Program Book

48th Annual Conference of the International Embryo Technology Society

Adaptation of Early Life to Prepare for a Healthy Future

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

Hyatt Regency Savannah
Savannah, Georgia
January 10–13, 2022
Table of Contents

Preface .............................................................................................................................................. 1
Recipient of the 2022 IETS Pioneer Award ..................................................................................... 2
Map of the Venue ............................................................................................................................. 7
General Information ......................................................................................................................... 9
Program .......................................................................................................................................... 12
Section Editors and Manuscript and Abstract Reviewers .............................................................. 17
Poster Session Information ............................................................................................................. 19
Poster Session Order by Topic ....................................................................................................... 20
Author Index .................................................................................................................................. 34
2022 Recipient of the IETS Distinguished Service Award ............................................................ 39
Special Events ................................................................................................................................ 41
IETS Foundation 2022 Early Career
  Achievement Award (Scientist) .................................................................................................. 44
Session Speakers and Keynote Biographies .................................................................................. 45
Exhibit Directory ........................................................................................................................... 48
Exhibit Hall Layout ........................................................................................................................ 48
CANDES Preconference Symposium ............................................................................................ 57
IETS Preconference Symposium—The Life and Travels
  of the IVF Embryo: From Donor to Recipient ............................................................................ 59
Thank You to Our Sponsors ........................................................................................................... 61

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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 CANDES-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


48th Annual Conference
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 butyrycholinesterase 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.

References


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.

Services and Amenities
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  CANDES/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 Medellín, 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 Gasparini, 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. Rodríguez-Álvarez (Abstract 1)
11:15 – 11:30 Noninvasive method for bovine embryo sexing through the analysis of DNA content in extracellular vesicles

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

12:15 – 12:30 Evaluation of reproductive status using near infrared spectroscopy in an endangered anuran

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

- 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-Vélez, 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*

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)

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, Biotalement 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 (Scarbrough 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

   Genome-wide abnormalities resulting from heterogonie cell division persist in the blastocyst-stage bovine embryo

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)**
The Program Co-Chairs Acknowledge and Thank the Following People

Section Editors
Bianca Gasparrini, Graduate Student Competition
William Holt, Bioethics, Welfare, and Sustainability
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
Luciano Bonilla, Embryo Transfer
Miki Sakatani, Epidemiology/Diseases
Katrin Hinrichs, Fertilization/ICSI/Activation
Peter Hansen, Folliculogenesis/Oogenesis
Irina Polejaeva, Genetic Engineering
Brett White, Male Physiology
Milo Wiltbank, Oestrus Synchronization/Artificial Insemination
Peter Bols, Oocyte Collection
Kiho Lee, Oocyte Maturation
Rocio M. Rivera, Periconceptional/Fetal Programming
Bernard Roelen, Stem Cells
Marja Mikkola, Superovulation
Paula Tribulo, Undergraduate Poster Competition

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William V. Holt
Patrice Humblot
John Kastelic
Carol Keefer
Rebecca Krisher
Michal Andrzej Kosior
Anna Lange Consiglio
Daniel Le Bourhis
Kiho Lee
Ligiane Leme
Jo Leroy
Niamh Lewis
Ying Liu
Pasqualino Loi
Pat Lonergan
Charles Long
Valentina Longobardi
Beatriz Macias Garcia
Reuben Mapletonf
Gabriela Mastromonaco
Erdogan Memili
Alejo Menchaca
Fernando Silveira
Mesquita
Marja Mikkola
Pedro Monteiro
Fabricio Desconsi
Mozzaquatro
Cesar Narciso
Veronica Negron-Perez
José Nélio Sales
Marcilio Nichi
Ricardo Perecin Nocit
Justine O’Brien
Eleanore O’Neil
Felipe Ledur Ongaratto
Sofia Ortega Obando
Isabel Ortiz
Takeshi Osawa
Takeshige Otoi
Christianne Otzdorff
Rolando Pasquariello
Felipe Perecin
Jorge Piedrahita
Paula Rodriguez-Villamil
Irina Polejaeva
Guilherme Pugliesi
Luisa Ramirez Agamez
Bethany Redel
Vitor Rissi
Rocio M. Rivera
Dimitrios Rizos
Juliano Rodrigues Sangali
Paula Rodriguez
Bernard Roelen
Pablo Ross
Elena Ruggeri
Miki Sakatani
Daniel Salamone
Renato Salgado
Angela Salzano
Roberto Sartori
Dragos Scarlet
Jennifer Schön
Marcelo Marcondes Seneda
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Joanna Souza-Fabjan
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Monica Stoops
Tom Stout
Mateus Sudano
Juhani Taponen
Dawit Tesfaye
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Andres Tribulo
Rodolfo Ungerfeld
Ann Van Soom
Iuri Viotti Perisse
Peter Vos
Zhongde Wang
Matthew Wheeler
Brian Whitaker
Brett White
Milo Wiltbank
Ryan Witt
Christine Wrenzycki
Jimena Yapura
Carly Young
Ye Yuan
Louisa Zak
Amanda Zangirolamo
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.
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. Rodríguez-Alvarez

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. Rodríguez-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

