



# AETE

Association Européenne des Technologies de l' Embryon  
Association of Embryo Technology in Europe

December 2017

AETE Newsletter Issue 48

Editor: [Roger Sturmey](#)

## Table of contents

<b>PRESIDENTS LETTER</b> .....	1
<b>AETE BOARD MEMBERS</b> .....	4
<b>AETE WORKSHOP 1 - MICROMANIPULATION!</b> .....	6
<b>AETE WORKSHOP 2 – SELECTING THE BEST ANIMALS</b> .....	6
<b>REPORT BY THE AETE 2</b> .....	7
<b>PRIZE WINNERS</b> .....	8
<b>STUDENT WINNING ABSTRACT</b> .....	9
<b>HOW CAN WE DEVELOP THE MARKET FOR EMBRYO TRANSFER SERVICES IN EUROPE?</b> .....	10
<b>IN MEMORIAM: REMEMBERING CATHERINE</b>	11
<b>INVITATION TO THE 34<sup>TH</sup> ANNUAL SCIENTIFIC MEETING OF AETE – 7<sup>TH</sup>-8<sup>TH</sup> SEPTEMBER, 2018</b> .....	13
<b>UPCOMING EVENTS</b> .....	16
<b>AETE CONFIRMED SPEAKERS - 2018</b> .....	17

## PRESIDENTS LETTER

Dear Colleagues and friends,

2018 is knocking our door! Four months have already passed since the 33<sup>rd</sup> AETE annual meeting held in Bath, UK; a designated city as a World Heritage site by UNESCO. The meeting was attended by over 200 delegates, originating mainly from Europe as well as from North and South America, indicating the dynamism of our society. The conference was organised in 5 main talks, 15 short oral presentations selected from the submitted abstracts, including student competition, 2 workshops and 2 poster sessions with a total of 82 posters. All invited papers and abstracts

published in July-September 2017 issue of *Animal Reproduction* (the official journal of the Brazilian College of Animal Reproduction) together with the 31<sup>st</sup> SBTE's annual meeting, which are available in our web site ([www.aete.eu](http://www.aete.eu)).

The presentation of **Prof. Cesare Galli** as the recipient of the **2017 AETE Pioneer Award** was a special moment of the meeting. Prof. Galli received the award due to his outstanding scientific input in reproductive biotechnologies from in vitro embryo production to embryo manipulation and animal cloning, recognized internationally and his significant influence on the development of the society.



Prof Galli receiving the 2017 AETE Pioneer Award

Invited lectures were given by **Dr. Jose Buratini Jr**, Universidade Estadual Paulista (UNESP), representative from our sister Brazilian society SBTE on "Follicular Environment and Oocyte Maturation"; **Dr. Ann Van Soom** from University of Gent, Belgium as a leader of the Cost Action-Epiconcept, gave an update on "Cost-Epiconcept: What we have learned and application for the future"; **Dr. Martin Sheldon**, from Swansea University Medical School, United Kingdom on "Uterine infection and immunity"; and **Dr. Heiner Bollwein** from University of Zurich, Switzerland on "Effects of nutritional programming on sexual development in bulls".

Five finalist students were selected, based on their submitted abstracts, to present their work in the student competition. All presentations were scientifically outstanding but there can be only one winner and this year **Mrs. Karolien Desmet** from University of Antwerp, Belgium who presented her work on "Effect of non-esterified fatty acids during in vitro oocyte maturation on the development of bovine embryos after transfer". The prize for best oral presentation won **Jose Maria Sanchez** from University College Dublin, Ireland for the "Effect of conceptus size on embryo-maternal

communication during early pregnancy in cattle”, while the prize for best poster won by **Julieta Hamzé** for “In vitro assessment of acrosomal status of boar sperm bound to beads conjugated with ZP proteins”. We congratulate them both and we are looking forward to hearing the future scientific activities of our students at the next AETE annual meeting. As previous years, a special lunch for post-graduate students was organized where they had the chance to speak and discuss with their colleagues and with senior scientists.

Both workshops were very practical orientated. The first, co-ordinated by **Jan Detterer**, AI- and ET-Center Georgsheil, Germany and **Pasqualino Loi**, University of Teramo, Italy on “Micromanipulation”, and the second, co-ordinated by **Erik Mullaart**, CRV, The Netherlands on “Selection and treatment of animals for embryo production”. We thank all involved for their excellent contribution to the scientific program.

