CSIC

Consejo Superior de Investigaciones Científicas

THE 55TH ANNUAL MEETING OF
THE SOCIETY FOR CRYOBIOLOGY

CRYO2018

July 10-13, 2018 Madrid

Program

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CRYO2018

cryopAL

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WELCOME TO **CRYO2018**

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 Spain's capital city, Madrid, to attend CRYO2018, the 55th Annual Meeting of the Society for Cryobiology.

Attending a Society for Cryobiology meeting is a unique experience – where else can you find such a diverse range of cryobiology professionals under one roof? This diversity encourages fertilization of ideas and methods across a wide range of fields, encompassing both practical and theoretical knowledge. I firmly believe this diversity is one of the Society's greatest assets - thank you for contributing to it.

My sincere thanks go to the organizers of this year's meeting, Nicole Evans, Executive Director of the Society for Cryobiology, and the CRYO2018 Executive Co-Chairs, Antonio Molina-García of the Spanish National Research Council and Daniel Ballesteros of Royal Botanic Gardens, Kew. They, along with the local organizing committee, have worked tirelessly to bring this meeting to life.

Best Wishes,

Dayong Gao
President, Society for Cryobiology
Origincell Professor
Department of Mechanical Engineering, University of Washington

Welcome from the CRYO2018 Executive Co-Chairs

Welcome to Consejo Superior de Investigaciones Científicas (CSIC), Spain's National Research Council, a government funded institute devoted to research in all areas of human knowledge.

Here we walk in the footsteps of historical giants. Albert Einstein and Marie Curie delivered lectures on this very site; great artists such as Salvador Dali and Frederico García Lorca lived, loved, and fought at the Residencia de Estudiantes. Today, as throughout history, CSIC plays host to a dazzling array of international experts from the Sciences and Arts, making it Spain's premier venue to share the latest research - a fitting location for CRYO2018.

This year's meeting features a truly international line up of researchers from around the globe – impressively, all 6 inhabited continents are represented. Over the course of the meeting you will enjoy 175 oral presentations and more than 100 poster presentations, across 5 plenary lectures and 31 sessions. It's going to be a busy four days and we trust that you will enjoy every minute of it.

Madrid is a wonderful city with a multitude of tourism and sightseeing opportunities to suit all interests. We sincerely hope you have a day or two to spare to take in Spain's rich scientific, cultural and artistic history here in the heart of Madrid. If you have time, be sure to visit the famous statue el oso y el madroño (the bear and the strawberry tree), located in Plaza Puerta del Sol. This well-loved symbol, depicted on the CRYO2018 logo, has been the symbol of Madrid since the 13th Century.

Sincerely,

Antonio Molina-García
Spanish National Research Council (CSIC)

Daniel Ballesteros
Royal Botanic Gardens, Kew

CRYO2018 ORGANIZERS

CRYO2018 Executive Co-Chairs

Daniel Ballesteros
Royal Botanic Gardens, Kew

Antonio Molina-García
Spanish National Research Council

Society for Cryobiology Principal Organizer

Nicole Evans
Executive Director, Society for Cryobiology

Local Organizing Committee

Daniel Ballesteros
Antonio Molina-García *(Chair)*
Nicole Evans
Teresa Mogas
Andrea Gomez-Zavaglia
Aline Schneider Teixeira

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Erik Woods

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Erik Woods

International Cryobiology Youth Researchers (ICYR) Committee

Krishnaa Mahbubani
Estefania Paredes
Natalia Fanega Sleziak *(Chair)*

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Jason Acker
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Robert Ben
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John Bischof
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Peter Davies
Janet A. W. Elliott
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Willem F. Wolkers
Erik Woods
Brian Wowk
Tiantian Zhang
Gang Zhao

Acknowledgements

Sponsors and exhibitors
The Society for Cryobiology acknowledges the support of CRYO2018's sponsors and exhibitors. See page 11-13 for details.

CRYO2018 Logo
Logo design gifted to the Society for Cryobiology by Matthew Pizzo. Contact matthew.pizzo@gmail.com for design enquiries.

PROGRAM AT A GLANCE

Monday July 9

5:00 – 9:00 PM
Delegate Arrival and Registration
Residencia de Estudiantes, CSIC

7:00 – 9:00 PM
President's Welcome Reception
Residencia de Estudiantes, CSIC

Tuesday July 10

8:15 – 10:30 AM
Welcome and Opening Ceremony/Plenary Session 1
Central Building
Opening Remarks
Yrjö Roos Plenary Lecture
Presentation of Luyet Fellow Medal to Pierre Boutron
Willem Wolkers Plenary Lecture

10:30 – 11:00 AM
Coffee Break
Cloister

11:00 – 1:00 PM
Symposium 1: Controlling Ice Formation and Growth – From Fundamentals to Applications in Biological Systems
Central Building
Session 1: Comparative Sperm Cryopreservation 1
Rocasolano Room
Symposium 2: Cryobiology in Food Science and Technology
Pinar Room

1:00 – 2:00 PM
Lunch
Cloister

2:00 – 2:45 PM
Plenary Session 2
Central Building
Joseph Saragusty Plenary Lecture

2:45 – 4:00 PM
Session 2: Novel Cryoprotection and Biopreservation Strategies Part A (continues after the break)
Central Building
Symposium 3: Role of Aquaporins during Cryopreservation of Gametes, Embryos and Reproductive Tissues
Rocasolano Room
Symposium 4: Challenges in Cryobiology for Microorganisms
Pinar Room

4:00 – 4:30 PM
Coffee Break
Cloister

4:30 – 6:00 PM
Session 2 (cont.): Novel Cryoprotection and Biopreservation Strategies Part B
Central Building
Session 3: Comparative Ovarian Tissue Cryopreservation
Rocasolano Room
Session 4: Advances in Blood Preservation
Pinar Room

6:00 – 8:00 PM
Poster Session 1
Cloister

Wednesday July 11

8:30 – 10:30 AM
Plenary Session 3
Central Building
Julia Buitink Plenary Lecture
Cryopreservation of Organs in association with the Organ Preservation Alliance

10:30 – 11:00 AM
Coffee Break
Cloister

11:00 – 1:10 PM
Session 5: New Tools and Technologies for Cryopreservation - Sponsored by VitriCell
Central Building
Symposium 5: The Best Way to Avoid Ice Formation? Removing all Freezable Water – Lessons we can Learn from Anhydrobiotic Organisms
Rocasolano Room

1:00 – 2:00 PM
Lunch
Cloister
Editorial Board Meeting
Rocasolano Room

2:00 – 4:00 PM
Symposium 6: Cryopreservation of Reproductive Tissue for Cancer Survivors: Clinical and Research Perspectives
Central Building
Session 6: From Single Cells to Complex Tissues: The Power of Plant Preservation
Rocasolano Room

4:00 – 4:30 PM
Coffee Break
Cloister

4:30 – 6:10 PM
Symposium 7: Cryopreservation of Organs 2
Central Building
Session 7: Comparative Oocyte and Embryo Cryopreservation 1
Rocasolano Room

6:00 – 8:00 PM
Poster Session 2
Cloister

8:30 – Late
International Cryobiology Youth Researchers (ICYR) Sangria Making Class
La Lonja del Mar Restaurant, 6 Plaza de Oriente

Thursday July 12

8:15* – 10:30 AM
*Note Start Time
Plenary Session 4
Central Building
Christina Walters Plenary Lecture – sponsored by Royal Botanic Gardens, Kew
Peter L. Steponkus Crystal Award for Best Student Presentation

10:30 – 11:00 AM
Coffee Break
Cloister

11:00 – 1:00 PM
Session 8: Advances in Tissue Preservation
Central Building
Session 9: Comparative Sperm Cryopreservation 2
Rocasolano Room

11:00 – 1:00 PM
Session 10: Mechanisms and Pathways to Successful Plant Cryopreservation
Pinar Room

1:00 – 2:00 PM
Lunch
Cloister

1:45 – 3:30 PM
Session 11: Best Practices and Biobanking for Research and Discovery
Central Building
Session 12: Advances in Thermal Medicine
Central Building
Session 13: Mathematical Modeling for Design of Tissue and Cell Cryopreservation Procedures
Rocasolano Room

3:30 – 4:00 PM
Coffee Break
Cloister

4:00 – 6:00 PM
Session 14: Adult and Induced Stem Cell Cryopreservation for Regenerative Medicine
Central Building
Session 15: Cryopreservation of Aquatic Organisms
Rocasolano Room
Symposium 8: Cryobiotechnological Challenges for the Ex Situ Conservation of Plant Genetic Resources
Pinar Room

6:00 – 7:00 PM
Society for Cryobiology AGM/ Business Meeting
Central Building

8:00 PM – Late
Awards Ceremony and Gala Banquet
Jai Alai Restaurant, Calle de Balbina Valverde, 2

Friday July 13

8:30 – 10:30 AM
Symposium 9: Cryopreservation of Aquatic Organisms
Central Building
Session 16: Comparative Sperm Cryopreservation 3
Rocasolano Room

10:30 – 11:00 AM
Coffee Break
Cloister

11:00 – 1:00 PM
Symposium 10: New Tools and Technologies for Cryopreservation and Cryo-Research
Central Building
Session 17: Comparative Oocyte and Embryo Preservation 2
Rocasolano Room

GENERAL CONFERENCE INFORMATION

WIFI

To connect to CSIC's WIFI please follow these steps:

1. Connect to '**guest**' WIFI network
2. Open your browser. It will be redirected to CSIC's web portal.
3. Under the Registro button click the link **'haga clic aquí'**
4. Enter username **cryo2018@csic.es** and password **6r5i8t**
5. Accept the terms and conditions and click log in.

If you require assistance to connect to the WIFI please visit the registration desk.

CRYO2018 App

Download Whova, the **CRYO2018** app, to create your personalized program, view venue maps, stay up to date with the latest announcements, and share contact information and message other delegates. You can download the app by searching 'Whova' in your app store.

Registration Desk

On Monday July 9 the registration desk will be located inside the Residencia de Estudiantes. From July 10 – July 13 the registration desk will be located in the central building.

Registration Desk Hours
Monday July 9: **5:00 PM – 9:00 PM**
Tuesday July 10: **8:30 AM – 6:00 PM**
Wednesday July 11: **8:30 AM – 6:00 PM**
Thursday July 12: **8:30 AM – 6:00 PM**
Friday July 13: **8:30 AM – 11:00 AM**

Poster Presentations

Presenting authors are welcome to attend both poster sessions, but minimum attendance is required according to the following schedule:

Poster Session 1
6:00-8:00 PM
Tuesday July 10:
Even numbered posters

Poster Session 2
6:00 – 8:00 PM
Wednesday July 11:
Odd numbered posters

Authors presenting two posters may attend one session of their choice or both sessions, according to their preference.