6. Evaluation of reproductive status using near infrared spectroscopy in an endangered anuran

**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

    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

14. Pregnancies produced after fixed-time artificial insemination using sex-sorted sperm in wood bison
<table>
<thead>
<tr>
<th>Cloning/Nuclear Transfer</th>
<th>Companion CANDES</th>
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<tr>
<td>Identification of developmental genes regulated by H3K9me2 and H3K27me3 histone marks in bovine somatic cells and their somatic cell nuclear transfer embryos&lt;br&gt; <em>I. Viotti Perisse, B. Abercrombie, Y. Liu, T. Patrick, J. Keim, A. Benninghoff, I. Polejaeva,</em> and <em>K. White</em></td>
<td>Temporal ultrastructure changes in staghorn coral (<em>Acropora cervicornis</em>) sperm: Implications for fertility&lt;br&gt; <em>L. Penfold, J. Wyffels, K. O’Neil,</em> and <em>A. Moura</em></td>
</tr>
<tr>
<td>Use of a hand-made cloning protocol to reduce oocyte mitochondria&lt;br&gt; <em>L. Adams, Y. Liu, B. Durrant, E. Ruggeri, C. Young,</em> and <em>I. Polejaeva</em></td>
<td>All aboard the polar express: Transferability of a cryopreservation protocol between anuran species&lt;br&gt; <em>I. Burger, L.-D. Chen, D. Barber, V. Poole, D. Smith, A. Kouba,</em> and <em>C. Kouba</em></td>
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<td>Granulosa cell gene expression and glucose consumption of <em>in vitro</em>-matured oocytes of the southern white rhino (<em>Ceratotherium simum simum</em>)&lt;br&gt; <em>E. Ruggeri, C. Young, N. Ravida, M. Sirard, R. Krisher, M. de la Rey, C. Herbst,</em> and <em>B. Durrant</em></td>
<td>Paths less travelled: Novel oral and nasal hormone administration routes for eliciting spermiation in male eastern tiger salamanders (<em>Ambystoma tigrinum</em>)&lt;br&gt; <em>D. M. Chen, L.-D. Chen, C. K. Kouba,</em> and <em>A. J. Kouba</em></td>
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<td>Paths less travelled: Novel oral and nasal hormone administration routes for eliciting spermiation in male eastern tiger salamanders (<em>Ambystoma tigrinum</em>)&lt;br&gt; <em>D. M. Chen, L.-D. Chen, C. K. Kouba,</em> and <em>A. J. Kouba</em></td>
<td>Saving salamanders with sonograms: Tracking follicular development with ultrasonography in a variety of caudate species&lt;br&gt; <em>S. Lampert, D. Chen, I. Burger, D. Barber, V. Poole, D. Smith, A. Kouba,</em> and <em>C. Kouba</em></td>
</tr>
<tr>
<td>Comparison of conventional and controlled-rate freezing methods to cryopreserve white spotted bamboo shark (<em>Chiloscyllium plagiosum</em>) sperm: Implications for elasmobranch biobanking efforts&lt;br&gt; <em>J. Gillis, G. Montano,</em> and <em>L. Penfold</em></td>
<td>Comparison of cryoprotectants and their combinations in the optimisation of a sperm cryopreservation protocol in the Argentine black and white tegu (<em>Salvator merianae</em>)&lt;br&gt; <em>C. Young, N. Ravida, M. Curtis, F. Mazzotti,</em> and <em>B. Durrant</em></td>
</tr>
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</table>

*International Embryo Technology Society*
Cryopreservation/Cryobiology

29 Cryopreservation by slow freezing of bovine in vitro embryos in different stages of development

30 Comparison of two vitrification processes on survival rates of ovine embryos

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. Baez, V. de Brun, N. Rodriguez-Osorio, and C. Víñoles

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

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

37 The comparison of different freezing methods and thawing temperatures on Windsnyer boar semen quality
M. A. Thema, M. L. Mphaphathi, M. R. Ledwaba, and T. L. Nedambale

38 The efficacy of different concentration of coconut water on boar semen following equilibration at 18°C for different times
M. Tshabalalala, M. Mphaphathi, C. Pilane, K. Nephawe, and T. Nedambale

39 Efficacy of roscovitine and dibutyryl cAMP to block premature meiosis in porcine oocytes vitrified at the germinal vesicle stage and their effect on subsequent embryo development

40 Rapid-freeze of bison semen in cholesterol-based extender
S. Yang, G. Adams, K. Rajapaksha, and M. Anzar

41 Antifreeze proteins as cryoprotectants in reproductive biology: A systematic review
L. Correia, G. Leal, B. Alves, R. Batista, P. Mermillod, and J. Souza-Fabjan

42 Comparison of three permeating cryoprotectant mixtures for equine immature oocyte vitrification

43 Factors affecting vitrification of canine epididymal spermatozoa
S. Stoddard, J. Linn, A. Lemma, and G. Wirtu

48th Annual Conference
The effect of various cryoprotective agents and slow cooling rate on viability of goat ovarian tissue

Developmental Biology

Paternal effects on early embryo development in bovine
K. Lockhart and M. Ortega

Gene expression changes in trophoblast cells after the blastocyst stage in cattle
H. Akizawa, H. Bai, M. Takahashi, and M. Kawahara

Regulation of bovine embryonic development by WNT5A is modified by the source of albumin and is independent of RAC1 signalling
S. Jeensuk, B. Hawryluk, T. L. Scheffler, and P. J. Hansen

Bisphenols modulate the anti-Müllerian hormone system in bovine granulosa cells cultured in vitro

Trascription factor TEAD4 is not required for bovine blastocyst formation

The characteristics and microRNA content of extracellular vesicles are modulated by embryo developmental stage during preimplantation
B. Melo-Báez, Y. S. Wong, E. A. Mellisho, C. Aguilera, J. Cabezas, D. Caamaño, N. N. Miranda-Rodriguez, and L. Rodríguez-Alvarez

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

Early Pregnancy

Equine embryo size does matter!
E. Derisoud, L. Jouneau, A. Margat, C. Gourtay, C. Dubois, C. Archilla, Y. Jaszcyszyn, M. Dahirel, N. Daniel, N. Peynot, L. Briot, F. De Geoffroy, L. Wimel, V. Duranthon, and P. Chavatte-Palmer

The effect of dexamethasone and platelet-rich plasma on the equine post-breeding endometrial transcriptome
M. H. Verstraete, P. Dini, M. F. Orsolini, S. Koshak, E. Santos-Villanueva, D. Orellana, P. Daels, and G. Dujovne

Evidence of sexual dimorphism in transcriptome of in vitro- versus in vivo-derived bovine embryos