This year, Vetoquinol in collaboration with AETE conducted a survey among European Embryo Transfer practitioners. The goal of the survey was to explore practitioner’s perception and views on the status of the ET business, and the opportunities and possible threats that may lie ahead. A total of 90 ET professionals responded anonymously and confidentially to the questionnaire that was administered by Beehive, a market research company of the UK. Federico Kobrac, International Marketing Manager for Vetoquinol, presented the output of the survey at the meeting in Bath while more information can be found in the present issue of AETE Newsletter.

Another point that I would like to bring into your attention is the initiative of Roger Sturmey creating the “**AETE2**” - 2 students who attended the sessions and “tweet” the key summaries and messages from the meeting live. Our first volunteers were **Beatriz Rodríguez Alonso** from University College Dublin, Ireland – INIA, Madrid, Spain and **Jordana Sena Lopes** from University of Murcia - Spain, two early stage researchers from the Rep-Biotech Joint Doctoral project (a Marie-Skłodowska Curie Innovative Training Network funded by the European Commission under the Horizon 2020 Programme). I congratulate them for succeeding with this task bringing our society closer to everyone even from distance through social media like “twitter” and “Facebook”. And yes it is true; thanks to Roger AETE has a “Facebook” page, which I encourage you all to visit, and why not following <https://www.facebook.com/TheAETE/>

Two key members step down from the board this year – **Urban Besenfelder** (Austria) the AETE secretary since 2008 and **Rainer Saner**, (Switzerland) the AETE Treasurer since 2008 - and I would like to thank them both for all they have done for the society. A few words will not be enough to describe their great personality and contribution to the society! Thank you Urban and Rainer for all the work put together, the great atmosphere kept between us and your inspiration to members and

the board. Together with others, your input has made AETE the European leader on embryo technologies for practitioners, scientists and students.



*Rainer Saner and Urban Besenfelder*

Of course, two new Board members were elected. Out of the three candidates, it is my pleasure to present **Helen Quinton** from Evolution, France and **Jane Morrell** from Swedish University of Agricultural Science who they got most votes at the General Assembly meeting in Bath, UK. I would like to congratulate and welcome them in the board and I am looking forward to work with them.

As every year, the meeting combined a successful scientific programme with outstanding social events, encouraging exchanges between practitioners, students, scientists and sponsors. Therefore, I would like to acknowledge the excellent organisation of this meeting, including the pre-conference “Practitioner Repro Day”, by the Local Organising Committee chaired by **Brian Graham** from EGG TECH who worked hard creating this event. Their hospitality in Bath made us all feel at home. They created a special social atmosphere for all participants at the Gala Dinner at Pump Rooms of Roman Baths and dance party and also in the last evening Farewell party with a British BBQ at the Green Park Brasserie. Thank you all for putting together such a great event celebrating the 33<sup>rd</sup> annual meeting of AETE in Bath, UK.

Last but not least, I would like to thank all the sponsors and exhibitors for their financial support allowing us to organise a successful meeting like this: Main: VETOQUINOL; General: EGG TECH; Exhibitors: BCF Technology Ltd, ECM, PETS, Bodinco, ICP Reproduction, IMV Technologies, IVF Technologies, IVF Biosciences, STIMUFOL, MiniTube]; Supporters: Calier, CryoLogic Ltd.

The preparation of our next AETE meeting in Nantes, France on the 7<sup>th</sup> and 8<sup>th</sup> of September 2018 is on the way. The Local Organizing Committee, chaired by Daniel Le Bourhis from ALLICE, France and the AETE board is already working hard and I am sure that we will have once again an interesting and enjoyable meeting. More information about the meeting, preliminary program, registration and abstract submission dead lines will be found on the AETE website.

I wish you all Merry Christmas and a Happy New Year 2018 and looking forward to see you in Nantes.