All posters must be placed in position on your assigned display board before 2:00 PM Tuesday July 10. Posters must remain in place until 11:00 AM Friday July 13 and must be collected no later 1:30 PM Friday July 13. Please use only the provided adhesive to display your poster. Check the author index in the abstract book or the noticeboard in the Cloister to find your poster number.

Student Awards and Grants

The four finalists for the Peter L. Steponkus Crystal Award for the best student oral presentation will deliver their presentations in a special plenary session on Thursday morning. The Crystal award carries an honorarium of $1,000. We encourage all delegates to attend to support these talented young cryobiologists.

Peter L. Steponkus Crystal Award Finalists

Md Ariful Alam, *Tokyo University of Marine Science and Technology, Japan*

Nikola Dolezalova, *Cambridge University, United Kingdom*

Zoran Marinovic, *Szent István University, Hungary*

Vitalii Mutsenko *Institute for Multiphase Processes, Leibniz Universität Hannover, Germany*

Critser Travel Award

The Critser travel award is awarded to the student with the highest rated extended abstract. The honorarium of $1,500 is generously supported by the family of late cryobiologist, John K. Critser.

This year's winner is **Vitalii Mutsenko**. Vitalii is studying toward his PhD in Regenerative Sciences at the Institute for Multiphase Processes, Leibniz Universität Hannover, Germany. His research develops methods for xeno-free cryopreservation of stem cells in suspension and cryopreservation of 3D tissue-engineered constructs.

Society for Cryobiology Travel Grant Winners

The Society for Cryobiology is pleased to announce 24 student travel award winners for CRYO2018.

Society for Cryobiology Travel Awards

Md Ariful Alam, *Japan*
Essraa Al-Essawe, *Sweden*
Maooz Awan, *United Kingdom*

Society for Cryobiology Travel Awards (cont.)

Lachlan Campbell, *Australia*
Olena Chabanenko, *Ukraine*
MélanieChow-Shi-Yée, *Canada*
Nikola Dolezalova, *United Kingdom*
Lawrence Edemhanria, *Nigeria*
Tania García-Martinez, *Spain*
Bruno Guerreiro, *Portugal*
Zeeshan Haider, *China*
Yevhen Horokhovatskyi, *Czech Republic*
Mariia Hrechyshnikova, *Ukraine*
Bin Huang, *China*
Daniel Kelly, *USA*
Zoran Marinovic, *Hungary*
Yulia Martynova, *Ukraine*
Momoh Karmah Mbogba, *China*
Fazil Panhwar, *China*
Tanushree Patra, *India*
Vera Sirotinskaya, *Israel*
Andres Vasquez-Rivera, *Germany*
Kezhou Wu, *Canada*

Travel Award sponsored by Royal Botanic Gardens, Kew

Bin Huang, *China*

Best Poster Award

The student Best Poster Award will be judged during the poster sessions. All student posters are eligible to enter. In order for your poster to be considered, presenting authors must be present to answer the judges' questions. Even numbered posters will be judged on Tuesday evening, and odd numbered posters on Wednesday evening. The winner of the best poster award will be presented with an honorarium of $500.

Name Badge

Your badge serves as evidence of registration and admission. Please wear it during all scientific and social events within CSIC for the benefit of security and catering

Social Events and Activities

Monday July 9

7:00 – 9:00 PM
President's Welcome Reception
Meet and mingle with your fellow delegates and enjoy light refreshments at the Residencia de Estudiantes located within CSIC.

Tuesday July 10

6:00 – 8:00 PM
Poster Session 1

Wednesday July 11

6:00 – 8:00 PM
Poster Session 2

8:30 – Late PM
ICYR Sangria making class (pre-booking required)
The International Cryobiology Youth Researchers take a sangria making class at La Lonja Restaurant. Please meet in the Cloister at 8:00 PM and we will walk to República Argentina metro station together. La Lonja is located at 6 Plaza de Oriente in downtown Madrid. The closest metro station is Ópera.

Thursday July 12

8:00 – Late PM
Awards Ceremony and Banquet at Jai Alai
Celebrate member successes and services to the Society, followed by a traditional Basque dinner and dancing. Pre-Registration required through Ex Ordo. Jai Alai is located at 2 Calle de Balbina Valverde, approximately a 10 minute walk from CSIC. No transport will be provided so please make your own way to the venue.

Other Events

Monday July 9

9:00 AM – 5:00 PM
Society for Cryobiology Board of Governors Meeting

Wednesday July 10

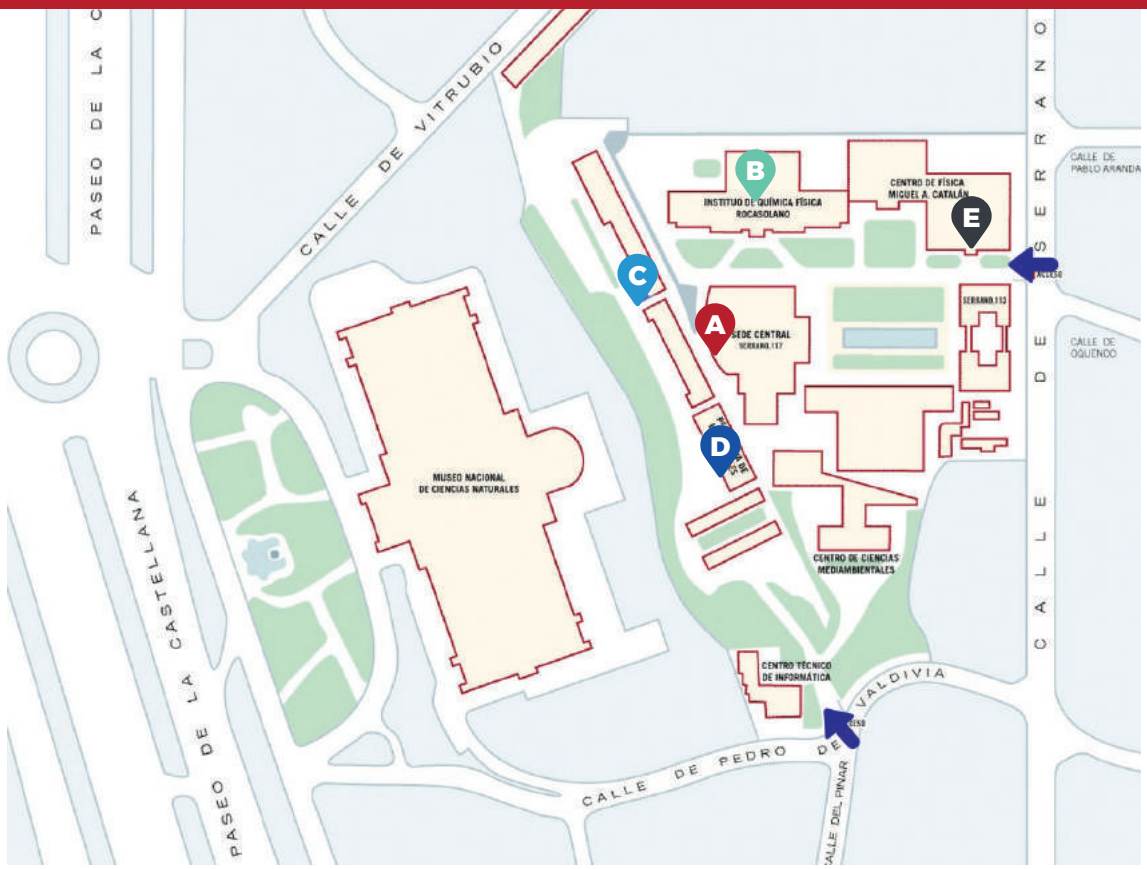
1:00 – 2:00 PM
Society for Cryobiology Editorial Board Meeting

Thursday July 12

6:00 – 7:00 PM
Society for Cryobiology AGM/Business Meeting

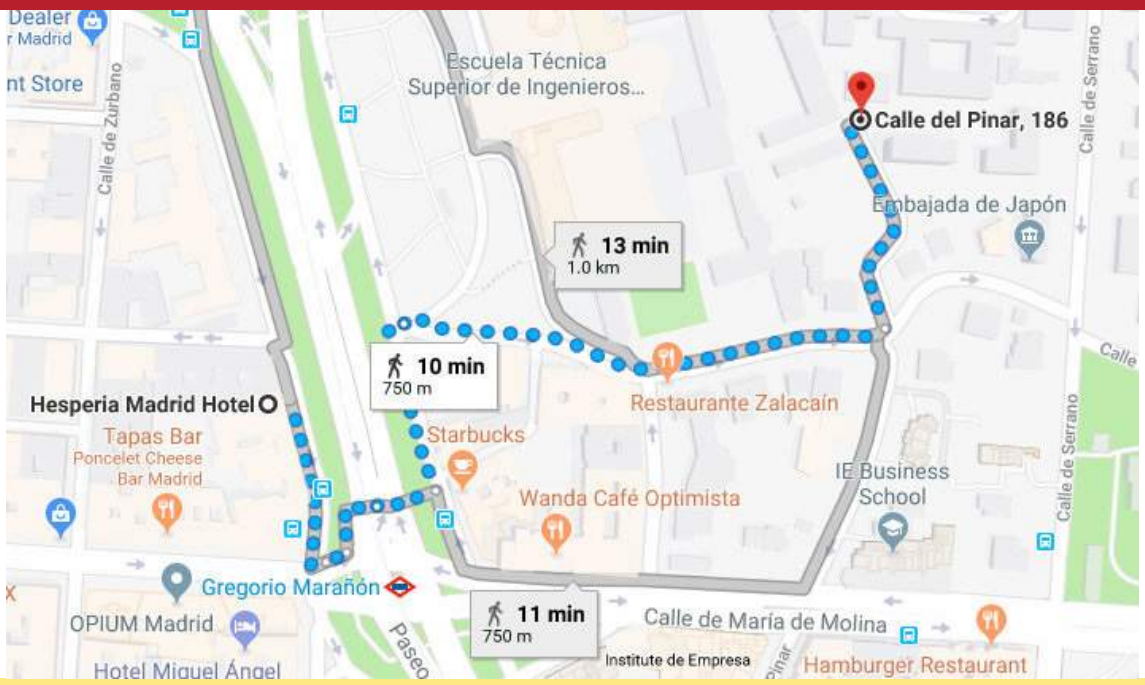
MAPS

CSIC Campus



A *Central Building*
C *Pinar Room*
Entry to CSIC
B *Rocasolano Room*
D *Residencia de Estudiantes*
E *Cloister*

Hesperia Hotel to CSIC



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The Society for Cryobiology and CRYO2018 appreciate the support of the following sponsors.

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Royal Botanic Gardens Kew

Exhibitors

The following exhibitors will be pleased to tell you about their products and services when you visit their display in the Cloister.

