

# 2017 IETS

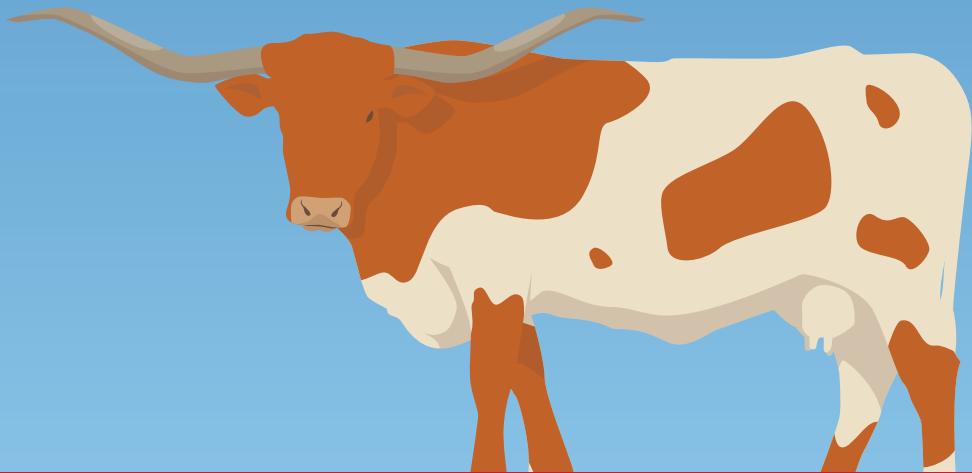
43rd Annual Conference

Renaissance Austin Hotel

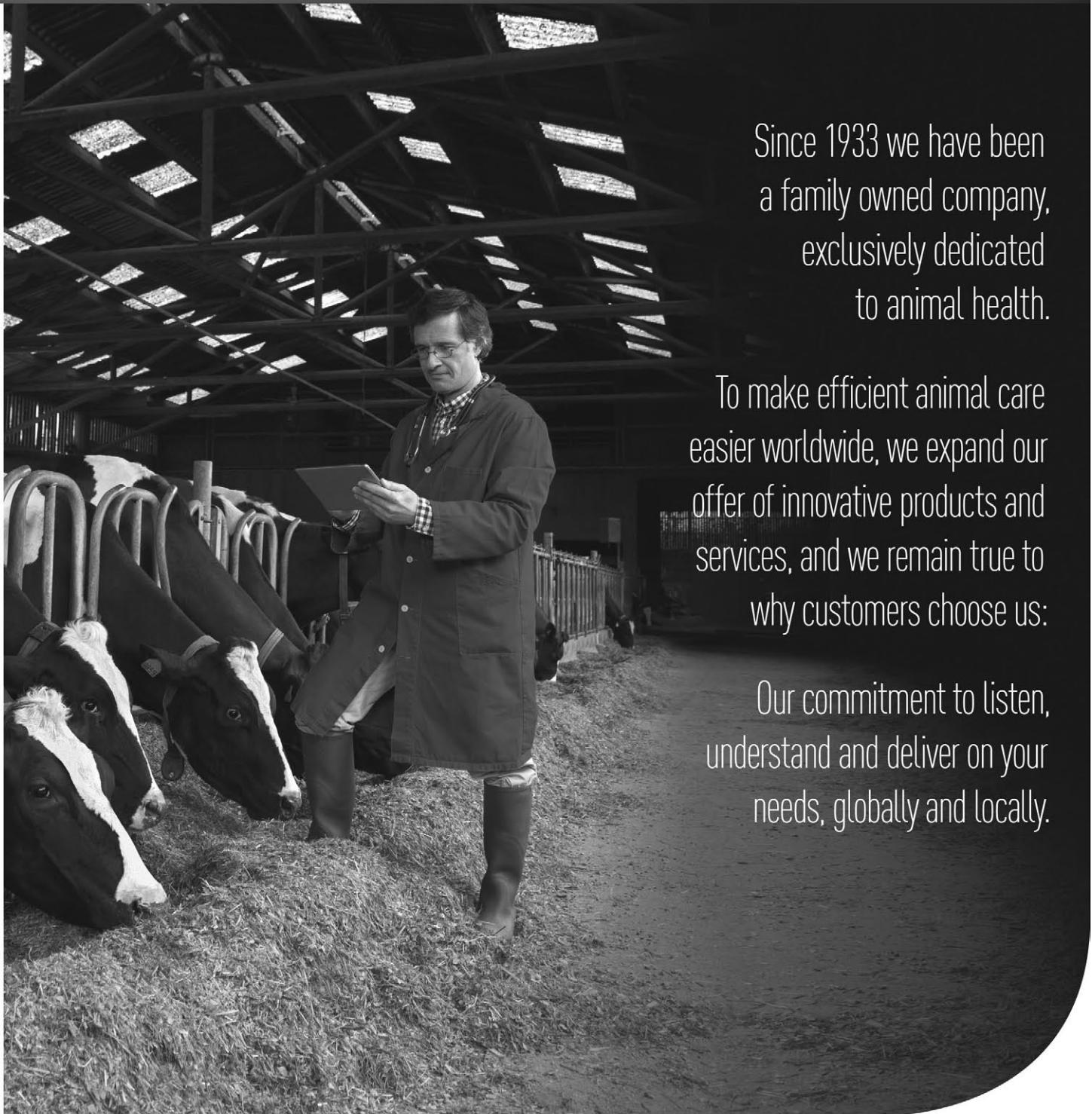
Austin, Texas

January 14–17, 2017

# Program Book



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# **Program Book**

**43rd Annual Conference of the  
International Embryo Technology Society**

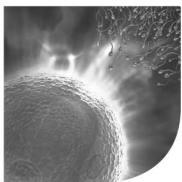
**From Molecules to Animals:  
Small Things Make Big Things Happen**



**Renaissance Austin Hotel  
Austin, Texas  
January 14–17, 2017**

**Scientific Program Co-Chairs:  
Tiziana A. L. Brevini and Charles R. Long**

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## Preface and Acknowledgments

The 43rd Annual Meeting of the International Embryo Technology Society will be held at Renaissance Austin Hotel in Austin, Texas, USA, from January 14 to 17, 2017. This year's program theme is "From molecules to animals: Small things make big things happen." When we defined this year's main theme, we were inspired by a quote from John Wooden, the legendary American basketball player and one of the most revered coaches in the history of sports, which states "Little things make big things happen." We feel this addresses two fundamental points in science: 1) the importance of observations carried out at the molecular level to obtain a better understanding of the whole and 2) the impact of team building to gather all expertise and disciplines, which is indispensable for good laboratory work, to investigate complex problems in a multidisciplinary approach.

The annual conference of the IETS is organized with five plenary sessions featuring 10 invited speakers who will provide in-depth overviews of different aspects related to the main theme, together with short oral presentations selected from the submitted abstracts. This year, the major topics include gene editing, molecular mechanisms regulating fertility, ART logistics and biosecurity for commercial embryo production, nutritional control of oocyte and embryo quality, and embryo communications. Poster sessions address recent advances in animal biotechnology. In addition, R. Michael Roberts will give the keynote lecture presentation, titled "Exploring early differentiation and pluripotency in domestic animals."

We are grateful to many people for their valuable contributions of time and effort in organizing this scientific meeting.

Special thanks goes to Mark Westhusin, Chair of the Local Organizing Committee, for arranging the closing party and social events. We also thank Cesare Galli and Charles Looney for organizing the Practitioners' Forum, titled "What do you want to know about OPU/IVF in Cattle?" Jorge Piedrahita for organizing the preconference DABE Symposium, and Gabriela Mastromonaco for organizing the CANDES Forum.

We would like to thank the main session speakers and their co-authors, the authors of the abstracts, and the participants in the student competition for providing excellent scientific material. This year, 240 abstracts were submitted and 213 were accepted for the journal. We sincerely appreciated the timely help of the manuscript reviewers and we are particularly grateful to all the section editors and abstract reviewers for their generous efforts during the summer, a time usually devoted to more pleasant occupations. We also thank Charles Rosenkrans for his leading role in selecting the student competition finalists. We are indebted to our colleagues and students who have responded to our invitations to volunteer their time and accepted the responsibility of chairing the various presentation sessions, as this is an important task for the smooth running of any meeting.

We would like to take this opportunity to thank the Morulas, who have developed into a very active and enthusiastic group, representing the bright future of our society, and we encourage all students to participate in the organized events.

We also send our appreciation to the IETS Board of Governors and Executive Board for their support in preparing for the 2017 Annual Conference. Enough thanks cannot be expressed to Debi Seymour, the Executive Secretary of IETS, and to Graeme Martin, Editor-in-Chief, and Jenny Foster, publisher, of *Reproduction, Fertility and Development* for their help in the production of the conference booklets and proceedings.

This meeting would not be possible without the critical economic contributions of our sponsors, and we especially thank them for their support. Finally, we thank you all for attending and contributing to the conference and hope that you have an exceptionally rewarding time at the 43rd Annual Conference of the IETS.

Hope to see y'all in Austin!

Tiziana A. L. Brevini & Charles R. Long  
2017 IETS Program Co-Chairs



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# 2017 Recipient of the IETS Pioneer Award