Dimitrios  
Dimitrios Rizos; President, AETE

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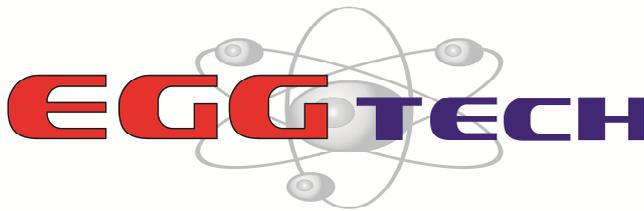
L-R – Marja Mikkola, Roger Sturme, Jan Detterer, Jo Leroy, Teresa Mogas, Dimitrios Rizos, Hilde Aardema, Jane Morrell, Helen Quinton, Daniel Le Bourhis

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## **AETE WORKSHOP 1 - MICROMANIPULATION!**

**Micromanipulation organized by Jan Detterer (Germany) and Pasqualino Loi (Italy)**

The aim of this workshop was to provide a short overview of the importance of embryo/oocyte micromanipulation as a tool that has led to fundamental discoveries in Developmental Biology, delivered by Lino Loi, entitled “*Embryo micromanipulation: from basic research to universal tool*”. Almost all the audience attended the introductory seminar, to confirm the importance of the topics. Practical demonstration followed immediately the presentation, and a mixed audience of senior scientists, PhD students and young scientists have attended the demonstration, run by the following Colleagues:

	Micromanipulation demonstrated
Serge Lacaze (France)	Biopsy of embryos
Carolina Herrera (Switzerland)	Blastocoele fluid collection for genetic testing of embryos
Luca Palazzese (Italy)	Piezo-mediated enucleation/injection in farm animal oocytes
Hanna Grothmann (Germany)	Embryo biopsy and splitting
Daniel Le Bourhis (France)	Bovine oocyte enucleation and embryo biopsy using aspiration method
Alexandre Morel (France)	Biopsy of embryos

Although there were a few logistical challenges, the patience of the Colleagues elegantly obviated these short-comes; after all, the micromanipulations procedures were demonstrated not in a lab, but in an elegant restaurant hall! Nice movies showing very sophisticated and elegant micromanipulation techniques were also displayed.

Various questions were raised by the audience, and the Colleagues demonstrating were able to pass along the passion and enthusiasm typical of scientists working on experimental embryology.

Embryo micromanipulation procedures, like Somatic Cell Nuclear Transfer (SCNT), Intra Cytoplasmic Sperm Injection (ICSI), embryo biopsy have become a binding tool in the portfolio of Assisted Reproductive Technologies (ART) applied to Reproductive control in domestic and farm animals. Like other ART, embryo micromanipulation still needs to improve in its efficiency, in order to be safely and conveniently applied in the field. Finally, Embryo biopsy in

particular, it is surely a powerful technique for the exploiting of advanced whole genome sequencing techniques for animal genetic improvement.



*Micromanipulation in action*

To conclude, the Workshop has confirmed the centrality of embryo micromanipulation in ART applied to farm animals.

The Workshop Could not have been organized without the financial/logistic support of the following Persons and Company: Ian Kippax, Roger Sturmey and Bethany Muller Activf-ET; Brian Graham (EGG Tech); Minitube; Bernardo Almeida (Narishige, UK); Paul Roberts (Olympus, UK); Onur Öztürk (Sparmed).

Thank You!

Lino Loi, University of Teramo, Faculty of Veterinary Medicine, Italy

## **AETE WORKSHOP 2 – SELECTING THE BEST ANIMALS**

**Selection and treatment of animals for embryo production, organised by Erik Mullaart (The Netherlands)**

In the previous years, much attention has been focused on improvements of the embryo production system (i.e. better oocyte/embryo collection methods, better embryo culture media, better procedures, ect.). However, a crucial factor in success is the female donor animal. Animals used in embryo programs are often selected by the breeding company or by the farmer who is interested in breeding. These donor cows are often selected based on other things (i.e. milk production) rather than high embryo production and the best animals for milk production are not always the best for embryo production. Indeed, results from several studies indicate that some female animals give high embryo production, while others give low embryo production. In practice however, practitioners and technicians in the field have to deal with these female animals and produces embryos from all embryo donor animals.

The aim of the workshop was to initiate some discussion on this item by addressing two questions, 1) Are there options to select female animals that give a good embryo production and how to deal with “problem” donor, and 2) can we treat (pre-treat) the animals to improve embryo production? The workshop summarized that results of a questionnaire sent out in the weeks before the workshop to 11 different breeding companies/organizations. In addition, some companies were invited to explain a bit more on a specific topic.