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BRINGS ENERGY TO LIFE

PLANER

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SPONSOR AND EXHIBITOR PROFILES

21st Century Medicine

21st Century Medicine is a cryobiological discovery company dedicated to solving the most difficult problems in applied cryobiology, including the vitrification of cells, tissues, and whole mammalian organs. It has successfully preserved a variety of embryonic and stem cells, oocytes, human pancreatic islets, liver, kidney, and brain slices, human tissue-engineered skin, human and porcine cartilage, human corneas, and even an entire rabbit kidney. The company sells its two patented ice blockers, Supercool-X1000 and Supercool-Z1000, a variety of vitrification solutions and vitrification solution concentrates, and high sub-TG isothermal storage systems.

Agilent

Agilent is a leader in life sciences, diagnostics and applied chemical markets. The company provides laboratories worldwide with instruments, services, consumables, applications and expertise, enabling customers to gain the insights they seek. Agilent's expertise and trusted collaboration give them the highest confidence in our solutions.

CryopAL

Cryopal, a subsidiary of Air Liquide group, has been dedicated to the development, engineering, manufacturing and global description of cryogenic solutions, equipment, and services for 50 years. Offering a complete range of cryogenic storage and transportation equipment, Cryopal is a key actor in cryobiology applications including assisted reproduction, oncology, research, immunology, gene therapy, tissue banking, bone marrow, stem cells, cord blood and bio-banking. Cryopal also offers a full range of services including cryogenic room design and audit, training, preventative and curative maintenance, equipment rental, and turn-key solutions.

GE Healthcare

At GE Healthcare's Life Sciences, we accelerate precision medicine by helping researchers, pharmaceutical companies, and clinicians discover and make new medicines and therapies. We provide expertise, technology and services for a wide range of areas within the life sciences industry, including the manufacture of contrast agents for diagnostic imaging, basic research of cells and proteins, and technologies that enable large-scale manufacturing of vaccines, biologics, and cell therapy.

Institute for Engineering in Medicine, University of Minnesota

The Institute for Engineering in Medicine (IEM) at the University of Minnesota serves as a catalyst for facilitating multidisciplinary collaborations in research and education between the Academic Health Center and the College of Science and Engineering, in addition to fostering collaborations with the medical technology industry. Our mission is to advance healthcare through research partnerships between engineering and medicine involving academia and industry. This is truly where medicine meets technology for tomorrow's innovations.

ISBER

ISBER is a global biobanking organization which creates opportunities for networking, education, and innovations and harmonizes approaches to evolving challenges in biological and environmental repositories.ISBER fosters collaboration; creates education and training opportunities; provides a forum for the dissemination of state-of-the-art policies, processes, and research findings; and provides an international showcase for innovative technologies, products, and services. Together, these activities promote best practices that cut across the broad range of repositories that ISBER serves.

Nexans

Nexans, a worldwide leader in the cable industry, has been supplying cryogenic flexible transfer lines (CRYOFLEX®) for liquefied gases for more than 40 years. CRYOFLEX transfer lines have been used as cryogenic envelopes for superconducting power cables, to supply cryogens to fusion, high energy physics and space research experiments, and for many other applications involving the transport of cryogenic liquids and gases in science and industry. CRYOFLEX transfer lines are currently in use in liquid helium (LHe), liquid hydrogen (LH2), liquid nitrogen (LN2), liquid oxygen (LOX), and liquid natural gas (LNG) applications.

Organ Preservation Alliance

The Organ Preservation Alliance is a 501(c)(3) nonprofit dedicated to catalyzing breakthroughs in organ and tissue preservation. These technologies could transform the field of transplantation – making more lifesaving organs available and simultaneously improving outcomes in transplantation. Advances could also profoundly improve broad areas of biomedicine, including cancer care, drug discovery, basic research, reconstructive surgery, trauma care, and emergency preparedness. For more background, see organpreservationalliance.org/media and Giwa et. al., "The Promise of Organ and Tissue Preservation to Transform Medicine." Nature Biotechology, 35(6) 530-42.

Planer

Planer specialise in the control of temperature and other parameters to help customers achieve their scientific breakthroughs in biology, medicine and industry. Over the last forty years we have assisted them in managing their processes, records and data. We pioneered the development and use of many controlled temperature products as well as equipment and sensors for monitoring and logging of key lab parameters, including bench top incubators, programmable freezers, loggers, alarms, cryo storage and software, systems and sensors for the safe preservation of medical and biological specimens – cells, cord blood, bone marrow, embryos, botanical matter, semen, oocytes, seeds, skin, ovarian tissue, heart valves, blood vessels and others.

Royal Botanic Gardens, Kew

Royal Botanic Gardens, Kew is a global resource for plant and fungal knowledge. Our unique combination of extensive collections, databases, scientific expertise and global partnerships gives us a leading role in facilitating access to fundamental plant and fungal information. The core purpose of our science stems from a simple but often overlooked truth: all our lives depend on plants and fungi.

Sylvatica Biotech

Sylvatica Biotech is 100% focused on vital organ and other complex tissue cryopreservation R&D - in order to transform transplantation and other areas of biomedicine.

We are developing both our own IP and are partnering on joint development projects with leading institutions such as Harvard, UMN, UC Berkeley and Carnegie Mellon. Approaches that we are working on span nature inspired, high-subzero approaches, isochoric pressure based preservation and nanowarming enabled vitrification. We have to date received research funding from six different institutes at the NIH as well as the Defense Health Program and the US Army.

For more background on the need we are working to address see nature.com/articles/nbt.3889.pdf that several of our cofounders and scientific advisors are co-authors of and for some color on our approaches see this science feature by The Economist at https://econ.st/2tLEcNt

Tissue Testing Technologies

Tissue Testing Technologies LLC started business in 2015 and is based in Charleston, South Carolina. Our core competence is storage and delivery of living biologic materials better and more effectively to customers. The Companies' first products are Unisol™ and vitrification formulations for research applications. We perform contract research and grant funded work focused on hypothermic, ice-free and freezing methods of cell, tissue and organ preservation with an emphasis on stem cells, differentiated cells and tissue engineered constructs for diagnostic, testing and regenerative medicine applications. Partners and licensees are being sought for commercialization of our patented ice-free vitrification strategies and DMSO-free, Nature inspired cell cryopreservation methods. For further information contact – KBrockbank@T3-TissueTestingTechnologies.com

VitriCell

VitriCell is a biotechnology company offering innovative and effective solutions for cryopreserving embryos and cells, even the most fragile. Its unique technology, based on aseptic vitrification in chemically defined media, enables optimal survival and safeguarding of biological properties for most, if not all, cell types currently used in biological research, including embryos at different stages. VitriCell aims to conquer the cell cryopreservation field by providing the scientific community with its unique expertise in cell vitrification and by commercializing controlled and either standardized or customized vitrification kits usable for most of the cells used in biological research, cell therapy and medically-assisted procreation (human & vet).

VitriMice™, its first commercial product, is intended for vitrification of rodent embryos from zygote to blastocyst stages. The procedures have been developed and patented by VitriCell to enable successful, time-efficient, biologically safe and easy-to-use vitrification. With its One-Step Protocol, VitriMice™ allows the cryopreservation of up to 20 embryos in only 1 minute. Moreover, VitriMice™ vitrification solution is a serum-free and protein-free medium.

CRYO2018 PROGRAM

Monday July 9

5:00 - 9:00 PM	**Delegate Arrival and Registration** *Residencia de Estudiantes, CSIC*
7:00 – 9:00 PM	**President's Welcome Reception** *Residencia de Estudiantes, CSIC*

Tuesday July 10

8:15 - 10:30 AM	**Opening Ceremony and Plenary Session 1** *Central Building* **Chairs:** Antonio Molina-García and Daniel Ballesteros
8:15 - 8:25 AM	**Opening Ceremony and Welcome Remarks**
8:25 - 9:15 AM	**Yrjö Roos, University College Cork, Republic of Ireland** S1 FOOD TECHNOLOGY AND LOW TEMPERATURES
9:15 - 9:35 AM	**Presentation of Society for Cryobiology Luyet Fellow Medal to Pierre Boutron** Society for Cryobiology President, Dayong Gao, presents Pierre Boutron with the Society for Cryobiology Luyet Fellow medal in recognition of the sustained scientific impact of his research in the field of vitrification.
9:35 - 10:30 AM	**Willem Wolkers, Leibniz University Hannover, Germany** S2 MEMBRANE MATTERS: MEMBRANE PERMEABILITY BARRIER FUNCTION UNDER EXTREME CONDITIONS

10:30 – 11:00 AM | Coffee Break *Cloister*

11:00 – 1:00 PM	**Symposium 1: Controlling Ice Formation and Growth – From Fundamentals to Applications in Biological Systems** *Central Building* **Chair:** Robert Ben **Student Trainee Chair:** Jessica Poisson	This symposium will bring together researchers who are studying or developing novel strategies to prevent ice formation and control the growth of nucleated ice crystals. It will highlight current understanding of ice, ice nucleation, ice growth and novel strategies to prevent the undesired biological effects of ice during freezing.
11:00 – 11:20 AM	**Thomas Koop, Germany** S3 PROMOTION OF ICE NUCLEATION AND INHIBITION OF ICE GROWTH BY MACROMOLECULES	
11:20 – 11:40 AM	**Jose M. Fernandez, Spain** S4 MEASURING THE TEMPERATURE OF THE COLDEST LIQUID WATER	
11:40 – 12:00 PM	**Takaaki Inada, Japan** S5 STRATEGY FOR INHIBITING HETEROGENEOUS ICE NUCLEATION	
12:00 – 12:20 PM	**Igor Katkov, United States** S6 REWARMING PARADOX DURING KINETIC (HYPERFAST) VITRIFICATION	
12:20 – 12:40 PM	**Ido Braslavsky, Israel** S7 ICE BINDING PROTEINS AND THEIR USE IN CRYOPRESERVATION	
12:40 – 1:00 PM	**Robert Ben, Canada** S8 IMPROVING CRYOPRESERVATION - A MODERN APPROACH TO AN "OLD" PROBLEM	

