald Brandacher, Reinier de Vries*	***Co-Chairs: Korkut Uygun and Erik Finger***
12:15 PM	**1:00 PM**	**VIRTUAL EXHIBITION HALL & COFFEE BREAK**	
1:00 PM	**2:30 PM**	**LIVE - SESSION 6: VITRIFICATION FOR ORGAN AND TISSUE PRESERVATION**	
		S39 VITRIFICATION AND REWARMING OF MAGNETIC NANOPARTICLE-LOADED RAT HEARTS	*Zhe Gao, United States*
		S40 VITRIFICATION AND NANOWARMING OF KIDNEYS	*Anirudh Sharma, United States*

Wednesday July 21 (cont.)

Start	End	Session Title and Presentation Titles	Session Chair/ Speaker
		S41 VITRIFICATION OF HUMAN CORNEA: ASSESSMENT BY VIABILITY, FUNCTION AND HUMAN TO RABBIT XENOGRAFT	*Xian Ge, United States*
		S42 STUDYING THE MECHANICAL PROPERTIES OF VITRIFIED ARTICULAR CARTILAGE	*Maha Ead, Canada*
1:00 PM	**1:45 PM**	**LIVE SUMMARY - SESSION 7: FUNDAMENTAL CRYOBIOTECHNOLOGY RESEARCH TO UNDERSTAND AND IMPROVE PLANT PRESERVATION AT LOW TEMPERATURES**	***Chair: Daniel Ballesteros***
		S43 ASSESSING PLANT METABOLIC RATES DURING CRYOPRESERVATION	*Lily Whelehan, Australia*
		S44 RAPID AND NONINVASIVE TOOLS TO UNDERSTAND LIPID ROLE IN SEED STORAGE: DSC AND FT-IR	*Antonio Diego Molina-Garcia, Spain*
		S45 ANALYSIS OF GRAPEVINE ZYGOTIC EMBRYOS RESPONSES TO A CRYOPRESERVATION PROTOCOL BY USING NEXT GENERATION SEQUENCING TECHNOLOGY	*Mariana Quijada-Rivera, Mexico*
		S46 DETERMINATION OF THE POTENTIAL OF FRUCTANTS IN PLANT CRYOPRESERVATION APPLICATIONS	*Yelda Özden Çiftçi, Turkey*
		S47 LOCALIZATION AND VISUALIZATION OF DIMETHYL SULFOXIDE IN MENTHA X PIPERITA SHOOT TIPS	*Heidi D. Kreckel, United States*
1:45 PM	**2:15 PM**	**LIVE SUMMARY - SESSION 8: MODELING TO OPTIMIZE CRYOPRESERVATION 2**	***Chair: Janet A.W. Elliott***
		S48 GENERAL MASS TISSUE TRANSFER MODEL FOR CRYOPRESERVATION APPLICATIONS	*Robyn Shuttleworth, Canada*
		S49 SIMULATING THE THERMODYNAMIC PROCESSES OF CRYOPRESERVATION UTILISING THE CRYODYNAMO CRYOPRESERVATION MODELLING PACKAGE	*Jack Jennings, United Kingdom*
		S50 SEA URCHIN OOCYTE DAMAGE MODELLING: ADVANCEMENTS IN CHILL INJURY AND CYTOTOXICITY MODELLING	*Dominic Olver, Canada*
		S51 OPTIMIZATION OF BOVINE SPERM CRYOPRESERVATION USING ITERATIVE OPTIMIZATION AND MACHINE LEARNING	*Frankie Tu, Canada*

Thursday July 22

8:00 AM	**9:00 AM**	**LIVE - POSTER SESSION 3**	
9:00 AM	**9:45 AM**	**LIVE - PLENARY SESSION 3: ARTHUR W. ROWE BEST PAPER AWARD AND DAYONG GAO YOUNG INVESTIGATOR AWARD**	***Co-Chairs: David Rawson and Estefania Paredes***
9:00 AM	**9:30 AM**	ARTHUR W. ROWE CRYOBIOLOGY BEST PAPER AWARD	*Janet A.W. Elliott, Canada*
9:30 AM	**9:45 AM**	DAYONG GAO YOUNG INVESTIGATOR AWARD, SPONSORED BY GOLDSIM	*Victor Gallego, Spain*
9:45 AM	**10:45 AM**	**LIVE - PLENARY SESSION 3: PETER L. STEPONKUS CRYSTAL AWARD FOR BEST STUDENT ORAL PRESENTATION**	***Co-Chairs: Estefania Paredes and Jason Acker***
		S52 DRY STORAGE OF BODILY FLUIDS FOR DISEASE DIAGNOSTICS AND GENOME RESOURCE BANKING	*Raffaele Brogna, Germany*