Gavin Tait (ABS Europe) began with some examples of factors that are important for good collection of oocytes by OPU at the farm. This included things like temperature control, logistics, communication and facilities at the farm. Notably, distances traveled, number of visits a day and number of OPU sessions are important to determine the efficiency of the process. Marja Mikkola, of Emovet Oy, Finland, described some considerations of donor selection breeding company vs. farmer. She sees a clear shift to more animals selected by the breeding company and a shift to the use of younger animals. Beside selection on an economical merit index, some animals are selected to produce embryos for export or are animals that are offspring from Neospora infected donors.

From the questionnaire, it could be concluded that most start to perform OPU at 8-13 month of age. MOET is often started a few months later. In the decision to start OPU, onset of puberty and body weight is very important. Health of the donor animals is important and some companies have strict protocols for disease screening before the animal is used for embryo production. As expected, all organizations use Economic breeding value as prime selection of donor animals. From these animals, there should be embryos produced. Sometimes Antral Follicle Counts (AFC) are used to select the animal, but for animals with high economical breeding index every follicle/oocyte that can be obtained counts. Another option for selection would be Anti -Müllerian hormone (AMH) as explained by Serge Lacaze (France). He showed significant correlations between the AMH level in serum and the number of follicles or embryos obtained from these animals. However, no good routine test for bovine is yet available and the prices of the tests are still very high.

Søren Ernst Madsen, of Trans Embryo Genetics Denmark, gave a nice practical example of problems that can be seen in the field. Sometimes animals do give low embryos during the first 3 flushings and then suddenly this is dramatically increased during the next 4 flushings. It is very difficult to get a good grip on this but things like feed-composition, changing housing, selenium/vitamin E, treatment schedules, routines, insemination, etc can all have an effect on this and should all be evaluated. The key message, never give up and after 3 zero flushes it is still possible to obtain embryos.

We then switched to the second question of the workshop, “Can we treat (pre-treat) the animals to improve embryo production? Based on the questionnaire it could be concluded that 7 out of the 10 companies performing OPU use FSH to pre-treat the animals (2 days 4x FSH (3 groups) or 3 days 6x FSH (4 groups)). The results are somewhat variable; no or marginal increase in number of oocytes but most see (large) increase in # embryos. Andreas Kuwer from Germany, showed some nice results on the use of different FSH treatment schedules and concluded that there is a large individual difference between the animals. Therefore it is not possible to make use of uniform schedule of FSH pre-treatment for every animal.

Finally, we had discussed tailored feeding of the female donor animals before embryo collection. A few companies reported a special feeding of animals for embryo production. These are quite often related to age of animal and aimed to promote good growth (= related to age of puberty). Serge Lacaze France demonstrated that Dietary propylene glycol (PG) added to feed, could improve animal condition and embryo production.

In general, it can be concluded that breeding companies are the ones who are selecting the animals for embryos production. There are some tools to get information on the embryo production potential of the animal (e.g. AMH) but these are not (yet) used. Practitioners and technicians in the field have to use their experience to get embryos out of every animal. There are some tools, like hormone pretreatment and feeding, that can be used to improve embryo production. These are already partly used but might be further improved.

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## **REPORT BY THE AETE 2**

**Jordana Sena Lopes & Beatriz Rodriguez Alonso**

September of 2017, Bath, England. The AETE congress had finally arrived. As early stage researchers, this was something we were looking forward to attending. Beautiful place, amazing lectures, so many important people to meet... uhh, the excitement couldn't be higher!

The welcoming reception was full of warmth and felt like we were revisiting an old friend's house. Everyone talking, hugging, drinking and some tired faces from their long or exquisite air traveling hours.

After a long night of sleep, the first word was given to our beloved president, Dr. Dimitrios Rizos, that fortunately gave us with a brief opening session. The first invited lecture, Prof. Jose Buratini, gave us an extended lecture on follicular environment and oocyte maturation, providing us plenty of data on cumulus expansion, viscosity of cumulus, steroids, peptides... it was a really complete lecture. And after hearing all about the female, the male part was given a chance to prosper with the lecture from Prof. Heinrich Bollwein concerning all the aspects on nutrition programming

and their effects on sexual development in bulls. We all knew this was important, but when we listen to the detailed explanation on how in specific stage of development, the excess and the insufficiency in some nutrients affect the final performance of the bull, it makes you think we might be underrating this matter.