Embryo Culture

Morphokinetics of in vitro-derived bovine embryo is associated with the transcriptomic profile of the developed blastocyst
S. Yaacobi-Artzi, D. Kalo, and Z. Roth

Paternal contributions to early embryonic stress affect development in the bovine
L. Fallon, K. Clark, and M. Ortega
Influence of donor mare age on pre- and postimplanation embryo development within an equine ovum pick-up–intracytoplasmic sperm injection–embryo transfer (OPU-ICSI-ET) program over a three-year period
G. Lazzari, S. Colleoni, M. Barandalla, M. Benedetti, R. Duchi, and C. Galli

The embryotrophic effect of cathepsin-L in a bovine in vitro model
A. Raes, E. Wydooghe, N. Azari-Dolatabad, D. Deforce, G. Opsomer, A. Van Soom, and K. Smits

The positive effect of the use of recombinant equine chorionic gonadotrophin for ovarian stimulation for in vitro embryo production in buffaloes
A. Bandeo, J. L. Konrad, J. Berdugo, P. Ibañ, N. Vallejos, P. Maldonado Vargas, and G. Crudeli

Follicular fluid extracellular vesicles: Endocytosis and influence on domestic cat cumulus cells and oocytes
J. Nagashima and N. Songsasen

Noninvasive prediction of pregnancy and birth in cattle by liquid chromatography–high-resolution mass spectrometry analysis of embryo culture medium

Functional characterisation of peroxisome proliferator-activated receptor gamma (PPARγ) in bovine blastocyst development and early trophectoderm formation
M. McGraw and B. Daigneault

Withdrew

No difference in health and fertility characteristics between offspring arising from in vitro production or multiple ovulation embryo transfer
E. Mullaart, G. Ludema, A. Zijlstra, and J. Veldhuisen

Comparison of SexedULTRA-4M™ X and Y chromosome-bearing semen versus conventional semen for the in vitro production of bovine embryos
A. Velázquez-Roque, H. Álvarez-Gallardo, M. Kjelland, M. Pérez-Martínez, F. Villaseñor-González, and S. Romo

The production of ovine embryos in vitro using frozen–thawed semen processed in the breeding and nonbreeding seasons

In vivo versus in vitro embryo production after superstimulation of donors in the camel (Camelus dromedarius)
B. S. Vettical and N. A. Wani

Developmental competency of bovine embryos derived from oocytes with granulated ooplasm after in vitro culture
K. Song, J. Park, W. Lee, and G. Jang

DNase treatment of extracellular vesicles released by in vitro-produced bovine embryos increases accuracy of preimplantation genetic testing
J. Cabezas, D. Caamaño, B. Melo-Báez, P. Silva-Ibañez, P. Poblete, Y. S. Wong, and L. Rodríguez-Alvarez
Glycolytic substrates influence intracellular movement of PKM2 and OCT4 expression in bovine preimplantation embryos
H. Weiner, L. Tompkins, and C. Keefer

Bovine embryonic development observed by time-lapse system
J. Benne, R. Krisher, and B. Beaton

**Embryo Manipulation**

Environmental conditions can modulate the gene expression of embryo from primiparous beef cows

Preimplantation genetic diagnosis of glycogen branching enzyme deficiency and sex determination in equine in vitro-produced embryos
M. Barandalla, S. Colleoni, R. Duchi, M. Benedetti, A. Perota, C. Galli, and G. Lazzari

Gene expression analysis of developmental key genes in in vitro bovine twin embryos produced by blastomeres separation and embryo bisection
A. Ynsaurralde-Rivolta, V. Alberio, M. Suvá, R. Bevacqua, V. Savy, L. Ratner, and D. Salamone

Withdrawn

**Embryo Transfer**

Effect of length of proestrus on pregnancies per embryo transfer and pregnancy losses in beef recipients synchronised with estradiol/progesterone-based protocols
A. V. Cedeño and G. A. Bó

The effect of inducing an accessory corpus luteum with gonadotrophin-releasing hormone or human chorionic gonadotrophin at the day of embryo transfer on fertility of recipient dairy heifers and lactating cows
M. S. El Azzi, J. L. L. Cardoso, R. A. Landeo, J. C. de Souza, J. H. F. Pontes, and J. P. N. Martins

Fertility in lactating dairy cows following timed artificial insemination or timed embryo transfer with fresh or frozen in vitro-produced embryos

Cytokine supplementation to improve developmental competence of bovine embryos following slow-rate freezing
K. S. Stoecklein, N. J. Drum, A. Garcia-Guerra, B. J. Duran, J. G. N. Moraes, L. D. Spate, R. S. Prather, and M. S. Ortega

Relationship between anogenital distance and reproductive efficiency of embryo recipient dairy heifers
A. Garcia-Guerra, R. Sala, L. Carrenho-Sala, F. Valencia, M. Fosado, and J. Moreno

Storage of in vivo-produced embryos at refrigeration temperature before transfer to synchronised recipients in the camel (*Camelus dromedarius*)
H. A. Abouhefnawy and N. A. Wani

Are antibiotics still truly needed in bovine embryo collection media? A preliminary study
Production of live calves after transfer of in vitro-produced embryos in synchronised wood bison (Bison bison athabascae)
M. Zwiefelhofer, G. Mastromonaco, E. Zwiefelhofer, and G. Adams

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

Anti-Müllerian hormone in Holstein heifers and reproductive performance after fixed-time embryo transfer

Fertilisation/ICSI/Activation

Creating homozygous offspring using oviductal sperm deposition with poor quality cryopreserved semen from a transgenic founder goat
N. Buzzell, S. Blash, K. Miner, M. Hevy, B. Tomlinson, R. Syme, and W. Gavin

Kinematic and morphological properties of Large White boar sperm under induced oxidative stress
M. R. Ledwaba, M. L. Mphaphathi, M. A. Thema, C. M. Pilane, and T. L. Nedambale