Start	End	Session Title and Presentation Titles	Session Chair/ Speaker
		S53 COLD- AND LOW CHLORIDE-INDUCED ALTERATIONS IN MITOCHONDRIAL MORPHOLOGY AND ULTRASTRUCTURE - A STUDY IN ENDOTHELIAL CELLS	*Dhanusha Schwan, Germany*
		S54 MOLLUSK LARVAL CRYOPRESERVATION FOR ESTABLISHMENT OF BASIS FOR SPAT PRODUCTION FROM CRYOPRESERVED LARVAE	*Pablo Heres, Spain*
		S55 CRYOPRESERVATION METHOD FOR DROSOPHILA MELANOGASTER EMBRYOS	*Li Zhan, United States*
		S56 SUCCESSFUL VITREOUS CRYOPRESERVATION OF RABBIT JUGULAR VEIN USING MAGNETIC NANOPARTICLES ENHANCED SINGLE_MODE ELECTROMAGNETIC RESONANCE REWARMING SYSTEM	*Shen Ren, United States*
10:45 AM	**11:30 AM**	**VIRTUAL EXHIBITION HALL & COFFEE BREAK**	
11:30 AM	**1:15 PM**	**LIVE - SYMPOSIUM 4: CRYOPRESERVATION OF AQUATIC ORGANISMS**	***Co-Chairs: Estefania Paredes and Kieran Smith***
		INVITED SPEAKER: S57 GAMETE CRYOPRESERVATION OF THREATENED SPECIES: FROM TINY FRESHWATER FISH TO BIG SHARKS	*Victor Gallego, Spain*
		INVITED SPEAKER: S58 ULTRA RAPID LASER WARMING FOR PRESERVATION OF FISH AND OTHER AQUATIC SPECIES	*Kanav Khosla, United States*
		INVITED SPEAKER: S59 PRODUCTION OF FUNCTIONAL GAMETES DERIVED FROM CRYOPRESERVED SPERMATOGONIA VIA TRANSPLANTATION INTO RECIPIENTS: A CASE STUDY WITH ENDANGERED BITTERLINGS	*Goro Yoshizaki, Japan*
		INVITED SPEAKER: S60 BIOBANKS OF GAMETES FROM AQUATIC SPECIES: FUTURE PERSPECTIVES AND CHALLENGES FOR THEIR APPLICATION IN LABORATORY RESEARCH	*Adele Fabbrocini, Italy*
11:30 AM	**1:30 PM**	**LIVE - SESSION 9: CRYOPRESERVATION OF CELLS FOR CELLULAR THERAPY**	***Co-Chairs: Zhiquan "Andy" Shu and Peter Kilbride***
		INVITED SPEAKER: S61 HOLISTIC APPROACH TO OVERCOME CRYOPRESERVATION CHALLENGES TO DEVELOP ALLOGENIC CAR-NK PRODUCTS	*Shuxia Zhou, United States*
		S62 CHARACTERIZATION OF MOLECULAR AND BIOPHYSICAL CRYOINJURY MECHANISMS IN A HUMAN T CELL LINE AT SLOW AND RAPID RATES OF COOLING	*Jens O.M. Karlsson, United States*
		S63 MECHANISMS OF ACTION IN CRYOPRESERVATION OF INDUCED PLURIPOTENT STEM CELLS AND IPSC-DERIVED CELLS	*Rui Li, United States*
		S64 ME2SO-FREE CRYOPRESERVED MESENCHYMAL STROMAL CELLS FOR BONE GRAFTS MANUFACTURING	*Olena Rogulska, Ukraine*
		S65 AN AUTOMATIC CRYOPRESERVATION SYSTEM INHIBITS TEMPERATURE FLUCTUATION AND REVERSES THE REDUCTION OF CELL VIABILITY AND FUNCTIONAL ACTIVITIES OF CRYOPRESERVED CELLS	*Xiaowen He, China*
1:15 PM	**2:00 PM**	**LIVE SUMMARY - SESSION 10: MOLECULAR EFFECTS OF LOW TEMPERATURES**	***Chair: John M. Baust***
		S66 CHARACTERIZING DIMETHYL SULFOXIDE EFFECT ON PROPERTIES OF REGULATORY ENZYME FRUCTOSE 1,6-BISPHOSPHATASE UNDER CONDITIONS OF GLUCONEOGENESIS	*Neda Ghousifam, United States*

Thursday July 22 (cont.)

Start	End	Session Title and Presentation Titles	Session Chair/ Speaker
		S67 THE GREY TREE FROG, HYLA VERSICOLOR, EXHIBITS DIFFERENTIAL MICRORNA BIOGENESIS AND TRANSCRIPTOMICS IN RESPONSE TO FREEZING	*W. Aline Ingelson-Filpula, Canada*
		S68 REWARMING INJURY AFTER EXTENDED COLD INCUBATION IS INDUCED BY ENERGY DEFICIENCY	*Bjoern Walter, Germany*
		S69 MULTI-FACETED ROLE OF AUTOPHAGY IN FREEZE TOLERANT WOOD FROG	*Gurjit Singh, Canada*
		S70 PROCYANIDIN B2 (PCB2) RESCUES MITOCHONDRIAL FUNCTION AND IMPROVES THE DEVELOPMENTAL POTENTIAL OF VITRIFIED OOCYTES BY REGULATING AUTOPHAGY	*Qingrui Zhuan, China*