When you get so much information, there's one thing that is a must-have: caffeine. The joy of the people's faces when they were given their cup of hot coffee was fascinating. Coffee brings people together. Not love nor reproduction, but coffee. And biscuits.

As students, we felt compassion for our beloved colleagues up for student competition, as the nervous state began to flow. The high quality of the presentations, projects and skills was incredible. Though all the students deserved to win, the fluidity of the presentation from Karolien Desmet was a stand out. Big congrats to Karolien!

The afternoon started with an insight on post-partum uterine infection by Prof. Martin Sheldon, and how the ovarian function is affected by it. Physiology is our basic subject and sometimes we tend to focus on one little thing and forget about everything else. Thank you Prof Martin for reminding us to look at the big picture. The following invited lectures about uterine health were superb, but one mention has to be made to our colleague José María Sanchéz, for his amazing work and the easiness that he went through that presentation. Great power-point design, by the way! Best oral communication prize winner: congrats!

At 20:00pm, there we were at the Roman baths. We must admit, we weren't expecting such astonishing beauty. The dinner, the socializing, the party, and most of all, dancing with your supervisors... totally priceless!

Yes, it's Saturday. Yes, you have to get up. Yes, you did drink too much last night. Come on, it's Prof. Ann Van Soom speaking. Not a chance of missing that one. Prof. Ann spoke a little bit of the importance of networking, and how this can be useful for science. And it was not all about Science, Sun and Sand. It was also about the importance of female scientists to come forward and have goals and achieve things. Personally, thank you Prof Ann for pointing that out.

The lectures continued but this time about embryo-environmental activity. During the coffee-break, another poster session and here we have to talk about the poster from PhD student Julieta Hamzé, concerning the use of beads in boar spermatozoa, which won the poster competition. Congrats Julieta!

During lunch time, the students had the opportunity to participate in a special lunch session with Dr. Roger and Dr. Jo as the representative hosts. This served as an encouragement for the shyest students to come forward and for the rest to have the opportunity to talk with each other's, get to know everyone and start networking. Networking is the word!

Prof. Cesare Galli received the Pioneer award this year and gave us a personal perspective on assisted reproduction technologies. It's always a pleasure to listen to the most experienced and wise people. The afternoon continued with some more oral communications, this time on sexual maturity in bulls and semen.

Finally, the farewell party. Barbecue in England? What? With this rainy weather? Surprisingly, yes, it can be made! Nothing beats an amazing burger with beer.

Goodbye AETE 2017, it was a pleasure. Hello AETE 2018, we are coming!



*The AETE2 and President of AETE.*

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## PRIZE WINNERS

As ever, we awarded three prizes this year. The standard of all presentations was higher than ever and judging panels had a very difficult choice. However, our winners this year were:

**Best Poster – Julieta Hamze (Murcia)** for her poster: *In vitro* assessment of acrosomal status of boar sperm bound to beads conjugated with ZP proteins.



*Rainer Saner presenting Julieta with her prize*

**Best oral presentation – Jose Maria Sanchez (Dublin)** for his talk: *Effect of conceptus size on embryo-maternal communication during early pregnancy in cattle.*



Jan Detterer presenting Jose with his prize

**Student Prize – Karolien Desmet (Antwerp)**, for her work on the *Effect of non-esterified fatty acids during bovine in vitro oocyte maturation on the development of bovine embryos after transfer.*



Jose Buratini presenting Karolien with her prize

As is customary, the abstract from winner of the student award is presented in full.

## STUDENT WINNING ABSTRACT

**Effect of non-esterified fatty acids during in vitro oocyte maturation on the development of bovine embryos after transfer**

KLJ Desmet<sup>1</sup>, WFA Marei<sup>1</sup>, C Richard<sup>2</sup>, I Hue<sup>2</sup>, S Andries<sup>1</sup>, PEJ Bols<sup>1</sup>, JLMR Leroy<sup>1</sup>

<sup>1</sup>Gamete Research Centre, University of Antwerp, Wilrijk, Belgium,

<sup>2</sup>UMR BDR, INRA, ENVA, Université Paris Saclay, Jouy en Josas, France

Metabolic disorders, as in negative energy balance (NEB) dairy cows, are associated with elevated non-esterified fatty acid (NEFA) concentrations, predominantly palmitic acid (PA), in the follicular fluid. These NEFAs are known to jeopardize oocyte *in vitro* maturation and elicit altered blastocyst quality and physiology. Lipotoxic conditions during final oocyte maturation also influence epigenetic reprogramming in the resultant day (D) 7 embryo and may thus affect subsequent development, potentially imprinting lasting marks during later stages of life. Therefore, we hypothesized that exposure of oocytes to high NEFA concentrations during IVM affects post-hatching development of D7 blastocysts after embryo transfer.