Increasing cytoplasmic glutathione in bovine oocytes with modified in vitro maturation systems
L. Gatenby, A. M. Giraldo, and K. R. Bondioli

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

Guinea pig sperm is capable of fertilising bovine zona-intact oocytes in vitro

Fertilising capacity of guinea pig spermatozoa by heterologous fertilisation with zona-intact murine oocytes

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

Zeta potential of equine sperm and its association with sperm quality
M. F. Orsolini, M. H. Verstraete, M. van Heule, D. Orellana, A. Ortega, S. Meyers, and P. Dini

Effect of glycine and creatine on the in vitro capacitation-related events in frozen/thawed equine sperm

Bulls fed a high-gain diet produce semen that results in fewer blastocysts following in vitro fertilisation and embryo culture
Alert or absent: How attentive is the oviduct?
R. Finnerty, J. Pru, and W. Winuthayanon

Generation of GGTA1 knockout porcine blastocysts by intracytoplasmic sperm injection mediated gene edition
O. Briski, G. La Motta, L. Ratner, R. Fernández-Martin, and D. Salamone

In vitro fertilisation with sperm prebound to oviduct glycans immobilised on a coverslip
S. Soto-Heras, L. Volz, and D. Miller

**Folliculogenesis/Oogenesis**

Effect of LH contamination in commercial formulations on FSH-induced follicle growth in heifers immunised against gonadotrophin-releasing hormone
N. Pereira, L. Martins, R. Moura, L. Dias, M. Peixer, and J. Viana

Effects of days in milk and body condition score loss after parturition on oocyte triacylglycerol content in Holstein cows

Evaluation of apoptosis in canine ovarian follicles throughout the estrous cycle
M. De los Reyes and J. Palomino

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

Seasonal effects on follicular metabolome in Italian Mediterranean buffalo
M. Kosior, R. Esposito, F. Piscopo, A. Calabria, G. Albero, V. Longobardi, C. Del Prete, and B. Gasparrini

Metabolic, electrolyte and acid-base parameters in blood and fluids of the reproductive tracts during in vivo maturation of bovine oocytes
O. Gungor, S. Salman, S. Ranjitkar, D. Zhang, and X. Tian

Proteome profiling of equine follicular fluid before, during, and after selection of the dominant follicle
J. Feugang, G. Ishak, T. Pechan, O. Pechanova, M. Gastal, P. Ryan, and E. Gastal

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

Anti-Müllerian hormone plasma concentration in alpacas as a predictor of their ovarian reserve
R. Céliz, E. Alvarado, and A. Gallegos-Cárdenas

**Genetic Engineering**

Preferential loading of thermal stress–associated microRNAs into extracellular vesicles: Attempt to mitigate effects of heat stress in bovine granulosa cells
N. G. Menjivar, S. Gebremedhn, and D. Tesfaye

Utilising cell-free DNA for detection of gene editing outcomes in rhesus macaque embryos
J. Ryu, W. Chan, F. Carvalho, E. Mishler, J. Hennebold, and C. Hanna
Development competence of β-lactoglobulin gene editing bovine embryos producing by CRISPR/Cas9 and somatic cell nuclear transfer

Male Physiology

Effect of different concentrations of glutathione during liquid storage of Kolbroek boar semen stored at 17°C
L. D. SehLABELA, M. L. MPhAPHATHI, T. L. Nedambale, and T. R. NetshiROVHA

Shuttle transfer of mRNA transcripts via extracellular vesicles from male cells to the cumulus–oocyte complex in the rabbit
I. M. Saadeldin, A. M. Abdelazim, and M. M. Abomughaid

The effects of bisphenols on cryopreserved bovine spermatozoa in vitro
O. Davis, K. Hickey, and L. Favetta

Rosiglitazone extends maintenance of frozen–thawed bull sperm for 24 hours at ambient temperature
J. D. de Agostini Losano, J. Parks, J. Bromfield, and B. Daigneault

Sperm motility subpopulations are correlated with fertility in Retinta bulls

Role of GnRH-II and its receptor in porcine sperm function
C. E. Ross, D. F. Ahern, G. A. Mills, and B. R. White

Nerve growth factor in seminal plasma and its association with extracellular vesicles in South American camelds
R. A. Carrasco, D. J. MacPhee, and G. P. Adams

Influence of sire fertility status on conceptus-induced transcriptomic response of the bovine endometrium

Effect of deacetylase inhibitors on kinematic parameters of stallion sperm
L. Aguiar and C. Pinto

Effect of bull exposure to high temperature-humidity index levels on the quality of sperm selected through density gradient centrifugation for in vitro fertilisation
M. Melean, C. Herrera, M. Siuda, H. Bollwein, and E. Malama

Oestrus Synchronisation/Artificial Insemination

Synchronisation of ovulation in lactating dairy cows following a lengthened proestrus in an estradiol/progesterone-based protocol
A. Macagno, J. C. Tschopp, and G. A. Bó

Reproductive performance of beef cattle submitted to resynchronisation at 16 or 25 days after first service
S. R. Wellert, G. M. Zanatta, B. J. Duran, E. Rojas Cañadas, A. Nall, P. S. Baruselli, and A. Garcia-Guerra
Induction of ovulation after artificial insemination in rabbits: Intramuscular injection of gonadotrophin-releasing hormone analogue versus intravenous administration of mated doe serum
N. Dadashpour Davachi, R. Masoodi, P. Bartlewski, B. Ahmadi, and M. Didarkhah

Reutilisation of intravaginal progesterone devices during fixed-time artificial insemination with sex-sorted semen in dairy heifers
R. Sala, V. Absalon-Medina, T. Reamsnyder, E. Maldonado, W. Smith, V. Fricke, J. Moreno, and A. Garcia-Guerra

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

ReBreed21, a rapid reinsemination program: Fertility in Bos indicus cattle of different parities