Friday July 23

8:00 AM	**9:00 AM**	**LIVE - POSTER SESSION 4**	
9:00 AM	**9:30 AM**	**LIVE - PLENARY SESSION 4: CRYOFELLOW PRESENTATION**	***Chair: Adam Z. Higgins***
		PRESENTATION OF CRYOFELLOW AWARD TO ARTHUR L. DEVRIES	*Arthur DeVries, United States*
9:30 AM	**10:45 AM**	**LIVE - SYMPOSIUM 5: ANTI-FREEZE PROTEINS**	***Chair: Ido Braslavsky***
		INVITED SPEAKER: S71 DYNAMIC MEASUREMENT OF ICE GROWTH BY ATOMIC FORCE MICROSCOPY IN AQUEOUS SOLUTIONS IN THE PRESENCE OF ICE-BINDING PROTEINS	*Ido Braslavksy, Israel*
		INVITED SPEAKER: S72 AFFINITY PURIFICATION OF ICE-BINDING PROTEINS	*Peter Davies, Canada*
		INVITED SPEAKER: S73 WHAT DETERMINES CRYOPRESERVATION ABILITIES OF ANTIFREEZE GLYCOPROTEINS?	*Konrad Meister, United States*
9:30 AM	**11:30 AM**	**LIVE - SESSION 11: NOVEL TOOLS & TECHNOLOGIES FOR CRYOPRESERVATION AND CRYORESEARCH 2**	***Co-Chairs: John M. Baust and Ben Wilks***
		S74 NOVEL FLOAT-PROCESS FOR THE CRYOPRESERVATION OF RED BLOOD CELLS	*Tim Rittinghaus, Germany*
		S75 VARIABLE FREQUENCY MICROWAVES FOR WARMING OF VITRIFIED ORGANS	*Ramon Risco, Spain*
		S76 DEVELOPMENT OF A 3D CRYOPRINTER FOR PRINTING SOFT BIOMATERIALS	*Linnea Warburton, United States*
		S77 STUDY OF THE LIPID PHASE TRANSITION IN CAT OOCYTES USING RAMAN SPECTROSCOPY OF DEUTERIUM LABELED LIPIDS	*Konstantin Okotrub, Russia*
		S78 SONOPORATION-MEDIATED LOADING OF TREHALOSE FOR CRYOPRESERVATION	*David Grimm, United States*
		S79 USE OF IN SITU FOURIER TRANSFORM INFRARED SPECTROSCOPIC ANALYSIS TO DETECT OXIDATIVE DAMAGE IN BIOMOLECULES AND TISSUES	*Sükrü Caliskan, Germany*
11:00 AM	**11:15 AM**	**LIVE SUMMARY - SESSION 12: ICE ACTIVE MOLECULES**	***Chair - Ido Braslavsky***
		S80 RATIONAL DESIGN AND CHARACTERIZATION OF SHORT ANTIFREEZE PEPTIDES DERIVED FROM LOLIUM PERENNE ANTIFREEZE PROTEIN	*Bimo Ario, Malaysia*
		S81 USING HYPERACTIVE ANTIFREEZE PROTEINS TO SUPERCOOL A RENAL TUBULE CELL LINE	*Heather E. Tomalty, Canada*

Friday July 23 (cont.)

