



Program Book

IETS 48th Annual Conference
Savannah, Georgia
January 10–13, 2022



Program Book

**48th Annual Conference of the
International Embryo Technology Society**

**Adaptation of Early Life to Prepare
for a Healthy Future**



**Hyatt Regency Savannah
Savannah, Georgia
January 10–13, 2022**

**Scientific Program Co-Chairs:
Hilde Aardema and Flavio Vieira Meirelles**

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Preface

After two long years of isolation and online conference sessions, we can finally congregate, discuss science and technology, and renew and strengthen our friendships. Because of the circumstances, it will certainly be the most desired and anticipated IETS meeting! The society has selected a charming location for our 48th annual meeting, with a large space to facilitate safe social interactions and allow all necessary biosecurity measures. Based on our first conference topic, we can be assured that it will be the optimal environment in which to discuss embryo technology–related science.

The theme of the 2022 conference is **Adaptation of early life to prepare for a healthy future**. The theme covers topics related to gamete and embryo manipulation, the ideal maternal conditions for healthy offspring, and methods to mimic *in vivo* conditions *in vitro*.

We have excellent speakers who have broad expertise related to this theme and who will generate lively discussions on the optimized environmental conditions to ensure high quality of gametes and embryos and healthy future offspring.

During session I, we will focus on metabolism and the best physiological adaptations of our systems to deal with *in vitro* embryo production. In session II, we will discuss the effects of maternal and recipient condition on oocytes and embryos, emphasizing their impact on the performance of the next generation. Session III will focus on the optimal *in vitro* environment that mimics *in vivo* conditions for better outcomes.

Session IV covers how the epigenome of male and female gametes may contribute to healthy offspring. Finally, session V will look closely at our embryo transfer actors to find evidence that we are using optimized techniques and selecting vital oocytes and embryos.

The keynote speaker of 2022, Dr. Marc-André Sirard, is a “homegrown star,” who will provide a comprehensive overview of the impact of the environment on embryo production and the environmental interactions during embryo development.

In addition to presentations by our invited speakers, we received numerous high-quality abstracts for poster and oral presentations during the conference. Attendees will have direct access to posters.

The CANDS-Morulas Preconference will cover many embryo technologies used in a broad number of species—from marsupials to the polar bear. The Practitioners Forum promises to showcase practical experience from oocyte recovery to embryo transportation and transfer to recipients. Finally, the DABE Forum will cover topics on modern technologies, from genetically tailored animals to nanoparticles for studding pregnancies and cell allocations.

We look forward to meeting in a fantastic venue for social interactions, where we can enjoy conversations on broad aspects of embryo technology. We hope to see you all at the start of 2022.

See you soon in Savannah!

Hilde Aardema and Flávio Meirelles, co-chairs

Recipient of the 2022 IETS Pioneer Award

Dr. Carol Keefer



The Pioneer Award is bestowed by the International Embryo Technology Society (IETS) to recognize individuals who have made seminal contributions to the development of embryo-based technologies.

Award Presentation: Thursday, January 13, at 13:45

Previous Recipients

E. Palmer (2020)	G. Seidel Jr. (2008)	N. W. Moore (1994)
B. Bavister (2019)	A. Iritani (2007)	R. G. Edwards (1993)
M.-A. Sirard (2018)	D. Kraemer (2006)	R. L. Brinster (1992)
D. T. Armstrong (2018)	S. Willadsen (2005)	A. K. Tarkowski (1991)
H. Niemann (2017)	B. Brackett (2004)	J. D. Biggers (1990)
C. E. Pope (2016)	K. Betteridge (2003)	C. Thibault (1989)
K. H. S. Campbell (2015)	R. H. Foote (2002)	A. L. McLaren and D. Michie (1988)
J.-P. Renard (2015)	P. J. Dziuk (2001)	E. J. C. Polge (1987)
W. W. Thatcher (2014)	R. Yanagimachi (2000)	T. M. Sugie (1986)
J. Hahn (2013)	R. M. Moor (1999)	L. E. A. Rowson (1985)
O. J. Ginther (2012)	I. Gordon (1998)	L. E. Casida (1984)
I. Wilmut (2011)	S. Wintenberger-Torres (1997)	M. C. Chang (1983)
R. J. Mapletoft (2010)	W. K. Whitten (1996)	R. O. Berry (1982)
S. P. Leibo (2009)	C. R. Austin (1995)	

Dr. Carol L. Keefer, a native of South Carolina, began her scientific career studying biology at the University of South Carolina, where she graduated magna cum laude in 1974. Her first research experience was working as an undergraduate with Dr. Wally Dawson in the *Peromyscus* mouse colony (later to become the *Peromyscus* Genetic Stock Center) doing vasectomies and artificial insemination in deer mice while studying sympatric speciation. That initial experience with reproductive biology led Dr. Keefer to pursue graduate studies in developmental biology with the distinguished Dr. Dick Tasca at the University of Delaware, where she earned a PhD in biological sciences in 1981. Dr. Keefer revealed that her alternate plan was to study evolutionary genetics, but she was listed as an alternate for a stipend at Stanford and so chose to study amino acid transport in preimplantation mouse embryos for her PhD dissertation work (Keefer and Tasca, 1984). We owe Stanford a debt of gratitude for unknowingly steering Dr. Keefer along her path of exemplary contributions to the field of reproductive biology! Indeed, Dr. Keefer has been a true pioneer in the areas of sperm injection, embryo and somatic cell nuclear transfer, transgenesis, and stem cell research throughout her illustrious career from the 1980s until today. Her contributions have been reflected in over 65 peer-reviewed research publications and three book chapters with more than 2,400 citations. She has been an invited speaker at more than 40 national and international events and holds two US patents for her novel work in reproductive technologies. Her experience is unique in that she has excelled in clinical, industry, and academic settings, giving her a unique perspective that allows her to think creatively about the challenges facing reproductive biology and assisted reproductive technologies in our current environment.

After her graduate work, Dr. Keefer conducted post-doctoral research at Johns Hopkins, and the University of Pennsylvania. The publication derived from her research at Johns Hopkins on spontaneous oocyte activation in rats (Keefer and Schuetz, 1982) provided a crucial key to the subsequent successful cloning of rats by others. She then joined the University of Georgia, first as an assistant physiologist and shortly thereafter as assistant professor in the College of Veterinary Medicine. During this time, she was also involved in establishing one of the first human *in vitro* fertilization clinics in the United States, Reproductive Biology Associates in Atlanta, Georgia. One of the most important findings that Dr. Keefer published early in her independent research program was that viable embryos and pregnancies could be obtained following direct microinjection of dead sperm into rabbit oocytes (Keefer et al., 1985; Perreault et al., 1988; Keefer et al., 1988; Keefer, 1989). This work paved the way for new methods of sperm storage and the rescue of sperm and genetics from males from whom viable sperm could not be collected. Dr. Keefer's program was successfully funded by the National Institutes of Health at the University of Georgia and marked a particularly productive period in her career. However, Carol was attracted to an opportunity in industry with American Breeders Service (ABS) in 1989 that allowed her to use her embryo manipulation experience to advance research in bovine embryo cloning toward commercial application for genetic improvement. During her time at ABS, Dr. Keefer made several crucial advances in embryo cloning technology that led to widespread adoption of the technique in both industry and academia (Keefer et al., 1993; Stice and Keefer, 1993; Keefer et al., 1994; Stice et al., 1994; Stice et al., 1996). It became clear through the success of Carol's work that the real value in nuclear transfer may not be in genetic advancement, but in biopharming—the production of transgenic animals for biopharmaceutical production of human medicine. Thus, in 1995, Dr. Keefer was recruited by Nexia Biotechnologies in Quebec, Canada, where she led a team in producing transgenic goats via nuclear transfer with transfected donor cells, which secreted recombinant spider silk protein and recombinant human butylcholinesterase in their milk (Gauthier et al., 2001; Keefer et al., 2001; Keefer et al., 2002; Baldassarre et al., 2002). At Nexia, Dr. Keefer served as industry liaison for federal and provincial grants of nearly \$1 million to develop technologies supporting the transgenic goat production system. During her time in industry, Carol remained an active collaborator with academia, serving as adjunct professor in Animal, Dairy, and Veterinary Sciences at Clemson University, and Animal Science at McGill University.

In 2003, Dr. Keefer returned to academia with tenure at the University of Maryland, where she remains today as professor of animal sciences within their Biotechnology Initiative. Dr. Keefer's research program at Maryland has been continually funded by the US Department of Agriculture and the National Science Foundation, as well as private foundations and competitive internal grants. At Maryland, Carol made a strategic shift in focus to study pluripotent cells, including embryonic stem cells (ESC) in ruminants and mice, feline spermatogonial stem cells, and human teratocarcinoma cells (Keefer et al., 2007). Her laboratory was the first to describe induction of trophectoderm lineage differentiation by cytokines in mouse ESC (He et al., 2008), demonstrating that ESC could differentiate into both embryonic and placental lineages. Her laboratory also described NANOG expression and unique protein localization potentially involved in cell differentiation in goat embryos (He et al., 2006), as well as control of NANOG expression by the cytokine Noggin in goat embryo-derived cell lines (Pant and Keefer, 2009). Dr. Keefer has also established strong collaborative relationships to study other characteristics of stem cells, such as measuring the stiffness of stem cells during differentiation (Keefer and Desai, 2011; Pillarisetti et al., 2011; Ladjal et al., 2012). Dr. Keefer has

returned to her research roots in some of her recent work, developing exciting new methods for studying metabolism in preimplantation embryos and sperm using metabolomics and fluxomics technologies (Weiner et al., 2019).

Dr. Keefer also maintains strong collaborative ties with investigators at the Smithsonian Conservation Biology Institute (SCBI). Dr. Keefer led efforts to establish conditions for culture of feline spermatogonial stem cells as a means to preserve the genetics of rare and endangered felids (Vansandt et al., 2012; Vansandt et al., 2016). Dr. Keefer has worked with this group on a number of reproductive technologies, including embryo culture, estrous cycle synchronization, reproductive behaviors, sperm quality, embryonic and induced pluripotent stem cells, and *in vitro* follicle culture in a variety of species from cats to cranes over the years (Nestle et al., 2012; Collins et al., 2014; Fujihara et al., 2014; Brown et al., 2016; Brown et al., 2017; Thuwanut et al., 2017; Brown et al., 2018; Brown et al., 2019; Zhou et al., 2019; Weiner et al., 2019; Zhou et al., 2019).

In addition to maintaining a dynamic and productive research program, Dr. Keefer is a vibrant and engaging teacher and mentor. She has developed 2 new courses for the animal science curriculum at Maryland, Experimental Embryology and Animal Biotechnology, in addition to guest lecturing in Physiology of Reproduction, and guiding students in Experiential Learning and Special Problems courses. Over the course of her career, Dr. Keefer has mentored many students as a member of their graduate committees and she has advised or co-advised six master's degree, seven PhD students, and three post-doctoral trainees, as well as serving as the graduate director of the Animal Sciences program for the past 10 years. Dr. Keefer's students have won multiple awards at the university, national, and international levels, reflecting her outstanding guidance. Her influence as a mentor has followed her graduate students into careers in academia, basic research, and conservation.

Finally, the respect and admiration of her colleagues is shown by her election to service in her scientific societies. Of specific interest is her election to president of IETS in 2003, the first woman to hold this office. Dr. Keefer served on the IETS Board of Governors from 1999 to 2005. She has also chaired the Domestic Animal Biomedical Embryology (DABE) committee of IETS and organized the DABE Symposium in 2015, and served IETS as program chair for the Kyoto meeting in 2007. Carol has been active in IETS on the Education Committee and as the chair of many sessions at our annual conference over the years. She is also an active member of the Society for the Study of Reproduction (SSR), serving that society on the Nominations and Program committees. Dr. Keefer also serves as a reviewer on both National Institutes of Health and US Department of Agriculture grant panels. She was invited to serve on the PEW Initiative on Food and Biotechnology Steering Committee in 2005. Her expertise was recognized when she served as one of only three external reviewers for the Food and Drug Administration (FDA) Risk Assessment of Animal Cloning in 2006–2007, and for the Canadian Food Inspection Agency's Cloning Risk Assessment in 2008. She also served as a temporary voting member on the FDA's blood products advisory committee in 2009 for regulatory consideration of the first biopharmaceutical product produced by transgenic animals. These activities demonstrate Dr. Keefer's impact, not only on the science of reproductive biotechnologies, but also on their applications in society.