Oocyte Collection

Does selection for oocyte yield indirectly affect production traits in Gir cattle (Bos taurus indicus)?
L. Feres, L. Siqueira, M. Palhao, L. Santos, L. Pfeifer, and J. Viana

Features and developmental potential of oocytes collected from Nelore (Bos taurus indicus) calves at the early and late prepubertal phase

Effect of equine chorionic gonadotrophin doses on number and size of ovarian follicles at the time of oocyte collection in llamas

Effect of the day of dominant follicle removal on ovum pick-up success on ½ Holstein × ½ Gyr cows

The effects of dominant follicle removal on quality of cumulus–oocyte complexes in half-blood Bos indicus × Bos taurus donor cattle

Abundance and activity of metabolic enzymes in bovine cumulus cells derived from ovarian samples under variable physiological conditions

The activity of metabolic enzymes in bovine oocytes derived from ovaries with heterogenous physiological conditions
Oocyte Maturation

134 Estradiol improves cattle oocyte maturation rate in vitro
M. D. Sebopela, M. L. Mphaphathi, S. M. Sithole, and T. L. Nedambale

135 Effect of different concentrations of follicular fluid exosome-like extracellular vesicles on in vitro oocyte maturation and embryo development in cattle
G. N. Singina, E. N. Shedova, R. E. Uzbekov, and S. Uzbekova

136 Progesterone concentration during bovine in vitro maturation might serve as a predictor of oocyte developmental capacity
J. Gutiérrez-Añez, P. Aldag, H. Niemann, and A. Lucas-Hahn

137 L-Carnitine improves developmental potential of bovine oocytes exposed to high lipid concentrations during in vitro maturation
G. Catandi and E. Carnevale

138 Ovarian factors associated with bovine in vitro embryo development and quality in an individual culture system

139 Effect of follicle characteristics on bovine in vitro embryo development
C. Benedetti, N. Azari Dolatabad, A. Fernandez Montoro, D. Angel Velez, O. Bogado Pascottini, K. Pavani, K. Smits, and A. Van Soom

140 Effect of lycopene supplementation to bovine oocytes exposed to heat shock during in vitro maturation

141 Effect of different quantities of epidermal growth factor and TCM-199 medium on polar body extrusion of cattle oocytes following in vitro maturation
S. M. Sithole, M. L. Mphaphathi, M. D. Sebopela, and T. L. Nedambale

142 Mimicking the follicular environment: in vitro maturation of prepubertal ovine oocytes in a liquid marble bioreactor as a 3-dimensional culture system
D. Bebbere, F. Ariu, S. Nieddu, and S. Ledda

143 Effect of different concentration of dimethyl sulfoxide cryoprotectant on oocyte maturation rate following brilliant cresyl blue exposure

144 A comparative study using flat, round, and V-shaped 96-well plates during bovine oocyte in vitro maturation
A. Fernández-Montoro, D. Angel-Velez, N. Azari-Dolatabad, C. Benedetti, O. Bogado Pascottini, K. Pavani, and A. Van Soom

145 Comparison of various buffalo sera collected during different phases of estrous cycle for in vitro maturation and culturing of Nili-Ravi buffalo oocytes
M. Waseem, M. Irfan-ur-Rehman Khan, M. Usman Mehmood, A. Riaz, and M. Akhtar

146 Transcriptome characterisation of equine oocyte maturation
Meiotic competence of oocytes obtained from seasonally anovulatory mares treated with estradiol and sulpiride
M. Vetter, C. Pinto, V. Bailey, B. Gilbert, and E. Oberhaus

Characterising cytoplasmic lipid profiles during in vitro maturation of porcine oocytes
E. Girka, A. M. Giraldo, and K. R. Bondioli

Effects of quisqualic acid and L-α-amino butyrate supplementation during in vitro oocyte maturation on embryonic development in pigs
S. Reynolds, K. Springl, H. Arena, and B. Whitaker

The influence of follicular fluid extracellular vesicles on in vitro maturation of oocytes in the domestic cat
R. Dahal, J. B. Nagashima, N. Songsasen, and T. Wood

Effect of biphasic in vitro maturation with C-type natriuretic peptide on meiosis arrest and in vitro embryo production of prepubertal and adult goats
M. Ferrer, A. Gil, D. Izquierdo, and M.-T. Paramio

Effect of biphasic in vitro maturation with C-type natriuretic peptide on meiosis arrest and in vitro embryo production of oocytes from prepubertal and adult sheep
A. Gil, M. Ferrer, M.-T. Paramio, and D. Izquierdo

Effects of ewe age on oocyte viability and timing of early embryo cleavage
K. Fryc, A. Nowak, P. M. Bartlewski, and M. Murawski

Periconceptional/Fetal Programming

Early metabolic reading of calf fitness in the embryo and the recipient
I. Gimeno, P. García-Manrique, J. Gatien, S. Carrocera, F. Goyache, M. Berdasco, P. Salvetti, and E. Gomez

Evaluation of bovine embryo morphology and subsequent postnatal phenotype following conception in the presence of seminal plasma

Epigenomics and transcriptomics of muscle and liver tissues from in vitro- and in vivo-produced dairy calves at 3 months of age
M. Rabaglino, J. Bojsen-Møller Secher, P. Hyttel, and H. Kadarmideen

Stem Cells

Mesenchymal stem cells as a regenerative therapy for the prevention of subclinical mastitis in cattle
S. Ghai, V. N. Verma, S. Ansari, S. Saini, A. Thakur, A. Kumar, S. Kumar, and D. Malakar

Umbilical cord blood-derived mesenchymal stem cells (UCB-MSC) used for the prevention of metritis in cattle
V. N. Verma, S. Ghai, S. Ansari, S. Saini, A. Thakur, A. Kumar, S. Kumar, and D. Malakar