Start	End	Session Title and Presentation Titles	Session Chair/ Speaker
11:15 AM	**12:15 PM**	**LIVE SUMMARY - SESSION 13: RECENT DEVELOPMENTS IN SPERM CRYOPRESERVATION**	***Chair: Budhan Pukazhenthi***
		S82 ELUCIDATING THE PHYSIOLOGICAL ROLE OF SLO1 AND HVCN1 CHANNELS IN MAMMALIAN SPERM CRYOPRESERVATION	*Ariadna Delgado-Bermúdez, Spain*
		S83 WITHDRAWN	
		S84 PREGNANCY RATE AFTER TRANSFER OF IN VITRO PRODUCED GOAT EMBRYOS USING FRESH VS FROZEN SPERM IN DIFFERENT SEASONS	*Anastasiia Bogdaniuk, Ukraine*
		S85 EFFECT OF ETHYLENE GLYCOL ON QUALITY, OXIDATIVE STRESS AND FERTILITY OF INDIAN RED JUNGLE FOWL (GALLUS GALLUS MURGHI) SEMEN	*Muhammad Aansari, Pakistan*
		S86 EFFECT OF BOVINE SERUM ALBUMIN ON QUALITY OF INDIAN RED JUNGLE FOWL SPERMATOZOA	*Bushra Rakha, Pakistan*
		S87 IMPROVEMENT OF CRYOSURVIVABILITY OF OVINE SPERM BY SUPPLEMENTATION OF NIGELLA SATIVA OIL	*Abdul G. Miah, Bangladesh*
11:30 AM	**12:15 PM**	**LIVE SUMMARY - SESSION 14: RECENT ADVANCES IN CELL AND TISSUE CRYOPRESERVATION**	***Chair: Jason Acker***
		S88 CRYOPRESERVATION OF THYMIC TISSUE AS A CELLULAR THERAPY FOR THE RECONSTITUTION OF IMMUNITY	*Mira M Chawda, United Kingdom*
		S89 DEVELOPMENT OF CRYOPRESERVATION PROTOCOLS FOR HUMAN CEREBRAL MICROVASCULAR ENDOTHELIAL CELLS AND ASTROCYTES IN MONOLAYERS	*Leah A Marquez-Curtis, Canada*
		S90 "ON-CHIP"-CRYOPRESERVATION FOR CELL-BASED BIOSENSORS AND LAB-ON-A-CHIP SYSTEMS	*Dua Özsoylu, Germany*
		S91 CRYOPROTECTANT LOADING AND DEHYDRATION TOLERANCE IN ANOPHELES GAMBIAE LARVAE	*Arun Rajamohan, United States*
		S92 TOWARDS CRYOPRESERVATION OF SCAFFOLD-LESS AND SCAFFOLD-BASED TISSUE-ENGINEERED CONSTRUCTS	*Oleksandr Gryshkov, Germany*
12:15 PM	**1:00 PM**	**VIRTUAL EXHIBITION HALL & COFFEE BREAK**	
1:00 PM	**2:00 PM**	**LIVE SUMMARY - SESSION 15: NOVEL CRYOPROTECTANTS FOR BIOPRESERVATION**	***Co-Chairs: Neda Ghousifam and Ben Wilks***
		S93 FROM BIO-BASED CRYOPRESERVATION STRATEGIES TO STRUCTURAL MODELLING: THE CASE STUDY OF FUCOPOL AND ITS SCALABILITY TO GREATER STRUCTURE-FUNCTION UNDERSTANDING	*Bruno Guerreiro, Portugal*
		S94 CRYOPRESERVATION OF MAMMALIAN CELLS USING PROTIC IONIC LIQUID SOLUTIONS	*Saffron J. Bryant, Australia*
		S95 EVALUATING THE POTENCY OF NEW MACROMOLECULAR CRYOPROTECTANTS; POST-THAW INTERVAL AND VIABILITY VERSUS RECOVERY	*Kathryn A Murray, United Kingdom*
		S96 FRUCTANS AS EFFECTIVE AGENTS FOR CRYOPROTECTION OF MAMMALIAN CELLS	*Selay Tornacı, Turkey*
		S97 CRYOPRESERVATION OF RED BLOOD CELLS USING A POLYAMPHOLYTE WITH ME2SO AND TREHALOSE	*Alex Murray, United Kingdom*

Friday July 23 (cont.)

Start	End	Session Title and Presentation Titles	Session Chair/ Speaker
1:00 PM	**1:45 PM**	**LIVE SUMMARY - SESSION 16: PRESERVATION OF OOCYTES, OVARIAN AND TESTICULAR TISSUE**	***Chair: Yuksel Agca***
		S98 EFFECTS OF VITRIFICATION ON MRNA EXPRESSION IN APOPTOTIC GENES IN IMMATURE CUMULUS OOCYTE COMPLEXES OF SHEEP	*Satish Kumar, India*
		S99 INFLUENCE OF MATERNAL AGE ON MOUSE OOCYTE DEVELOPMENTAL COMPETENCE AND CRYOTOLERANCE	*Akshatha Daddangadi, India*
		S100 DIFFERENCES IN PERMEATION KINETICS OF CRYOPROTECTIVE SOLUTIONS IN EQUINE OOCYTES COMPARED TO THAT IN OVARIAN TISSUE	*Harriëtte Oldenhof, Germany*
		S101 MEMBRANE LIPID RICH FREEZING MEDIUM IMPROVES PREPUBERTAL TESTICULAR TISSUE CRYOSURVIVAL	*Reyon Dcunha, India*
		S102 CRYOPRESERVATION OF TESTICULAR CELLS AND TISSUES BY SOLID SURFACE VITRIFICATION	*Tanushree Patra, India*
2:00 PM	**2:05 PM**	**CLOSING REMARKS**	*Adam Higgins, United States*