## Heiner Niemann



**Award Presentation: Tuesday, January 17, at 09:35**

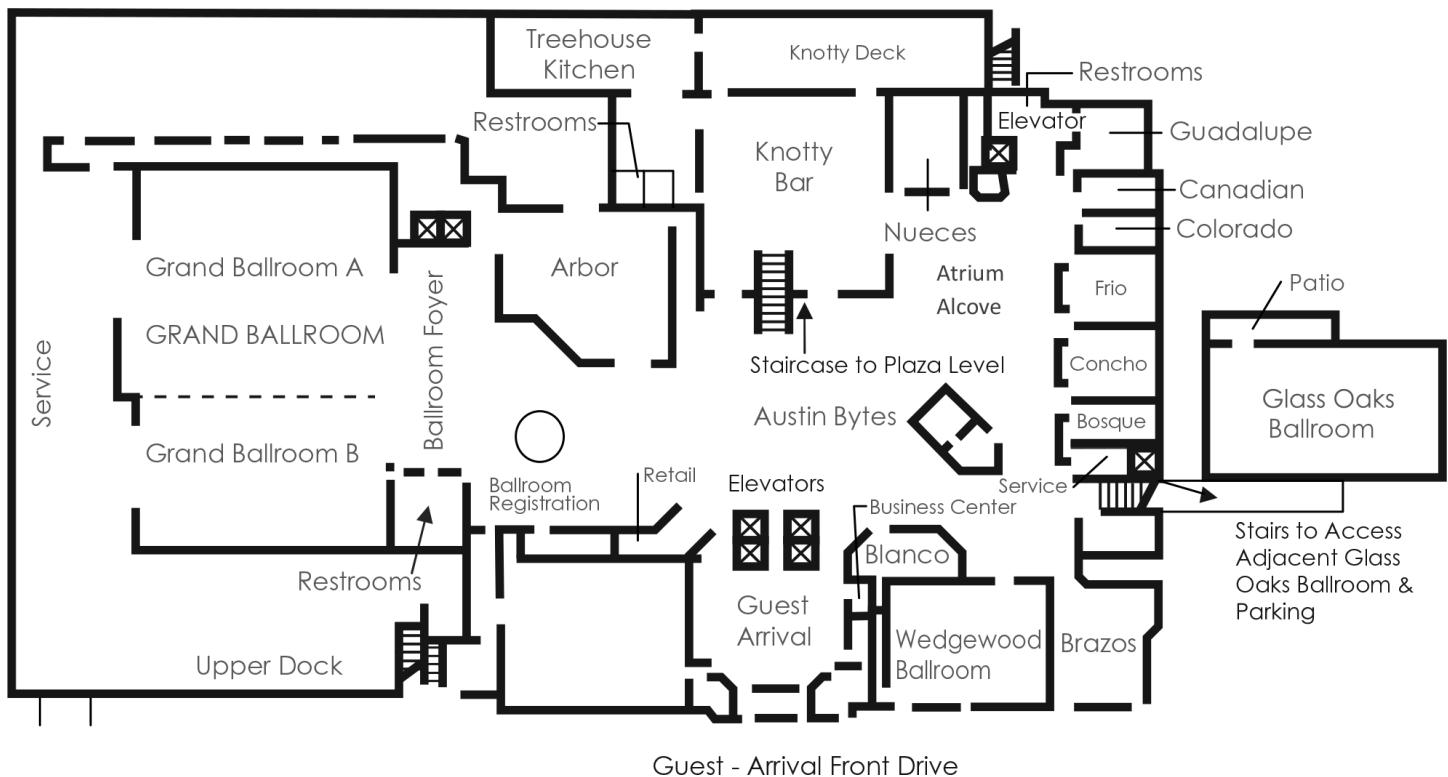
## Previous Recipients

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

# Map of the Venue

Renaissance Austin Hotel  
9721 Arboretum Boulevard, Austin, Texas 78759

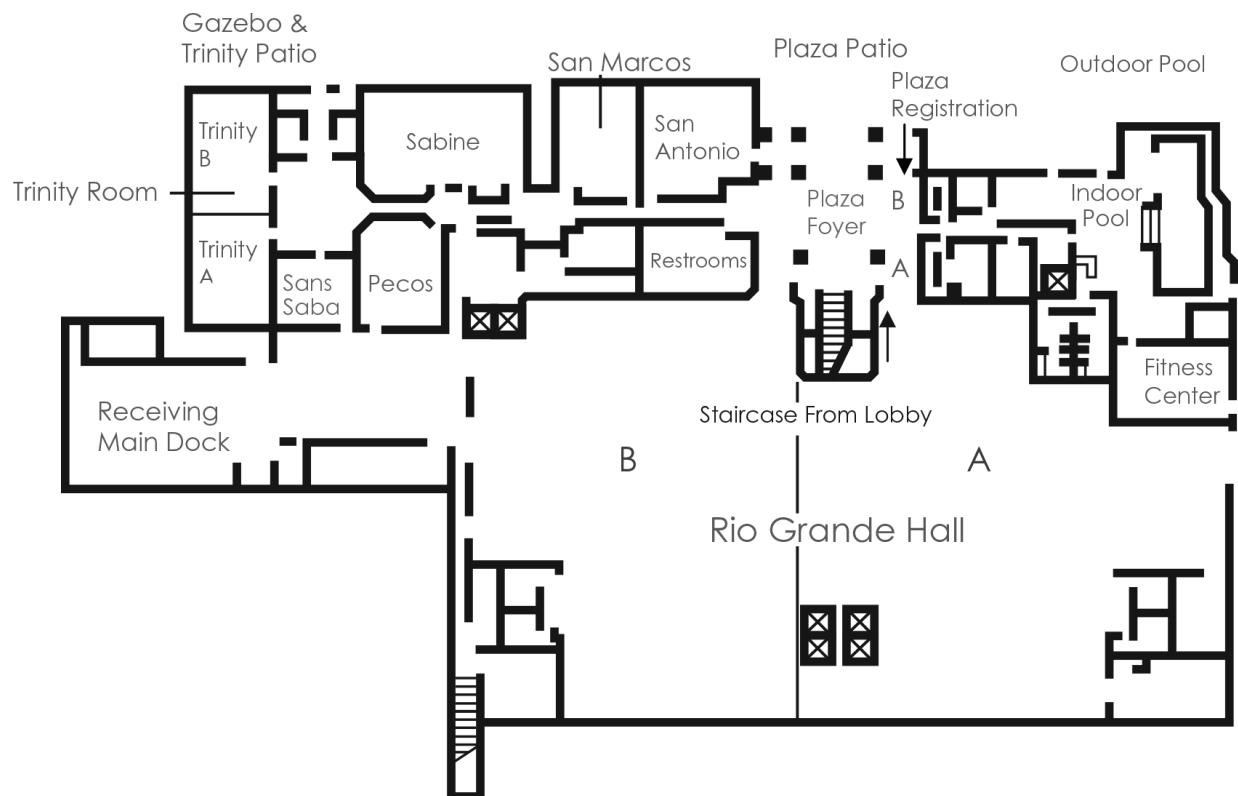
## Atrium Level (Lobby Level)



# Map of the Venue

Renaissance Austin Hotel  
9721 Arboretum Boulevard, Austin, Texas 78759

## Plaza Level (Lower Level)



# General Information

## Meeting Room Directory

Main Conference Sessions	Ballroom A; Concurrent Sessions: Ballroom B, Practitioners' Forum
Exhibits	Rio Exhibit Hall B
Poster Displays	Rio Exhibit Hall B

Please see the Scientific Program on page 8 for additional room assignments.

## Registration Desk Hours

The registration desk is located at Concho on the Atrium Level.

### Pick up of preregistration packets

Friday, January 13                  16:00–19:00

### On-site registration hours

Saturday, January 14              07:00–18:00

Sunday, January 15                07:00–18:00

Monday, January 16               07:30–16:00

Tuesday, January 17              08:00–15:00

## Exhibit Information

Rio Exhibit Hall B

### Setup

Saturday, January 14              09:00–17:00

### Exhibits open

Sunday, January 15                09:00–17:00  
                                      18:00–19:00 (Reception)

Monday, January 16              08:00–17:00

Tuesday, January 17             08:30–13:00

### Teardown

Tuesday, January 17              13:00–17:00

Details on the exhibitors can be found in the Exhibit Directory on page 45.

## Badges

As a security requirement, we request that all participants wear their conference name badges to all sessions and social functions.

## Certificates of Attendance and Presentation

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 make exchanges at the larger airports, Denver, Los Angeles, Atlanta, Dallas, or Houston.

## Messages

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

## Refreshments

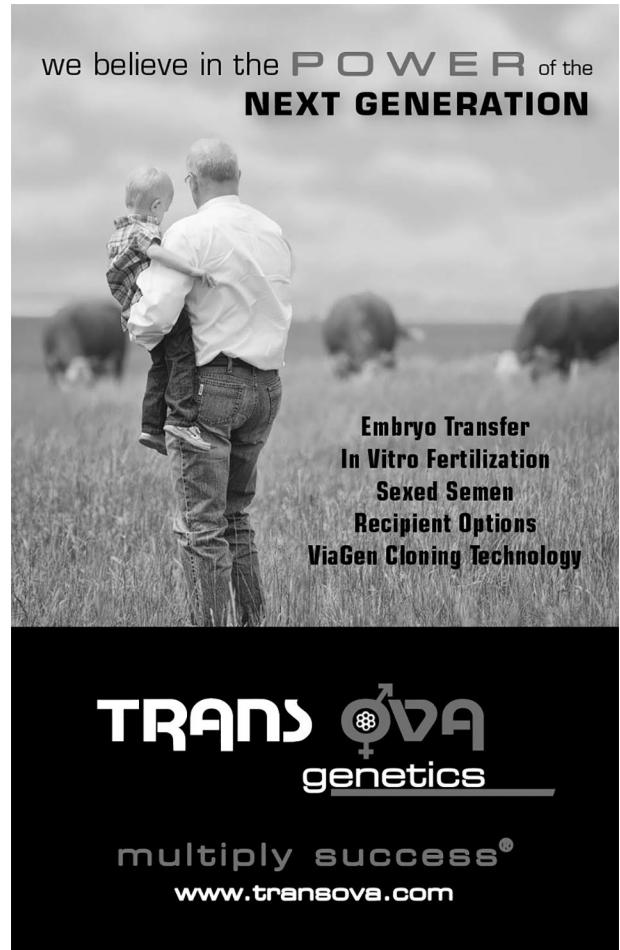
Morning and afternoon refreshments are included in your registration fee and are provided during the scheduled break times in the Exhibit area located in Rio Exhibit Hall B.

## Dining and Entertainment

There are restaurants and lounges located in the Renaissance Austin Hotel. In addition to the hotel restaurants, the Aboretum Mall is located right next to the hotel for your shopping and dining pleasure.

## Services and Amenities

The Renaissance Austin Hotel has a fitness center, indoor and outdoor pools, and a whirlpool. Security, a business center, restaurants and lounges, valet parking, and many more services and amenities are offered to make your stay feel as if you were in the comfort of your home. The Renaissance Austin offers complimentary wi-fi in all public areas and wireless Internet in the guest rooms.



# Program

## Thursday, January 12

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

## Friday, January 13

08:00–17:00 IETS Board of Governors meeting (Frio)  
09:00–13:00 HASAC Research Subcommittee meeting (San Antonio)  
13:00–17:00 W-3171 Committee meeting (Pecos)  
14:00–18:00 HASAC Regulatory Subcommittee meeting (San Antonio)  
16:00–19:00 Registration (Concho)

## Saturday, January 14

07:00–18:00 Registration (Concho)  
08:00–17:00 Domestic Animal Biomedical Embryology (DABE) Preconference  
*Workshop on the Use of CRISPR-Cas9 for Gene Editing: Principles and Practices*,  
Program listing on page 57 (Grand Ballroom B)  
08:00–12:00 AETA Certification Exam (for initial certification) (Pecos)  
09:00–17:00 Commercial Exhibit Setup and Poster Setup (Rio Exhibit Hall B)  
14:00–17:15 Morulas Workshop, program listing on page 56 (Sabine)  
*Sponsored by CSIRO*  
17:00–21:00 IETS Foundation Board of Trustees meeting (Frio)

## Sunday, January 15

07:00–08:30 Poster Setup (Rio Exhibit Hall B)  
07:00–18:00 Registration (Concho)  
07:00–08:30 Past President's Breakfast (Pecos)  
07:00–08:30 Graduate and Undergraduate Student Competition Presenters Breakfast, with IETS Foundation Education Chair (Frio)  
09:00–17:00 Affiliates Lounge (Sans Saba)  
09:00–18:00 Commercial Exhibition (Rio Exhibit Hall B)  
08:45–09:00 Opening and Welcome - Tiziana Brevini, Charles Long, and Mark Westhusin (Grand Ballroom A)

### Session I: Gene-Editing: Concepts, Tools, and Achievements (Grand Ballroom A)

Session co-chairs: Daniel Salamone, Universidad de Buenos Aires, and Paul Kordowitzki, Friedrich-Loeffler-Institut