Transforming growth factor β priming of horse adipose mesenchymal stem cells stimulates antifibrotic cargo in their secreted extracellular vesicles
Y. Wong, C. Aguilera, X. Méndez, P. Poblete, A. Mançanares, L. Rodríguez-Alvarez, and F. Castro

Derivation and evaluation of bovine embryonic stem cells from early and full blastocyst-stage embryos
C. Guiltinán, J. I. Candelaria, M. B. Rabaglino, J. M. Smith, and A. C. Denicol

International Embryo Technology Society
Establishment of bovine induced pluripotent stem cells  

**Superovulation**

162 Simplification of a superovulation protocol using FSH and equine chorionic gonadotrophin in beef donors  
*J. Carvajal Basto, A. Catube, A. Tribulo, R. Tribulo, and G. A. Bo*

163 Superovulation efficiency by using different FSH-derived protocols in cattle: bovine medium-acting recombinant FSH versus conventional FSH  

164 Effect of dissolving solution on embryo recovery results of superovulation with FSH single subcutaneous injection  

165 Superovulatory response and embryo production using a bioactive recombinant equine chorionic gonadotrophin in sheep  

166 Superovulation with mainly constant doses of Pluset: Reconsideration of the decreasing doses dogma  
*V. Gorleri, I. Mujica, and D. F. Salamone*

167 Ovarian response and embryo production of cows superstimulated with different FSH regimens and inseminated with conventional or sex-sorted spermatozoa  

168 Improvement of *in vivo*-produced bovine embryo competence by using a bovine recombinant FSH in a superovulation protocol  

169 Superovulatory response and embryo production following administration of recombinant FSH (bscFSH-r) in dairy and beef cattle  

**Undergraduate Poster Competition Finalists**

170 Acetylation patterns of histone H3K27 in aged pig oocytes  
*K. Sprungl, H. Arena, S. Reynolds, and B. Whitaker*

171 Blood sample type and storage conditions affect circulating anti-Müllerian hormone concentrations in cattle  
*D. I. Saade-Rampolla, J. C. L. Motta, A. E. Crist, and A. Garcia-Guerra*

172 Hatch rate of Fowler’s toad (*Anaxyrus fowleri*) embryos as influenced by different culture media  
*L. Culpepper, D. Chen, I. Burger, S. Lampert, L.-D. Chen, E. Saylor, A. Kouba, and C. Kouba*
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Author Index