Poster Listings

Tuesday July 20

1:00 PM	**2:00 PM**	**LIVE - POSTER SESSION 1**	
		P1 DEVELOPMENT OF A MULTIFUNCTIONAL INSTRUMENT AND AUTO-GENERATED PROTOCOLS TO MINIMIZE CELL OSMOTIC INJURY DURING CPA REMOVAL	*Ruidong Ma, United States*
		P2 A NEW APPROACH FOR DMSO-FREE CELL CRYOPRESERVATION	*Yulong Zhong, United States*
		P3 PRE-ACTIVATED FREEZING NUCLEATION CLOSE TO 0C	*Gabor Vali, United States*
		P4 RAPID AND UNIFORM REMARMING BY SINGLE-MODE ELECTROMAGNETIC RESONANCE CAVITY: EFFECT OF SAMPLE SHAPE	*Shen Ren, United States*
		P5 NANOPARTICLES ARE LOOKING FOR JOBS IN CRYOBIOLOGY	*Olena Polivanova, Ukraine*
		P6 NACL EXTENDER IMPROVES KINETICS PARAMETERS AND REPRODUCTIVE CAPACITY OF FISH POST-THAW SPERM	*Thales França, Brazil*
		P7 CRYOPRESERVATION OF SOUTH AMERICAN NEOTROPICAL FISH SPERM: CURRENT STATUS	*Danilo Streit Jr, Brazil*
		P8 FERTILIZATION AND HATCHING RATES AFTER CRYOPRESERVATION OF RHAMDIA QUELEN MILT CONTAMINATED WITH BLOOD	*Raquel Santos , Brazil*
		P9 VITRIFICATION CHANGES THE FATTY ACIDS PROFILE OF ZEBRAFISH OVARIAN FOLLICLES AT DIFFERENT DEVELOPMENTAL STAGES	*Fernanda De Mello, Brazil*
		P10 COMPARATIVE ANALYSIS OF CRYOPRESERVATION OF SPERMATOZOA FROM BOMBUS IMPATIENS AND APIS MELLIFERA	*Claire Campion, United States*
		P11 EFFECT OF QUERCETIN ON CRYOPRESERVATION OF JAPANESE BLACK BULLS SPERMATOZOA	*Reza Rajabi-Toustani, Japan*
		P12 THE EFFECT OF MELATONIN ON BOAR SPERM PLASMA MEMBRANE FLUIDITY AND CRYOSURVIVAL	*Norma A. Ramirez-Campos, Mexico*

		P13 OPTIMIZATION OF TURKEY SEMEN DILUTION RATE AND LIQUID STORAGE PERIOD AT 4-8OC WITH PLANT BASED EXTENDER FOR OPTIMUM FERTILITY	*Adedeji S. Balogun, Nigeria*
		P14 DETAILED ANALYSIS OF CRYOINJURY IN HUMAN OVARIAN TISSUE FOLLOWING VITRIFICATION OR SLOW FREEZING	*Larissa Silva, Brazil*
		P15 CLINICAL GRADE ADDITIVES EXERT CHONDROPROTECTIVE EFFECTS IN PORCINE ARTICULAR CARTILAGE DURING EXPOSURE TO CRYOPROTECTIVE AGENTS	*Mary Crisol, Canada*
		P16 IMPROVEMENT OF EQUINE EMBRYO CRYOPRESERVATION VIA LASER ASSISTED MICROMANIPULATION	*Reza Rajabi-Toustani, Japan*
		P17 IMPROVEMENT IN THE PHYSICAL PROPERTIES OF FREEZE-DRIED SOUP WITH THE ADDITION OF GELLING AGENT	*Tomochika Sogabe, Japan*
		P18 RETENTION OF HEMOGLOBIN BY RED BLOOD CELLS AFTER CRYOPRESERVATION	*Charles A. Elder, United States*
		P19 ICE RECRYSTALLIZATION INHIBITORS (IRIS) AS NOVEL CRYOPROTECTANTS FOR HUMAN INDUCED PLURIPOTENT STEM CELLS (IPSCS) AND IPSC-DERIVED NEURONS (INS)	*Salma Alasmar-Abdou, Canada*
		P20 A BIOCOMPATIBLE ICE NUCLEATING AGENT ELIMINATES SUPERCOOLING AND ENHANCES CELL CRYOPRESERVATION IN 96-WELL PLATES	*Martin Daily, United Kingdom*
		P21 ONCOLOGICAL AND FUNCTIONAL OUTCOMES AFTER SALVAGE PROSTATE CRYOTHERAPY FOR THE MANAGEMENT OF PRIMARY BRACHYTHERAPY VERSUS CRYOTHERAPY FAILURES: A PROPENSITY SCORE MATCHED COMPARISON	*Hazem Orabi, United States*
		P22 COMPARATIVE STUDY BETWEEN SALVAGE CRYOABLATION OF THE PROSTATE AFTER PRIMARY RADIOTHERAPY FAILURE AND AFTER PRIMARY CRYOTHERAPY FAILURE FOR CLINICALLY LOCALIZED PROSTATE CANCER	*Hazem Orabi, United States*
		P23 NEW, LN2-FREE SOLUTION FOR CRYOGENIC TRANSPORT OF CELL THERAPIES	*Julie Meneghel, United Kingdom*
		P24 MVE CRYOSHIPPER CT-50 TILT VALIDATION FOR CRYOGENIC CORD BLOOD SHIPMENTS	*Lee Berry, United Kingdom*
		P25 CONTAINMENT CONSIDERATIONS FOR THE CRYOPRESERVATION OF CELL AND GENE THERAPIES	*Samuel A Molina, United States*