Bovine oocytes were matured for 24h under 2 conditions: 1) physiological NEFA conditions (28 $\mu$ M stearic acid (SA), 21 $\mu$ M oleic acid (OA), 23 $\mu$ M PA (BAS) and 2) elevated PA concentration as present in follicular fluid during NEB (150 $\mu$ M) with physiological concentrations of SA (28 $\mu$ M) and OA (21 $\mu$ M) (HPA). Matured oocytes were routinely fertilized and cultured in SOF with serum until D7. Cleavage (D2) and blastocyst rate (D7) were compared among treatments using a binary logistic regression model. Eight blastocysts (normal and expanded, equally distributed per treatment and per replicate) were transferred per cow (n=8, 5 replicates). Four cows were attributed to HPA or BAS per replicate and were crossed over for the next replicate. Embryos were recovered at D14 and morphologically assessed (n=46). Glucose, lactate and pyruvate turn-over and interferon-tau (IFNT) secretion were measured in extra-embryonic tissue (EXT) after 24h culture (n=62). Morphological, metabolic and IFNT data were tested for normality with a Kolmogorov-Smirnov test and differences between treatment were analysed with a T-test. Data are presented as mean  $\pm$  SEM.

Developmental competence at D7 was not significantly different between treatments (blastocyst rate of 26 vs. 29.6% for HPA and BAS, resp.). Recovery rate at D14 was 30% and 36% for HPA and BAS, resp. ( $P>0.05$ ). HPA during IVM significantly reduced embryo elongation (3.7 $\pm$ 1.5 vs. 8.6 $\pm$ 1.7mm,  $P=0.001$ ) but did not affect diameter of embryonic disc compared to BAS. EXT from HPA group consumed similar amount of glucose but tended to produce less lactate compared to EXT from BAS group (1732 $\pm$ 211 vs. 2428 $\pm$ 355pmol/mm<sup>2</sup>/h,  $P=0.073$ ). IFNT secretion was significantly lower in HPA group (0.47 $\pm$ 0.71pg/ml) compared to BAS group (3.79 $\pm$ 1.16pg/ml,  $P=0.018$ ).

In conclusion, exposure to elevated PA during *in vitro* oocyte maturation affected post-hatching development at D14. Embryos were less elongated, were metabolically altered and produced less IFNT, a major signal of pregnancy recognition, than their physiological counterparts. This suggests that metabolic stress during oocyte maturation may have long-lasting effects on embryo development that may lead to higher pregnancy

loss and reduced fertility in high yielding dairy cows. More research is ongoing to investigate underlying mechanisms through genome wide transcriptome pathway mapping.

**KEYWORDS**

NEFA, oocyte, embryo transfer

# HOW CAN WE DEVELOP THE MARKET FOR EMBRYO TRANSFER SERVICES IN EUROPE?

By Federico Kobrak  
International Marketing Manager, Reproduction Business, Vetoquinol



The development of Embryo Transfer services is very different from one country to another, particularly when considered as a proportion of “reproductively active females” (cows and heifers).

	reproduction females (000)			IVD collections		OPU collections		total collections per 1000 head		
	dairy	beef	total	dairy	beef	dairy	beef	dairy	beef	total
Netherlands	1 610	84	1 694	3 519	780	3 240	22	5,80	-	5,51
Germany	4 296	674	4 969	2 231	45	545	185	1,27	1,19	1,26
Italy	2 069	329	2 398	1 967	45	545	185	1,21	0,70	1,14
France	3 697	4 138	7 835	5 648	1 278	181	30	1,58	0,32	0,91
Belgium	519	436	956	256	122			0,49	0,28	0,40
Ireland	1 128	1 041	2 169	420				0,37	-	0,19
Spain	845	1 824	2 669	435			22	0,51	0,01	0,17
Poland	2 248	155	2 403	162				0,07	-	0,07