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

Abdelazim, A. M., 112
Abercrombie, B., 15
Abomughaid, M. M., 112
Abouhefnawy, H. A., 81
Absalon-Medina, V., 85, 124
Acosta-Galindez, J., 167
Adams, G., 40, 83
Adams, G. P., 14, 117
Adams, L., 16
Aguiar, L., 119
Aguilera, C., 1, 2, 50, 159, 163, 168, 169
Ahern, D. F., 116
Ahmadi, B., 123, 125
Akhtar, M., 145
Alberio, V., 74
Albero, G., 103
Alcaráz, L. P., 36
Aldag, P., 136
Ali, H., 146
Alvarado, E., 107
Alvarez, M. C., 25
Álvarez-Gallardo, H., 31, 65, 66
Alves, B., 41
Alves, R., 167
Amaral, T. F., 84
Ambrogi, M., 132, 133
Andrade, J. P., 126
Angel Velez, D., 42, 138, 139, 140, 144
Ansari, S., 157, 158
Antuña, S., 30, 165
Anzar, M., 40
Archilla, C., 52
Arenas, H., 149, 170
Arias-Álvarez, M., 90, 91
Ariu, F., 142
Assanova, Y. A., 44
Azari-Dolatabad, N., 42, 58, 138, 139, 140, 144
Báez, F., 32
Bai, H., 46
Bailey, V., 147
Bandeo, A., 59
Barandalla, M., 57, 73
Barber, D., 6, 18, 21, 28
Bartlewski, P., 123
Bartlewski, P. M., 125, 153
Baruselli, P. S., 122
Bastos, R., 125
Batista, R., 41
Baumgartner, T., 8, 12
Beaton, B., 71
Bebbere, D., 106, 142
Ben Hania, W., 82
Benedetti, C., 42, 138, 139, 140, 144
Benedetti, M., 57, 73
Benne, J., 71
Benninghoff, A., 15
Berdasco, M., 154
Berdugo, J., 59
Bermejo-Álvarez, P., 49
Bevacqua, R., 74
Blash, S., 86
Block, J., 155
Blockx, Z., 35
Bö, G. A., 30, 76, 121, 162, 165
Bogado Pascottini, O., 42, 138, 139, 140, 144
Bojsen-Moller Secher, J., 156
Bollwein, H., 7, 120
Bondioli, K. R., 33, 88, 94, 148
Borges, M. F. A., 29, 34
Bosi, G., 92
Bradecamp, E., 146
Brevini, T. A. L., 102
Briand-Amirat, L., 82
Briot, L., 52
Brisiki, O., 97
Bromfield, J., 114
Bromfield, J. J., 95, 155
Bruckmaier, R., 7
Bruno-Galarraga, M., 30, 165
Budiono, , 140
Burato, S., 95
Burger, I., 6, 18, 21, 28, 172
Butler, S. T., 78
Buzzelli, N., 86
Caamaño, D., 2, 50, 69
Cabezas, J., 163, 168, 169
Cabezas, J., 1, 2, 50, 69, 163, 168, 169
Cajas, Y. N., 90, 91
Calabria, A., 103
Campbell, M., 23
Camps, D. B., 54
Canadas, E. R., 85
Candelaria, J. I., 160
Canesi, S., 92
Cañón-Beltrán, K., 90, 91
Cardoso, B. L., 29, 34
Cardoso, J. L. L., 77
Carnevale, E., 137
Carrasco, R. A., 117
Carreno-Sala, L., 80
Carrocera, S., 61, 154
Carvajal Basto, J., 162
Carvalho, C., 106
Carvalho, F., 109
Castro, F., 1, 159, 163, 169
Castro, F. O., 2, 25, 168
Catandi, G., 137
Cattaneo, L., 30, 165
Catube, A., 162
Cedeño, A. V., 76
Célix, R., 107
Chan, W., 109
Chavatte-Palmer, P., 52, 82
Chelenga, M., 100
Chen, D., 6, 21, 172
Chen, D. M., 20
Chen, L.-D., 6, 18, 20, 172
Chen, Q., 5
Chevrier, L., 82
Chiba, H., 100
Chung, J., 4
Clark, K., 56, 132, 133
Colleoni, S., 57, 73
Consentini, C., 167
Correia, L., 41
Correia, L. F. L., 36
Cremonesi, F., 92
Crist, A. E., 171
Crowe, A. D., 78
Crudeli, G., 59
Cueto, M., 30, 165
Culpepper, L., 172
Curry, E., 23, 24, 26
Curtis, M., 27
Dadashpour Davachi, N., 123
Daels, P., 35, 53
Dahal, R., 150
Dahirel, M., 52
Daigneault, B., 62, 114
Dang-Nguyen, T., 39
Daniel, N., 52
Davis, D. B., 95
Davis, O., 113
de Agostini Losano, J. D., 114
de Aguiar, L. H., 94
de Barros, F., 106
De Blende, P., 35
De Brun, V., 32
De Coster, T., 42, 51
De Geoffroy, E., 52
De Iorio, T., 102
De la Fuente, A., 146
de la Rey, M., 19
de los Reyes, M., 101
de Souza, J. C., 77
Philpott, M., 23
Picard-Hagen, N., 9
Piedrahita, J., 4
Pilane, C., 38
Pilane, C. M., 87
Pimenta, C., 126
Pinto, C., 119, 147
Pirosanto, Y., 13, 115
Piscopo, F., 103
Poblete, P., 69, 159
Pol, J., 82
Pol, J., 36
Polejaeva, I., 15, 16, 110, 161
Polkoff, K., 4
Ponce-Salazar, M. D., 10
Pontelo, T. P., 128
Pontes, J. H. F., 77
Poole, V., 18, 21
Prata, A., 126
Prather, R. S., 79
Prieto, C., 30, 165
Pringle, T. D., 95
Pru, J., 96
Quinton, H., 82
Quispe, Y. M., 129
Rabaglino, M., 118, 156, 160
Rabenau, B., 104
Rajapaksha, K., 40
Rajput, S., 132, 133
Rajput, S., 8
Ramos-Ibeas, P., 49
Randi, F., 78
Randi, F., 36
Raniktar, S., 104
Ratner, L., 74, 97
Ravida, N., 19, 27
Ravin, N. V., 110
Reamsnyder, T., 124
Reed, S., 5
Residwaiti, G., 140
Residwaiti, G., 138
Reynolds, S., 149, 170
Riaz, A., 145
Ribeiro, H., 126
Rizo, J. R., 155
Rizos, D., 90, 91
Robl, A., 126
Rodrigues, J. N. D., 125
Rodrigues, R., 78
Rodriguez-Alvarez, L., 1, 2, 25, 50, 69, 159, 163, 168, 169
Rodriguez-Osorio, N., 32
Rodriguez-Zas, S. L., 130, 131
Rojas Cañadas, E., 122
Romo, S., 31, 65, 66
Romo-Dominguez, S., 66
Rosa, C., 54
Ross, C. E., 116
Roth, T., 24
Roth, T. L., 23, 26
Roth, Z., 55
Rubessa, M., 29, 34, 130, 131, 132, 133
Rubtsova, M. P., 110
Ruggeri, E., 16, 19
Ryan, P., 105
Ryu, J., 109
Saadeldin, I. M., 112
Saade-Rampolla, D. I., 171
Sabry, R., 48
Sadeghi, H., 138
Saez-Ruiz, D., 25
Saini, S., 157, 158
Sala, R., 80, 124
Sala, R. V., 85
Salamone, D., 74, 97, 166
Salman, S., 104
Salvetti, P., 154
Sanchez, O., 168
Sanchez, J. M., 78, 118
Sanchez, O., 163, 169
Sang, L., 84
Santos, L., 127
Santos, R., 8, 12
Santos-Rivera, M., 6
Santos-Villanueva, E., 53
Saravia, F., 25
Sartori, R., 54, 126, 167
Savy, V., 74
Saylor, E., 172
Scarlet, D., 7
Scheffler, T. L., 47
Schwarzmann, L., 7
Scoggin, C., 146
Sebopela, M. D., 134, 141, 143
Seekford, Z. K., 95, 155
Sehlabela, L. D., 111
Sekizawa, H., 164
Seneda, M., 54
Sergiev, V. P., 110
Shedova, E. N., 110, 135
Shi, J., 5
Sidi, S., 140
Silva, L., 167
Silva, M., 167
Silva, T., 167
Silva-ibañez, P., 69
Singina, G. N., 110, 135
Siqueira, L., 127
Siqueira, L. G. B., 84
Sirard, M., 19
Sithole, S. M., 134, 141, 143
Siuda, M., 120
Smith, D., 18, 21
Smith, J. M., 160
Smith, W., 124
Smits, K., 42, 51, 58, 139
Somfai, T., 39
Song, K., 68
Songsasen, N., 60, 150
Sosa, F., 84
Soto-Heras, S., 98
Sousa, M. A. P., 125
Souza-Fabjan, J., 41
Souza-Fabjan, J. M. G., 36
Spate, L. D., 79
Springl, K., 149
Springl, K., 170
Stewart, R. L., 95
Stoddard, S., 43
Stoecklein, K. S., 79
Su, Y., 161
Sugawara, M., 164
Suvá, M., 74
Syne, R., 86
Takahashi, M., 46
Talbot, A. S., 33, 94
Tang, Y., 161
Tannous, M., 132, 133
Tannura, J. H., 29, 34
Tardivo, B., 30, 165
Teran, E., 115
Terán, E., 13
Terashima, T., 164
Tesfaye, D., 108
Thakur, A., 157, 158
Thema, M. A., 37, 87
Thorin, C., 82
Tian, X., 104, 161
Tillquist, N., 5
Toishibekov, Y. M., 44
Toishybek, D. Y., 44
Tomlinson, B., 86
Tomkins, L., 70
Tompros, A., 23
Tribulo, A., 162
Tribulo, R., 162
Troedsson, M., 146
Truong, V. B., 48
Tschopp, J. C., 121
Tshabalala, M., 38
Tsukui, O., 51
Tuska, H., 140
Usman Mehmood, M., 145
Uzbekov, R. E., 135
Uzbekova, S., 135
Valencia, E., 80
Valera, M., 13
Valledor, L., 61
Vallejos, N., 59
Van Damme, P., 140