09:00–09:40 Concepts and tools for gene editing  
*Lluis Montoliu, National Centre for Biotechnology, Spain*  
09:40–10:20 Gene editing in livestock  
*Kevin Wells, University of Missouri, USA*  
10:20–10:35 Invited Abstract Oral Presentation (Grand Ballroom A)  
Efficient generation of myostatin promoter mutations in bovine embryos using the CRISPR/Cas9 system  
*C. A. Pinzon\*, M. Snyder, J. Pryor, B. Thompson, M. Golding, and C. Long (Abstract 207)*  
10:35–11:00 Refreshment Break/Poster Exhibit and Exhibition (Rio Exhibit Hall B)

## **Session II: Molecular Mechanisms Regulating Male and Female Fertility (Grand Ballroom A)**

*Session co-chairs: Matthew Wheeler, University of Illinois, and Bruna Rodrigues Willhelm, Universidade Federal do Rio Grande do Sul*

- 11:00–11:40 Potential role of microRNAs in mammalian female fertility  
*Dawit Tesfaye, University of Bonn, Germany*
- 11:40–12:20 Expression of microRNA in male reproductive tissues and their role in male fertility  
*Scott Pratt, Clemson University, USA*
- 12:20–12:35 Invited Abstract Oral Presentation (Grand Ballroom A)  
Next generation sequencing discloses differences in microRNA expression profiles of buffalo (*Bubalus bubalis*) embryos produced by hand-made cloning and *in vitro* fertilization  
*S. Lagah\*, T. J. Sood, P. Palta, M. Mukesh, R. S. Manik, M. Chauhan, and S. K. Singla (Abstract 32)*
- 12:35–14:00 Lunch Break
- 12:35–14:00 IETS Board Luncheon with Affiliate Society Representatives (San Antonio)
- 12:35–14:00 HASAC Manual and Certificates Subcommittee Meeting (Pecos)
- 12:35–14:00 Morulas and Mentor Luncheon (Sabine)

## **IETS Foundation Student Competition Presentation (Grand Ballroom A)**

*Session chair: Charles F. Rosenkrans, University of Arkansas*

- 14:00–14:15 Insulin treatment during *in vitro* oocyte maturation leads to different gene expression and methylation patterns of key genes associated with metabolism and steroid synthesis in the bovine blastocyst  
*D. Laskowski, P. Humblot, M. A. Sirard, Y. Sjunnesson, G. Andersson, and R. Bage (Abstract 1)*
- 14:15–14:30 Bovine embryonic stem-like cells derived from *in vitro*-produced blastocysts  
*Y. S. Bogliotti, J. Wu, M. Vilariño, K. Suzuki, J. C. Belmonte, and P. J. Ross (Abstract 2)*
- 14:30–14:45 SIRT1–A possible marker for reproductive aging of *in vivo*-derived bovine oocytes?  
*P. Kordowitzki, S. Klein, K.-G. Hadeler, P. Aldag, M. Nowak-Imialek, A. Lucas-Hahn, and H. Niemann (Abstract 3)*
- 14:45–15:00 Subfertility in bulls carrying a nonsense mutation in TMEM95 is due to failure to penetrate the zona pellucida  
*B. Fernandez-Fuertes, S. Kölle, and P. Lonergan (Abstract 4)*
- 15:00–15:15 Testicular GnRh-II receptor knockdown impairs diurnal testosterone secretion in the boar  
*A. T. Desaulniers, R. A. Cederberg, C. A. Lents, and B. R. White (Abstract 5)*
- 15:15–15:30 Aneuploidy tolerance in rhesus macaque pre-implantation embryos via micronuclei formation, cellular fragmentation, and blastomere exclusion  
*B. L. Daughtry, J. L. Rosenkrantz, N. Lazar, N. Redmayne, K. A. Nevonen, L. Carbone, and S. L. Chavez (Abstract 6)*
- 15:30–16:00 Refreshment Break/Poster Exhibit and Exhibition (Rio Exhibit Hall B)

## **Concurrent Forum**

### **16:00–18:00 Practitioners' Forum (Grand Ballroom B)**

*Co-chairs: Cesare Galli, AVANTEA, Italy, and Charles Looney, OvaGenix LP*

*Sponsored by Partner Animal Health Inc.*

What do you want to know about OPU/IVF in cattle?

IETS Foundation Early Career Achievement Award Winner (Practitioner)

## **Concurrent Forum**

### **16:00–18:00 CANDES (Grand Ballroom A)**

*Chair: Gabriela Mastromonaco, Toronto Zoo, Canada, and Pierre Comizzoli, Smithsonian Conservation Biology Institute*

16:00–16:15 Business update

16:15–17:00 Epigenetic changes due to environmental and social challenges

*David Crews, University of Texas, Austin*

Successful reproduction is more than sperm meets egg. Much goes before and after, and much of that is mediated by behavior. For centuries agriculturists used complementarity, or mutual choice, as standard practice. Modern science has revealed that complementarity is necessary at all levels of biological organization (molecules, hormones, brain and behavior). Mutual choice sometimes is not possible with threatened and endangered species or with certain breeds. In the former there might not be the numbers, and indeed, only gametes may be available. As a long-time member of the IUCN and on the Crocodilian Specialist Group, I have first-hand knowledge of the daunting task this can present. In the latter, the coefficient of harm to profit may not make it an acceptable risk. My purpose is to provide entry into the area of behavioral endocrinology that may be useful in your own practice. Propagation efforts with any species draw upon knowledge and skills of reproductive physiology, immunology, behavior, and the brain. Adding the microbiome, we are speaking of the total organism, its' life history and present conditions. Some significant discoveries in basic research experimental work do not appear to have penetrated the field of assisted reproduction in many species, particularly as it relates to behavior. For example, (a) Norman Adler documented that in laboratory rats intromission, including cervical stimulation, in a patterned manner that resembles the natural mating sequence, is essential for catapulting the sperm from the sperm cap in the mating plug into the uterus; Milton Diamond subsequently found evidence for species differences, amounting to a vaginal code particular to the species. Cynthia Bluhm demonstrated that self-selection by both the male and the female canvasbacks is essential for the surge in luteinizing hormone (LH); in forced pairings the female never exhibited a LH surge necessary for ovulation. Many experiments with reptiles, birds, and mammals show pronounced reproductive success with mutual mate choice. (b) Conspecifics can serve as social buffers and, with a modicum of emphasis in predictability and control, stress can be minimized. Such information can modulate the now serious effects of environmental contamination. (c) Beginning with the Industrial Revolution, the Chemical Revolution has been particularly pernicious. Endocrine disrupting chemicals (EDCs) are ubiquitous and have well-documented effects on both sex determination and sexual differentiation, often to the extent that exposed individuals, or even those descended from exposed individuals, are functionally sterile. (d) It is particularly important to appreciate that organisms are not exposed to pure chemicals, but to mixtures of chemicals, often unique to particular geographies. Little is known about these effects at the level of individuals, even though population level effects are obvious. (e) A classic principle in environmental toxicology is that for every chemical there is a threshold level, below which there is no response. There is now clear evidence that for at least three EDCs there is no threshold. Because transitions between critical life stages (e.g., conception, birth, and adolescence) are modulated by a delicate balance of naturally occurring hormones, any EDC contamination changes endocrine signalling systems with severe consequences to development. (f) We know that adult individuals with high body burdens of EDCs have compromised immune systems and reproductive difficulties. (g) However, focusing only on EDCs is overly narrow. Habitat loss, air pollution, hypoxic water, and open pit mining for metals and minerals are just a few of the other permanent changes in our ecosystems. Taken together, anthropogenic changes to the environment, most often acting through epigenetic mechanisms, represent a rapidly accelerating evolutionary force with unpredictable outcomes. Even chemicals no longer in production (for example, polychlorinated biphenyls or PCBs) and banned in the USA, Canada, and Europe for decades, continue to be detectable in body tissues of virtually all wildlife (including humans).

17:00–18:00	Short talks from CANDES travel award winners Maternal obesity at conception and insulin sensitivity in late gestation alters placental structure but no fetal biometry at birth in the horse <i>M. Robles, E. Noveau, L. Wimel, C. Dubois, M. Dahirel, A. Tarrade, and P. Chavatte-Palmer (Abstract 67)</i>
	First llama born by <i>in vitro</i> fertilization <i>L. Landeo, J. Mendoza, L. Manrique, E. Taipe, R. Molina, J. Contreras, and J. Ruiz (Abstract 158)</i>
	Incorporation and developmental toxicity of quantum dot nanoparticles in amphibian larvae <i>A. R. Julien, S. B. Park, C. K. Vance, P. L. Ryan, S. T. Willard, A. J. Kouba, and J. M. Feugang (Abstract 116)</i>
18:00–19:00	Welcome Reception (Rio Exhibit Hall B) <i>Sponsored by Professional Embryo Transfer Supply Inc. (PETS)</i>

## Monday, January 16

07:00–18:00	Registration (Concho)
08:00–17:00	Commercial Exhibits (Rio Exhibit Hall B)
09:00–17:00	Affiliates Lounge (Sans Saba)

### Session III: ART Logistic and Biosecurity for Commercial Embryo Production (Grand Ballroom A)

Session co-chairs: Carol Keefer, University of Maryland, and Jesus Manuel Palomino, University of Guelph

08:00–08:40	Logistic of large scale commercial IVF embryo production <i>Patrick Blondin, Boviteq-Semex, Canada</i>
08:40–09:20	Caprine arthritis encephalitis: An example of risk assessment for embryo trading <i>Francis Fieni, Oniris, France</i>
09:20–10:20	Invited Abstract Oral Presentations (Grand Ballroom A) Influence of estrus expression and treatment with gonadotropin-releasing hormone on pregnancy rates in recipients synchronized with progesterone devices and estradiol and transferred at a fixed time <i>A. Cedeño, A. Tribulo, S. Andrada, J. L. Barajas, J. Fonseca, A. Ruiz, R. Tribulo, H. Tribulo, R. J. Mapletoft, and G. A. Bó* (Abstract 103)</i>
	Freezing bull semen in a synthetic medium <i>L. Gavin-Plagne*, P. Bodranghien, A. Vachet, L. Commin, S. Buff, and T. Joly (Abstract 53)</i>
	Survival of Holstein <i>in vitro</i> -produced embryos cultured in novel synthetic oviductal fluid media (SCF1) and dehydrated prior to cryopreservation <i>C. M. Owen*, M. Barceló-Fimbres, J. L. Altermatt, and L. F. Campos-Chillon (Abstract 45)</i>
	Near-infrared spectroscopy and aquaphotomics analysis of serum from mares exposed to the fungal mycotoxin zearalenone <i>C. K. Vance*, K. R. Counsell, L. A. Agcanas, N. Shappell, S. Bowers, S. T. Willard, and P. L. Ryan (Abstract 105)</i>

### 10:20–10:45 Distinguished Service Award (Grand Ballroom A)

10:45–11:15	Refreshment Break/Poster Exhibit and Exhibition (Rio Exhibit Hall B)
10:45–12:45	Poster session I (Rio Exhibit Hall B)
12:45–14:00	Lunch Break
12:45–14:00	Exhibitors' Luncheon with IETS Board of Governors (San Antonio)

- 12:45–14:00 IETS Data Retrieval Committee Meeting (Pecos)  
12:45–14:00 Morulas Career Luncheon (Sabine)  
*Sponsored by CSIRO*