Wednesday July 21

8:00 AM	**9:00 AM**	**LIVE - POSTER SESSION 2**	
		P26 STANDARDIZING THE CRYOPRESERVATION PROCEDURE OF EUROPEAN PERCH SEMEN FOR THE DEVELOPMENT OF CONSISTENT PROCEDURES AND FUTURE IMPLEMENTATION OF CRYOPRESERVATION TECHNOLOGY IN COMMERCIAL HATCHERIES	*Sylwia Judycka, Poland*
		P27 COMPARISON OF DIFFERENT SEMEN EXTENDERS AND LIQUID PRESERVATION TEMPERATURES ON SPERM MOTILITY OF KOLBROEK BOARS' SEMEN	*Tsholofelo Welheminah Tongwane, South Africa*
		P28 INVESTIGATION OF THE ANTIOXIDANT CAPACITY OF DITHIOTHREITOL AND GLUTATHIONE ON LARGE WHITE BOARS SEMEN DURING CRYOPRESERVATION	*Mahlatsana R. Ledwaba, South Africa*

		P29 DIRECT (ALKALINE AND NEUTRAL COMET AND TUNEL) BUT NOT INDIRECT METHODS (SCD AND SCSA) RELATE THE PERCENTAGES OF SPERM WITH FRAGMENTED DNA TO CHROMATIN DAMAGE IN CRYOPRESERVED BOAR SPERM	*Jordi Ribas-Maynou, Spain*
		P30 EFFECT OF GRADIENT VITRIFICATION SOLUTIONS AND TEMPERATURE ON SURVIVAL RATE OF CRYOPRESERVED BLACK SOLDIER FLY EMBRYOS	*Idan Alyagor, Israel*
		P31 VITRIFICATION OF MOUSE CUMULUS-OOCYTE COMPLEXES SELECTED WITH BRILLIANT CRESYL BLUE; AN IMPROVED PROTOCOL FOR IMMATURE OOCYTE VITRIFICATION	*Moslem Mohammadi, Iran*
		P32 STATIC MAGNETIC FIELD ASSISTED VITRIFICATION OF MOUSE GV OOCYTES	*Sara Soleimani, Iran*
		P33 EQUILIBRIUM VITRIFICATION OF MOUSE OOCYTES WITH LOWER CONCENTRATIONS OF CRYOPROTECTANTS	*Juan Qiu, China*
		P34 LOW-TEMPERATURE PHASE TRANSITIONS IN DORMANT GRAPE BUDS	*Olena Bobrova, Ukraine*
		P35 CRYOPRESERVATION OF APICAL AND AXILLARY SWEET POTATO MERISTEMS BY VITRIFICATION TECHNIQUES	*Anna Mozgovska, Ukraine*
		P36 CRYO-LIGHT MICROSCOPY TO STUDY THE FREEZING BEHAVIOR OF MICROALGAE CELLS	*Nadiia Chernobai, Ukraine*
		P37 INVESTIGATIONS ON GLASSY STATE OF SUGARCANE SHOOT TIPS BY DSC STANDARDIZATION OF PVS2	*M. Shankar, India*
		P38 USE OF FROZEN VEINS IN VASCULAR AND RECONSTRUCTIVE SURGERY	*Seyed Mousavi, Iran*
		P39 FREEZING DAMAGE ASSESSMENT IN EPIDERMAL TISSUE CRYOPRESERVED WITH ANTARCTIC YEAST ISOLATED TYPE1-ANTIFREEZE PEPTIDE	*Muhammad Shuaib khan, Pakistan*
		P40 THE EFFECT OF CRYOIRRIGATION AND CRYOPRESERVED PLACENTA EXTRACT ON THE CONTENT OF NITROGEN MONOXIDE IN THE GASTRIC MUCOSA IN RATS WITH DICLOFENAC SODIUM-INDUCED GASTROPATHY	*Fedir Hladkykh, Ukraine*
		P41 DETECTION AND CHARACTERIZATION OF ANTIFREEZE ACTIVITY FROM BRASSICA JUNCEA LEAF CUTICLE	*Satya Prakash, India*
		P42 FIRST SPERM CRYOPRESERVATION PROTOCOLS DESIGNED FOR IBERIAN THREATENED FRESHWATER SPECIES: IBERIAN TOOTHCARP (APHANIUS IBERUS) AND VALENCIA TOOTHCARP (VALENCIA HISPANICA)	*Marta Blanes-García, Spain*
		P43 DEVELOPMENT OF A PROTOCOL FOR THE CRYOPRESERVATION OF PUFFERFISH (TAKIFUGU ALBOPLUMBEUS) SPERM	*Victor Gallego, Spain*
		P44 EFFECT OF LOW TEMPERATURE STORAGE IN SEA URCHIN EGGS VIABILITY	*Sara Campos , Spain*
		P45 EFFECTS OF PENETRATING CRYOPROTECTANTS ON SPERM CRYOPRESERVATION OF PACIFIC ABALONE, HALIOTIS DISCUS HANNAI	*Kang H. Kho, South Korea*