11:00 – 1:00 PM	**Session 1: Comparative Sperm Cryopreservation 1** *Rocasolano Room* **Chair:** David Rawson **Student Trainee Chair:** Juan German Herranz-Jusdado	These multiple sessions on sperm cryobiology will cover human, agricultural, and laboratory animals. The speakers will provide brief information about the current status of representative species and their research findings.
11:00 – 11:15 AM	**Raquel Gonzalez, United States** S9 ULTRA-RAPID FREEZING OF DOMESTIC CAT SPERMATOZOA FOR POTENTIAL APPLICATION TO ENDANGERED FELIDS	
11:15 - 11:30 AM	**Essraa Al-Essawe, Sweden** S10 SEMINAL PLASMA ADDED BEFORE CRYOPRESERVATION AFFECTS STALLION SPERM BINDING TO BOVINE OOCYTES	
11:30 – 11:45 AM	**Maryam Hezavehei, Iran** S11 MICRORNA NETWORK ANALYSIS AND TARGET GENES ASSOCIATED WITH HUMAN SPERM CRYOPRESERVATION	
11:45 – 12:00 PM	**Shu-Shan Zhang, P.R. China** S12 PROFILIN IS RELATED TO FREEZABILITY OF FROZEN-THAWED BOAR SPERMATOZOA	
12:00 – 12:15 PM	**Abbas Farshad, Iran** S13 EFFECT OF MINOCYCLINE ON ROS-PRODUCTING DURING CRYOPRESERVATION PROCESS ON RAM EPIDIDYMAL SPERMATOZOA	
12:15 – 12:30 PM	**Jarrod McKenna, Australia** S14 CRYOPRESERVATION OF SPINY MOUSE EPIDIDYMAL SPERM	
12:30 – 12:45 PM	**Mustafa N. Bucak, Turkey** S15 EFFECT OF FETUIN AND TREHALOSE ON POST-THAWED RAM SEMEN DNA INTEGRITY	
12:45 – 1:00 PM	**Ajeet Kumar, India** S16 COMPARISON OF ICE NUCLEATION STAGE DURING CRYOPRESERVATION OF CROSSBRED (HF X SAHIWAL) AND BUFFALO BULL (BUBALUS BUBALIS) SEMEN IN TRIS CITRATE EGG YOLK EXTENDER	

11:00 – 12:00 PM	**Symposium 2: Cryobiology in Food Science and Technology** *Pinar Room* **Chair:** Andrea Gomez-Zavaglia The goal of this symposium is to bring together researchers concerned on the	formulation of functional foods, offering solutions to technological issues involved in the elaboration of food products, including industrial management, economics of food industry. Issues like obtaining dehydrated food products and storage conditions will be especially addressed
11:00 – 11:20 AM	**Cecilia Puppo, Argentina** S17 MESQUITE FLOUR AS A NOVEL INGREDIENT FOR "PANETTONE-LIKE" BREAD: APPLICATION OF PART-BAKING AND DOUGH FREEZING TECHNOLOGY	
11:20 – 11:40 AM	**Antonio Molina-García, Spain** S18 FREEZING UNDER PRESSURE: LOW TEMPERATURE AND HIGH HYDROSTATIC PRESSURE IN FOOD TECHNOLOGY	
	S19 WITHDRAWN	
11:40 – 12:00 PM	**Monica Marro, Spain** S20 ASSESSING MOLECULAR CHANGES DURING PLANT CRYOPRESERVATION BY NOVEL RAMAN AND AUTO-FLUORESCENCE HYPERSPECTRAL IMAGING	
	S21 WITHDRAWN	

1:00 – 2:00 PM | Lunch *Cloister*

Tuesday July 10 (continuation)

1:00 – 2:00 PM | Lunch *Cloister*

2:00 – 2:45 PM

Plenary Session 2
Central Building
Chair: Yuksel Agca
Joseph Saragusty, University of Teramo, Italy
S22 CRYOBIOLOGY IN WILDLIFE CONSERVATION

2:45 – 4:00 PM

Session 2: Novel Cryoprotection and Biopreservation Strategies - Part A (Part B continues after the break)
Central Building
Chairs: Antonio Molina-García and Mike Taylor
Student Trainee Chair: Bruno Guerreiro

Novel cryopreservation and biopreservation strategies are urgently required as conventional cryoprotectants and protocols often fail to provide the high post-thaw recoveries required by emerging applications of the post-thaw product. This varied session will explore a range of cryoprotectants, including synthetic and natural adaptation inspired protectants, as well as a range of other tools and techniques for effective preservation and post-thaw success.

2:45 – 3:00 PM
Jiri Zamecnik, Czech Republic
S23 FROZEN AND UNFREEZABLE WATER DETECTED BY DSC: THEIR ROLE IN PLANT CRYOPRESERVATION

3:00 – 3:15 PM
Francisco del Monte, Spain
S24 USE OF DESS AS NOVEL CRYOPROTECTANTS FOR EFFICIENT MAMMALIAN CELL STORAGE AND PRESERVATION

3:15 – 3:30 PM
Mike Taylor, United States
S25 COMPARISON OF SUCROSE AND SYNTHETIC ICE BLOCKERS AS ICE MODULATORS FOR VITRIFICATION

3:30 – 3:45 PM
Bruno Guerreiro, Portugal
S26 A NOVEL POLYSACCHARIDE-BASED APPROACH FOR CRYOPRESERVATION

3:45 – 4:00 PM
Bita Ebrahimi, Iran
S27 EVALUATION OF ANTIFREEZE PROTEIN III FOR CRYOPRESERVATION OF HUMAN SPERM

2:45 – 4:00 PM

Symposium 3: Role of the Aquaporins during Cryopreservation of Gametes, Embryos and Reproductive Tissues
Rocasolano Room
Chair: Teresa Mogas

Aquaporins are crucial to prevent osmotic-induced damage, one of the major risks of cryopreservation protocols. Many efforts have been made to elucidate the relevance of aquaporins to cryotolerance, but further research is required to determine whether additional knowledge of aquaporins may be used to improve cryopreservation protocols for gametes, embryos and ovarian and testicular tissues

2:45 – 3:05 PM
Marc Yeste, Spain
S28 INVOLVEMENT OF AQUAPORINS IN MAMMALIAN SPERM CRYOPRESERVATION

3:05 – 3:25 PM
Keisuke Edashige, Japan
S29 THE MOVEMENT OF WATER AND CRYOPROTECTANTS IN MAMMALIAN OOCYTES AND EMBRYOS: MEMBRANE PERMEABILITY AND AQUAPORINS

3:25 – 3:45 PM
Adam Higgins, United States
S30 CONCENTRATION DEPENDENCE OF CRYOPROTECTANT PERMEABILITY AND IMPLICATIONS FOR DESIGN OF CRYOPRESERVATION PROCEDURES

3:45 – 4:00 PM
Juan Qiu, Japan
S31 EXPRESSION AND DISTRIBUTION OF AQUAPORIN 3 IN HUMAN OOCYTES AND EMBRYOS

2:45 – 4:00 PM	**Symposium 4: Challenges in Cryobiology for Microorganisms** *Pinar Room* **Chair:** Andrea Gomez-Zavaglia **Student Trainee Chair:** Illia Petrov The increasing biotechnological importance of microorganisms highlights the requirement of appropriate preservation processes. Moreover, their stability when faced to adverse environments (low pH, temperatures, high salt concentrations, dehydration, among others) is a critical issue when considering industrial applications. During all these processes, different bacterial structures can be damaged, in particular, bacterial membranes. For these reasons, stabilizing microorganisms of industrial relevance is a great challenge, and the strategies to be implemented are dependent on the type of microorganism and on the conditions to which they are exposed. This symposium will bring together researchers with interests on the stabilization of different genus and species of microorganisms, as well as on the mechanisms involved on bacterial stability.
2:45 – 3:05 PM	**Andrea Gomez-Zavaglia, Argentina** S32 STABILIZING EFFECT OF FOS DURING FREEZE-DRYING AND STORAGE OF LACTOBACILLUS DELBRUECKII SUBSP. BULGARICUS RESULTS FROM A BALANCE BETWEEN HIGH AND LOW MOLECULAR WEIGHT OLIGOSACCHARIDES
3:05 – 3:25 PM	**Francisca Randez-Gil, Spain** S33 LIPID METABOLISM REGULATION AND ITS RELATIONSHIP WITH COLD STRESS RESPONSE IN YEAST
3:25 – 3:45 PM	**Jindrich Peiren, Belgium** S34 TOWARDS MINIATURIZED CULTURE COLLECTIONS: PRESERVATION OF BACTERIA BY FREEZE-DRYING IN MICROPLATES
3:45 – 4:00 PM	**Julie Meneghel, United Kingdom** S176 CRYOPRESERVATION-RELATED STRESSES IN *LACTOBACILLUS DELBRUECKII SUBSP. BULGARICUS*: GLOBAL AND MULTI-SCALE STUDY

4:00 – 4:30 PM | Coffee Break *Cloister*

4:30 – 6:00 PM	**Session 2 (cont.): Novel Cryoprotection and Biopreservation Strategies – Part B** *Central Building* **Chairs:** Antonio Molina-García and Gloria Elliott **Student Trainee Chair:** Bruno Guerreiro
4:30 – 4:45 PM	**Natalia Li, Russian Federation** S35 USE OF ARCTIC INSECT HEMOLYMPH AS A COMPLIMENTARY AGENT IN APPLIED CRYOPRESERVATION
4:45 – 5:00 PM	**Hugo Desnos, France** S36 BIOPHYSICAL PHENOMENA INFLUENCED BY THE NUCLEATION TEMPERATURE DURING SLOW-FREEZING PROCEDURES
5:00 – 5:15 PM	**Antonio Molina-García, Spain** S37 FREEZING POINT AT HIGH HYDROSTATIC PRESSURE: ROBINSON-STOKES EQUATION EXTENSION TO HIGH PRESSURES
5:15 – 5:30 PM	**Gloria Elliott, United States** S38 STABILIZING THE AMORPHOUS STATE OF TREHALOSE IN HIGH HUMIDITY ENVIRONMENTS
5:30 – 5:45 PM	**Jan Huebinger, Germany** S39 MODULATION OF LIPID BILYAER MEMBRANES CONTRIBUTES TO CRYOPROTECTION UPON RAPID COOLING CRYOPRESERVATION
5:45 – 6:00 PM	**Trisha Bailey, United Kingdom** S40 BIO-INSPIRED CELL CRYOPRESERVATION USING SYNTHETIC ANALOGUES