In summary, Dr. Keefer has contributed significantly to the growth of our knowledge, and the use of that knowledge in assisted reproductive technologies for the good of human medicine, the treatment of infertility in humans and endangered species, conservation, and domestic animal genetic improvement. She has left an enduring mark on our field and on the many of us who call her a mentor, colleague, and friend. We extend our heartfelt congratulations to Dr. Carol Keefer as the well-deserved recipient of the 2022 IETS Pioneer Award.

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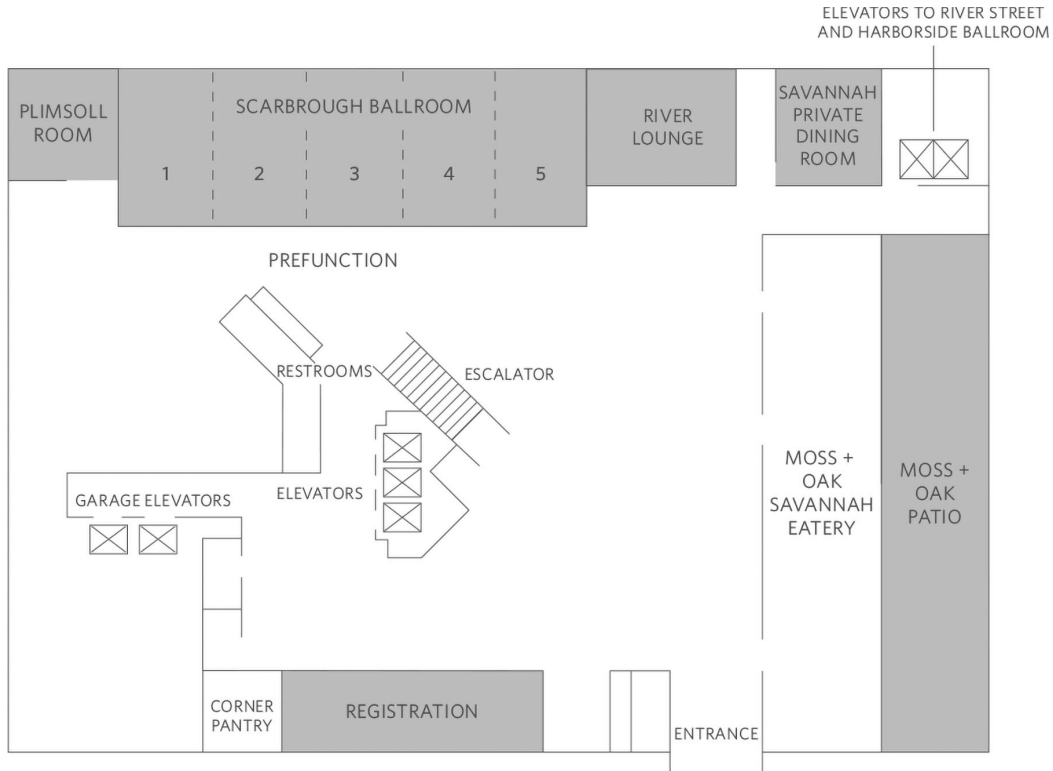
Pluset Powder and solvent for solution for injection. Statement of the active substances and other ingredients: White to off-white lyophilized pellet and clear and colourless solution. One vial of lyophilized product contains: Active substances: Follicle stimulating hormone (FSH) 500 IU, Luteinizing hormone (LH) 500 IU. One vial of solvent contains: Chlorocresol 0.021 g, Sterile, pyrogen-free, normal saline to 21 ml. Each ml of reconstituted solution contains: Active substance: Follicle stimulating hormone (FSH) 50 IU, Luteinizing hormone (LH) 50 IU. Indications: To induce superovulation in reproductively mature heifers or cows. Withdrawal period: Cattle: meat and offal: Zero days, milk: Zero hours. Special warnings: The following recommendations for the use of this product for the induction of superovulation with adequate response should be followed: a. The donor animal must have had at least one normal oestrous cycle prior to the initiation of the treatment. b. The donor animal should not have any signs of clinical illness when treatment with this product begins. Ovarian examination should confirm the presence of a functional corpus luteum and the absence of any pathological conditions such as cystic ovarian degeneration or adhesions around the ovaries. c. Treatment should be initiated between day 9 and 12 of the oestrous cycle (with day 11 generally giving best results). d. A luteolytic dose of prostaglandin F2 alpha or analogue should be given intramuscularly at 60 and/or 72 hours after the beginning of superovulation treatment. e. Standing oestus will take place 40-48 h after prostaglandin treatment and animals should be bred 12 h after the onset of standing heat and, again 12 h later with high quality semen. f. Following the non-surgical recovery of embryos on day 7, it is recommended to give the animals another prostaglandin treatment to ensure a rapid return to heat. f. Not, animals should be examined 4 weeks after, to ascertain that normal ovarian activity has been restored. Breeding can take place the first heat after superovulation, which normally is seen after 28 days. g. The effect of repeated treatments with this product over long periods has not been assessed for all possible schedule treatment. Therefore it is recommended not to be administered more than twice for superovulation and that at least one natural oestrous cycle be allowed to occur between the two superovulation treatments. h. The interval from calving to initiation of superovulation treatment should be at least 3 months. i. Individually variability of responses depending of age, breed, on reproductive status, could occur. User warnings: Accidental self-injection of this product may cause hormonal effects in women and may harm unborn children. Care should be taken by those handling the product to avoid self-injection. In the event of accidental self-injection by women who are pregnant, or whose pregnancy status is unknown, seek medical advice immediately and show the package leaflet or label to the physician. Use during pregnancy, lactation or lay: Do not use during pregnancy. A slight reduction in milk yield has been observed during superovulatory heat (as in other heats) but the production in general reaches pretreatment levels within 2 weeks. Overdose (symptoms, emergency procedures, antidotes): It is not advisable to exceed the maximum recommended dose. High doses of FSH and LH could be associated with reduced fertilisation rate, resulting in an increase of unfertilised embryos. For animal treatment only. To be supplied only on veterinary prescription. Marketing authorisation holder and responsible for batch release: LABORATORIOS CALIER, S.A. C/Barcelonés, 26 (El Ramonell) 08530 Les Franqueses del Vallès (Barcelona) Spain

CALIER

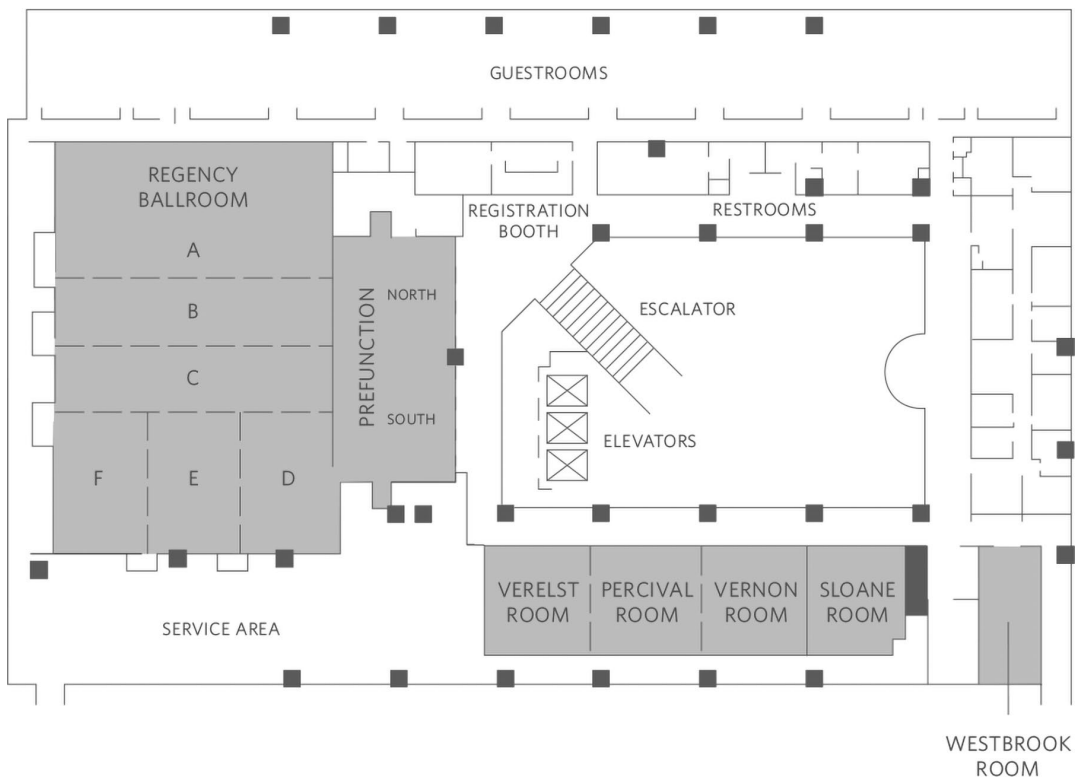
Map of the Venue

Hyatt Regency Savannah
2 W. Bay Street, Savannah, Georgia 31401

Meeting Space (Lobby Level)



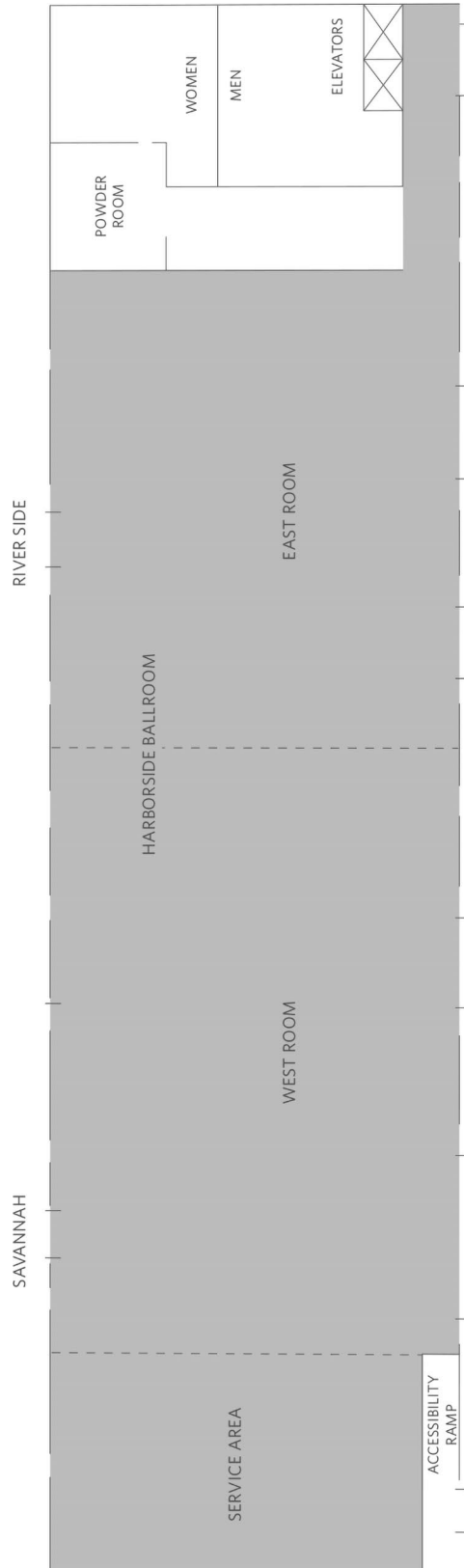
Meeting Space (Second Level)



Map of the Venue

Hyatt Regency Savannah
2 W. Bay Street, Savannah, Georgia 31401

Meeting Space (River Street)



General Information

All attendees of the January 2022 IETS Annual Conference in Savannah, Georgia, must show proof of vaccination against COVID-19 to attend. If an attendee has a valid medical exemption and cannot be vaccinated, then they must show proof of a negative test result within 24 to 48 hours of registration. All attendees will be required to wear a mask in public spaces at the conference.