#### **Session IV: Food for Thought: Nutritional Control of Oocyte and Embryo Quality (Grand Ballroom A)**

*Session co-chairs: Rebecca Krisher, National Foundation for Fertility Research, and Kathryn Polkoff, University of Illinois*

- 14:00–14:40 Epidemiological evidence for metabolic programming in dairy cattle  
*Geert Opsomer, Ghent University, Belgium*
- 14:40–15:20 Effects of dry matter and energy intake on quality of oocytes and embryos in ruminants  
*Roberto Sartori, University of São Paulo, Brazil*
- 15:20–15:35 Invited Abstract Oral Presentation  
Effect of progesterone supplementation of day 4 after timed artificial insemination on pregnancy rate of lactating dairy cows  
*G. Tortorelli\*, A. J. Azrak, V. da Costa Andrade, R. dos Santos Ramos, A. S. Moraes, M. A. da Silva Menon, M. R. Bastos, and C. da Costa Carrer (Abstract 72)*
- 15:35–16:00 Refreshment Break/Poster Exhibit and Exhibition (Rio Exhibit Hall B)
- 16:00–16:30 IETS Business Meeting (Grand Ballroom A)
- 16:30–17:00 Peter Farin Trainee Award Winners Presentations (Grand Ballroom A)**
- 17:00–18:00 HASAC Open Meeting (Grand Ballroom A)
- 17:00–18:00 Morulas Forum (Grand Ballroom B)
- 18:30–19:30 Morulas Student Mixer, Knotty Deck & Bar, Renaissance Austin Hotel

### **Tuesday, January 17**

#### **07:00–08:00 Sunrise Sponsor Session, Sexing Technologies (Sabine)**

- 07:00–08:30 Organizational Meeting of the IETS Board of Governors (Frio)
- 08:00–15:00 Registration (Concho)
- 09:00–15:00 Affiliates Lounge (Sans Saba)
- 08:00–12:30 Commercial Exhibits (Rio Exhibit Hall B)

#### **Session V: Embryo Communications: Who is Talking to Whom? (Grand Ballroom A)**

*Session co-chairs: Dimitrios Rizos, National Institute for Agriculture and Food Research, and Technology, Spain, and Andressa Varella Gonsirooski, Universidade Federal do Rio Grande do Sul*

- 08:00–08:40 Emerging role of extracellular vesicles in communication of preimplantation embryos *in vitro*  
*Ann Van Soom, Ghent University, Belgium*
- 08:40–09:20 Insights into conceptus elongation and establishment of pregnancy in ruminants  
*Thomas E. Spencer, University of Missouri, USA*
- 09:20–09:35 Invited Abstract Oral Presentation (Grand Ballroom A)  
Improvement of an *in vitro* canine oocyte maturation by oviductal secretome  
*A. Lange-Consiglio\*, C. Perrini, P. Esposti, and F. Cremonesi (Abstract 188)*

#### **09:35–10:00 Pioneer Award (Grand Ballroom A)**

- 10:00–10:30 Refreshment Break/Poster Exhibit and Exhibition (Rio Exhibit Hall B)
- 10:00–12:00 Poster session II (Rio Exhibit Hall B)
- 12:00–12:30 15th Annual IETS Running Competition

- 12:00–14:00 Lunch Break  
12:00–14:00 Organizational Lunch Meeting of the IETS Foundation (Frio)  
12:00–14:00 2017, 2018, 2019 IETS Program Committee Lunch (Sabine)  
13:00–17:00 Commercial Exhibit and Poster Takedown (Rio Exhibit Hall B)

### **Session VI: Keynote Lecture (Grand Ballroom A)**

*Session chair: Christine Wrenzycki, Justus-Liebig-Universität Gießen*

- 14:00–14:45 Exploring early differentiation and pluripotency in domestic animals  
*R. Michael Roberts, University of Missouri, USA*

### **Awards Presentations and Updates (Grand Ballroom A)**

- 14:45–15:15 IETS Foundation Early Career Achievement Award Winner (Scientist)  
15:15–16:15 IETS Foundation Student Competition Awards, CANDES, DABE, and HASAC Updates  
16:15–16:30 Closing Ceremony (Grand Ballroom A)  
19:00–23:00 Closing Party, The Pecan Grove, catered by The Salt Lick BBQ Company

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# Poster Session Information

## Location

Posters are located in Rio Exhibit Hall B of the Renaissance Austin Hotel on the Plaza Level (see map on page 4).

## Poster Numbers

Posters are identified by the number corresponding to the abstract number in *Reproduction, Fertility and Development* 2017; 29 (1). Numbering of the posters begins at 1 and ends at 213.

## Setup

Posters can be put up from 08:00 to 17:00 on Saturday, January 14, 2017, and from 06:30 to 08:00 on Sunday, January 15, 2017. **All posters must remain up throughout the meeting.** Authors of posters not put up by 08:00 on Sunday will be reported to the IETS President for possible disciplinary action.

## Poster Session I

**Presentations by authors of odd-numbered abstracts** (e.g., 7, 9, 11) in *Reproduction, Fertility and Development* 2017; 29 (1); the Student Competition finalist; and Undergraduate finalist poster presentations will take place Monday, January 16, 2017, from 10:45 to 12:45.

## Poster Session II

**Presentations by authors of even-numbered abstracts** (e.g., 8, 10, 12) in *Reproduction, Fertility and Development* 2017; 29 (1), will take place Tuesday, January 17, 2017, from 10:00 to 12:00.

## Teardown

Poster teardown will take place from 12:00 to 13:00 on Tuesday, January 17, 2017. Posters that are not taken down **by 13:00 on Tuesday will be taken down and discarded.**

# Poster Session Order by Topic

Poster number = abstract number in *Reproduction, Fertility and Development* 2017; 29 (1)

## Student Competition

- 1 Insulin treatment during *in vitro* oocyte maturation leads to different gene expression and methylation patterns of key genes associated with metabolism and steroid synthesis in the bovine blastocyst  
*D. Laskowski, <sup>SC</sup> P. Humblot, M. A. Sirard, Y. Sjunnesson, G. Andersson, and R. Bage*
- 2 Bovine embryonic stem-like cells derived from *in vitro*-produced blastocysts  
*Y. S. Bogliotti, <sup>SC</sup> J. Wu, M. Vilariño, K. Suzuki, J. C. Belmonte, and P. J. Ross*
- 3 SIRT1—A possible marker for reproductive aging of *in vivo*-derived bovine oocytes?  
*P. Kordowitzki, <sup>SC</sup> S. Klein, K.-G. Hadeler, P. Aldag, M. Nowak-Imialek, A. Lucas-Hahn, and H. Niemann*
- 4 Subfertility in bulls carrying a nonsense mutation in TMEM95 is due to failure to penetrate the zona pellucida  
*B. Fernandez-Fuertes, <sup>SC</sup> S. Kölle, and P. Lonergan*
- 5 Testicular GnRH-II receptor knockdown impairs diurnal testosterone secretion in the boar  
*A. T. Desaulniers, <sup>SC</sup> R. A. Cederberg, C. A. Lents, and B. R. White*
- 6 Aneuploidy tolerance in rhesus macaque pre-implantation embryos via micronuclei formation, cellular fragmentation, and blastomere exclusion  
*B. L. Daughtry, <sup>SC</sup> J. L. Rosenkrantz, N. Lazar, N. Redmayne, K. A. Neponen, L. Carbone, and S. L. Chavez*

## Artificial Insemination

- 7 Influence of estrus expression and treatment with GnRH on pregnancy rates in beef cattle synchronized with progesterone devices and estradiol and inseminated at a fixed-time  
*G. A. Bó, A. Cedeño, A. Tribulo, S. Andrada, R. Tribulo, J. L. Barajas, J. Ortega, M. Pellizari, and R. J. Mapletoft*
- 8 Anti-Müllerian hormone at weaning and breeding as a predictor of beef heifer fertility  
*R. W. Rorie, H. R. Newberry, T. D. Lester, M. Acharya, and C. R. Hansen*
- 9 Evaluation of a modified GnRH-based timed artificial insemination protocol associated with estrus detection in cyclic beef heifers inseminated with sex-selected semen  
*M. G. Colazo, P. R. Whittaker, D. J. Bignell, and R. J. Mapletoft*
- 10 Prediction of calving time using body-surface temperature sensors and pedometers in beef cattle  
*Y. Nishimura, M. Mise, K. Imai, and O. Dochi*
- 11 Pregnancy rates and *ATP1A1* polymorphism in thermotolerant Holstein cows during summer in Brazil  
*T. F. Lacerda, R. B. G. C. Carvalho, M. G. Favoreto, and B. Loureiro*
- 12 Ovarian structures, estrus expression, and pregnancy rate in beef heifers using estradiol cypionate or GnRH as ovulation inductors in timed AI protocol  
*E. Pradebon da Silva, A. B. Machado, L. S. Gambin, A. V. Gonsioroski, M. da Silva, M. L. Bernardi, M. M. Dias, M. F. da Cunha Chaiben, and J. B. S. Borges*

- 13 Effects of nerve growth factor- $\beta$ , purified from bull seminal plasma, on corpus luteum function and conceptus development in cows  
*J. L. Stewart,<sup>SC</sup> V. R. G. Mercadante, I. F. Canisso, and F. S. Lima*
- 14 Enhancement of the early recovery of ovary and uterus functions by treatment of ECG and povidone-iodine in postpartum Japanese Black cattle  
*H. Matsuda, T. Yamanouchi, Y. Goto, M. Ohtake, and Y. Hashiyada*
- 15 Quantification of bull sperm traits as assessed by computer-assisted semen analysis and the relationship to pregnancy rate following controlled breeding  
*M. L. Mphaphathi, M. M. Seshoka, F. V. Ramukhithi, Z. C. Raphalalani, T. R. Netshirovha, A. Maqhashu, N. L. Kanuya, M. B. Raito, J. P. C. Greyling, and T. L. Nedambale*
- 16 Comparative study on epididymal sperm traits of Bonsmara and Nguni bulls  
*A. Maqhashu, T. R. Netshirovha, N. Bovula, L. G. Makhanya, P. J. Sebei, M. B. Matabane, M. L. Mphaphathi, and T. L. Nedambale*
- 17 Sperm fertility rate assessed by embryo production *in vivo* and *in vitro* in South African bulls  
*M. H. Mapeka,<sup>SC</sup> F. V. Ramukhithi, C. M. Pilane, D. Norris, C. Banga, and K. C. Lehloenya*
- 18 SemenRate: The use of computer-assisted semen analysis and flow cytometry for objective bovine semen analysis in the United Kingdom  
*M. W. Spilman, K. L. Burton, and J. M. E. Statham*
- 19 A novel approach to comparing reproductive stage serum profiles in mares using near-infrared spectroscopy and aquaphotomics  
*L. A. Agcanas,<sup>SC</sup> K. R. Counsell, N. Shappell, S. Bowers, P. L. Ryan, S. T. Willard, and C. K. Vance*
- 20 Effect of penicillamine, hypotaurine, and epinephrine treatment on motility, hyperactivity, and acrosome reaction of ram spermatozoa  
*K. El-Shahat, T. Ismail, M. Badr, and K. Zaki*
- 21 Evaluation of semen extenders for short-term storage of ram semen at 4°C  
*M. Acharya, J. M. Burke, C. Hansen, and R. W. Rorie*
- 22 Dynamic of synchronized follicular wave in ewes subjected to different doses of 17 $\beta$ -oestradiol given at beginning of the progesterone protocol  
*M. E. F. Oliveira, R. P. Nociti, E. S. C. Camela, L. C. Padilha-Nakaghi, G. S. Maciel, M. G. K. Rodriguez, V. J. C. Santos, J. F. Fonseca, and W. R. R. Vicente*
- 23 The effect of withdrawal timing of controlled internal drug release (CIDR) on ewe reproductive performance  
*A. Swelum,<sup>SC</sup> A. Moumen, and A. Alowaimer*
- 24 Relationship between boar sperm traits and fertility rate following artificial insemination under smallholder production systems  
*M. B. Matabane, P. Nethenzheni, R. Thomas, D. Norris, K. Nephawé, M. Tsatsimpe, and T. L. Nedambale*