4:30 – 6:00 PM	**Session 3: Comparative Ovarian Tissue Cryopreservation** *Rocasolano Room* **Chair:** Yuksel Agca **Student Trainee Chair:** Ellen Cristina Rivas Leonel	This session will cover comparative ovarian tissue cryobiology in human, domestic and rodent models of ovarian tissue cryopreservation and transplantation. The speakers will provide brief information about the current status of representative species with regards to ovarian tissue structure, cryobiology, transplantation, as well as their potential clinical impact on women's infertility treatment.
4:30 – 4:45 PM	**Harriette Oldenhof, Germany** S41 DIFFUSION KINETICS OF DIFFERENT CRYOPRESERVATION SOLUTION COMPONENTS INTO OVARIAN TISSUE	
4:45 – 5:00 PM	**Reihane Nateghi, Iran** S42 DIETARY FATTY ACIDS, VITAMIN E AND HEN OVARIAN CRYOPRESERVATION; APOPTOTIC PATHWAY VIEWPOINTS	
5:00 – 5:15 PM	**Ellen Cristina Rivas Leonel, Brazil** S43 CRYOPRESERVATION OF CAT OVARIAN TISSUE: POST-TRANSPLANTATION EFFECTIVENESS	
5:15 – 5:30 PM	**Ferda Topal çelikkan, Turkey** S44 EFFECTS OF DIFFERENT VITRIFICATION SOLUTIONS ON OVARIAN TISSUE CRYOPRESERVATION IN PREPUBERTAL DOGS	
5:30 – 5:45 PM	**Ellen Cristina Rivas Leonel, Brazil** S45 THE EQUILIBRIUM VITRIFICATION TECHNIQUE FOR HUMAN OVARIAN TISSUE CRYOPRESERVATION	
5:45 – 6:00 PM	**Cansu Agca, United States** S46 DIFFERENTIAL GENE EXPRESSION OF FRESH AND CRYOPRESERVED RAT OVARIAN TISSUE GRAFTS	
4:30 – 6:00 PM	**Session 4: Advances in Blood Preservation** *Pinar Room* **Chair:** Jason Acker **Student Trainee Chair:** Olga Mykhailova	Advances in the preservation of blood cells has been critical to the field of transfusion medicine and has informed current practices in the preservation and storage of cell-based therapeutics. This session will introduce recent advances and challenges in clinical blood cell preservation.
4:30 – 4:45 PM	**Robyn Osborne, United States** S47 WHAT IS NORMAL? RANGE OF SUBSET FREQUENCY IN "NORMAL" PBMC	
4:45 – 5:00 PM	**Daniil Ostras, Ukraine** S48 ERYTHROCYTE OSMOTIC FRAGILITY UNDER COLD EXPOSURES IN RATS OF DIFFERENT AGES	
5:00 – 5:20 PM	**Jason Acker, Canada** S49 ICE RECRYSTALLIZATION INHIBITORS MITIGATE DAMAGE DUE TO TRANSIENT WARMING OF CRYOPRESERVED RBCS	
5:20 – 5:40 PM	**Jessica Poisson, Canada** S50 CRYOPRESERVATION OF RED BLOOD CELLS USING ICE RECRYSTALLIZATION INHIBITORS AS NOVEL PERMEATING CRYOPROTECTANTS	
5:40 – 6:00 PM	**Julie Meneghel, United Kingdom** S51 INTERDEPENDENCY OF FREEZING AND THAWING RATES ON CRYOPRESERVED HUMAN T CELLS	
6:00 – 8:00 PM	**Poster Session 1** *Cloister*	View poster presentations and speak to the presenting authors of even numbered posters. Judging for the student poster competition will begin during this session.

Wednesday July 11

8:30 – 10:30 AM

Plenary Session 3
Central Building

Chairs: Christina Walters and Jedediah Lewis

Serving as an introduction to the following anhydrobiosis symposium, Wednesday morning's plenary session begins with a lecture by Julia Buitink. This will be followed by a 60 minute plenary session on the current status and research in organ preservation, hosted in association with the Organ Preservation Alliance.

Organ transplantation is one of the most impressive medical achievements of the past century. In the past 25 years, it has added over two million life-years to patients in the United States alone. Yet access to transplantation and its efficacy are still fundamentally constrained, with maximum clinical organ preservation times measured in hours. Organ cryopreservation breakthroughs could expand transplant access, increase the pool of donor organs and enhance transplant viability and function. In this session, we will discuss the current state of organ transplantation and how cryopreservation advances are opening up many new possibilities.

8:30 – 9:20 AM	**Julia Buitink, National Institute for Agricultural Research, France** S52 LESSONS FROM ANHYDROBIOSIS IN SEEDS: HOW NOT TO DIE WHEN DRY
9:20 – 10:30 AM	**Cryopreservation of Organs 1**
9:20 – 9:50 AM	**Jedediah Lewis, United States** S53 ESTABLISHING AN ORGAN BANKING RESEARCH NETWORK
9:50 – 10:10 AM	**Javier Cabo-Salvador, Spain** S54 DIFFERENT APPROACHES TO INCREASE THE NUMBER OF TRANSPLANTS
10:10 – 10:30 AM	**Beatriz Dominguez-Gil, Spain** S55 ORGAN TRANSPLANTATION: CURRENT SITUATION IN SPAIN AND IN THE WORLD

10:30 – 11:00 AM | Coffee Break *Cloister*

11:00 – 1:00 PM

Session 5: New Tools and Technologies for Cryopreservation - Sponsored by VitriCell
Central Building

Chair: Igor Katkov and Yong Ba
Student Trainee Chair: Fazil Panhwar

The development of new technologies and tools can benefit cryobiological study and applications. In this session, speakers will discuss their research in a wide variety of novel tools and technologies, and the resulting advances in cryopreservation and cryoresearch.

11:00 – 11:15 AM	**Igor Katkov, United States** S56 KRIOBLAST-3: A THREE-MODULE SYSTEM FOR KINETIC (HYPER-FAST) VITRIFICATION
11:15 – 11:30 AM	**Irena Kratochvílová, Czech Republic** S57 HUMAN FIBROBLAST POST-THAW REGENERATION MONITORED BY AFM AND FLUORESCENCE MICROSCOPY
11:30 – 11:45 AM	**Yong Ba, United States** S58 NEW INSIGHT OF ANTIFREEZE PROTEINS VIA SITE-DIRECTED SPIN LABELING TECHNIQUE
11:45 – 12:00 PM	**Itziar Aurora Montalbán, Spain** S59 SIMPLIFIED METHOD TO STORE EMBRYOGENIC CELLS: SILVER NANOPARTICLES AND CRYOPROTECTORS ELIMINATION EFFECT
12:00 – 12:15 PM	**Jan Huebinger, Germany** S60 REVERSIBLE CRYO-ARREST FOR IMAGING MOLECULES IN LIVING CELLS AT HIGH RESOLUTION

Wednesday July 11 (continuation)

12:15– 12:30 PM	**Martin Golan, Czech Republic** S61 CRITICAL DEFECTS IN CRYOPRESERVED CELL NUCLEI: DNA STRUCTURE CHANGES
12:30 – 12:45 PM	**Tim Rittinghaus, Germany** S62 IS FREEZER COOLING RATE EQUAL TO SAMPLE COOLING RATE?
12:45 – 1:00 PM	**Fazil Panhwar, P.R. China** S63 NIR-LASER MEDIATED MODULATION OF ICE CRYSTALLIZATION BY 2D-NANOSHEETS FOR CELL CRYOPRESERVATION

11:00 – 1:00 PM

Symposium 5: The Best Way to Avoid Ice Formation? Removing all Freezable Water – Lessons we can Learn from Anhydrobiotic Organisms

Rocasolano Room

Chairs: Daniel Ballesteros and Antonio Molina-García
Student Trainee Chairs: Hugo Desnos and Jarrod McKenna

In nature, diverse organisms (and their cells) tolerate the removal of large amounts of water, up to a point that cooling and living below zero is possible without ice formation. We can find these organisms among plant seeds and pollen, plant and bacterial spores, yeasts, nematodes, insects, and many others. What can we learn from them? Can we apply their natural technology to desiccation sensitive cells to decrease their sensitivity to the removal of water and hence reduce ice crystal formation? This symposium will bring together researchers who are studying anhydrobiosis in diverse organisms. It will highlight current understanding of the genomics, proteomics and mechanisms for desiccation tolerance that could serve as a basis for the development of novel strategies to prevent intracellular ice formation when freezing.

11:00 – 11:20 AM	**Joseph Saragusty, Italy** S64 EXPLORING DRY STORAGE AS AN ALTERNATIVE BIOBANKING STRATEGY INSPIRED BY NATURE
11:20 – 11:40 AM	**Dirk Hincha, Germany** S65 STRUCTURAL AND FUNCTIONAL DIVERSITY AMONG ARABIDOPSIS LEA_4 PROTEINS
11:40 – 12:00 PM	**Anja Thalhammer, Germany** S66 LEA PROTEINS – FROM UNDERSTANDING THE BASICS TO TAILORING FOR IMPROVED FUNCTIONALITY
12:00 – 12:20 PM	**Takahiro Kikawada, Japan** S67 LIFE IN NO WATER: THE EXTREME DESICCATION TOLERANCE, ANHYDROBIOSIS IN POLYPEDILUM VANDERPLANKI
12:20 – 12:40 PM	**Richard Cornette, Japan** S68 NEW INSIGHTS ABOUT ANHYDROBIOSIS IN Polypedilum vanderplanki (DIPTERA, CHIRONOMIDAE) FROM METABOLOME ANALYSIS
12:40 – 1:00 PM	**Thomas Boothby, United States** S69 TARDIGRADES USE INTRINSICALLY DISORDERED PROTEINS TO SURVIVE DESICCATION

1:00 – 2:00 PM | Lunch *Cloister*

1:00 – 2:00 PM

Editorial Board Meeting

Rocasolano Room

2:00 – 4:00 PM	**Symposium 6 : Cryopreservation of Reproductive Tissue for Cancer Survivors: Clinical and Research Perspectives** *Central Building* **Chair:** Jedediah Lewis Organ and tissue banking could become a staple of cancer care for children and young adults. Reproductive organs are highly sensitive to injury from chemotherapy and radiation, often leaving survivors of childhood and young adult cancer infertile and with altered endocrine function, resulting in lifelong sexual and psychological side effects. Ovary, uterus, and testis banking could be used to restore fertility and hormone balance to thousands of childhood and young adult cancer survivors each year worldwide. In this session, researchers will discuss both the clinical need for these technologies and the promising research approaches in reproductive tissue preservation.
2:00 – 2:20 PM	**Helen Picton** S70 THE CHALLENGES OF OVARIAN TISSUE BANKING FOR FERTILITY PRESERVATION AND RESTORATION
2:20 – 2:40 AM	**Hooman Sadri-Ardekani** S71 HUMAN TESTIS CRYOPRESERVATION FROM BODY TO THE DISH
2:40 – 3:00 PM	**Yodo Sugishita** S72 DEVELOPMENT OF OVARIAN TISSUE VITRIFICATION METHOD BY USING CLOSED DEVICE
3:00 – 3:30 PM	**Helen Picton; Hooman Sadri-Ardekani; Yodo Sugishita** PANEL DISCUSSION 1: CLINICAL NEED FOR OVARIAN, TESTES AND FERTILITY PRESERVATION
3:30 – 4:00 PM	**Bradley Weegman; Harriëtte Oldenhof; Ariadna Corral** PANEL DISCUSSION 2: RESEARCH APPROACHES IN FERTILITY PRESERVATION

2:00 – 4:00 PM	**Session 6: From single cells to complex tissues, the power of plant cryopreservation** *Rocasolano Room* **Chair:** Valerie Pence Plant cryopreservation is a powerful tool for the long-term conservation of plant genetic resources, as is the main way to preserve propagules from clonal crops and species with desiccation sensitive seeds. Cryopreservation of plant genetic resources can be accomplished using diverse types of propagules of increasing tissue complexity. From single cells such as pollen and fern spores, to complex systems such as embryonic axes or whole seeds, the latest approaches and experiences for the cryopreservation of diverse plant propagules are discussed in this session.
2:00 – 2:15 PM	**Rajasekharan PE, India** S73 POLLEN CRYOPRESERVATION IN TROPICAL FRUITS: CHALLENGES AND PROSPECTS
2:15 – 2:30 PM	**Anna Nebot Escrigues, United Kingdom** S74 DESICCATION TOLERANCE AND THE HYDRATION WINDOW FOR THE CRYOPRESERVATION OF WOODY SPECIES' POLLEN
2:30 – 2:45 PM	**Rakesh Mathad, India** S75 CRYO-PRESERVATION OF POLLEN IN HYBRID SEED PRODUCTION
2:45 – 3:00 PM	**Raquel Folgado, United States** S76 IMPERILED PLANTS GO COLD: THE HUNTINGTON BOTANICAL GARDENS CASE STUDIES
3:00 – 3:15 PM	**Xiaoling Chen, China** S77 CRYOPRESERVATION OF JERUSALEM ARTICHOKE CULTIVARS
3:15 – 3:30 PM	**Pablo Bernal, United Kingdom** S78 CRYOBIOTECHNOLOGICAL APPROACHES FOR THE PRESERVATION OF OAK (Quercus SP) EMBRYONIC AXES.
3:30 – 3:45 PM	**Natalia Fanega Sleziak, United Kingdom** S79 CONTRIBUTION OF EMBRYO SIZE AND AGE TO THE SUCCESSFUL CRYOPRESERVATION OF AESCULUS SPECIES.