Meeting Room Directory

Main conference sessions Ballroom ABC and Ballroom DEF

Exhibits Harborside Ballroom

Poster displays Harborside Ballroom

Please see the Scientific Program for additional room assignments.

Registration

The registration desk is located on the second floor. Registration desk hours are as follows:

Pick-up of preregistration packets

Sunday, January 9 16:00–19:00

Onsite registration hours

Monday, January 10 07:00–18:00

Tuesday, January 11 07:00–18:00

Wednesday, January 12 07:30–16:00

Thursday, January 13 08:00–13:00

Exhibit Information

Exhibits will be located in the **Harborside Ballroom**. Details of exhibitors can be found in the Exhibit Directory beginning on page 47.

Exhibit Setup

Monday, January 10 13:00–18:00

Exhibits Open

Tuesday, January 11 09:00–19:00
17:30–18:30 (Reception)

Wednesday, January 12 08:00–17:00

Thursday, January 13 08:30–13:00

Exhibit Teardown

Thursday, January 13 13:00–15:00

All registrants of the 48th IETS Annual Conference will find a game board in their registration bags. Take time to meet the exhibitors and fill your game board. All completed game boards will be eligible for a drawing for one of four prizes, to be drawn on Thursday, January 13, immediately before the George E. Seidel Keynote Lecture.

Badges

For security reasons, we ask all participants to wear their conference name badges to all sessions and social functions.

Certificates of Attendance

A Certificate of Attendance will be included in your badge packet.

Currency

The dollar is the legal tender in the United States. Should you need to exchange your local currency, you will be able to do so at the larger airports: New York, Miami, Los Angeles, Atlanta, Dallas, or Houston.

Passport and Visa Information

As with all IETS meetings, we are expecting attendees from all over the world. **Please contact your embassy for visa/passport requirements for entering into the United States to attend conferences. For COVID-19 rules on entering the US, please visit the Centers for Disease Control and Prevention (CDC) website: <https://www.cdc.gov/coronavirus/2019-ncov/travelers/proof-of-vaccination.html#covid-vaccines>**

Climate

In January, daytime high temperatures tend to be in the lower 60s (°F) (~16°C), and overnight lows tend to average in the mid to upper 40s (°F) (~4°C).

You will probably need a coat (or warm jacket); be sure to pack clothes that layer well.

Wear comfortable, warm shoes or boots when sightseeing. Savannah is a walking city and you want to keep your feet warm and dry.

Registration Fees

All registration fees must be paid in US dollars or using a credit card.

Messages

Messages received for conference delegates will be posted on the message board located near the registration desk.

Refreshments

Morning and afternoon refreshments are included in your registration fee and provided during the scheduled break times in the exhibit area located in the Harborside Ballroom.

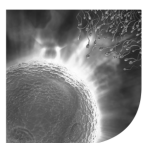
Dining and Entertainment

With lots of restaurants in Savannah, there is something for everyone in all price ranges. The Hyatt Regency Savannah in the Savannah Historic District, with direct access to cobblestoned River Street, puts you steps away from monuments, shops, local restaurants, and live music. Experience the city's unique spirit on a ghost tour or paddle-steamer ride, then unwind with a cocktail on the hotel's outdoor patio overlooking the Savannah River.

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Guests can take advantage of the modern fitness center, complimentary internet in guest rooms, pool, tour desk, and transportation desk.

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Program

Saturday, January 8

08:00 – 17:00 IETS Board of Governors meeting (Savannah)

Sunday, January 9

08:00 – 17:00 IETS Board of Governors meeting (Savannah)

11:00 – 18:00 W4171 Committee Meeting (Vernon)

15:00 – 16:00 HASAC Research Subcommittee Meeting (Sloane)

16:00 – 18:00 HASAC Regulatory Subcommittee Meeting (Sloane)

Monday, January 10

08:30 – 17:00 Preconference Symposium – The Life and Travels of the IVF Embryo: From Donor to Recipient (Ballroom ABC)

08:30 – 17:00 CANDLES/Morulas Preconference Symposium (Ballroom DEF)

13:00 – 17:00 Exhibitor setup (Harborside Ballroom)

13:00 – 17:00 Poster setup (Harborside Ballroom)

14:00 – 17:00 IETS Foundation Board of Trustees Meeting (Savannah)

18:00 – 19:00 HASAC Manual Subcommittee Meeting (Sloane)

Tuesday, January 11

07:00 – 08:30 Poster Setup (Harborside Ballroom)

07:00 – 08:30 Past Presidents' Breakfast (Verelst Percival)

07:00 – 08:30 Graduate and Undergraduate Student Competition Presenters' Breakfast, with IETS Foundation Education Chair (Vernon)

09:00 – 19:00 Commercial Exhibits (Harborside Ballroom)

08:30 – 09:00 Opening and Welcome (Ballroom ABC)

Session I: The optimal environment for gametes and the proper environment (Ballroom ABC)

Session co-chairs: Hilde Aardema, Utrecht University, and Jesus Alfredo Berdugo, Universidad Nacional de Colombia-Sede Medellin, Colombia

09:00 – 09:45 Metabolic exchanges between the oocyte and its environment: Focus on lipids
Svetlana Uzbekova, France

09:45 – 10:30 Physiological parameters related to oocyte nuclear differentiation for the improvement of IVM/IVF outcomes in women and cattle
José Buratini, Brazil

10:30 – 11:00 Refreshment Break/Poster Viewing and Exhibits (Harborside Ballroom)

IETS Foundation Student Competition Presentations (Ballroom ABC)

Session chair: Bianca Gasparrini, Università degli Studi di Napoli Federico II

11:00 – 11:15 Preimplantation bovine embryos secrete extracellular vesicles that participate in embryo-maternal communication
C. Aguilera, A. E. Velásquez, Y. Wong, M. A. Gutierrez-Reinoso, J. Cabezas, B. Melo-Baez, F. Castro, and L. Rodriguez-Álvarez (Abstract 1)

- 11:15 – 11:30 Noninvasive method for bovine embryo sexing through the analysis of DNA content in extracellular vesicles
D. Caamaño, J. Cabezas, Y. S. Wong, C. Aguilera, D. Veraguas, F. O. Castro, and L. Rodriguez-Alvarez (Abstract 2)
- 11:30 – 11:45 Derivation of bovine trophoblast stem cells
Y. Wang, L. Yu, L. Zhu, H. Ming, J. Wu, and Z. Jiang (Abstract 3)
- 11:45 – 12:00 Transgenic porcine model reveals two roles for LGR5 in lung development and homeostasis
K. Polkoff, N. Gupta, J. Chung, K. Gleason, Y. Marquez, and J. Piedrahita (Abstract 4)
- 12:00 – 12:15 Maternal gestational nutrition perturbs small RNA code in offspring sperm in sheep
L. Zhu, N. Tillquist, J. Shi, Q. Chen, K. Govoni, S. Reed, S. Zinn, and Z. Jiang (Abstract 5)
- 12:15 – 12:30 Evaluation of reproductive status using near infrared spectroscopy in an endangered anuran
L.-D. Chen, M. Santos-Rivera, I. Burger, S. Lampert, D. Chen, D. Barber, A. Kouba, and C. Kouba (Abstract 6)
- 11:30 – 12:30 HASAC Forms and Certificates Subcommittee Meeting (Sloane)
- 12:30 – 13:30 HASAC Emerging Technologies and Issues Subcommittee Meeting (Sloane)
- 12:30 – 14:00 Lunch Break
- 12:30 – 14:00 IETS Committee Luncheon with Partner Society (Verelst Percival)
- 12:30 – 14:00 Morulas and Mentor Lunch (Vernon)

Session II: Maternal conditions affecting future performance in practice (Ballroom ABC)

Session co-chairs: Pat Lonergan, University College Dublin, and Giovana Di Donato Catandi, Colorado State University

- 14:00 – 14:45 Impact of oocyte donor age and breed on in vitro embryo production in cattle, and relationship of dairy and beef embryo recipients on pregnancy and the subsequent performance of offspring: A review
Pietro Baruselli, Brazil
- 14:45 – 15:30 Female age and parity in horses: How and why does it matter?
Pascale Chavatte-Palmer, France
- 15:30 – 16:00 Refreshment Break/Poster Viewing and Exhibits (Harborside Ballroom)
- 16:00 – 16:45 Selected short presentations (Ballroom ABC)
- The activity of metabolic enzymes in bovine oocytes derived from ovaries with heterogenous physiological conditions
S. Gebremedhn, M. Ambrogi, B. Krueger, E. Natera, M. Tannous, K. Clark, S. Rajput, R. L. Krisher, and M. Rubessa (Abstract 133)
- Heat stress alters oocyte genome-wide DNA methylation patterns revealed at single base resolution
M. Moura, C. Carvalho, F. de Barros, F. Mossa, D. Bebbere, and F. Paula-Lopes (Abstract 106)
- Creation of 3-dimensional artificial niches for *ex vivo* culture of ovarian cells
G. Pennarossa, T. De Iorio, F. Gandolfi, and T. A. L. Brevini (Abstract 102)
- 16:45 – 17:15 **Distinguished Service Award (Ballroom ABC)**
- 17:30 – 18:30 Welcome Reception (Harborside Ballroom)
- 18:30 – 20:30 Student Mixer (River Lounge)

Wednesday, January 12

07:00 – 08:00 Organizational Breakfast Meeting of the IETS Foundation (Savannah)

08:00 – 17:00 Exhibits

Session III: Methods to mimic the *in vivo* environment *in vitro* (Ballroom ABC)

Sponsored by Trans Ova Genetics

Session co-chairs: Joanna Souza-Fabjan, Universidade Federal Fluminense, and Daniel Angel-Velez, Ghent University

08:00 – 08:45 Role of reproductive fluids and extracellular vesicles in embryo-maternal interaction during early pregnancy in cattle
Dimitrios Rizos, Spain

08:45 – 09:30 Sperm interaction with the uterine innate immune system: Toll-like receptor 2 (TLR2) is a main sensor in cattle
Akio Miyamoto, Japan

09:30 – 10:00 **IETS Business Meeting (Ballroom ABC)**

10:00 – 12:00 **Poster Session I (Harborside Ballroom)**

10:00 – 12:00 **Exhibits (Harborside Ballroom)**

12:00 – 13:30 Lunch break

12:00 – 13:30 IETS Exhibitors' Luncheon with IETS Board of Governors (Verelst Percival)

12:00 – 13:30 Morulas Career Luncheon (Vernon)

Session IV: Modifications to the epigenome for healthy offspring via the male and female gametes

Session co-chairs: Fabiola Paula Lopes, Federal University of São Paulo, and Alejandro de la Fuente, University of California, Davis

13:30 – 14:15 Nurturing the egg: The essential connection between cumulus cells and the oocyte
Claude Robert, Canada

14:15 – 15:00 Sperm-borne sncRNAs: Potential biomarkers of semen fertility?
Eli Sellem, France

15:00 – 15:30 **Peter Farin Trainee Award Winners Presentations (Ballroom ABC)**

15:30 – 16:00 Refreshment Break/Poster Viewing and Exhibits (Harborside Ballroom)

Concurrent Forum

16:00 – 18:00 Practitioners' Forum (continuation of the Preconference) (Ballroom ABC)

Sponsored by Agtech Inc.

Co-chairs: Matthew Wheeler, University of Illinois, and Brad Lindsey, Ovitra Biotechnology Inc.

Part 5

How Does the Practitioner Set Up Donor Cows for IVEP: Working with the Farm Manager and the Cattle Owner

Various systems and protocols will be discussed by a panel of expert practitioners with participation by the audience. A consensus bullet point list of best practices will be developed by the group.