## Cloning/Nuclear Transfer

- 25 Production of transgenic pigs with CreER-mediated astrocytic-specific recombination system for neurological disease models  
*S.-U. Hwang,<sup>SC</sup> J. D. Yoon, K. Eun, H. Kim, and S.-H. Hyun*
- 26 The use of paired CRISPR guide RNAs and the Cas9 system does not always produce site specific deletions of gene sequence in porcine cell and embryo culture  
*A. M. Spate, K. M. Whitworth, C. W. O'Gorman, A. K. Byrne, R. S. Prather, and K. D. Wells*

- 27 Oxidative stress of liver in transgenic piglets with multiple copies of transgenes soluble human tumour necrosis factor receptor type IG-FC and human heme oxygenase-1  
*G. A. Kim, J.-X. Jin, S. Lee, A. Taweechaipaisankul, H. J. Oh, C. Ahn, I. M. Saadeldin, and B. C. Lee*
- 28 Improved hatch rate after partial dissection of zona pellucida in cloned pig embryo  
*Y. J. Kim, K. S. Ahn, S. M. Park, B. C. Lee, H. Shim, and C. Ahn*
- 29 Positron emission tomography imaging of brain metabolism and dopaminergic neuron destruction in Parkinson's disease model pig  
*H. J. Oh, J. Moon, G. A. Kim, S. Lee, S. H. Paek, S. Kim, H. Kim, J. H. Kim, and B. C. Lee*
- 30 Oxygen deprivation does not further augment mitochondrial membrane potential in pharmacologically treated fibroblasts for use in somatic cell nuclear transfer  
*B. R. Mordhorst,<sup>SC</sup> S. N. Bogue, K. D. Wells, J. A. Green, and R. S. Prather*
- 31 Efficient generation of Klotho mutations in porcine somatic cell nuclear transfer embryos using a delivery of Cas9 ribonucleoproteins  
*S. Lee, M. H. Jung, H. J. Oh, O.-J. Koo, and B. C. Lee*
- 32 Next-generation sequencing discloses differences in microRNA expression profiles of buffalo (*Bubalus bubalis*) embryos produced by hand-made cloning and *in vitro* fertilization  
*S. Lagah,<sup>SC</sup> T. J. Sood, P. Palta, M. Mukesh, R. S. Manik, M. Chauhan, and S. K. Singla*
- 33 Buffalo (*Bubalus bubalis*) embryos produced by hand-made cloning and *in vitro* fertilization differ in their global transcriptome profile  
*T. J. Sood,<sup>SC</sup> S. Viviyan, S. K. Singla, M. Mukesh, M. S. Chauhan, R. S. Manik, and P. Palta*
- 34 Production of transgenic cloned buffalo embryos containing overexpressed stearoyl Co-A desaturase gene following efficient transfection  
*T. Sharma,<sup>SC</sup> D. Dua, N. Saini, M. K. Singh, S. K. Singla, P. Palta, R. S. Manik, A. Alam, and M. S. Chauhan*
- 35 Use of metaphase donor cells and activation with roscovitine for somatic cell nuclear transfer in bovine  
*G. V. Landschoot,<sup>SC</sup> V. Savy, N. Canel, S. Ferraris, and D. Salamone*
- 36 Serial somatic cell nuclear transfer increases pregnancy losses in goats  
*M. Yang, J. Hall,<sup>SC</sup> Q. Meng, Z. Fan, and I. Polejaeva*
- 37 Normality of neonatal reflex in cloned dogs  
*E. M. N. Setyawan,<sup>SC</sup> G. A. Kim, H. J. Oh, M. J. Kim, A. Taweechaipaisankul, S. H. Lee, Y. B. Choi, and B. C. Lee*
- 38 Production of transgenic dogs that overexpress peroxisome proliferator-activated receptor-alpha in a muscle-specific manner  
*M. J. Kim, H. J. Oh, E. M. N. Setyawan, Y. B. Choi, S. H. Lee, M. S. Kwon, B. C. Koo, T. Kim, and B. C. Lee*

## Cryopreservation/Cryobiology

- 39 The effects of resveratrol during *in vitro* maturation on the developmental competence of porcine oocytes vitrified at the immature stage  
*E. C. S. Santos, T. Somfai, R. Appeltant, T. Q. Dang-Nguyen, H. Kaneko, N. Junko, T. Nagai, and K. Kikuchi*

- 40 The effect of exposure time on toxicity of vitrification solution on porcine cumulus-oocyte complexes  
before *in vitro* maturation  
*R. Appeltant, T. Somfai, E. C. S. Santos, and K. Kikuchi*
- 41 The effect of ultrarapid vitrification for sheep oocyte viability  
*M. Toishibekov, Y. Toishibekov, and M. Yermekova*
- 42 The effect of various cryoprotective agents and slow cooling rate on viability of sheep ovarian tissue  
*A. S. Seisenbayeva,<sup>SC</sup> Y. M. Toishibekov, U. I. Iglmanov, and B. A. Valieva*
- 43 Correlations of methods of sperm analysis in fresh semen of South African indigenous goat  
*O. A. Ajao,<sup>SC</sup> F. Fushai, D. O. Owiny, and D. M. Barry*
- 44 Successful kidding after ultrarapid vitrification of goat embryos  
*Y. Toishibekov and M. Yermekova*
- 45 Survival of Holstein *in vitro*-produced embryos cultured in novel synthetic oviductal fluid media (SCF1) and dehydrated prior to cryopreservation  
*C. M. Owen, M. Barceló-Fimbres, J. L. Altermatt, and L. F. Campos-Chillon*
- 46 Vitrification of immature and mature bovine oocytes  
*P. T. Hardin,<sup>SC</sup> F. A. Diaz, B. A. Foster, E. J. Gutierrez, and K. R. Bondioli*
- 47 Cryopreservation of bovine germ cell using antifreeze polyamino-acid (carboxylated poly-L-lysine)  
*T. Fujikawa, C. Kubota, T. Ando, S. Imamura, M. Tokumaru, H. Yamakuchi, Y. Gen, and S.-H. Hyon*
- 48 Effect of dimethyl sulfoxide- or glycerol-based vitrification protocols on the DNA methylation of bovine cumulus-oocyte complexes  
*E. J. Gutierrez, F. A. Diaz, B. A. Foster, P. T. Hardin, and K. R. Bondioli*
- 49 Successful cryopreservation using low ethylene glycol concentration for *in vitro*-produced bovine embryos  
*M. Takayama, S. Sato, Y. Nishimura, K. Imai, and O. Dochii*
- 50 Survival of sexed IVF-derived bovine embryos frozen at different preimplantation stages of development  
*L. Ferré, C. Fresno, M. Kjelland, and P. Ross*
- 51 Caspase-3 inhibitor Z-VAD-FMK enhances cryotolerance of *in vitro*-produced bovine pre-implantation embryos  
*M. E. Pero, G. Zullo, C. De Canditiis, G. Albero, V. Longobardi, A. Salzano, R. Varchetta, and B. Gasparini*
- 52 Cryopreservation of bovine somatic cell using antifreeze polyamino-acid (carboxylated poly-L-LYSINE)  
*T. Fujikawa, C. Kubota, T. Ando, Y. Gen, and S.-H. Hyon*
- 53 Freezing bull semen in a synthetic medium  
*L. Gavin-Plagne,<sup>SC</sup> P. Bodranghien, A. Vachet, L. Commin, S. Buff, and T. Joly*
- 54 Single layer centrifugation before cryopreservation improves bull sperm quality  
*T. Nongbua, A. Utta, N. Am-In, J. Suwimonteerabutr, A. Johannisson, and J. Morrell*
- 55 Seminal plasma components and their relationship with stallion semen freezability  
*A. Usuga, G. Restrepo, and B. Rojano*
- 56 The viability and longevity of Ogye chicken frozen semen with mitotempol, mitochondria-specific antioxidant  
*S. W. Kim, M. S. Kim, C.-L. Kim, D. Kim, and H.-H. Seong*

- 57 Effect of seminal plasma removal on sperm characteristics and mitochondrial membrane following cryopreservation of South African indigenous buck semen  
*L. P. Nethenzheni, M. L. Mphaphathi, P. V. M. Kalonji, V. Monyelote, N. C. Negota, L. R. Madzhie, O. A. Ajao, D. M. Barry, and T. L. Nedambale*
- 58 Radio-frequency identification Inteli-Straws: Gametes and embryo packaging, storage, and information recovery  
*M. E. Kjelland, T. Loper, C. Woodley, T. M. Swannack, T. K. Stroud, and S. Romo*
- 59 Effect of pellet volume and thawing temperature on vitrification efficacy with domestic cat semen collected via urethral catheterization  
*A. Moresco, H. L. Bateman, J. Newsom, and W. F. Swanson*