3:45 – 4:00 PM	**Rachael Davies, United Kingdom** S80 EVALUATION OF SHORT-LIVED SEEDS' CRYOPRESERVATION AS ALTERNATIVE TO CONVENTIONAL SEED BANKING.

4:00 – 4:30 PM | Coffee Break *Cloister*

4:30 – 6:10 PM	**Symposium 7: Cryopreservation of Organs 2** *Central Building* **Chair:** Ramon Risco Organ cryopreservation breakthroughs could expand transplant access, increase the pool of donor organs and enhance transplant viability and function. In this session, researchers will present the most recent advances and remaining challenges in cryopreservation of organs and complex tissues.
4:30 – 4:50 PM	**Greg Fahy, United States** S81 CURRENT TOPICS IN KIDNEY CRYOPRESERVATION: COOLING INJURY AND BIOCHEMICAL INJURY
4:50 – 5:10 PM	**Adam Higgins, United States** S82 EFFECTS OF CRYOPROTECTANT CARRIER SOLUTION TONICITY ON TRANSPORT DURING ORGAN PERFUSION
5:10 – 5:30 PM	**Yuansheng Tan, United States** S83 FULL FUNCTIONALITY AFTER CRYOPRESERVATION OF BRAIN SLICES BY VITRIFICATION
5:30 – 5:50 PM	**Bo He, P.R. China** S84 BREAKTHROUGH OF "ORGAN BANKING": SCOPE OF APPLICATION OF LIMB CRYOPRESERVATION TECHNIQUES
5:50 – 6:10 PM	**Bradley Weegman, United States** S85 FEASIBILITY STUDY IN THE DEVELOPMENT OF WHOLE OVARY VITRIFICATION AND NANOWARMING

4:30 – 6:00 PM	**Session 7: Comparative Oocyte and Embryo Cryopreservation 1** *Rocasolano Room* **Chairs:** Ali Eroglu and Steve Mullen **Student Trainee Chair:** Taisiia Yurchuk This session will cover oocyte and embryo cryobiology of human, agricultural, laboratory, domestic and wild animals. The speakers will provide brief information about the current status of representative species and their research findings.
4:30 – 4:45 PM	**Simon Clulow, Australia** S86 THE STATE OF CRYOPRESERVATION AND ASSISTED REPRODUCTIVE TECHNOLOGIES FOR THE CONSERVATION OF AMPHIBIANS AND REPTILES
4:45 – 5:00 PM	**John Clulow, Australia** S87 CRYOPRESERVATION OF OOCYTES AND FOLLICULAR CELLS OF THE CANE TOAD, RHINELLA MARINA
5:00 – 5:15 PM	**Tania García, Spain** S88 EXPOSURE TO HYPEROSMOTIC SOLUTIONS MODIFIES EXPRESSION OF AQP3 AND AQP7 ON BOVINE OOCYTES
5:15 – 5:30 PM	**Miguel Gallardo, Portugal** S89 A TWO MINUTE PROTOCOL TO PREPARE HUMAN OOCYTES AND EMBRYOS FOR VITRIFICATION
5:30 – 5:45 PM	**Martina Colombo, Italy** S90 OOCYTES VITRIBANKING IN THE DOMESTIC CAT MODEL: DEVELOPMENTAL COMPETENCE IN 3D CULTURE
5:45 – 6:00 PM	**Fabien Ectors, Belgium** S91 ONE-STEP VITRIFICATION OF MURINE EMBRYOS CHALLENGES CURRENT PARADIGMS OF CRYOBIOLOGY

6:00 – 8:00 PM	**Poster Session 2** *Cloister*	View poster presentations and speak to the presenting authors of odd numbered posters. Judging for the student poster competition will conclude during this session.

8:30 PM – Late | International Cryobiology Youth Researchers (ICYR) Sangria Making Class
La Lonja del Mar Restaurant
See social events on page 9 for details.

Thursday July 12

8:15* – 10:30 AM ***Note start time**	**Plenary Session 4** *Central Building* **Chairs:** Hugh Pritchard and James Benson This morning's plenary session begins with a lecture from Christina Walters, followed	by the Society's for Cryobiology's Peter L. Steponkus Crystal Award for the best student oral presentation. The Crystal award carries an honorarium of $1,000 and we encourage all delegates to attend in support of these talented young cryobiologists The winner of the Crystal award will be announced at tonight's banquet.
8:15 – 9:10 AM	**Christina Walters, USDA-ARS, United States – Sponsored by Royal Botanic Gardens, Kew** S92 SOLID-STATE BIOLOGY AND ITS IMPLICATIONS TO CRYOBIOLOGY	
9:10 – 10:30 AM	**Peter L. Steponkus Crystal Award**	
9:10 – 9:30 AM	**Nikola Dolezalova, United Kingdom** S93 CHARACTERISING DIFFUSION KINETICS TO IMPROVE PANCREATIC ISLET CRYOPRESERVATION	
9:30 – 9:50 AM	**Md Ariful Alam, Japan** S94 OPTIMIZATION OF PROTOCOLS FOR MICROINJECTION-BASED DELIVERY OF CRYOPROTECTIVE AGENTS INTO FISH EMBRYOS	
9:50 – 10:10 AM	**Vitalii Mutsenko, Germany** S95 'IN AIR' CRYOPRESERVATION OF MESENCHYMAL STROMAL CELLS ON 3D COLLAGEN-HYDROXYAPATITE SCAFFOLDS	
10:10 – 10:30 AM	**Zoran Marinovic, Hungary** S96 TESTIS CRYOPRESERVATION AND SPERMATOGONIA TRANSPLANTATION AS A TOOL FOR ZEBRAFISH LINE RECONSTITUTION	

10:30 – 11:00 AM | Coffee Break *Cloister*

11:00 – 1:15 PM	**Session 8: Advances in Tissue Preservation** *Central Building* **Chairs:** Erik Woods and Janet Elliott **Student Trainee Chair:** Reihane Nateghi	This session brings together those involved in the preservation research, clinical banking and transplantation of tissues. Several different biopreservation approaches will be discussed, including hypothermic; cryopreservation; and vitrification, across a range of tissues including cartilage, heart valves, and skin, among others.
11:00 – 11:15 AM	**Janet Elliott, Canada** S97 SHORTENING A CRYOPROTECTANT LOADING PROTOCOL FOR ARTICULAR CARTILAGE VITRIFICATION WITH ENGINEERING MODELLING	
11:15 – 11:30 AM	**Kelvin Brockbank, United States** S98 OPTIMIZATION OF HYPOTHERMIC CARTILAGE STORAGE	

Thursday July 12 (continuation)

11:30 – 11:45 AM	**Peter Kilbride, United Kingdom** S99 TRANSPLANTED HUMAN THYMUS SLICES INDUCE AND SUPPORT T-CELL DEVELOPMENT IN MICE POST-CRYOPRESERVATION
11:45 – 12:00 PM	**Andrés Vásquez-Rivera, Germany** S100 USE OF SUCROSE TO DIMINISH PORE FORMATION IN FREEZE-DRIED HEART VALVES
12:00 – 12:15 PM	**Sabra Zouhair, Italy** S101 PRESERVATION OF DECELLULARIZED CARDIOVASCULAR GRAFTS FOR APPLICATIONS IN TISSUE GUIDED REGENERATION
12:15– 12:30 PM	**Kelvin Brockbank, United States** S102 IMPACT OF VS83 AND ITS COMPONENTS UPON TISSUE IMMUNOGENICITY
12:30 – 12:45 PM	**Zhaowei Zhu, P.R. China** S103 CRYOPRESERVED ACELLULAR NERVE ALLOGRAFT: HISTOLOGICAL, MECHANICAL AND BIOLOGICAL EVALUATION
12:45 – 1:00 PM	**M. Shuaib Khan, Pakistan** S104 TGF-α and VEGF EXPRESSIONS IN SKIN GRAFTS CRYOPRESERVED BY ANTARCTIC YEAST ORIENTED ANTI- FREEZE PEPTIDE (Afp1m)

11:00 – 1:00 PM	**Session 9: Comparative Sperm Cryopreservation 2** *Rocasolano Room* **Chair:** David Rawson	These multiple sessions on sperm cryobiology will cover human, agricultural, and laboratory animals. The speakers will provide brief information about the current status of representative species and their research findings.