Thursday July 22

8:00 AM	**9:00 AM**	**LIVE - POSTER SESSION 3**	
		P46 EVALUATING THE EFFICACY OF SELECTIVE INHIBITION OF ARACHIDONATE 15-LIPOXYGENASE (ALOX15) DURING HUMAN SEMEN CRYOPRESERVATION IN PROTECTING FREEZE THAW INDUCED SPERM DAMAGE	*Shubhashree Uppangala, India*
		P47 MITO-TEMPO IMPROVES CRYOPRESERVATION PERFORMANCE OF BULK SEMEN BY CONTROLLING APOPTOSIS RATE, DNA FRAGMENTATION AND ROS PRODUCTION	*Reza Masoudi, Iran*

		P48 POST-THAW QUALITY OF BEETAL GOAT SPERM CRYOPRESERVED DURING LATE SUMMER AND WINTER SEASONS	*Ejaz Ahmad, Pakistan*
		P49 QUALITY AND FERTILITY OF TREHALOSE SUPPLEMENTED CRYOPRESERVED STALLION SEMEN	*Dinesh Jhamb, India*
		P50 CONTRIBUTION OF METABOLIC PATHWAYS IN RESISTANCE OF ALGINATE ENCAPSULATED MESENCHYMAL STROMAL CELLS TO STORAGE AT AMBIENT TEMPERATURE	*Natalia Trufanova, Ukraine*
		P51 VIABILITY OF HAEMATOPOIETIC STEM CELL PRODUCTS STORED FOR MORE THAN ONE YEAR	*Tanya Nadia Glatt, South Africa*
		P52 THERAPEUTIC EFFICACY OF EXPERIMENTAL ORAL DRUG DELIVERY SYSTEM AFTER STORAGE AT -75˚C	*Illia Petrov, Ukraine*
		P53 EFFECT OF WARMING PROCESS ON THE SURVIVAL OF CRYOPRESERVED HUMAN PERIPHERAL BLOOD MONONUCLEAR CELLS	*Yanhong Xu, China*
		P54 NUMERICAL MODELING OF CRYOGEN SPRAY EJECTING FROM COMMERCIAL CRYOGUN	*Satyam Singh, India*
		P55 METHODICAL APPROACHES TO CRYOPRESERVATION OF CELLULAR SPHEROIDS	*Anton I. Moisieiev , Ukraine*
		P56 REAL-TIME MONITORING OF SKIN TEMPERATURE FIELD DYNAMICS DURING CRYOTHERAPY	*Gennadiy Kovalov, Ukraine*
		P57 THE EFFECT OF HYPOBIOSIS DURING E.COLI INFECTION	*Ilona Tekdemir, Ukraine*
		P58 PHASE BEHAVIOR OF SUCROSE-CONTAINING CRYOPROTECTIVE SOLUTIONS AT TEMPERATURES BELOW 0 ˚C	*Olena Bobrova, Ukraine*
		P59 ADDITION OF FERULAGO ANGULATA EXTRACT TO FREEZING EXTENDER FOR GOAT SPERM CRYOPRESERVATION	*Nushin Naderi, Iran*
		P60 THE EFFECT OF DIFFERENT CRYOPROTECTANT CONCENTRATIONS DURING CRYOPRESERVATION OF SEMEN FROM WINDSNYER BOARS	*Mamonene A. Thema, South Africa*
		P61 EFFECT OF DIFFERENT CONCENTRATIONS OF GLUTATHIONE ON FROZEN-THAWED SEMEN FROM KOLBROEK BOARS	*Lerato D. Sehlabela, South Africa*
		P62 EFFECTS OF RUTIN ON THE QUALITY OF ROOSTER SPERM DURING CRYOPRESERVATION	*Abouzar Najafi, Iran*
		P63 CHANGES IN THE REDOX STATE OF CYTOCHROMES IN MOUSE EMBRYOS DURING COOLING WITH DIFFERENT CRYOPRESERVATION PROTOCOLS	*Konstantin Okotrub, Russia*
		P64 CRYOPRESERVATION OF DOMESTIC CAT PREIMPLANTATION EMBRYOS: EFFECTS OF IN VITRO EXPOSURE TO LINOLEIC ACID	*Svetlana Okotrub, Russia*
		P65 BOECS-DERIVED EXOSOMES IMPROVES THE TIGHT JUNCTION SEALING AND BALANCE TRANSCELLULAR FLUID MOVEMENT IN BOVINE EMBRYOS AFTER CRYOPRESERVATION	*Tabinda Sidrat, South Korea*
		P66 FORMATION OF A CRYOBANK OF HIGH PRODUCING COWS' EMBRYOS IN THE CONDITIONS OF THE INDUSTRIAL DAIRY COMPLEX	*Oksana Shcherbak, Ukraine*