## Developmental Biology

- 60 Effects of concanavalin A on the progesterone production by bovine steroidogenic luteal cells *in vitro*  
*F. C. Destro, I. Martin, F. D. C. Landim-Alvarenga, R. Sartori Filho, J. L. Pate, and J. C. P. Ferreira*
- 61 Reversible inhibition of bovine minor embryonic genome activation impairs pre-implantation development  
*R. P. Nociti,<sup>SC</sup> R. V. Sampaio, V. F. M. H. de Lima, R. M. Schultz, and P. J. Ross*
- 62 Bovine *OCT4 (POU5F1)* knockout embryos fail during the second lineage differentiation due to loss of Nanog  
*K. Simmet, N. Klymiuk, V. Zakhartchenko, T. Güngör, M. Reichenbach, H.-D. Reichenbach, and E. Wolf*
- 63 Effect of endometrial biopsy on uterine health of tropically adapted beef cattle  
*O. Ramirez-Garzon,<sup>SC</sup> N. Satake, R. E. Lyons, C. Palmieri, J. Hill, C. Gallego-Lopez, M. K. Holland, and M. McGowan*
- 64 Effects of nanopurified boar semen for artificial insemination on protein detection in swine offspring muscle and fat tissue  
*W. A. Moorhead,<sup>SC</sup> C. L. Durfey, S. Liao, D. Devost-Burnett, G. D. A. Gastal, P. L. Ryan, S. T. Willard, and J. M. Feugang*
- 65 Ovulation of immature oocytes with high competence rates  
*A. M. Taiyeb, S. A. Muhsen-Alanssari, M. E. Kjelland, S. M. Taiyeb, A. I. Haji, D. C. Kraemer, and M. T. Ridha-Albarzanchi*
- 66 Developmental health assessment of offspring produced from magnetic nanoparticles using near infrared analysis of plasma  
*K. R. Counsell,<sup>SC</sup> C. L. Durfey, J. M. Feugang, S. T. Willard, P. L. Ryan, and C. K. Vance*
- 67 Maternal obesity at conception and insulin sensitivity in late gestation alters placental structure but not fetal biometry at birth in the horse  
*M. Robles,<sup>SC</sup> E. Nouveau, L. Wimel, C. Dubois, M. Dahirel, A. Tarrade, and P. Chavatte-Palmer*
- 68 Growth and market quality of pigs born from magnetic nanoparticle-treated boar spermatozoa  
*C. L. Durfey,<sup>SC</sup> S. Liao, D. Devost-Burnett, T. Dinh, M. Crenshaw, S. T. Willard, P. L. Ryan, H. Clemente, and J. M. Feugang*
- 69 Blastocysts developed from embryos that spent up to 2-cell stage *in vivo* exhibited massive DNA methylation dysregulation including imprinted genes and DNA methyltransferases  
*D. Salilew-Wondim, M. Hoelker, U. Besenfelder, V. Havlicek, E. Held, F. Rings, D. Gagné, E. Fournier, M. A. Sirard, C. Robert, E. Tholen, C. Neuhoff, K. Schellander, and D. Tesfaye*

- 70 XBP1 dysregulation by CRISPR/Cas9-mediated gene editing during porcine embryo early development  
*K. Gutierrez, W. G. Glanzner, N. Dicks, R. C. Bohrer, L. G. Currin, L. Michalovic, L. B. Agellon, and V. Bordignon*
- 71 Melatonin improves porcine *in vitro* maturation via sonic hedgehog signalling  
*J.-X. Jin, S. Lee, A. Taweechaipaisankul, G. A. Kim, and B. C. Lee*

## Early Pregnancy

- 72 Effect of progesterone supplementation on Day 4 after timed artificial insemination on pregnancy rate of lactating dairy cows  
*G. Tortorelli,<sup>SC</sup> A. J. Azrak, V. da Costa Andrade, R. dos Santos Ramos, A. S. Moraes, M. A. da Silva Menon, M. R. Bastos, and C. da Costa Carrer*
- 73 Spatial differences in metabolites and energy substrates in the bovine oviduct  
*V. Maillo, C. Simintiras, R. Sturmey, P. Lonergan, and D. Rizos*
- 74 The bovine embryo influences the proteome of the oviductal fluid  
*V. Maillo, O. S. Acuña, M. Aviles, P. Lonergan, and D. Rizos*
- 75 Placenta protein profile characterization by placentome size and gestational age in cattle  
*M. M. Ramirez, J. F. Martins, P. R. Villamil, M. Bertolini, L. R. Bertolini, and A. A. Moura*
- 76 *CLOCK* mutant mice having a diminished circadian clock show abnormal implantation  
*T. Amano*

## Embryo Culture

- 77 Transcriptome profiling in oocytes-embryo and granulosa cells from bovine  
*M. A. Sirard, É. Fournier, I. Dufort, I. Gilbert, and C. Robert*
- 78 Supplementation with carnosine during *in vitro* culture improves the quality of *in vitro*-produced bovine embryos  
*D. Le Bourhis, M. Verachten, P. Salvetti, M. Hochet, and L. Schibler*
- 79 The cell-cycle related nuclear localization of platelet-activating factor in bovine and murine embryo development  
*L. T. M. Vandenberghe,<sup>SC</sup> C. De Schauwer, B. Heindryckx, and A. Van Soom*
- 80 Effect of bovine oviductal fluid on DNA methylation of bovine blastocysts produced *in vitro*  
*A. D. Barrera, E. V. García, M. Hamdi, M. J. Sánchez-Calabuig, D. Rizos, and A. Gutiérrez-Adán*
- 81 Improvement of developmental competence of bovine *in vitro*-produced embryos by adding 2-methoxystyrene in maturation media  
*A. Mesalam,<sup>SC</sup> I. Khan, K.-L. Lee, S.-H. Song, M.-D. Joo, M. M. R. Chowdhury, L. Xu, S. Zhang, J.-I. Jin, and I.-K. Kong*
- 82 How low can you go? Defining the minimal nutrient requirements for bovine embryos in culture  
*J. R. Herrick, A. F. Greene, J. Becker, W. B. Schoolcraft, and R. L. Krisher*
- 83 Bone morphogenetic protein signaling during interaction of the bovine embryo with oviductal epithelial cells *in vitro*  
*E. V. García, M. Hamdi, A. D. Barrera, M. J. Sánchez-Calabuig, A. Gutiérrez-Adán, and D. Rizos*

- 84 Pterostilbene can reduce the percentage of lipids and reactive oxygen species in *in vitro*-produced bovine embryos  
*F. Sosa, J. Fernando de la Torre, H. Álvarez, S. Pérez, M. E. Kjelland, and S. Romo*
- 85 Regulation of stearoyl-coenzyme A desaturase by fatty acids is essential to porcine early embryo development  
*D.-K. Lee, J. Y. Hwang, K.-H. Choi, S.-H. Kim, J.-N. Oh, and C.-K. Lee*
- 86 *In vitro*-matured gilt oocytes can have equal or better developmental competence than sow oocytes with new maturation media  
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PETS has been a world leading embryo transfer supply company in the bovine and equine industries for almost 3 decades. Our goal all this time has been your success and we work every day to achieve this with excellent customer service and quality E.T. supplies from multiple reputable companies such as ICPbio, Vetoquinol, MAI, SPI, Wesco, NovaVive and more.

**Come by and visit with us at Booth # 16 to find out more about our products.**

## 2017 Recipient of the IETS Distinguished Service Award



### Pascale Chavatte-Palmer

Pascale Chavatte-Palmer obtained her BS in 1984 and completed her DVM in 1989 with the national veterinary school of Alfort, located in Maisons-Alfort, Val-de-Marne, near Paris. She then went on to complete her residency in theriogenology with the University of Florida School of Veterinary Medicine, Gainesville, FL. Wanting to pursue a career in research, Chavatte-Palmer completed her PhD in 1995 at the University of Cambridge, and her postdoctoral studies in 1997 at the National Institute of Medical Research (INSERM), Paris.

Chavatte-Palmer began her career as a Lecturer from 1998 to 2006 with AgroParisTech, a leading university in life sciences and agronomy and one of the foremost and most prestigious Grandes Ecoles in France. It was after this that she joined INRA (National Institute of Agronomical Research) as a researcher/team leader, and she is still with this fine institute as a research director of the Reproduction and Developmental Biology unit.

Chavatte-Palmer has been an active member of IETS since 1999 and was elected as a member of the Board of Directors of IETS from 2009 to 2014. She was a co-chair of the scientific program for the 38th Annual Conference of the IETS in 2012 held in Phoenix, Arizona. She was also the head of the Local Conference organizing committee for the 41st Annual Conference of the IETS in 2015 held in Versailles, France. Chavatte-Palmer was very actively involved in the sponsorship committee that year, making the Versailles meeting one of the most financially successful meetings held in Europe. One IETS committee that was very dear to Chavatte-Palmer was the HASAC committee, which she chaired from 2010 to 2014 and acted as deputy chair after this. She certainly was an outstanding chair who made certain that HASAC represented IETS' priorities with the different governing bodies and other influential groups worldwide.

Chavatte-Palmer's scientific passion has permitted her to significantly advance the field of placental function and pathology. With over 266 publications and over 2,500 citations of her work, she remains an active scientist in reproductive biology. She has researched different areas such as progestogens in horses, bovine cloning and placental pathology, developmental programming and placental adaptations to a high fat diet in rabbits, feto-placental imaging, effects of air pollution by diesel exhaust on feto-placental development and offspring health in rabbits, and developmental origins of health and disease in horses and small ruminants. Chavatte-Palmer certainly is an important member of our scientific community and is also a member of different societies and invited speaker to many international meetings.

Because this award is given to recognize individuals who have provided outstanding leadership or service to the International Embryo Technology Society, it is clear why Pascale Chavatte-Palmer is a logical choice for the 2017 Distinguished Service Award. Congratulations!

# Special Events

## Morulas' Preconference Workshop

How to write an effective grant proposal

Saturday, January 14

14:00–17:30

Sabine

*Sponsored by CSIRO Publishing*

This preconference symposium organized by the IETS Morulas Board of Governors explores the necessary field of grant writing. Trainees should plan to arrive one day early and take advantage of this great opportunity by hearing from excellent speakers who are going to share their knowledge of grant writing from different perspectives, including Peter Sutovsky, Patrick Lonergan, and David Miller. All IETS members are welcome to attend this three and a half hour event that will cover the basics of grant writing and where to submit grants along with discussion from the audience. Trainees will have the opportunity to interact with each other and speakers in a short discussion that will close the conference. Please take advantage of this wonderful opportunity at a fantastic cost (**registration required**).

## Affiliates Lounge

Sunday, January 15 to Tuesday, January 17

07:00–17:00, Daily

Sans Saba

A room has been reserved for the society affiliates to meet and network for the duration of the meeting.

## Morulas and Mentor Luncheon

Sunday, January 15

12:35–14:00

Sabine

One of the main goals of the Morulas is to provide trainees opportunities to interact with the general membership of the IETS. The Morulas and Mentors luncheon is designed to give trainees a chance to sit down with mentors in small groups to develop meaningful connections with leaders in our field. Join a number of outstanding mentors at this annual event and choose from one of eight mentors that you would like to dine with. Our confirmed mentors are Pablo Ross, Marcello Bertolini, Peter Hansen, Gregg Adams, Reuben Mapletoft, Roberto Sartori, Katrin Hinrichs, and Jason Herrick (**ticket required**).

## Practitioners' Forum

Sunday, January 15

16:00–18:00

Grand Ballroom B

*Sponsored by Partner Animal Health Inc.*

What do you want to know about OPU/IVF in cattle?

## CANDES Forum

Sunday, January 15

16:00–18:00

Grand Ballroom A

## Welcome Reception

Sunday, January 15

18:00–19:00

Rio Exhibit Hall B

*Sponsored by Professional Embryo Transfer Supply Inc. (PETS)*

A welcome reception will be held in the Rio Exhibit Hall B of the Renaissance Austin Hotel from 18:00 to 19:00. Meet the exhibitors and renew old friendships. Light hors d'oeuvres will be served with a cash bar.

## **Sunrise Sponsor Session (Invitation Only)**

Monday, January 16

07:00–08:00

### **Sexing Technologies**

#### **Sex Sorted Semen—Coming of Age, Application in Artificial Insemination and Embryo Production**

After more than two decades of research and progressive commercial application, sex sorted semen has now come of age and it is a very viable option for livestock industries. A sure way to fast track genetic gain as well as multiply animal numbers from desired matings, sex sorted semen is now commonplace in dairy and beef cattle systems. The technology is also gaining acceptance in other livestock industries such as deer, sheep and goats. New research is also targeted at the large porcine industry. This session will feature some key speakers who will highlight recent developments in the technology and also provide examples for application in AI and ET programs (**invitation only**).