11:00 – 11:15 AM	**Ejaz Ahmad, Pakistan** S105 A STRATEGY TO IMPROVE CRYOSURVIVAL OF GOAT SPERM BY USING ADENOSINE 5' TRIPHOSPHATE
11:15 – 11:30 AM	**Rose Upton, Australia** S106 SUCCESSFUL SPERM CRYOPRESERVATION AND GENERATED OFFSPRING OF THE ENDANGERED FROG, LITORIA AUREA
11:30 – 11:45 AM	**Jaime Onofre, Belgium** S107 INFLUENCE OF TESTICULAR TISSUE AND TESTICULAR CELL SUSPENSION CRYOPRESERVATION ON SPERMATOGONIAL STEM CELL FUNCTION
11:45 – 12:00 PM	**Koray Tekin, Turkey** S108 EFFECT OF POLYVINYL ALCOHOL ON ANGORA BUCK SPERMATOZOA SURVIVAL AND FUNCTION DURING CRYOPRESERVATION
12:00 – 12:15 PM	**Walter Bravo, Peru** S109 THE EFFECT OF BLOOD ON PRESERVING ALPACA SEMEN
12:15 – 12:30 PM	**Rouhollah Fathi, Iran** S110 TRANSCRIPTOME ALTERATION OF SPERM ASSOCIATED ANTIGENS (SPAGS) IN NORMAL FROZEN HUMAN SPERM
12:30 – 12:45 PM	**Bushra Rakha, Pakistan** S111 CRYOPRESERVATION OF INDIAN RED JUNGLE FOWL SEMEN WITH DIMETHYLFORMAMIDE
12:45 – 1:00 PM	**Lachlan Campbell, Australia** S112 MODEL PROTOCOL FOR CRYOPRESERVATION OF LIZARD SPERM USING THE PHOSPHODIESTERASE INHIBITOR CAFFEINE

11:00 – 1:00 PM	**Session 10: Mechanisms and Pathways to Successful Plant Cryopreservation** *Pinar Room* **Chair:** Elena Popova Cryopreservation procedures induce diverse stresses in cells and tissues (e.g. osmotic stress, stress due to water and lipid crystallization, toxicity). These stresses can reduce or preclude the success of a particular cryopreservation protocol. Understanding the molecular mechanisms and pathways activated by the different steps of the cryopreservation process can help to increase the rate of success of the cryopreservation protocol for a species, or even predict a general procedure for the successful cryopreservation of a large range of species and propagules.
11:00 – 11:15 AM	**Claudia Köpnick, Germany** S113 BIOCHEMICAL CHANGES DURING POTATO SHOOT TIP CRYOPRESERVATION
11:15 – 11:30 AM	**Kamatchi Ulagappan, Germany** S114 TRANSCRIPTOMIC, BIOCHEMICAL, AND ULTRASTRUCTURAL ANALYSIS FOR UNDERSTANDING CRYO-STRESS IN GARLIC
11:30 – 11:45 AM	**Maria Teresa Gonzalez-Arnao, Mexico** S115 BIOCHEMICAL AND THERMOPHYSICAL STUDIES DURING CRYOPRESERVATION OF VANILLA (V. INSIGNIS) APICES
11:45 – 12:00 PM	**Bryn Funnekotter, Australia** S116 NON-DESTRUCTIVE MEASUREMENT OF METABOLIC ACTIVITY IN SHOOT TIPS AFTER CRYOPRESERVATION
12:00 – 12:15 PM	**Daniela Impe, Germany** S117 WHEAT POLLEN VIABILITY AND FEASABILITY OF POLLEN STORAGE
12:15 – 12:30 PM	**Rainer Vollmer, Peru** S118 SUGAR DETOX: IS HIGH SUGAR CONCENTRATION REALLY REQUIRED FOR REWARMING?
12:30 – 12:45 PM	**Bin Huang, P.R. China** S119 OXIDATIVE DAMAGE AND ANTI-OXIDATIVE INDICATORS IN RICE 48-GERMINATED EMBRYOS DURING CRYOPRESERVATION
12:45 – 1:00 PM	**Romain Baffoin, France** S120 AUTUMNAL PHENOLOGY INTEGRATED TO FROST HARDINESS MODELLING OF WALNUT AND APPLE TREES

1:00 – 2:00 PM | Lunch *Cloister*

1:45 – 2:40 PM	**Session 11: Best Practice and Biobanking for Research and Discovery** *Central Building* **Chair:** Erik Woods ISBER EMEA director, Alison Parry-Jones, will introduce delegates to the recently published ISBER Best Practices, Fourth Edition. This session also includes reflections on tissue banking for research and discovery in the United Kingdom.
1:45 – 2:00 PM	**Alison Parry-Jones, United Kingdom** S121 ISBER BEST PRACTICES: RECOMMENDATIONS FOR REPOSITORIES, 4TH EDITION
2:00 – 2:20 PM	**Emma Lawrence, United Kingdom** S122 THE UKCRC TISSUE DIRECTORY: ENGAGEMENT FOR A PLATFORM OF UK HUMAN SAMPLE DISCOVERY
2:20 – 2:40 PM	**Alison Parry-Jones, United Kingdom** S123 BIOBANKING FOR CANCER RESEARCH – CHALLENGES AND REFLECTIONS

Thursday July 12 (continuation)

2:40 – 3:30 PM

Session 12: Advances in Thermal Medicine
Central Building
Chair: Erik Woods

Minimally invasive and able to be highly targeted, cryotherapy and cryoablation are often employed as a treatment for benign and malignant tumors. This session explores clinical outcomes of different temperature cryotherapy; recent advances in the treatment of lung cancer, and cryoablation for skin tumors.

2:40 – 3:00 PM	**Aaron Katz, United States** S129 CRYOTHERAPY TEMPERATURE EFFECTS ON FUNCTIONAL AND ONCOLOGICAL OUTCOMES IN PROSTATE CANCER
3:00 – 3:15 PM	**Claudio Pusceddu, Italy** S130 CRYOABLATION IN THE TREATMENT OF LUNG CANCER
3:15 – 3:30 PM	**Chandrika Kumari, India** S131 AN EXPERIMENTAL AND NUMERICAL APPROACH FOR NODULAR SKIN TUMOUR ABLATION USING CRYOTHERAPY

2:00 – 3:30 PM

Session 13: Mathematical Modeling for Design of Tissue and Cell Cryopreservation Procedures
Rocasolano Room
Chairs: Adam Higgins and Janet Elliott
Student Trainee Chair:
Kezhou Wu

Cryopreservation exposes cells and tissues to changes in temperature and solution composition that can cause damage by a variety of mechanisms, including osmotic damage and cryoprotectant toxicity. This session will focus on mathematical modeling approaches for the design of cryopreservation methods that avoid or minimize these damage mechanisms.

2:00 – 2:20 PM	**Kezhou Wu, Canada** S124 COMPARISON OF THREE MULTI-CRYOPROTECTANT LOADING PROTOCOLS FOR VITRIFICATION OF ARTICULAR CARTILAGE
2:20 – 2:35 PM	**Joseph Abrams, Canada** S125 AN AGENT BASED MODEL OF CELL LEVEL TOXICITY ACCUMULATION AND INTERCELLULAR MECHANICS DURING CPA EQUILIBRATION IN OVARIAN FOLLICLES
2:35 – 2:55 PM	**Ariadna Corral, Spain** S126 TOWARDS NEW PROTOCOLS OF OVARIAN TISSUE CRYOPRESERVATION ASSISSTED BY X-RAY COMPUTED TOMOGRAPHY
2:55 – 3:10 PM	**Adam Higgins, United States** S127 BIOMECHANICAL MODEL OF CRYOPROTECTANT TRANSPORT IN TISSUES WITH HIGH CELL DENSITY
3:10 – 3:30 PM	**Henri Woelders, Netherlands** S128 SIMULATIONS OF OSMOTIC EVENTS IN VITRIFICATION OF EQUINE OOCYTES AND PORCINE EMBRYOS

3:30 – 4:00 PM | Coffee Break *Cloister*

4:00 – 6:00 PM

Session 14: Adult and Induced Stem Cell Cryopreservation for Regenerative Medicine
Central Building
Chairs: Erik Woods and Yuksel Agca

This session covers human adult and induced stem cell and tissue cryopreservation as well as biobanking for human regenerative medicine and various biomedical applications. The speakers will provide brief information about the current status of human stem cell cryopreservation and novel approaches for large-scale cryopreservation of human mesenchymal stem cells, induced pluripotent stem cells and tissues and their research findings.

4:00 – 4:15 PM	**Tanushree Patra, India** S132 OPEN VS CLOSED ENCAPSULATION-VITRIFICATION OF LEYDIG CELLS

4:15 – 4:30 PM	**Haritz Gurruchaga, Spain** S133 AN ALLOGENEIC BIOSCAFFOLD FOR THE STORAGE OF HUMAN MESENCHYMAL STEM CELLS
4:30 – 4:45 PM	**Ina Meiser, Germany** S134 TOWARDS LARGE-SCALE CRYOPRESERVATION: STERILE VITRIFICATION OF ADHERENT HUMAN INDUCED PLURIPOTENT STEM CELLS AND THEIR NEURAL DERIVATES
4:45 – 5 PM	**Oleksandr Gryshkov, Germany** S135 ADVANCES IN CRYOPRESERVATION OF ALGINATE-ENCAPSULATED STEM CELLS AND ANALYSIS OF CRYOPRESERVATION OUTCOME
5:00 – 5:15 PM	**Vitalii Mutsenko, Germany** S136 ME2SO- AND SERUM-FREE CRYOPRESERVATION OF MESENCHYMAL STROMAL CELLS USING ELECTROPORATION OF SUGARS
5:15 – 5:30 PM	**Zeeshan Haider, P.R. China** S137 SURFACE ACOUSTIC WAVES BASED MULTISTEP ON-CHIP DEVICE FOR LOADING AND UNLOADING OF CRYOPROTECTIVE AGENTS ON HUCM-MSCS CELLS IN CRYOPRESERVATION APPLICATION FOR SMALL BIO SAMPLES
5:30 – 5:45 PM	**Aubrey Sherry, United States** S138 NOVEL STRATEGIES FOR STORAGE AND RECOVERY OF CADAVERIC BONE MARROW STEM CELLS
5:45 – 6:00 PM	**Bhawna Chandravanshi, India** S139 SUPPLEMENTING SMALL MOLECULES PROTECTS ISLETS AGAINST CRYO-INJURY AND ENHANCES RECOVERY UPON CRYOPRESERVATION

4:00 – 5:30 PM	**Session 15: Cryopreservation of Aquatic Organisms** *Rocasolano Room* **Chairs:** Estefania Paredes and Tiantian Zhang **Student Trainee Chair:** Lawrence Edemhanria	In the last four decades scientists have been researching the peculiarities of developing cryopreservation protocols for aquatic organisms. In this session we will go over novel cryopreservation protocols for very different cell types, factors like cryoprotecting agent toxicity, apoptosis or biobanking will be addressed and we will approach the actual problems from different directions in order to propose solutions.
4:00 – 4:15 PM	**Nelly Odintsova, Russian Federation** S140 ATTEMPTS TO MODULATE APOPTOSIS IN CRYOPRESERVED MOLLUSCAN CELLS	
4:15 – 4:30 PM	**Pablo Heres, Spain** S141 CRYOPRESERVATON OF MYTILUS GALLOPROVINCIALIS: TESTING TOXICITY OF CRYOPROTECTING AGENTS ALONG EARLY DEVELOPMENT	
4:30 – 4:45 PM	**Jelena Lujic, Hungary** S142 CRYOPRESERVATION OF COMMON CARP (CYPRINUS CARPIO L.) SPERMATOGONIAL STEM CELLS	
4:45 – 5:00 PM	**Juan Herranz-Jusdado, Spain** S143 EUROPEAN EEL SPERM CRYOPRESERVATION: AN OVERVIEW	
5:00 – 5:15 PM	**Valentin Ananiev, Russian Federation** S144 PRESERVATION OF DANIO RERIO AND CARP EMBRYOS AND PROLARVA IN CRYOBANKS. PROBLEMS AND PERSPECTIVES	
5:15 – 5:30 PM	**Yevhen Horokhovatskyi, Czech Republic** S145 CRYOPRESERVATION EFFECT ON STERLET SPERM VIABILITY AND PROTEIN CONTENT AFTER PERCOLL SEPARATION	

4:00 – 6:00 PM

Symposium 8: Cryobiotechnological Challenges for the *ex situ* Conservation of Symposium Plant Genetic Resources

Pinar Room

Chair: Daniel Ballesteros

Plant genetic resources are commonly preserved by the storage of dry seeds in seed banks. However, a large number of plants species cannot be included in these biobanks for their long-term storage. For these (exceptional) species, which are estimated to include two thirds of all plant species, cryopreservation and new technologies are required for the precise propagation of the explants are needed. There are multiple institutions worldwide working on and cryopreserving a large variety of plant species, however, plant cryopreservation is not straight forward, and multiple cryobiotechnicological challenges exist (e.g. optimal selection of explants, differential response of tissues within an explant, oxidative stress, cryoprotection, in vitro growth) particularly in species from the tropics. This symposium will bring together researchers from around the globe who are studying plant cryobiotechnology, and will highlight current understanding, challenges of, and research on plant cryopreservation.