Part 6

How Does the Practitioner Set Up Recipient Cattle for IVEP: Working with the Farm Manager and the Cattle Owner

Various systems and protocols will be discussed by a panel of expert practitioners with participation by the audience. A consensus bullet point list of best practices will be developed by the group.

Concurrent Forum

- 16:00 – 18:00 DABE (Ballroom DEF)
Chair: Marcia A. M. M. Ferraz, Ludwig-Maximilians-Universitat Munchen
- 16:00 – 16:05 Introduction
- 16:05 – 16:45 Updates on genetically tailored animals as disease models and organ donors for xenotransplantation
Eckhard Wolf, Ludwig-Maximilians-Universitat Munchen
- 16:45 – 17:00 *In vivo* PET/CT imaging of GLP-1 receptor in rodents and pigs
Magdalena Lindner, Ludwig-Maximilians-Universitat Munchen
- 17:00 – 17:15 IThera optoacoustic device for non-invasive imaging in pigs and rodents
Alexa Hasenbach, European Institute for Molecular Imaging
- 17:15 – 17:30 Genetic modification of stem cells for infrared fluorescent protein expression applicable for optoacoustic detection of transplanted cells
Andras Dinnyés, BioTalentum Ltd and Szent Istvan University
- 17:30 – 17:45 Generation of multifunctional nanoparticles for enhanced imaging properties of transplanted cells
Laura Russo, University of Milano-Bicocca
- 17:45 – 18:00 Closing remarks
- 18:00 – 19:00 HASAC Open Meeting (Ballroom ABC)
- 18:00 – 19:00 Morulas Forum (Ballroom DEF)
- 19:00 – 23:00 Gala (Scarborough Ballroom)

Thursday, January 13

- 07:00 – 08:00 Organizational Meeting of the IETS Board of Governors (Savannah)
- 08:30 – 13:00 Commercial Exhibits (Harborside Ballroom)

Session V: How to recognize a vital gamete and embryo (Ballroom ABC)

Session co-chairs: Flavio Vieira Meirelles, University of São Paulo, and Jessica Cristina Lemos Motta, Ohio State University

- 08:00 – 08:45 Current knowledge and the future potential of extracellular vesicles in mammalian reproduction
Dawit Tesfaye, USA
- 08:45 – 09:30 Parameters to identify good quality oocytes and embryos in cattle
Christine Wrenzycki, Germany
- 09:30 – 10:00 Selected oral presentations
- Influence of sire fertility status on conceptus-induced transcriptomic response of the bovine endometrium
E. O'Callaghan, J. M. Sánchez, M. B. Rabaglino, M. McDonald, H. Liu, T. E. Spencer, S. Fair, D. A. Kenny, and P. Lonergan (Abstract 118)
- Genome-wide abnormalities resulting from heterogoneic cell division persist in the blastocyst-stage bovine embryo
T. De Coster, H. Masset, O. Tsuiko, K. Smits, A. Van Soom, and J. Vermeesch (Abstract 51)
- 10:00 – 12:00 **Poster Session II (Harborside Ballroom)**
- 12:00 – 13:30 Lunch break
- 12:00 – 13:30 2022, 2023, 2024 IETS Program Committee Lunch (Verelst Percival)
- 13:30 – 16:00 Commercial Exhibit and Poster Takedown (Harborside Ballroom)

13:45 – 14:15 **Pioneer Award (Ballroom ABC)**

Session VI: George E. Seidel Jr. Keynote Lecture (Ballroom ABC)

Session chair: Cesare Galli, AVANTEA

14:15 – 15:00 How the environment affects early embryonic development

Marc-André Sirard, Canada

Awards Presentation and Updates (Ballroom ABC)

15:00 – 15:30 IETS Foundation Early Career Achievement Award Winner

15:30 – 16:00 IETS Foundation Student Competition Awards, CANDES, DABE, and HASAC Updates

16:00 – 16:15 Closing Ceremony (Ballroom ABC)



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Roberto Sartori, *Case Reports and Field Data*
Vilceu Bordignon, *Cloning/Nuclear Transfer*
Dragos Scarlet, *Companion CANDES*
Mateus Sudano, *Cryopreservation/Cryobiology*
Mario Binelli, *Developmental Biology*
Niamh Forde, *Early Pregnancy*
Barbara Durrant, *Embryo Culture*
Sofia Ortega Obando, *Embryo Manipulation*
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Irina Polejaeva, *Genetic Engineering*
Brett White, *Male Physiology*
Milo Wiltbank, *Oestrus Synchronization/Artificial Insemination*
Peter Bols, *Oocyte Collection*
Kiho Lee, *Oocyte Maturation*
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Marja Mikkola, *Superovulation*
Paula Tribulo, *Undergraduate Poster Competition*

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Poster Session Information

Poster Numbers

Posters are identified by the number corresponding to the abstract number in *Reproduction, Fertility and Development* 2022, 34(1-2). Numbering of the posters begins at 1 and ends at 172.

Setup

Poster can be put up from 13:00 to 18:00 on Monday, January 10, and from 07:00 to 08:00 on Tuesday, January 11. Posters must be posted on the website by Tuesday, January 4. All posters will be available for viewing on Tuesday, January 11.

Poster Session I

Presentations by authors of odd-numbered abstracts (e.g., 7, 9, 11) in *Reproduction, Fertility and Development* 2021; 33(1-2) as well as the student competition finalist and undergraduate finalist poster presentations will take place on Wednesday, January 12, from 10:00 to 12:00. Odd-numbered posters for the poster competition will be judged on January 12, from 10:00 to 12:00.

Poster Session II

Presentations by authors of even-numbered abstracts (e.g., 8, 10, 12) in *Reproduction, Fertility and Development* 2021; 33(1-2) will take place Thursday, January 13, from 10:00 to 12:00. Even-numbered posters for the poster competition will be judged on January 13, from 10:00 to 12:00.

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Poster Session Order by Topic

Poster number = abstract number in *Reproduction, Fertility and Development* 2022; 34(1-2)

Graduate Student Competition

- 1 Preimplantation bovine embryos secrete extracellular vesicles that participate in embryo–maternal communication
C. Aguilera, A. E. Velásquez, Y. Wong, M. A. Gutierrez-Reinoso, J. Cabezas, B. Melo-Baez, F. Castro, and L. Rodriguez-Álvarez
- 2 Noninvasive method for bovine embryo sexing through the analysis of DNA content in extracellular vesicles
D. Caamaño, J. Cabezas, Y. S. Wong, C. Aguilera, D. Veraguas, F. O. Castro, and L. Rodriguez-Alvarez
- 3 Derivation of bovine trophoblast stem cells
Y. Wang, L. Yu, L. Zhu, H. Ming, J. Wu, and Z. Jiang
- 4 Transgenic porcine model reveals two roles for LGR5 in lung development and homeostasis
K. Polkoff, N. Gupta, J. Chung, K. Gleason, Y. Marquez, and J. Piedrahita
- 5 Maternal gestational nutrition perturbs small RNA code in offspring sperm in sheep
L. Zhu, N. Tillquist, J. Shi, Q. Chen, K. Govoni, S. Reed, S. Zinn, and Z. Jiang
- 6 Evaluation of reproductive status using near infrared spectroscopy in an endangered anuran
L.-D. Chen, M. Santos-Rivera, I. Burger, S. Lampert, D. Chen, D. Barber, A. Kouba, and C. Kouba

Case Reports and Field Data

- 7 Relationships between antral follicle count, serum concentration of anti-Müllerian hormone, and fertility in dairy cows
D. Scarlet, L. Schwarzmann, R. Bruckmaier, and H. Bollwein
- 8 Jersey *in vitro* embryo production data
D. Demetrio, M. Oliveira, T. Baumgartner, C. Demetrio, and R. Santos
- 9 Ovum pick-up/*in vitro* embryo production (OPU-IVP), an alternative means for infertile or bad donor cows to produce embryos
G. Gamarra, S. Lacaze, E. Gouache, N. Leroy, and N. Picard-Hagen
- 10 *In vivo* embryo production of superovulated maiden Dohne Merino ewes and embryo transfer under high-altitude conditions
H. W. Vivanco-Mackie, M. D. Ponce-Salazar, M. Miguel-Gonzales, and H. Huaynate-Paucar
- 11 Prediction of birth weight in Japanese Black calves by measuring forelimb leg width
H. Kataoka, T. Nishisouzu, K. Imai, and O. Dochi
- 12 Factors affecting Jersey *in vitro* embryo pregnancy rates
M. Oliveira, C. Demetrio, T. Baumgartner, R. Santos, and D. Demetrio
- 13 Genome scanning reveals regions with increased homozygosity negatively affecting fertility in Pura Raza Español mares
N. Laseca, A. Molina, Y. Pirosanto, E. Terán, A. Encina-Martinez, M. Valera, and S. Demyda-Peyrás
- 14 Pregnancies produced after fixed-time artificial insemination using sex-sorted sperm in wood bison
E. M. Zwiefelhofer, G. F. Mastromonaco, C. Gonzalez-Marin, M. L. Zwiefelhofer, and G. P. Adams

Cloning/Nuclear Transfer

- 15 Identification of developmental genes regulated by H3K9me2 and H3K27me3 histone marks in bovine somatic cells and their somatic cell nuclear transfer embryos
I. Viotti Perisse, B. Abercrombie, Y. Liu, T. Patrick, J. Keim, A. Benninghoff, I. Polejaeva, and K. White
- 16 Use of a hand-made cloning protocol to reduce oocyte mitochondria
L. Adams, Y. Liu, B. Durrant, E. Ruggeri, C. Young, and I. Polejaeva

Companion CANDES

- 17 Temporal ultrastructure changes in staghorn coral (*Acropora cervicornis*) sperm: Implications for fertility
L. Penfold, J. Wyffels, K. O'Neil, and A. Moura
- 18 All aboard the polar express: Transferability of a cryopreservation protocol between anuran species
I. Burger, L.-D. Chen, D. Barber, V. Poole, D. Smith, A. Kouba, and C. Kouba
- 19 Granulosa cell gene expression and glucose consumption of *in vitro*-matured oocytes of the southern white rhino (*Ceratotherium simum simum*)
E. Ruggeri, C. Young, N. Ravida, M. Sirard, R. Krisher, M. de la Rey, C. Herbst, and B. Durrant
- 20 Paths less travelled: Novel oral and nasal hormone administration routes for eliciting spermiation in male eastern tiger salamanders (*Ambystoma tigrinum*)
D. M. Chen, L.-D. Chen, C. K. Kouba, and A. J. Kouba
- 21 Saving salamanders with sonograms: Tracking follicular development with ultrasonography in a variety of caudate species
S. Lampert, D. Chen, I. Burger, D. Barber, V. Poole, D. Smith, A. Kouba, and C. Kouba
- 22 Comparison of conventional and controlled-rate freezing methods to cryopreserve white spotted bamboo shark (*Chiloscyllium plagiosum*) sperm: Implications for elasmobranch biobanking efforts
J. Gillis, G. Montano, and L. Penfold
- 23 Anti-Müllerian hormone in polar bears (*Ursus maritimus*): Assay validation and concentrations in relation to sex, age, and season
A. Tompros, J. Wojtusik, M. Philpott, T. L. Roth, M. Campbell, and E. Curry
- 24 Evaluation of an antibody-free approach to identifying faecal peptides for pregnancy detection in polar bears (*Ursus maritimus*)
E. Curry, J. Wojtusik, and T. Roth
- 25 Effect of roscovitine on the cumulus cells expansion, oocyte maturation and *in vitro* development of domestic cat embryos generated by *in vitro* fertilisation
D. Veraguas-Davila, D. Saez-Ruiz, M. C. Alvarez, F. Saravia, F. O. Castro, and L. Rodriguez-Alvarez
- 26 Evaluation of polar bear (*Ursus maritimus*) sperm collection and cryopreservation techniques
J. Wojtusik, T. L. Roth, and E. Curry
- 27 Comparison of cryoprotectants and their combinations in the optimisation of a sperm cryopreservation protocol in the Argentine black and white tegu (*Salvator merianae*)
C. Young, N. Ravida, M. Curtis, F. Mazzotti, and B. Durrant
- 28 Cryopreserved sperm obtained from live donor males in four amphibian species produces F₁ generation sexually mature adults with subsequent F₂ generation offspring
C. Kouba, A. Julien, I. Burger, D. Barber, S. Lampert, and A. Kouba