## **Morulas Career Luncheon**

Monday, January 16

12:45–14:00

Sabine

Sponsored by CSIRO Publishing

This year's Career Luncheon will feature a talk by two speakers who will share unique perspectives from their own personal career paths. Hear from Carrie Hanna from the Oregon National Primate Research Center and François-Xavier Grand from Boviteq, Canada. This forum provides a chance for trainees to gain perspective outside of their current work environment and meet others with similar aspirations (**ticket required**).

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

Monday, January 16

17:00–18:00

Grand Ballroom A

## **Morulas' Trainee Forum**

Monday, January 16

17:00–18:30

Grand Ballroom B

All trainees are invited and encouraged to attend the Morulas Trainee Forum. The Board of Governors will be updating the membership on activities and attending to business matters. In addition, we will welcome the new Morulas Governors, recognize the 2016 Mentor of the Year Recipient, 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.**

## **Morulas' Student Mixer**

Monday, January 16

18:30–19:30

Knotty Deck & Bar, Renaissance Austin Hotel

After business comes fun! Shortly after the Morulas Trainee Forum, everyone is invited to gather with friends and drinks for a social event. Hosted by IETS, this annual event is a fun time for all trainees and general members to relax and enjoy the atmosphere. Take advantage of meeting new people and establish connections that will last a lifetime. The mixer will be conveniently located in the Knotty Deck & Bar in the Renaissance Hotel. **Registration and tickets are NOT required.**

## **15th Annual IETS Fun Run**

Tuesday, January 17

12:00–12:30

Maps will be located at the registration desk.

Even if you do not participate, come and cheer on the runners in a magnificent landscape and even dress up!

## **Closing Party**

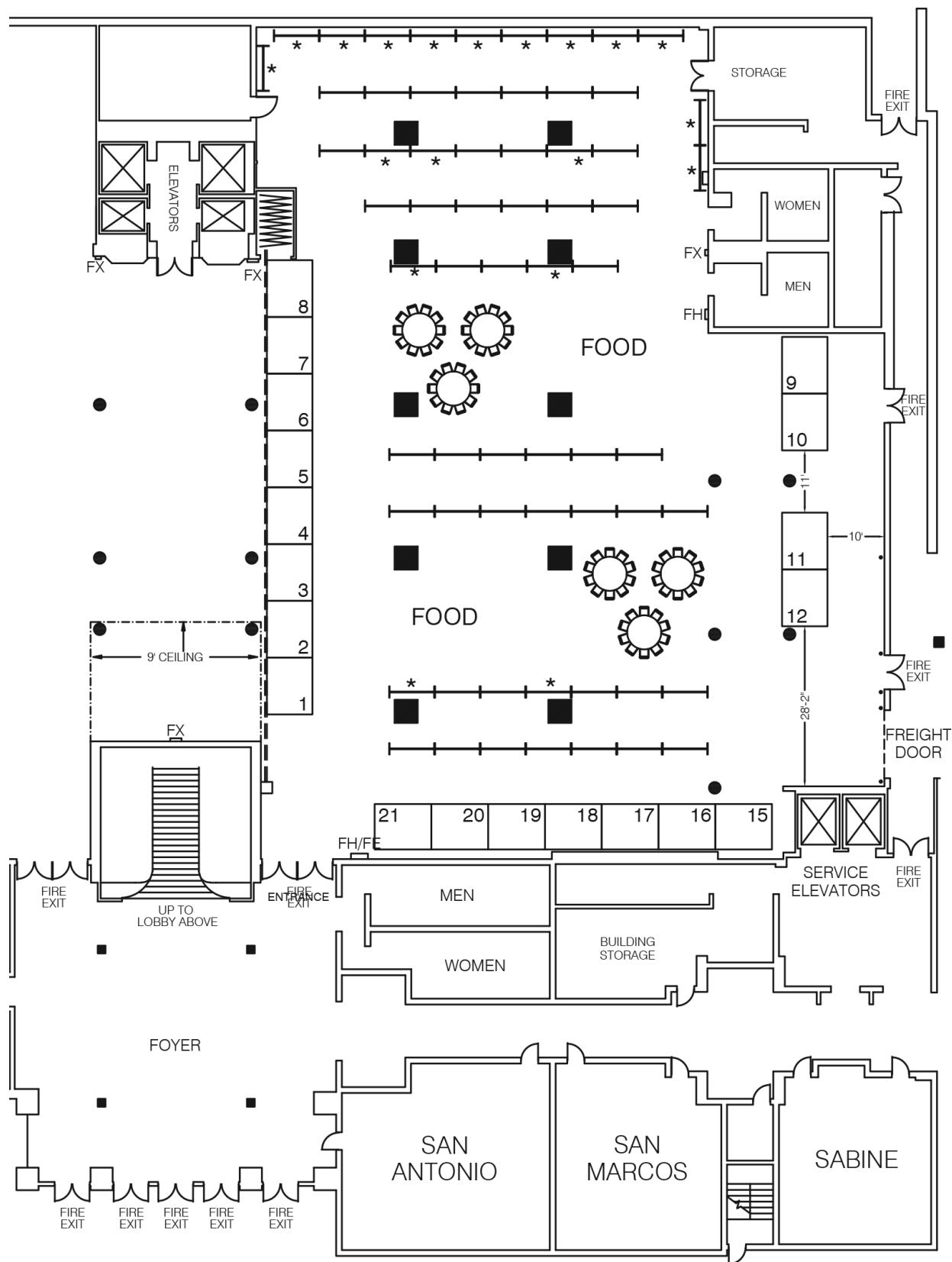
Tuesday, January 17

19:00–23:00

The Pecan Grove

**Come and join us for the event of the week.** Share a meal, enjoy the surroundings and get reacquainted with old friends. Nestled on the banks of Onion Creek underneath a majestic canopy of pecan trees, Pecan Grove boasts a beautifully manicured lawn and is truly one of the most magical destinations in the Texas Wine Country. Pecan Grove combines function with charm as it is glass enclosed to ensure year-round comfort while still maximizing views of the surroundings. The meal will be all-you-can-eat served family-style with our classic Salt Lick sauce and famous Texas BBQ. There will be music for your listening and dancing pleasure supplied by Mike and the Moonpies. **Shuttle service to and from the Renaissance Austin Hotel to the Pecan Grove will be provided,** beginning at 18:00, from the Renaissance Austin Hotel. **Tickets are required for this event.**

# Exhibit Hall Layout



# Exhibit Directory

## Booth Listing by Number:

<b>Booth number</b>	<b>Company</b>
1 .....	Professional Embryo Transfer Supply Inc. (PETS)
2 and 3.....	Vetoquinol
4 .....	Partnar Animal Health Inc.
5 and 6.....	WTA Technologies
7 .....	Echo Control Medical
8 .....	IMV Technologies
9 .....	Agtech Inc.
10 .....	Boviteq
11 .....	IVFtech ApS
12 .....	IVF Bioscience
15 .....	MOFA Global
16 .....	E. I. Medical Imaging
17 .....	Elsevier
18 .....	Rafter D Genetics
19 .....	Misawa Medical Industry
20 .....	American Embryo Transfer Association (AETA)
21 .....	ICPbio Reproduction

# Alphabetical Listing of Exhibitors

## Agtech Inc.

Agtech Inc. is your source for the embryo transfer products you can count on for success. In all that we do, from product development to assisting with your product needs, it is the drive to build on our customer's success that keeps us moving forward.

We are driven to help our customers succeed, helping them continue to be leaders in the industry and support their goals.

We take great pride in our relationship with our customers and providing them with the products, support, and attention to detail that they have come to rely on.

8801 Anderson Avenue  
Manhattan, KS 66503-9612 USA  
Phone: 800-367-4016  
Fax: 785-776-4295  
[www.agtechinc.com](http://www.agtechinc.com)  
Booth: 9

## American Embryo Transfer Association (AETA)

The purpose of the American Embryo Transfer Association is to unite those organizations and individuals in the United States engaged in the embryo transfer industry into an affiliated federation operating under self-imposed standards of performance and conduct;

-To present a unified voice of the industry to promote the mutual interests and ideals of its members;

-To protect the users of the embryo transfer industry to the extent technically and ethically possible

-To educate the public properly to the status and capability of the United States embryo transfer industry; and to encourage others to engage in the pursuit of this industry.

1800 South Oak Street  
Suite 100  
Champaign, IL 61820  
Phone: 217-398-2217  
<http://www.aeta.org>  
Booth: 20

## Boviteq

A world leader in developing and implementing new techniques for embryo transfer, Boviteq offers reproductive and genetic solutions to clients across North America from its world-class In Vitro Fertilization (IVF) labs in Madison, Wisconsin, and Saint-Hyacinthe, Québec.

Working with accredited OPU (Ovum Pick Up) centers, clients can take advantage of Boviteq's innovative reproductive technologies. "Our goal is to make available a range of options to enable breeders to optimize the reproductive career of their elite animals and manage the genetic advancement of their herds," explains Boviteq's Director of Embryo Operations and R&D, Dr. Patrick Blondin, Ph.D.

This network of accredited OPU centers and vets are part of a unique, 360° IVF embryo solution, and as a fully integrated semen and IVF embryo facility, Boviteq is one of the industry's only true genetic solutions company.

3801 Kipp Street  
Madison, WI, 53718  
Phone: 608-838-2503  
[bovitequsa@boviteq.com](mailto:bovitequsa@boviteq.com)  
<http://www.boviteq.com/us-home>  
Booth: 10

## Echo Control Medical

The company ECM has been in the field of ultrasound scanning for more than 30 years. We design and produce a complete range of ultrasound systems for reproduction diagnosis and ovary exam.

Come and see the Exago as well as the Exapad, which can be equipped with an OPU guide and deliver an outstanding image quality for oocyte retrieval applications.

126 Bd De La Republique  
F-16000 Angouleme  
France  
Phone: +33 5 45 92 03 57  
<http://www.ecmscan.com>  
Booth: 7

## E. I. Medical Imaging

E. I. Medical Imaging® is a world leader and the only US manufacturer of portable ultrasound solutions specifically engineered for veterinary use. For the past 33 years, the company's core values have remained intact: putting the customer first and delivering solid, effective ultrasound solutions. EIMI provides the Ibex® portable ultrasound systems.

E. I. Medical Imaging  
110 12th Street SW  
Unit 102  
Loveland, CO 80537  
Phone: 1-866-365-6596  
<http://www.eimedical.com/>  
Booth: 16

## **Elsevier**

Elsevier is a world-leading provider of information solutions that enhance the performance of science, health, and technology professionals, empowering them to make better decisions, deliver better care, and sometimes make groundbreaking discoveries that advance the boundaries of knowledge and human progress. Elsevier provides web-based, digital solutions—among them ScienceDirect, Scopus, Elsevier Research Intelligence and ClinicalKey—and publishes nearly 2,200 journals, including *The Lancet* and *Cell*, and over 26,000 book titles, including a number of iconic reference works.