4:00 – 4:20 PM	**Elena Popova, Canada** S146 CRYOBANKING CLONAL CROPS: WHEN KNOWLEDGE AND PRACTICE ARE NOT THE SAME
4:20 – 4:40 PM	**Vanesa Cano, Spain** S147 STATUS OF CRYOPRESERVATION TECHNOLOGIES IN HARDWOOD FOREST TREES
4:40 – 5:00 PM	**Valerie Pence, United States** S148 CHALLENGES IN THE CRYOPRESERVATION OF ENDANGERED WILD SPECIES
5:00 – 5:20 PM	**Daniel Ballesteros, United Kingdom** S149 ASSESSING THE LIMITS OF LIQUID NITROGEN STORAGE: FERN SPORES AS UNICELLULAR MODEL TO UNDERSTAND AND IMPROVE LONGEVITY AT CRYOGENIC CONDITIONS
5:20 – 5:40 PM	**Randall Niedz, United States** S150 DESIGN OF EXPERIMENTS (DOE)—HISTORY, CONCEPTS, AND RELEVANCE TO BIOLOGICAL SYSTEMS
5:40 – 6:00 PM	**Hugh Pritchard, United Kingdom** S151 THE RISE OF PLANT CRYOBIOTECHNOLOGY AND DEMISE OF PLANT CRYOPRESERVATION?

6:00 – 7:00 PM

Society for Cryobiology Annual Business Meeting

Central Building

8:00 PM – Late | CRYO2018 Awards Ceremony and Banquet

Jai Alai Restaurant

See social events on page 9 for details.

Friday July 13

8:30 – 10:30 AM

Symposium 9: Cryopreservation of Aquatic Organisms
Central Building
Chair: Estefania Paredes and David Rawson
Student Trainee Chair: Khairi El Battawy

In this symposium speakers will present their research focused on freshwater and marine cryobiology, bringing together experienced researchers who are studying very different cells (from invertebrates to fish) with their specific challenges and pursuing different applications. The invited speakers will show results obtained with a wide variety of technologies/tools from traditional cryopreservation methodology to novel techniques like vitrification with laser warming.

8:30 – 8:50 AM	**Estefania Paredes, Spain** S152 MARINE INVERTEBRATE CRYOPRESERVATION: PAST, PRESENT AND FUTURE
8:50 – 9:15 AM	**John Bischof, United States** S153 PHYSICAL LIMITS OF LASER GOLD NANOWARMING
9:15 – 9:40 AM	**Jonathan Daly, United States** S154 SUCCESSFUL CRYOPRESERVATION OF CORAL LARVAE USING VITRIFICATION AND LASER WARMING
9:40 – 10:05 AM	**Igor Katkov, United States** S155 CRYOPRESERVATION OF AQUATIC SPECIES: ACHIEVEMENTS, CHALLENGES AND FUTURE DIRECTIONS
10:05 – 10:30 AM	**Tiantian Zhang, United Kingdom** S156 CRYOPRESERVATION OF FISH GAMETES AND ITS APPLICATIONS IN BRAZIL

8:30 – 10:30 AM

Session 16: Comparative Sperm Cryopreservation 3
Rocasolano Room
Chairs: Willem Wolkers and Henri Woelders
Student Trainee Chair: Maryam Hezavehei

These multiple sessions on sperm cryobiology will cover human, agricultural, and laboratory animals. The speakers will provide brief information about the current status of representative species and their research findings.

8:30 – 8:45 AM	**Mohsen Sharafi, Iran** S157 MODIFICATION OF PHYSICOCHEMICAL CHARACTERISTICS OF FREEZING MEDIA WITH APPLYING ELECTROMAGNETIC FIELD
8:45 – 9:00 AM	**Mohsen Sharafi, Iran** S158 MICROTUBULE DYNAMICITY OF HUMAN SPERM DURING CRYOPRESERVATION PROCESS WITH EXTREMELY LOW ELECTROMAGNETIC FIELD
9:00 – 9:15 AM	**Israa Alhamad, Turkey** **S159 COMPARISON OF POST-THAWED BULL SEMEN MORPHOLOGICAL** CHARACTERISTICS STORED IN DIFFERENT TEMPERATURES
9:15 – 9:30 AM	**Armin Towhidi, Iran** S160 EFFECT OF LECITHIN NANOMICELLES IN EXTENDER ON BULL SPERM CRYOSURVIVAL
9:30 – 9:45 AM	**Henri Woelders, Netherlands** S161 FREEZING POULTRY SEMEN; EFFECTS OF CPA CONCENTRATION X COOLING RATE; OTHER FACTORS
9:45 – 10:00 AM	**Muhammad Ansari, Pakistan** **S162 LIPID PEROXIDATION, ANTIOXIDANT POTENTIAL, DNA INTEGRITY AND** MITOCHONDRIAL ACTIVITY OF INDIAN RED JUNGLE FOWL (GALLUS GALLUS MURGHI) SEMEN
10:00 – 10:15 AM	**Clara Malo, United Arab Emirates** S163 CATALASE ADDED AT THAWING IMPROVES DROMEDARY CAMEL SPERM MOTILITY
10:15 – 10:30 AM	**Daniel Kelly, United States** S164 VIABILITY OF CATTLE SEMEN AFTER 26 YEARS OF CRYOPRESERVATION

10:30 – 11:00 AM | Coffee Break *Cloister*

11:00 – 1:00 PM

Symposium 10: Tools and Technologies for Cryopreservation and Cryo-Research

Central Building

Chair: Dayong Gao
Student Trainee Chair: Rakesh C. Mathad

The development of novel technologies and tools can benefit cryobiological study and applications. When we look back to the history of cryobiology, each blooming period of this field was related to the application of novel technologies or tools. From the groundbreaking advance in cryomicroscopy, Coulter Counter, to the current micro-/nano-technology and others, such novel techniques have enabled us to investigate cell behaviours responding to cryopreservation and better understand the mechanisms of cryoinjury. Meanwhile, the emerging devices for cryopreservation, such as Mr. Frosty, cooling rate controlled freezer using passive or active cooling mechanisms, freeze-dryer, etc., have significantly facilitated the successful applications of cryopreservation in different fields. In this symposium, the speakers will talk about the application or development of novel tools and technology for cryopreservation and cryoresearch, such as methods for the measurement of cellular biophysical properties for cryopreservation, application of microfluidics for cryobiology and cryomedicine, ultra-fast and uniform rewarming of cryopreserved tissues or organs with radio frequency and electromagnetive wave, development of novel devices for cryopreservation, and others.

11:00 – 11:20 AM	**John Bischof, United States** S165 NANOPARTICLE AND METAL FORM HEATING FOR IMPROVED CRYOPRESERVATION
11:20 – 11:40 AM	**Xiaoming "Shawn" He, United States** S166 COLD RESPONSIVE NANOPARTICLES FOR CRYOBIOLOGICAL APPLICATIONS
11:40 – 12:00 PM	**Ramon Risco, Spain** S167 FOCUSED ULTRASOUND GUIDED-BY-MRI-THERMOGRAPHY FOR FAST AND CONTROLLED RE-WARMING OF CRYOPRESERVED ORGANS
12:00 – 12:20 PM	**Lindong Weng, United States** S168 MOLECULAR SIMULATION FOR CRYOPRESERVATION: ICE RECRYSTALLIZATION INHIBITION UNDER COMPUTATIONAL MICROSCOPE
12:20 – 12:40 PM	**Dayong Gao, United States** S169 TOOLS AND TECHNOLOGY FOR FUNDAMENTAL AND APPLIED CRYOBIOLOGY: AN EXPERIENCE IN SEATTLE
12:40 – 1:00 PM	**Roundtable/Discussion**

11:00 – 1:00 PM

Session 17: Comparative Oocyte and Embryo Cryopreservation 2

Rocasolano Room

Chairs: Yuksel Agca and Ali Eroglu
Student Trainee Chair: Martina Colombo

This session will cover oocyte and embryo cryobiology of human, agricultural, laboratory and domestic animals. The speakers will provide brief information about the current status of representative species and their research findings.

11:00 – 11:20 AM	**Konstantin Okotrub, Russian Federation** S170 RAMAN STUDY OF LIPID PHASE STATE IN FREEZING MAMMALIAN EMBRYOS AND OOCYTES
11:20 – 11:40 AM	**Krzysztof Papis, Poland** S171 DAY 2 HUMAN EMBRYOS CRYOPRESERVATION: WHICH OF AVAILABLE METHODS IS MOST BENEFICIAL?
11:40 – 12:00 PM	**Liga Wuri, United States** S172 CRYO-SURVIVAL, FERTILITY AND SUBCELLULAR STRUCTURAL INTEGRITY OF MOUSE CUMULUS OOCYTE COMPLEXES AFTER CRYOLOOP VITRIFICATION
12:00 – 12:20 PM	**Ximo Garcia-Dominguez, Spain** S173 EMBRYO VITRIFICATION MODIFY THE PROTEOMIC PROFILE OF ADULT RABBIT LIVER, AND IT PERSISTS ACROSS GENERATIONS
12:20 – 12:40 PM	**Rouhollah Fathi, Iran** S174 MOUSE MATURE OOCYTE VITRIFICATION UNDER STATIC MAGNETIC FIELD
12:40 – 1:00 PM	**Ali Eroglu, United States** S175 SUGARS ARE MORE EFFECTIVE IN SUPPRESSING INTRACELLULAR ICE FORMATION THAN PENETRATING CRYOPROTECTANTS

NOTES:

CRYO 2019

Save the Date

SAN DIEGO

July 22-25 2019

Sheraton San Diego Hotel & Marina