Cryopreservation/Cryobiology

- 29 Cryopreservation by slow freezing of bovine *in vitro* embryos in different stages of development
L. R. Peixoto, B. L. Cardoso, N. J. Lopes, B. A. P. Maiollo, M. F. A. Borges, J. H. Tannura, R. L. Krisher, and M. Rubessa
- 30 Comparison of two vitrification processes on survival rates of ovine embryos
J. Fernandez, M. Bruno-Galarra, L. Cattaneo, C. Prieto, S. Antuña, B. Tardivo, D. Fontana, G. Bó, A. Gibbons, and M. Cueto
- 31 Evaluation of *in vitro*-produced bovine embryos with conventional and SexedULTRA-4M X and Y chromosome-bearing semen: Survival after slow freezing for direct transfer
H. Álvarez-Gallardo, M. Kjelland, M. Pérez-Martínez, A. Velázquez-Roque, F. Villaseñor-González, and S. Romo
- 32 Low oxygen tension during *in vitro* oocyte maturation and fertilisation improves cryotolerance of bovine blastocysts produced *in vitro*
F. Báez, V. de Brun, N. Rodríguez-Osorio, and C. Viñoles
- 33 Effect of extended culture after vitrification-warming of bovine oocytes on mitochondrial function
E. J. Gutierrez-Castillo, S. A. Talbot, F. A. Diaz, and K. R. Bondioli
- 34 Influence of fetal bovine serum addition post-thaw in the survival of cryopreserved embryos
B. L. Cardoso, L. R. Peixoto, N. J. Lopes, B. A. P. Maiollo, M. F. A. Borges, J. H. Tannura, R. L. Krisher, and M. Rubessa
- 35 The effect of different cooled storage protocols on frozen–thawed equine semen
M. van Heule, M. H. Verstraete, Z. Blockx, P. De Blende, P. Dini, and P. Daels
- 36 Effect of antifreeze protein type I supplementation in the extender for semen cryopreservation in the domestic cat
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- 45 Paternal effects on early embryo development in bovine
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- 47 Regulation of bovine embryonic development by *WNT5A* is modified by the source of albumin and is independent of RAC1 signalling
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- 49 Transcription factor TEAD4 is not required for bovine blastocyst formation
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- 50 The characteristics and microRNA content of extracellular vesicles are modulated by embryo developmental stage during preimplantation
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- 59 The positive effect of the use of recombinant equine chorionic gonadotrophin for ovarian stimulation for *in vitro* embryo production in buffaloes
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- 60 Follicular fluid extracellular vesicles: Endocytosis and influence on domestic cat cumulus cells and oocytes
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- 61 Noninvasive prediction of pregnancy and birth in cattle by liquid chromatography–high-resolution mass spectrometry analysis of embryo culture medium
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- 62 Functional characterisation of peroxisome proliferator-activated receptor gamma (PPAR γ) in bovine blastocyst development and early trophectoderm formation
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- 66 The production of ovine embryos *in vitro* using frozen–thawed semen processed in the breeding and nonbreeding seasons
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- 69 DNase treatment of extracellular vesicles released by *in vitro*-produced bovine embryos increases accuracy of preimplantation genetic testing
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- 73 Preimplantation genetic diagnosis of glycogen branching enzyme deficiency and sex determination in equine *in vitro*-produced embryos
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- 74 Gene expression analysis of developmental key genes in *in vitro* bovine twin embryos produced by blastomeres separation and embryo bisection
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- 79 Cytokine supplementation to improve developmental competence of bovine embryos following slow-rate freezing
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- 80 Relationship between anogenital distance and reproductive efficiency of embryo recipient dairy heifers
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- 81 Storage of *in vivo*-produced embryos at refrigeration temperature before transfer to synchronised recipients in the camel (*Camelus dromedarius*)
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- 82 Are antibiotics still truly needed in bovine embryo collection media? A preliminary study
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- 84 Actions of DKK1 on the bovine embryo during the morula-to-blastocyst stage of development on pregnancy outcomes and placental hormone secretion after embryo transfer
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- 85 Anti-Müllerian hormone in Holstein heifers and reproductive performance after fixed-time embryo transfer
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- 87 Kinematic and morphological properties of Large White boar sperm under induced oxidative stress
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- 88 Increasing cytoplasmic glutathione in bovine oocytes with modified *in vitro* maturation systems
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- 89 Influence of sperm preincubation on development and sex ratio of *in vitro*-produced bovine embryos
A. Fries, B. Zimmer, B. Rabenau, F. Kotarski, and C. Wrenzycki
- 90 Guinea pig sperm is capable of fertilising bovine zona-intact oocytes *in vitro*
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- 91 Fertilising capacity of guinea pig spermatozoa by heterologous fertilisation with zona-intact murine oocytes
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- 92 Extracellular vesicles from oviductal spheroids and uterine horn epithelial cells show different uptake times by equine spermatozoa and act upon capacitation
A. Lange-Consiglio, S. Canesi, F. Funghi, G. Bosi, and F. Cremonesi
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- 95 Bulls fed a high-gain diet produce semen that results in fewer blastocysts following *in vitro* fertilisation and embryo culture
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- 105 Proteome profiling of equine follicular fluid before, during, and after selection of the dominant follicle
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- 106 Heat stress alters oocyte genome-wide DNA methylation patterns revealed at single base resolution
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- 107 Anti-Müllerian hormone plasma concentration in alpacas as a predictor of their ovarian reserve
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- 125 The effects of human chorionic gonadotrophin administered 7 days after induced oestrus on original (ovulatory) and induced (accessory) corpora lutea and on pregnancy rates in seasonally anovular dairy goats
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2022 Recipient of the IETS Distinguished Service Award



Peter J. Hansen

Dr. Peter J. Hansen obtained a BS degree in agricultural sciences from the University of Illinois and MS and PhD degrees from the University of Wisconsin–Madison in endocrinology-reproductive physiology. His research focuses on the regulation of puberty and the postpartum period in beef cattle. Dr. Hansen was a post-doctoral research associate at the University of Florida, where he studied maternal recognition of pregnancy and uterine biology. Since 1984, he has been a faculty member at the University of Florida, first in the College of Veterinary Medicine and, since 1986, in the Department of Animal Sciences. His current position is Distinguished Professor and L.E. “Red” Larson Professor of Animal Sciences. Dr. Hansen is deeply involved in teaching, research, service, and outreach.

Dr. Hansen attended his first IETS meeting in 1996 in Salt Lake City, Utah, and has been an active member ever since. He received the 2012 Mentor of the Year Award from the Morulas Student Organization. He was program co-chair of the 2001 annual meeting, chair of the local organizing committee for the 2006 and 2011 annual meetings in Orlando, and program chair of the 2020 meeting in New York. He also developed the idea of the IETS Innovation Workshop and organized the first workshop in St. Augustine, Florida, in 2012, and the second in Orlando, Florida, in 2017.

Dr. Hansen was a member of the Board of Governors and treasurer from 2008 to 2010, vice president of IETS from 2012 to 2013, and president from 2013 to 2014.

Dr. Hansen continues to assist with the excellent fiscal health of the IETS and its investments. He has also served as president of the American Society for Reproductive Immunology and the International Congress of Animal Reproduction. He is currently vice president of the Society for the Study of Reproduction.

Dr. Hansen has been involved in embryo transfer and embryo biology research since 1986; he has published more than 300 peer-reviewed articles, chapters, and technical articles. Dr. Hansen is currently involved with disseminating embryo technologies regarding heat stress in cattle around the world. In his career, he has conducted basic and applied research to formulate new concepts regarding the nature of the interaction between the maternal system and developing embryo. His work has resulted in the use of embryo transfer to alleviate maternal infertility caused by heat stress. He has characterized genes that confer thermotolerance in dairy cattle, led development of a new line of Holstein dairy cattle with increased resistance to heat stress, and contributed to industry-wide efforts to improve the reliability of estimates of breeding value for reproductive traits. He has received several awards for his research and is a Fellow of the American Dairy Science Association, American Society of Animal Science, American Association for the Advancement of Science, Society for the Study of Reproduction, and Japan Society for the Promotion of Science.

Dr. Hansen’s commitment and dedication to the International Embryo Technology Society has been unwavering. He has been a tireless advocate for embryo research, the embryo transfer industry, new embryo technologies, and for students. Dr. Peter Hansen serves as the model of the engaged scientist. He has made significant contributions to the embryo transfer industry and embryo biology while giving selflessly to the IETS and the broader scientific community. He is a most deserving recipient of the 2021 IETS Distinguished Service Award.



Meet our Scientific Panel

IVF Bioscience has assembled a panel of globally renowned animal IVF experts, advising us on all aspects of OPU-IVP; from collection (OPU) right through to embryo transfer.



Professor Helen Picton

University of Leeds, UK



Dr Jonathan Lehouiller

Medi-Vet Inc, Canada



Dr Carlos Pinto

Louisiana State University, USA



Dr Chelsey Leisinger

Ovation® Fertility, USA



Dr Peter May

Drove Farm Vets, UK



Dr Ali Fouladi-Nashta

Royal Veterinary College, UK



Dr Roger Sturmey

Hull York Medical School, UK

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SCAN ME



Special Events

CANDES–Morulas Preconference

Monday, January 10

08:30–16:45

Ballroom DEF

The CANDES Committee, together with the Morulas, have worked hard to overcome pandemic issues and organize a preconference symposium with in-person presentations from all speakers. Lachlan Howell, Ryan Witt, and their group have agreed to talk during the preconference symposium. Leah Jacobs will be presenting in person about “Recovering a critically endangered frog species using assisted reproductive and genetic technologies” on behalf of Natalie Calatayud.

The winners of the CANDES Trainee Travel Awards were selected from the submitted applications. This time, first place goes to Daniel Angel Velez from Belgium, and Emilie Derisoud from France is the runner-up. They will both present their results during the preconference symposium.

We hope to see as many of you as possible in Savannah! We hope that you will enjoy the diverse symposium program and are looking forward to suggestions for future meetings. **Additional registration fee required.**

Preconference Symposium: The Life and Travels of the IVF Embryo: From Donor to Recipient: Focus on the Practitioner

Monday, January 10

08:00–17:00

Ballroom ABC

Sponsored by WTA Technologies LLC

Join us for a hands-on experience. Professional members will be available for questions and demonstrating how to use the equipment for best results. Part 1: Ovum Pick-Up (OPU), Set-up and Equipment; Part 2: Recovery and Transport of the Oocyte to the Laboratory; Part 3: Decisions for Packaging and Distribution of IVEP Embryos to the Practitioner; Part 4: Disposition of IVEP Embryos in the Field. **Additional registration fee required.**

Morulas and Mentors Luncheon

Tuesday, January 11

12:00–13:30

Vernon

Sponsored by CSIRO Publishing

One of the main goals of the Morulas is to provide trainees the opportunity to interact with the senior members of the IETS. The Morulas and Mentors Luncheon is designed to give trainees an opportunity to sit down with mentors in small groups, providing a chance to interact and develop a connection with leaders in our field. Trainees will have an opportunity to choose a mentor they would like to sit with prior to the conference. Four amazing mentors will join the lunch and share their wisdom with the Morulas: Drs. Dimitrios Rizos (Spain), Akio Miyamoto (Japan), Claude Robert (Canada), and Dawit Tesfaye (USA). *Participation of the mentors is subjected to COVID-19 travel restrictions. **A ticket is required for this event.**

Welcome Reception

Tuesday, January 11

17:30–18:30

Harborside Ballroom

Sponsored by Professional Embryo Transfer Supply Inc. (PETS)

A welcome reception will be held in the Harborside Ballroom of the Hyatt Regency Savannah Hotel, from 17:30 to 18:30. Meet the exhibitors and renew old friendships. Light hors d’oeuvres will be served with a cash bar. Don’t forget to bring your drink ticket!