The company is part of Reed Elsevier Group PLC, a world leading provider of professional information solutions in the science, medical, legal and risk and business sectors, which is jointly owned by Reed Elsevier PLC and Reed Elsevier NV. Its ticker symbols are REN (Euronext Amsterdam), REL (London Stock Exchange), RUK and ENL (New York Stock Exchange).

Elsevier  
Radarweg 29  
1043 NX Amsterdam  
The Netherlands  
<http://www.elsevier.com/>  
Booth: 17

## **ICPbio Reproduction**

ICPbio Reproduction is a global supplier of embryo transfer and reproductive products including flushing and embryo handling media for equine, bovine, ovine, caprine and cervine species. ICPbio Reproduction also manufactures and distributes Ovagen™ follicle stimulating hormone for ovarian stimulation/superovulation of bovine and small ruminant species in IVF or conventional *in vivo* embryo transfer procedures.

PO Box 39  
303 South McKay Avenue  
Spring Valley, WI 54767 USA  
Phone: 877-978-5827  
<http://www.icpbiorepro.com>  
Booth: 21

## **IMV Technologies**

IMV Technologies is world leader in reproductive biotechnologies.

IMV Technologies designs and develops equipment, disposable items and preservation media used in animal reproduction. Our areas of expertise include:

- Semen collection and analysis
- Sample preparation and dilution
- Packaging and cryopreservation

- Assisted insemination

- Embryo transfer

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](http://www.imv-technologies.com).

11725 95th Avenue North  
Maple Grove, MN 55369  
<http://www.imv-technologies.com>  
Booth: 8

## **IVF Bioscience**

Bringing a new approach to the animal ART market, IVF Bioscience's new IVP media range for bovine, caprine and ovine species will help to produce an increased number of higher quality embryos. Alongside our ready to use and serum free media, we aim to provide exceptional service levels to help create a more productive world. Join us in booth 12 to find out more about our IVP media line.

Bickland Industrial Park  
Falmouth, Cornwall TR11 4TA  
United Kingdom  
Phone: +441326 372 733  
<http://www.research-instruments.com>  
Booth: 12

## **IVFtech ApS**

IVFtech is a company producing high quality, customisable equipment for IVF laboratories. The art and science of assisted reproduction often demands personalised 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 CO<sub>2</sub> concentration.

IVFtech knows that not all laboratories are the same, that's why IVFtech combines the bespoke nature of our products with a high quality and service level.

Custom products and services are, by definition, unique.

Toppevadvej 34-38  
DK-3660 Stenløse  
Phone +45 3940 2565  
Fax +45 3940 2564  
IVFtech aps -CVR no:20892307  
e-mail:[info@ivftech.dk](mailto:info@ivftech.dk)  
[www.ivftech.dk](http://www.ivftech.dk)  
Booth: 11

## **Misawa Medical Industry Co., Ltd.**

We are one of the leading manufacturers and distributors of disposable needles and cow ova vacuuming, ET products for veterinary purposes in Japan and we have established a worldwide reputation for our reliability and expertise, based on experiences over half a century. Our products for veterinary purposes, cow ova vacuuming needles, "mo-No.4" embryo transfer catheter, and "mo-No.5" intra-uterine horn catheter were developed and manufactured using a special, innovative method. We offer these superior quality products, all manufactured in Japan.

351 Asahi-machi  
Kasama City, Ibaraki 309-1717  
Japan  
Phone: +81 296 77 8804  
<http://www.misawa-medical.co.jp/English/intro.html>  
Booth: 19

## **MOFA Global**

MOFA Global is a recognized leader in the field of animal reproduction through the manufacturing and sales of a full line of products and services for advanced reproductive technologies (ART) for livestock and companion animals.

Its success is tied to continual innovation and education. Since inception, MOFA has developed many products which are now considered industry standards for IVF and embryo transfer.

419 Venture Ct  
Verona, WI 53593  
Phone: 800-646-4882  
<http://www.mofaglobal.com>  
Booth: 15

## **Partnar Animal Health**

Partnar Animal Health is pleased to present its range of embryo transfer and OPU products. We will present information on Stimufol (pFSH) and eMP3, our own range of embryo flush, hold and freeze media. For OPU, we also have aspiration pumps, retrieval needles and the MicroQ controlled temperature shipping device for oocyte, embryo and fresh extended sexed semen transport.

2014 Holland Ave, Unit 227  
Port Huron, MI 48060  
Phone: 519-666-0033  
<http://www.partnaranimalhealth.com>  
Booth: 4

## **Professional Embryo Transfer Supply Inc. (PETS)**

PETS has been a world-leading embryo transfer supply company in the bovine and equine industries for 3 decades. Our goal all this time has been your success,

and we work every day to achieve this with quality service and ET supplies from ICPbio, Vetoquinol, MAI, SPI, Wesco, NovaVive, and more. Come visit with us for more details.

285 FM 16  
Canton, TX 75103 USA  
[www.pets-inc.com](http://www.pets-inc.com)  
Booth: 1

## **Rafter D Genetics**

Rafter D Genetics is a full service embryo transfer company offering ET service, training and equipment sales.

We are a distributor for the Beltron EFT-3002 portable embryo freezer and the Ramgo nonsurgical caprine AI system.

Rafter D Genetics  
7750 Raymond Stotzer Pkwy  
College Station, TX 77845  
(979) 260-7852  
<http://rafterdgenetics.com/>  
Booth 18

## **Vetoquinol USA, Inc.**

Vetoquinol, the manufacturer of Folltropin®, is a family-owned, independent company devoted exclusively to animal health. Our product portfolio is divided between livestock and companion animals and includes most therapeutic categories. Vetoquinol embraces the challenge of finding better ways to help animals and is committed to servicing 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 passionately work to develop new products and protocols.

4250 North Sylvania Avenue  
Fort Worth, TX 76137  
Phone: 800-267-5707  
[customerserviceusa@vetoquinol.com](mailto:customerserviceusa@vetoquinol.com)  
[www.vetoquinolusa.com](http://www.vetoquinolusa.com)  
Booth: 2 and 3

## **WTA Technologies LLC**

WTA Technologies LLC is a Brazilian technology company with additional offices in Texas. It is focused on products for animal assisted reproduction, offering high added value solutions for ovum pick-up (OPU), *in vitro* fertilization (IVF), embryo transfer (ET) and artificial insemination (AI).

Our products are mainly for cattle, horse, and small ruminant reproduction but also attend to different laboratory requirements.

WTA sells throughout Brazil, the United States, and in many other countries, and is recognized as one of the leading companies in its market.

Each product is designed to provide security, economy, and the very best result, always focusing on animal health.

Every piece has a precise design, quality materials, and fine workmanship.

WTA-Brazil: + 55 16 39518161  
Sales USA: + (979) 324-6168  
<http://www.wtavet.com.br>  
Booth: 5 and 6

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Soluções para reprodução animal

# Morulas Preconference Workshop

## How to Write an Effective Grant Proposal

Saturday, January 14, 2017  
Renaissance Austin Hotel (Sabine)

Sponsored by CSIRO

14:00–14:10 Introduction

*Morulas Board of Governors*

**14:10–15:00 Session I: What Makes a Good Grant?**

*Peter Sutovsky, University of Missouri, USA*

- Before you start writing
- Getting started
- Proposal parts/grant sections
- Peer-review considerations
- What to do when the project does not get funded

**15:00–15:45 Session II: Keys to Writing a Successful Grant**

*Patrick Lonergan, University College Dublin, Ireland*

- If at first you don't succeed... try harder!
- Collaboration vs. competition
- Funding opportunities for reproduction-related research in Europe—Agencies and eligibility

15:45–16:00 Refreshment break

*Sponsored by CSIRO*

**16:00–16:45 Session III: Introduction to US Federal Agencies that Fund Research on Reproduction:**

**Including Types of Grants, Typical Size of Grants, and Amount of Available Funding**

*David Miller, University of Illinois, USA*

- Funding opportunities supported by each agency for graduate students, postdocs, and junior faculty
- How are submitted proposals reviewed?
- How to choose the appropriate funding agency

16:45–17:15 Round Table and Closing Remarks



### ***The IETS Morulas Mission Statement***

*"To cultivate a supportive organization within the IETS that is dedicated to the personal and professional development of its trainee members. The Morulas Board of Governors shall strive to motivate trainees to become integral participants of the IETS and work to create opportunities that foster their continued investment into the society."*

# DABE Preconference Symposium

## Workshop on the Use of CRISPR-Cas9 for Gene Editing: Principles and Practices

Saturday, January 14, 2017  
Renaissance Austin Hotel (Grand Ballroom B)

08:15–08:30 Introductions to workshop, Jorge Piedrahita, DABE Chairperson

### Session I. Introduction to CRISPR-Cas9 Genome Editing & Strategies for Defining and Improving Specificity

*Shengdar Tsai, Department of Hematology, St. Jude Children's Hospital, Memphis, Tennessee, USA*



RNA-guided CRISPR-Cas9 nucleases have transformed genome editing due to the simplicity and robustness with which they can be programmed to introduce targeted double-strand breaks (DSB) into the genomes of living cells and organisms. In this workshop session, a broad overview of the landscape of CRISPR-Cas9 genome editing will be provided, and state-of-the-art strategies for both defining and improving the genome-wide specificities of CRISPR-Cas9 nucleases will be discussed. An extensive question and answer session will enable participants to discuss best practices for applying these transformative technologies in their own laboratories.

08:30–09:30 Session I, Part 1

09:30–10:30 Session I, Part 2

10:30–11:00 Coffee break

### Session II. Direct CRISPR-Cas9 Microinjection into Mammalian Embryos

*Lluis Montoliu, Centro Nacional de Biotecnología (CNB-CSIC), Campus de Cantoblanco, Madrid, Spain*



In this section we will be focusing on the delivery of CRISPR-Cas reagents to mammalian embryos by means of direct microinjection. The workshop will cover the different CRISPR-Cas-related molecules one can microinject, different applications including small insertion and deletions, large deletions, inversions, duplications, and large insertions (knock-ins). This section will also include a reference to single versus multiple simultaneous genetic modifications. Finally, we will discuss the current knowledge on how to minimize nonhomologous end-joining (NHEJ) and boost homology directed repair (HDR). An extensive question and answer session will enable participants to discuss best practices for applying these technologies in their own laboratories.

11:00–12:00 Session II, Part 1

12:00–13:00 Session II, Part 2

13:00–14:30 Box Lunch and Poster Session

As part of the workshop, there will be a poster session to showcase your work. Details to follow.

### Session III. Gene Editing Using CRISPR-Cas9 as a Therapeutic Strategy

*Deepak Rey, Editas Medicine, Cambridge, Massachusetts, USA*



The continual maturation of this technology supports the transition of gene editing from being a powerful laboratory tool to becoming a viable therapeutic strategy. In this workshop session, we will explore what it takes to transition this revolutionary technology from the laboratory to the clinic. These challenges, along with various strategies and lessons learned, will be discussed using real-world examples. The workshop will be followed by a question and answer session in which participants can discuss not only the use of CRISPR-Cas9 as a therapeutic, but also as a reagent to generate crucial tools that enable drug discovery.

14:30–15:30 Session III, Part 1  
15:30–16:30 Session III, Part 2  
16:30–17:30 Poster Awards and Panel Discussion  
18:30–20:30 Social—Location and time to be determined

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## Notes

## Notes