Friday July 23

8:00 AM	**9:00 AM**	**LIVE - POSTER SESSION 4**	
		P67 CRYOPRESERVATION OF HUMAN OOCYTES AND THE 'CARRYOVER' EFFECT ON EARLY EMBRYO DEVELOPMENT	*Qi-Peng Jia, China*
		P68 OOCYTE AND SPERM CRYOPRESERVATION IN ONCOLOGICAL PATIENTS DURING COVID-19 PANDEMIC	*Eleonora Porcu, Italy*
		P69 THE SURVIVAL OF RAT TESTICULAR INTERSTITIAL CELLS IN HYDROXYETHYL STARCH AND DEXTRAN BASED SERUM-FREE MEDIA	*Oleksandr Pakhomov, Ukraine*

P70 EFFECT OF CRYOPRESERVATION ON MORPHOLOGICAL PARAMETERS, METABOLIC AND ANTIOXIDANT ACTIVITIES OF SEMINIFEROUS TUBULES FRAGMENTS OF TESTES	*Nataliia Volkova, Ukraine*
P71 ENDOCRINE FUNCTION OF CRYOPRESERVED OVARIAN TISSUE GRAFTS UNDER PROTECTION OF 3M DIMETHYLSULFOXIDE (ME2SO)	*Iryna Rula, Ukraine*
P72 NATURAL COLD RESISTANCE IN MAMMALS OF THE TUNDRA HABITAT ZONE	*Innokenti Okhlopkov, Russia*
P73 DOES CRYOSTIMULATION PREVENT DESYNCHRONOSIS-INDUCED CHANGES IN ERYTHROCYTES' SPHERICITY INDEX?	*Oleksandr Shylo, Ukraine*
P74 MORPHOLOGICAL AND ECOLOGICAL ADAPTATIONS OF THE ROCK PTARMIGAN (LAGOPUS MUTUS, MONTIN, 1776) TO COLD CLIMATE CONDITIONS	*Arkady Isaev, Russia*
P75 CHANGES IN AUTONOMIC REGULATION OF HEART IN ANTARCTIC WINTERERS	*Dmytro Lutsenko, Ukraine*
P76 IMMOBILIZATION OF LIPASE FROM PSYCHROPHILIC PSEUDOMONAS PUTIDA LTB15 ISOLATED FROM BATURA GLACIER (PAKISTAN) ON ZNO NANOPARTICLES FOR USE IN DETERGENTS	*Fariha Hasan, Pakistan*
P77 CRYOPRESERVATION OF VIRAL TOMATO (SOLANUM LYCOPERSICUM L.) SHOOT TIPS	*Natalia Bashtan, Ukraine*
P78 STORAGE OF FROZEN FOOD ARTICLES: PROBLEMS AND SOLUTIONS	*Prakriti Kashyap, India*
P79 GERMINATION OF STIPA CAPILLATA L. BEFORE AND AFTER LOW TEMPERATURE STORAGE	*Nadiia Shevchenko, Ukraine*
P80 RESPONSES OF THE BUDS OF THREE SOUTH AFRICAN SWEET POTATO (IPOMOEA BATATAS) TO DIFFERENT CRYOPROTECTANTS	*Tshidi M., South Africa*
P81 DITHIOERYTHRITOL IMPROVES FROZEN-THAWED SPERM QUALITY IN ROOSTER	*Mahdieh Mehdipour, Iran*
P82 ENHANCEMENT OF POST-THAWED SPERM QUALITY IN ROOSTER BY BUTYLATED HYDROXYLTOLUENE	*Mahdieh Mehdipour, Iran*
P83 IMPACT OF RAFFINOSE, GLUCOSE OR TREHALOSE ALONG WITH DIFFERENT CRYOPROTECTIVE AGENTS IN TRIS BASED EXTENDER ON POST THAW QUALITY OF RAM SPERMATOZOA	*Muhammad Saleem Akhtar, Pakistan*
P84 STUDIES ON ROS (REACTIVE OXYGEN SPECIES) DURING NILI-RAVI BUFFALO SPERM CRYOPRESERVATION AND EFFECT OF ADDITION OF SPERMINE	*Muhammad Amjad Ali, Pakistan*
P85 INCREASE OF DNA FRAGMENTATION EVALUATED THROUGH THE ALKALINE COMET IS CONCOMITANT WITH A DECREASE IN THE QUALITY OF FROZEN-THAWED BOVINE SPERM	*Ariadna Delgado-Bermúdez, Spain*
P86 EFFECTS OF MELATONIN ON THE ROOSTER SPERM QUALITY DURING CRYOPRESERVATION	*Abouzar Najafi, Iran*
P87 EFFECT OF SUPPLEMENTATION OF TREHALOSE IN EGG YOLK-FREE POLYVINYL ALCOHOL EXTENDER ON DOG SPERM CRYOPRESERVATION	*Nabeel Talha, Sudan*
P88 FREEZING OF BOVINE SEMEN IN A EXTENDER WITH SODIUM CASEINATE	*Alexandra Usuga, Colombia*