International Embryo Technology Society
van Heule, M., 35, 93
Van Soom, A., 42, 51, 58, 138, 139, 140, 144
Vargas, L. N., 128
Velásquez, A. E., 1
Velázquez-Roque, A., 31, 65, 66
Veldhuisen, J., 64
Veraguas, D., 2
Veraguas-Davila, D., 25
Vergani, G. B., 125
Verma, V. N., 157, 158
Vermeesch, J., 51
Verstraete, M. H., 35, 53, 93
Vetter, M., 147
Vettical, B. S., 67
Viana, J., 99, 127
Viana, J. H. M., 84, 128
Villaseñor-González, F., 31, 65, 66
Viñoles, C., 32
Viotti Perisse, I., 15
Vivanco-Mackie, H. W., 10
Volz, L., 98
Walker, C. N., 94
Wang, L., 161
Wang, Y., 3
Wani, N. A., 67, 81
Waseem, M., 145
Watanabe, Y. F., 72
Weiner, H., 70
Wellert, S. R., 122
Wheeler, M. B., 130, 131
Whitaker, B., 149, 170
White, B. R., 116
White, K., 15
Wiltbank, M., 126
Wiltbank, M. C., 54
Wimel, L., 52
Winuthayanon, W., 96
Wirtu, G., 43
Wojtusik, J., 23, 24, 26
Womack, S. A., 130, 131
Wong, Y., 1, 159, 168
Wong, Y. S., 2, 50, 69
Wood, T., 150
Wrenzycki, C., 89
Wu, J., 3
Wu, Y., 100
Wydooghe, E., 58
Wyffels, J., 17
Yaacobi-Artzi, S., 55
Yanagawa, Y., 100
Yang, S., 40
Yee, S. P., 161
Ynsaurralde-Rivolta, A., 74
Yokota, A., 164
Young, C., 16, 19, 27
Yu, L., 3
Zanatta, G. M., 122
Zhang, D., 104
Zhu, J., 161
Zhu, L., 3, 5
Zijlstra, A., 64
Zimmer, B., 89
Zinn, S., 5
Zinovieva, N. A., 110
Zwiefelhofer, E., 14, 83
Zwiefelhofer, M., 14, 83

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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

Collaborating with these world-leading scientists allows us to call on their expertise on subjects such as improvements to our existing media system, development of new products, as well as supporting customers in their use of our products.
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.
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
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$_{2\alpha}$, 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:

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

Exhibit Hall Layout

Hyatt Regency - Main Building

River Street
**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.

The company inventories more than 300 ART items, including oocyte and embryo collection and transfer devices, semen collection-evaluation-packaging and insemination equipment, veterinary pharmaceuticals, media for *in vitro* fertilization-incubation-transfer, multi-well culture dishes, and controlled-rate portable biological freezers and incubators. We appreciate the challenges you face with your reproduction program and work hard to create and source effective, high-value solutions that positively influence your success.

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.

Because *success transfers*, we take pride in customer relationships and providing you with the products and detail that you expect. Our team looks forward to collaborating with you!

8801 Anderson Ave.
Manhattan, KS 66503 USA
Phone: +1 (785) 776-3863
Fax: +1 (785) 776-4295
www.agtechinc.com
Booth: 10

**DRAMINSKI S.A.**
Draminski—A world-leading manufacturer of veterinary ultrasound scanners for large and small animals and the systems for embryo transfer. Since 1987, the company has been designing and manufacturing specialized portable equipment for veterinary medicine. Light and rugged became the signature characteristics of Draminski products intended for the most demanding users and the toughest of conditions.

We are present on all continents with a network of over 60 certified distributors worldwide. As a global player on the market, we care about the high quality of the products we offer and strong after-sales service. Innovation is in our blood and we add innovative products to the company’s portfolio all the time.

Ongoing cooperation with prestigious research centers and scientists throughout the world provides the understanding, use, and implementation of our instruments ahead of the expectations of our customers.

Owocowa 17
10-860 Olsztyn
Poland
Phone: +48 89 527 11 30
Fax: +48 89 527 84 44
www.draminski.com
Booth: 13

**E.I. Medical Imaging**
For over 35 years, E.I. Medical Imaging (EIMI) has been producing reliable, portable, veterinary ultrasound technology here in the United States. The Ibex and EVO platforms are the latest evolution of rugged, lightweight units. We deliver great image quality and processing power in weather-resistant, versatile units that are appropriate for all practice types.

110 12th Street SW, Unit 102
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.icpbiorepro.com
Booth: 3

**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:

- Embryo transfer
- Semen collection and analysis
- Sample preparation and dilution
- Packaging and cryopreservation
- Assisted insemination

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
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

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.
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299 Adams Street
Bedford Hills, NY 10507 USA
Phone: 914-666-6200 or 800-842-0607
www.universalimaginginc.com
Booth: 16

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
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MEDICAL
CANDES Preconference Symposium
Chair: Dragos Scarlet

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 athabascae)
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-Vélez, 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
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 manufacturers 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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