Morulas' Student Mixer

Tuesday, January 12

18:30–20:30

River Lounge

After business comes fun! Shortly after the IETS Welcome Reception, all trainees are invited to gather with friends for a social event with refreshments. Hosted by IETS, this annual event is a fun time for all trainees to relax and enjoy the atmosphere. Meet new people and establish connections that last a lifetime. It is our pleasure to invite you all to the Morulas Mixer. We are excited to have an exclusive time set aside for trainee interaction. Some drinks will be provided. **Registration and tickets are NOT required for this event.**

IETS Business Meeting

Wednesday, January 12

09:30–10:00

Ballroom ABC

Don't miss this opportunity to hear about the new and exciting strategic plan and future programs of the IETS.

Morulas Career Luncheon

Wednesday, January 12

12:00–13:30

Vernon

Sponsored by CSIRO Publishing

Trainees will have the opportunity to meet and interact with two fantastic speakers who will talk about their experiences, career paths, and decisions they have made that led to their current positions within industry or academia. This year's career luncheon will feature a talk by two speakers who will share unique perspectives from their own personal career paths. We look forward to hearing from Dr. Pascale Chavatte-Palmer (France) and Christine Wrenzycki (Germany). *Participation of the speakers is subjected to COVID-19 travel restrictions. **A ticket is required for this event.**

Practitioners' Forum

Wednesday, January 12

16:00–18:00

Ballroom ABC

Sponsored by Agtech Inc.

The Practitioners' Forum will continue the preconference program with Part 5: How Does the Practitioner Set Up Donor Cows for IVEP: Working with the Farm Manager and the Cattle Owner, and Part 6: How Does the Practitioner Set Up Recipient Cattle for IVEP: Working with the Farm Manager and the Cattle Owner.

DABE Forum

Wednesday, January 12

16:00–18:00

Ballroom DEF

DABE will host our colleagues from iNanoBit (Integration of Nano- and Biotechnology for Beta-cell and Islet Transplantation) during our concurrent session. The session will start with a talk from Dr. Eckhard Wolf, who will update us on current knowledge for developing genetically tailored animal models. His talk will be followed by four short presentations from iNanoBit members about new technologies for *in vivo* imaging.

Open Meeting of the Health and Safety Advisory Committee (HASAC)

Wednesday, January 12

18:00–19:00

Ballroom ABC

Morulas' Trainee Forum

Wednesday, January 12

18:00–19:00

All trainees are invited and encouraged to attend the Morulas' Trainee Forum. The Morulas Governors will be updating the membership on activities and attending to business matters. In addition, we will welcome the new governors and discuss important events and opportunities for all trainees. This is a great time to get involved and boost your international relations. **Everyone is welcome.**

IETS Gala

Wednesday, January 12

19:00–23:00

Scarborough Ballroom

Put on your dancing shoes and join us for an evening filled with music, good food, and old and new friends. (Don't forget your drink tickets!). **Tickets are required for this event.**

IETS Awards Presentations and Updates

Thursday, January 13

15:00–16:00

Join us for the Early Career Achievement Award winner presentation and the IETS Foundation Student Competition and Poster Award winners.



IETS Foundation 2022 Early Career Achievement Award (Scientist)

Islam M. Saadeldin



Islam M. Saadeldin obtained his DVM and master's degrees from Zagazig University, Egypt, and PhD from Seoul National University, South Korea. After his PhD, he worked as a postdoctoral researcher at Seoul National University. He was a visiting scholar at Niigata University, Japan, and an associate professor at King Saud University, Saudi Arabia. Currently, he is a research professor at Chungnam National University, South Korea, in addition to his tenured faculty position at Zagazig University. He has a patent of invention (The Korean Intellectual Property Office) regarding bovine embryo transgenesis through piggybac transposons, and he has authored more than 120 research papers, reviews, and book chapters covering the fields of advanced reproductive biotechnology, including somatic cell nuclear transfer (SCNT), transgenesis, adult and embryonic stem cells, the roles of extracellular vesicles in embryo communication, and embryo–maternal crosstalk. In addition, he has investigated the comparative cellular defense against extreme hyperthermia and the relationship with cellular anastasis and cellular resilience. His current research focuses on developing CRISPR/Cas9 engineered extracellular vesicles for improving embryo

implantation and pregnancy of cloned and transgenic animals. He has been awarded several national and international prizes, including the Egyptian State Prize, Shoman Prize, Almarai Prize, Misr Elkheir prize, and the Asian Universities Alliance Scholar Award. He has served as an editorial board member and ad hoc reviewer for several journals and is a university teacher and science communicator.

Previous Recipients

Joanna Maria Gonçalves de Souza-Fabjan (Scientist), 2020

Alejo Menchaca (Scientist), 2019

Kiho Lee (Scientist), 2018

Pablo J. Ross (Scientist), 2017

Todd Stroud (Practitioner), 2017

Session Speakers and Keynote Biographies

Svetlana Uzbekova



Svetlana Uzbekova graduated in with a degree in genetics at the Saint Petersburg State University, Russia, in 1987. She obtained a PhD in molecular biology from the Institute of Agricultural Biotechnology, Moscow, Russia, in 1994. Since 1995, Svetlana has worked in France on different aspects of molecular mechanisms of animal reproduction. She is currently working with the Integrative Biology of the Gonads team in the Physiology of Reproduction and Behavior INRAE research unit in Centre Val-et-Loire, France. Her recent investigations are related to lipid metabolism in the ovary and oocyte maturation, and oocyte quality biomarkers in farm animals and humans.

José Buratini



José Buratini earned his DVM degree at São Paulo State University and PhD in animal reproduction at the University of São Paulo in collaboration with the University of Montreal. He has been an associate professor and coordinator of the Molecular Ovarian Physiology Laboratory at the Department of Structural and Functional Biology, Institute of Biosciences, São Paulo State University, since 2001. He was initially engaged in studies of the regulation of folliculogenesis by fibroblast growth factors (FGFs) and the roles of luteinizing hormone and FGFs in dominant follicle selection. Since 2012, his main research focus has been the paracrine control of cumulus cell metabolism and oocyte developmental competence. He has been the scientific coordinator for Eugin, in Italy, since 2019, working on studies covering different aspects of human assisted reproductive technologies, including oocyte and sperm competence, controlled ovarian stimulation, and embryo morphokinetics. He served as president of the Brazilian Society for Embryo Technology (SBTE) from 2016 to 2017.

Pietro Baruselli



Pietro Baruselli is professor of animal reproduction at the University of São Paulo in Brazil. He holds an undergraduate degree in veterinary (1985) with a master's (1992) and PhD (1997) in animal reproduction from São Paulo University. He was president of the Brazilian Embryo Transfer Society from 2012 to 2014 and is a member of the executive committee of International Congress of Animal Reproduction (2012–2022). Baruselli's research and teaching focus on control of follicular dynamics and ovulation for self-appointed artificial insemination and embryo transfer in cattle (*Bos indicus* and *Bos taurus*) and buffalo (*Bubalus bubalis*). He has over 300 scientific publications and over 600 abstracts presented at scientific congresses on a wide range of topics, including physiology of reproduction, synchronization of ovulation, biotechnology of reproduction, and reproductive management. He has supervised 60 completed master's and PhD candidates and has extensive international experience.

Pascale Chavatte-Palmer



Pascale Chavatte-Palmer graduated as a DVM in France in 1989 and specialized in animal reproduction in the UK (Rossdale and partners, Newmarket; University of Cambridge), United States (University of Florida), and France (AgroParisTech; Institute of the Horse; INSERM), with a research focus in placental and perinatal development in horses. In 1999, she joined the Biology of Development and Reproduction research unit at INRAE in France and studied feto-placental and postnatal consequences of cloning and embryo technologies in cattle. In 2006, she started to develop biomedical and veterinary models for studying the developmental origins of health and disease (DOHAD), with an emphasis on placental function. She headed her own group, focusing on the programming effects of nutritional challenges, metabolic imbalance, embryo technologies, and exposure to airborne and/or food pollutants, taking advantage of access to a large number of species and developing multidisciplinary approaches. Since January 2020, she has been head of the new Biology of Reproduction, Environment, Epigenetics and Development (BREED) INRAE-Ecole Vétérinaire d'Alfort-Université Paris-Saclay research unit (https://www6.jouy.inrae.fr/breed_eng/), which gathers expertise in animal and human reproduction and development. She currently concentrates her personal research mainly on reproduction and DOHAD in horses. Dr. Chavatte-Palmer is a founding member of the French-speaking society for DOHAD (SF-DOHAD). She chaired the IETS HASAC group from 2009 to 2012 and was

president of IETS from 2018 to 2020. She is currently president of the European Placenta Group (EPG) and the French Society for the Study of Fertility (SFEF). She has co-authored >100 original articles and >70 review papers in peer-reviewed journals and books. She is a member of the French Academy of Veterinary Surgeons. She received the IETS Distinguished Service Award in 2018 and the gold medal of the French Academy of Agriculture for her career in 2019.

Dimitrios Rizos



Dr. Dimitrios Rizos is a professor of research at the National Center Institute for Agricultural and Food Research and Technology (CSIC-INIA), Department of Animal Reproduction, Madrid, Spain. He received his PhD from University College Dublin (UCD) in 2002, where he spent a further 3 years as a post-doctoral fellow. In 2004, he received a “Ramon y Cajal” Research Fellowship and, in 2006, a permanent position as senior researcher leading the Assisted Reproduction and Preimplantation Embryology in Cattle group at CSIC-INIA in Spain. His main research focus is on factors affecting embryo production *in vitro* and their quality; mechanisms controlling embryo–maternal interactions and the role of extracellular vesicles; and fertility in dairy cows. Dr. Rizos has over 120 peer-reviewed scientific articles, several dissemination articles and book chapters, as well as numerous invitations to give plenary lectures at international conferences, symposia and university seminars. He is an active member in various scientific committees; he was elected to the Board of Governors of the Association of Embryo Technologies in Europe (AETE; 2010–2015) and International Embryo Technology Society (2016–2020), and was elected president of AETE (2015–2018).

Akio Miyamoto



Akio Miyamoto is professor and director of Global Agromedicine Research Center (GAMRC) of Obihiro University of Agriculture and Veterinary Medicine in Japan. He obtained a PhD in 1987 from Tohoku University, Sendai, Japan, and moved as a postdoctoral fellow to the Institute of Physiology, Technical University of Munich, Germany. In Munich, he focused on ovarian physiology and endocrinology, studying luteal oxytocin, growth factors, and neuropeptides. He obtained a faculty position in Obihiro University in 1992 and was promoted to full professor in 2003. At Obihiro, he applied a microdialysis system surgically implanted into corpora lutea and follicles in the living cow, and found that local prostaglandins and vasoactive peptides are critically working on ovulation, follicle and CL development and regression. Accordingly, he developed real-time investigations of local blood flow in individual follicles and CLs, and discovered the acute blood flow increase is induced by PGF_{2α}, followed by luteal regression. He is now interested in a crosstalk of sperm and embryos with uterine and oviduct immune system that appears to be a physiological interaction toward sperm capacitation and embryo development *in vivo*. His team recently found that toll-like receptor 2 is involved in such communication, and this immune system is a physiological process necessary for the process of fertilization in the cow.

Claude Robert



Claude Robert has a degree in biochemistry and graduate studies in animal sciences. He completed his PhD in 2001 and went on to do a post-doctoral internship at the University of Guelph under the supervision of Dr. Allan King. Early on, he was interested in the potential impact of the application of assisted reproductive technologies on developmental outcomes, mainly during early embryogenesis. Following his hire as a professor at Laval University, he became involved in the EmbryoGENE project, leading the development of technological platforms to study gene expression and DNA methylation in follicular cells, oocytes, and early embryos. His current research interests are multiple: he is involved in projects focused on ovarian physiology, specifically on the intercellular connectivity between cumulus cells and the oocyte in cattle, which he also studies using mouse lines. He also leads collaborative projects in genetics and genomics in different species, including cattle, pig, reindeer, and honey bees. He is the current director of the Réseau Québécois en Reproduction (RQR), which is composed of over 100 research teams invested in research on the topic of reproductive biology.

Dawit Tesfaye

Dr. Dawit Tesfaye is an associate professor in the Department of Biomedical Sciences at Colorado State University. Dr. Tesfaye received his BSc in animal sciences in 1991 from Haramaya University, Ethiopia, and was awarded MSc and



PhD degrees in animal science in 2000 and 2004, respectively, from the University of Bonn, Germany. He continued his studies in reproductive science as a postdoctoral fellow at the same university. In 2010, he became a faculty member at the University of Bonn until he moved to Colorado State University in 2019. Dr. Tesfaye's research focuses on understanding the molecular mechanisms behind early embryo development and survival under various environmental and physiological conditions. Dr. Tesfaye is especially interested in investigating the NRF2-mediated oxidative stress response in bovine preimplantation embryos and evaluating potential approaches to modulate the pathway to improve embryo survival and viability under suboptimal conditions. Most recently, his research team is interested in investigating the role of extracellular vesicle-mediated molecular signaling in modulating the stress response in bovine follicular cells, oocytes, and preimplantation embryos. Dr. Tesfaye is a member of the American Society of Animal Science, Society for the Study of Reproduction, and the International Embryo Technology Society. He is an associate editor of the Journal of Ovarian Research and academic editor for PLoS One.

Eli Sellem



Eli Sellem has worked for Allice for 20 years. He fell in love with all topics around sperm cells: enhancement of sperm quality or quantity, improvement of sperm freezability, prediction of puberty age, sexed semen, and more. His primary focus of research concerns prediction of bull fertility. He spent more than 10 years developing sperm quality assessments in order to correlate sperm functionality with bull fertility. For the past 7 years, Eli has focused on the sperm epigenome and particularly on sncRNAs to enhance the strength of fertility prediction. His studies in this area established solid bases to shed light on the non-genetic gift of bull sperm to the oocyte.

Christine Wrenzycki



Christine Wrenzycki is a full professor at the Justus-Liebig-University Giessen in Germany, Faculty of Veterinary Medicine, Clinic for Obstetrics, Gynecology and Andrology of Large and Small Animals, a position she has held since 2012. She holds the Chair for Molecular Reproductive Medicine. In 1993, she graduated from the University of Veterinary Medicine in Hanover and was licensed to practice veterinary medicine by the Lower Saxony Chamber of Veterinarians. Her postgraduate studies were completed in 1995 when she received her doctoral degree from the University of Veterinary Medicine in Hanover. In 2003, the same university awarded her the habilitation and *venia legendi* in the field of reproductive medicine and biotechnology. She is veterinary specialist in reproductive medicine as well as in molecular genetics and gene technology. Professor Wrenzycki was a scientist at the Department of Biotechnology at the Institute for Farm Animal Genetics in Mariensee until August 2006, whereupon she returned to her alma mater as a senior veterinarian at the Clinic for Cattle. In September 2008, she became associate professor for biotechnology in reproduction. Since 1998, she has acted as a lecturer and teaches in the field of physiology and pathology of reproduction, including biotechnologies in reproduction. Her main research interest focuses on understanding the molecular mechanisms resulting in oocytes/embryos with high developmental competence. This includes the characterization of the *in vivo* and *in vitro* environment affecting oocyte/embryo quality.

Marc-André Sirard



Dr. Sirard spent all his professional life working in *in vitro* fertilization (IVF). He used a laparoscopic approach to perform IVF in cattle and obtained the first test-tube calves in 1985 using a non-surgical approach. During his post-doc in the United States, Dr. Sirard co-developed a method to produce bovine embryos by the hundreds using oocytes recovered postmortem from cows. He returned to Québec in 1987 and obtained an industrial chair to work on bovine oocytes and sperm in 1990. He founded the Centre de Recherche en Biologie de la Reproduction in 1995, which has grown to include a staff of more than 100 people today. He obtained a senior Canadian Research Chair in 2000 on genomics applied to reproduction, and he created an international effort to define the normal genomic program in early mammalian embryos, which became an NSERC strategic network, EmbryoGENE, in 2008. He has published over 325 scientific papers and has been invited to give more than 95 invited lectures at international meetings. His current research activities focus on the epigenetic mechanism allowing information transfer from one generation to the next.

Exhibit Directory

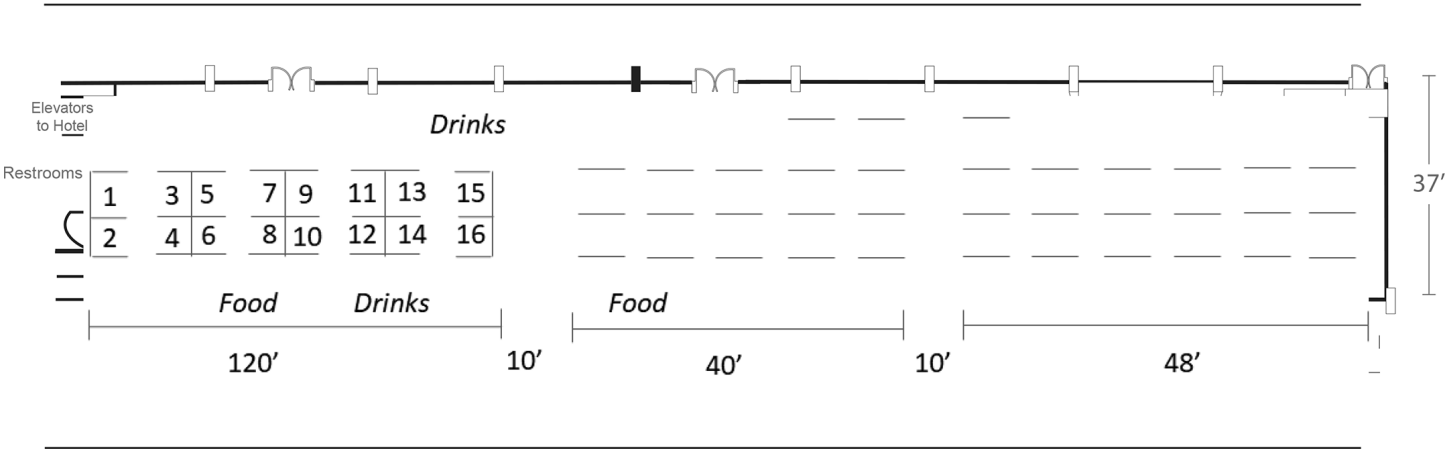
Booth Listing by Number:

Booth number	Company
1.....	Professional Embryo Transfer Supply, Inc. (PETS)
2.....	Stroebech Media
3.....	ICPbio Reproduction
4, 6.....	WTA Technologies LLC
5.....	E. I. Medical Imaging
7, 9.....	IMV Technologies/IMV Imaging
8.....	IVFtech ApS
10.....	Agtech Inc.
11.....	Minitube USA Inc.
12.....	IVF Bioscience
13.....	DRAMINSKI S.A.
14.....	Vetoquinol USA Inc.
15.....	Esco Technologies Inc.
16.....	Universal Imaging Inc.

Exhibit Hall Layout

Hyatt Regency - Main Building

River Street



Savannah River

Exhibitor Directory

Agtech Inc.

Livestock embryo and semen technologies...since 1990 formulating and designing field-tested liquid media and devices for livestock assisted reproductive technologies (ART), specifically ovum pick-up, *in vitro* fertilization, multiple-ovulation embryo transfer, and technologies. Many products are designed by and manufactured exclusively for Agtech.

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Customers outside the US find it very convenient to order their ART products through Agtech's e-commerce store (<https://store.agtechinc.com>), which enables you to select products, determine fees for transportation and duty, and pay for everything online at your convenience. Your package moves seamlessly from Agtech's office to your destination outside the United States.

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Booth: 10

DRAMINSKI S.A.

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Phone: +48 89 527 11 30
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E.I. Medical Imaging

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Loveland, CO 80537 USA
Phone: 1-866-365-6596
www.eimedical.com
Booth: 5

Esco Technologies Inc./Esco Medical

Esco Medical is a leading manufacturer and innovator of high-quality equipment such as long-term embryo incubators, ART workstations, anti-vibration tables, and time-lapse incubators. We are continuously developing technologies to meet the increasing demand of the IVF industry. Esco Medical products are designed to assist embryo development based on the "silent embryo hypothesis" as a guiding principle. The silent embryo hypothesis states that the less disturbed an embryo can remain, the better its developmental potential will be. Most of our products are designed in Denmark and made in the European Union. The primary focus of this division is to increase pregnancy success rates and patient satisfaction.

903 Sheehy Drive, Suite F
Horsham, PA 19044
<https://www.esco-medical.com/>
Booth: 15

ICPbio Reproduction

ICPbio Reproduction is a global supplier of embryo transfer and reproductive products, including flushing

and embryo handling media for equine, bovine, and ovine used by veterinarians and reproductive specialists. ICPbio Reproduction also manufactures and distributes Ovagen brand FSH for superovulation of ovine and bovine for embryo transfer procedures.

PO Box 39, 303 South McKay Avenue
Spring Valley, WI 54767 USA
Phone: 877-978-5827
www.icpbio repro.com
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IMV Technologies/IMV Imaging

IMV Technologies

IMV Technologies is a world leader in reproductive biotechnologies. We design and develop equipment, disposable items, and preservation media used in animal reproduction. Our areas of expertise include the following:

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IMV Technologies offers a wide range of ET products, including collection and freezing media, filtration devices, laboratory equipment, embryo packaging, and transfer tools. Our complete range can be found at www.imv-technologies.com.

IMV Imaging

Part of the IMV Technologies group, IMV Imaging are leaders in veterinary ultrasounds. Previously known as BCF Technology and ECM (Echo Control Medical), we have been committed to helping our customers improve animal care for over 35 years. Our team of over 500 people are committed to our core values of partnership, innovation, and learning. We are dedicated to providing the best equipment, advice, learning, customer care, and technical support. Our ExaPad, ExaPad mini, and ExaGo pair with our Ovum Pick-Up probe that provides exceptional image quality and ease of use, with a small shaft making it easy to manipulate, and it incorporates a set of adapters that allow use of any size of needle. The innovative design ensures effective scanning in harsh environments and provides the capability to scan high volumes quickly and effectively.

IMV Technologies
11725 95th Avenue North
Maple Grove, MN 55369 USA
Contact: imv-technologies.com
www.imv-technologies.com
Booth: 7

IMV Imaging
2900 43rd Street NW, #600

Rochester, MN 55901 USA
www.imv-imaging.com
Booth: 9

IVF Bioscience

IVF Bioscience manufactures high-quality, species-specific media for *in vitro* fertilization (IVF) in animals. Our innovative range of ready-to-use media is helping many customers around the world to consistently achieve higher blastocyst rates and superior results.

Our advanced, serum-free media system is provided in combination with an optimized IVF protocol and backed by continuous technical support, so you can be confident that you are in good hands. IVF Bioscience has assembled a panel of globally renowned animal IVF experts, advising us on all aspects of OPU-IVP, from collection (OPU) to embryo transfer.

Collaborating with these world-leading scientists allows us to call on their expertise on subjects such as improvements to our existing media system and development of new products, as well as supporting customers in their use of our products.

Discover how IVF Bioscience can support your animal IVF laboratory on our website where you can find out information about training courses, and technical resources, and request a discounted media trial.

Falmouth, Cornwall
United Kingdom
Phone: +44 1326 370 642
www.ivfbioscience.com
Booth: 12

IVFtech ApS

IVFtech is a company producing high-quality, customizable equipment for *in vitro* fertilization (IVF) laboratories, including workstations, incubators, heated tables, tubewarmers, and much more.

The art and science of human assisted reproduction often demands personalized solutions where strict considerations must be given to the culture conditions and the growth environment of gametes and embryos. Key factors for success rely on providing a steady temperature close to 37°C and secure an atmosphere with the right humidity and CO₂ concentration.

IVFtech knows that not all laboratories are the same; that's why IVFtech combines the bespoke nature of our high-quality products with exceptional service.

DK-3660 Stenløse
Denmark
Phone: +45 3940 2565
Fax: +45 3940 2564

Contact: info@ivftech.dk

www.ivftech.dk

Booth: 8

Minitube USA Inc.

Since 1970, Minitube has been at the forefront of assisted reproduction technologies, setting worldwide standards in reproductive technology. Backed by extensive research, real-world experience, and excellent customer service, Minitube delivers performance, efficiency, and peace of mind to reproductive practices globally.

Embryo transfer is hard enough without worrying about unreliable equipment. From ET consumables to ovum pickup, Minitube has proven, research-backed, reliably safe products that will make any ET specialist's job a little easier.

Product List

- Minitube Aspiration Pump for OPU
- QuickLock Heater 4.0
- Embryo Transport Kit
- BoviFlush
- BoviHold
- BoviFreeze
- MiniFlush Filter
- EmSafe Filter
- BoviPlus OPU Recovery Medium
- Minitube IVP Media

419 Venture Ct.

Verona, WI 53593 USA

Phone: 608-845-1502

www.minitube.com

Booth: 11

Professional Embryo Transfer Supply Inc. (PETS)

PETS has been a world-leading embryo transfer supply company in the bovine and equine industries for almost three decades. Our goal throughout this time has been your success, and we work every day to achieve this with quality service and ET supplies from ICPbio, Vetoquinol, MAI, ABT360, SPI, IMV, Wesco, and more. Come visit with us for more details.

285 FM 16

Canton, TX 75103 USA

Phone: 800-735-9215

www.pets-inc.com

Booth: 1

Stroebech Media

Stroebech Media is a new company, led by Dr Lotte Stroebech, Dr Birthe Avery and Dr Claus Yding Andersen, behind the media formulations and protocols within the veterinary field.

Combined, we have more than 40 years of experience in media manufacturing and assisted reproductive technologies. We offer a new and optimized media product line for in vitro production. Protocols are simple and easy to follow. We have numerous solutions for immediate customer support as well as training. We will offer courses, online, hands-on courses in Denmark as well as around the world. We can also visit in your laboratory, and we work with a network of highly skilled embryologists who will be happy to consult with you too, depending on your location.

Quality Control: Each new batch of media comes with a certificate specifying sterility, fungal, and endotoxin tests. Our factory is ISO9001 and ISO13485 certified and delivers media only in glass bottles. Our products have a shelf life up to 2 years and large batch sizes. Patents for growth factors and peptides are being explored, and we use continuous monitoring of stability for guaranteed shelf life. Our Bovine Embryo Assay (BEA) test is the most important QC release parameter.

Copenhagen, Denmark

Contact: info@stroebech-media.com

<https://www.stroebech-media.com>

Booth: 2

Universal Imaging Inc.

For more than 44 years, over 18,000 clients have placed their trust in Universal Imaging to provide leading-edge diagnostic imaging equipment and superior training. Whether your practice focuses on internal medicine, cardiac, MSK, reproduction, or sports medicine, our mobile-optimized systems deliver the clarity and detail you need for a faster, more accurate diagnosis. We partner with the pioneers of the digital imaging field, including: Canon, SonoScape Ultrasound and AGFA Digital Radiography. Visit our booth or website to learn how we can help you expand your practice and provide the highest standard of veterinary care.

299 Adams Street

Bedford Hills, NY 10507 USA

Phone: 914-666-6200 or 800-842-0607

www.universalimaginginc.com

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Vetoquinol USA Inc.

Vetoquinol, the manufacturer of Folltropin (porcine pituitary-derived follicle stimulating hormone for injection), is a family-owned, independent company devoted exclusively to animal health. Our product portfolio is divided between food-producing animals and companion animals and includes product categories to improve the health of animals. Vetoquinol embraces the challenge of finding better ways to help animals and is committed

to supporting the assisted reproduction industry with its long-lasting tradition of excellence. The company boasts one of the largest research facilities in the world, where 100 world-class researchers work passionately to develop new products and protocols.

4250 N. Sylvania Avenue
Fort Worth, TX 76137 USA
www.vetoquinolusa.com
Booth: 14

WTA Technologies LLC

WTA Technologies LLC is a Brazilian technology company with additional offices in Texas. We specialize in producing tools for animal assisted reproduction, offering solutions with high added value for ovum pick-up, *in vitro* fertilization, embryo transfer, and artificial insemination.

Our products are mainly for the reproduction of cattle, horses, and small ruminants, but we also meet different laboratory requirements. WTA distributes throughout Brazil, USA, Canada, and Mexico, as well as in many countries across the five continents. WTA is recognized as one of the leading companies in the animal assisted reproduction market. Each of our products is designed to provide the very best results and give a sense of security at an economical price, while always being mindful of animal welfare. Every piece incorporates precise design, quality materials, and excellent workmanship.

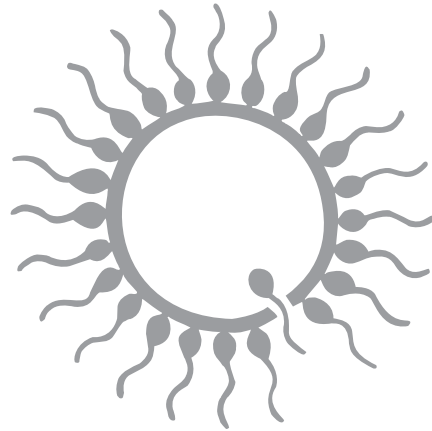
WTA Brazil
Phone: + 55 16 3951 8161
Phone for USA Sales: + 979-324-6168
www.wtavet.com.br
Booth(s): 4, 6

Thank You to Our Exhibitors



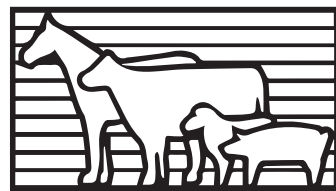


IVFtech



minitube

PETS



Professional Embryo Transfer Supply, Inc.

Stroebechmedia

Assisted Reproduction Techniques in Animals



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CANDES Preconference Symposium

Chair: Dragos Scarlet

08:00–08:30 Registration

08:30–08:45 Welcome

Session I

08:45 – 09:30 Emerging arguments for ARTs in wildlife and their implications for assisted reproduction in the conservation breeding of managed marsupials

Lachlan Howell, Australia

09:30 – 10:00 Granulosa cell gene expression and glucose consumption of *in vitro*-matured oocytes of the southern white rhino (*Ceratotherium simum simum*)

Elena Ruggeri, USA

Production of live calves after transfer of *in vitro*-produced embryos in synchronized wood bison (*Bison bison athabasca*)

Miranda Zwiefelhofer, Canada

10:00 – 10:30 Break

Session II

10:30 – 11:15 Recovering a critically endangered frog species using assisted reproductive and genetic technologies

Leah Jacobs, USA

11:15 – 11:30 Comparison of various buffalo sera collected during different phases of estrous cycle for *in vitro* maturation and culturing of Nili-Ravi buffalo oocytes

Muhammad Irfan-ur-Rehman Khan, Pakistan

11:30 – 12:15 Connecting the spots: Understanding cheetah biology to improve reproduction

Adrienne Crosier, USA

12:15 – 12:30 Follicular fluid extracellular vesicles: Endocytosis and influence on domestic cat cumulus cells and oocytes

Jennifer Nagashima, USA

12:30 – 13:30 Lunch break (on your own)

Session III

13:30 – 14:15 Success rate in a clinical equine *in vitro* embryo production program

Anthony Claes, Netherlands

14:15 – 14:45 CANDES Trainee Travel Awards

Equine embryo size does matter!

Emilie Derisoud, France

Comparison of three permeating cryoprotectant mixtures for equine immature oocyte vitrification

Daniel Angel-Velez, Belgium

14:45 – 15:15 Coffee break

Continued

Session IV

- 15:15 – 16:00 Wild theriogenology: Understanding reproduction of natural populations in the context of conservation physiology
Karina Acevedo-Whitehouse, Mexico
- 16:00 – 16:30 Temporal ultrastructure changes in staghorn coral (*Acropora cervicornis*) sperm: Implications for fertility
Linda Penfold, USA
- Evaluation of an antibody-free approach to identifying fecal peptides for pregnancy detection in polar bears (*Ursus maritimus*)
Erin Curry, USA
- 16:30 – 16:45 Final discussion and remarks

IETS Preconference Symposium—The Life and Travels of the IVF Embryo: From Donor to Recipient

Focus on the Practitioner

Sponsored by WTA Technologies LLC, University of Illinois, Clemson University, AETA, Chessie Creek Farm, and Ovitra Biotechnologies

Part 1: Ovum Pick-Up—Setup and Equipment

This activity will be a live-streamed or taped segment covering the different ultrasound equipment available along with the probes, needles, and tubing setups used for ovum pick-up (OPU). We will have equipment from different manufacturers and several practitioners who use the specific equipment. The equipment and setup will be demonstrated cow-side at Chessie Creek Farm in South Carolina. Workshop participants will have the opportunity to ask practitioners questions regarding equipment use and setup at the workshop room in Savannah, Georgia. The equipment vendors will have the equipment available.

The emphasis for Part 1 will be all things on the cow side, with respect to the aspirator and an assistant performing anything related to donor preparation, maintenance of sterile technique and temperature control, the OPU itself, recording relevant information and data—basically everything leading up to the point of handing over the oocyte collection vessel to the searching laboratory.

Part 2: Recovery and Transport of the Oocyte to the Laboratory

We will have equipment from different manufacturers and several practitioners who use the specific equipment. The equipment and setup will be demonstrated at the conference hotel in Savannah, Georgia. The workshop participants will have the opportunity to use the equipment and ask practitioners questions regarding equipment use and setup at the workshop room in Savannah. The equipment vendors will have the equipment available.

The emphasis for Part 2 will be primarily on the setup in the laboratory to prepare the various media (recovery, rinsing, washing, maturation), rinsing the collection tube and filter, searching, grading, packaging, loading incubator, recording information and data, and shipping. Also, maintenance of sterile technique and temperature control will be emphasized.

Lunch—on your own

Part 3: Decisions for Packaging and Distribution of *In Vitro* Embryo Production Embryos to the Practitioner

The different methods to handle *in vitro* embryo production (IVEP) after production will be demonstrated and discussed. The use of field incubators, embryo freezing, and various packaging systems will be covered. We will have equipment from different manufactures and several practitioners that use the specific equipment. The equipment and setup will be demonstrated at the conference hotel in Savannah, Georgia. The workshop participants will have the opportunity to use the equipment and ask the practitioners questions regarding equipment use and setup at the workshop room in Savannah. The equipment vendors will have the equipment available.

Part 3 will emphasize the various scenarios that require decisions in the laboratory to determine when to pull out the embryos to freeze or transfer due to a variety of logistical concerns such as physical distance from the laboratory to recipient, and the number of available recipients. Obviously, this brings into account an emphasis on communications between the laboratory personnel, the owner of the embryos, the owner or manager of the recipients, potentially a courier or shipping service, and the practitioner who will transfer the embryos.

Continued

Part 4: Disposition of IVEP Embryos in the Field

The different methods to package IVEP embryos after production for shipment to the field practitioner will be demonstrated and discussed. The use of field incubators, transport incubators, and various embryo delivery systems will be covered. We will have equipment from different manufacturers and several practitioners who use the specific equipment. The equipment and setup will be demonstrated at the conference hotel in Savannah, Georgia. The workshop participants will have the opportunity to use and ask the practitioners questions regarding equipment use and setup at the workshop room in Savannah. The equipment vendors will have the equipment available.

Part 4 will emphasize the handling of the embryos once received from the laboratory, all the way through to the transfers, thus, potentially, unloading embryos out of tubes and into straws. Thus, this part should probably also include discussions of temperature control, organization and coordination of unloading tubes, and so on, to ensure optimal throughput and recording information and data.

Final Group Discussion

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