Canada	957	3 824	4 781	7 768	2 360	1 559	33	9,75	0,63	2,45
USA	9 307	29 693	39 000	12 627	29 319	17 332	15 307	3,22	1,50	1,91

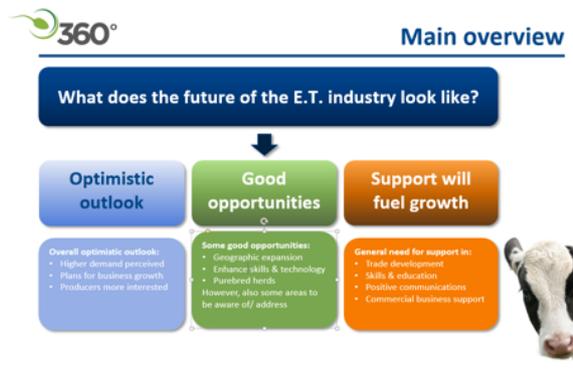
source: Euro stats 2014; IETS Newsletter Dec-2016

Even considering the possible inaccuracies of the reported number of collections, we can safely assume that the proportional penetration of Embryo Transfer technologies in Europe is less than half of that of countries like Canada and the USA.

In order to better understand the reasons behind that gap in the development of the European industry, Vetoquinol partnered with AETE to conduct a survey among European Embryo Transfer practitioners. The goal of the survey was to explore practitioner’s perception and views on the status of the ET business, and the opportunities and possible threats that may lie ahead.

A total of 90 ET professionals responded anonymously and confidentially to the questionnaire that was administered by Beehive, a market research company out of the UK.

In general, most practitioners (64%) expect an increase in demand for ET services in the next 3 years; many of them consider investing in active promotion of their services (71%), increasing their specialization in ET (65%) or developing their facilities or equipment (55%).



The use of ET in small or premium breeds was rated the largest opportunity to develop ET services; however practitioners also indicated that if given the possibility, they would invest 55% of their efforts to develop the use of ET to improve the genetics or fertility of commercial herds.

The development of genomic testing and improved performance of sexed semen are also perceived to offer opportunities to increase profitability and stimulate the development of ET practice.

When asked about specific challenges, practitioners pointed out that producer communication is a key driver for development and growth: producers don’t always understand the benefits of introducing ET technology and specifically the economic return that they can expect for using embryos in their herds. Although “cost” is often mentioned as an important barrier to the adoption of ET by producers, sometimes farmers are simply under the impression that these technologies are “not for them”. In this sense, 63% of respondents highlighted the importance of raising breeder’s awareness and understanding of Embryo Transfer technologies, and 68% expressed the need for materials and tools to promote these technologies to producers.

Much like what happens with genetically modified crops and intensive farming methods, consumer concerns about embryo transfer are also perceived as a possible threat that could derail all other efforts to develop the industry. Positive communication to consumers may also be needed to counteract any potential negatives.

Finally, ET professionals also expressed a need for continuing education to develop knowledge and skills of existing practitioners (66%) as well as opportunities for effective training for new practitioners (48%), in order to ensure that they become effective and proficient as quickly as possible following training.

Developing the business of Embryo Transfer in Europe is an excellent path to promote the continued improvement of our herd and the

profitability of our producers. Ongoing collaboration between industry players like Vetoquinol and the practitioners represented by AETE offers rich opportunities to support this development.



## **IN MEMORIAM: REMEMBERING CATHERINE**

**Remembering Catherine Guyader-Joly**



**Catherine, a beautiful person, a shooting star in embryo's world, who brightened many lives**

**Claire PONSART**, Unité Zoonoses Bactériennes, Laboratoire de Santé animale, ANSES, Maisons-Alfort, France

**Patrice HUMBLLOT**, Swedish University of Agricultural Sciences, SLU, Department of Clinical Sciences, Uppsala, Sweden

The sad news has been around embryologists for only a few hours. Like many friends and colleagues, we were very touched by Catherine's poignant text posted on Facebook just before she passed away [1]: *"I am grateful for the beautiful years, during which I gave you my love! You can only guess the happiness you have brought to me."* Such a beautiful text from a beautiful person, lovely to work with.

In our community of embryo technicians and scientists, Catherine has, for many years, been a reference, a support, an example, an exceptional colleague. Many experiments she conceived led to significant improvements in OPU-IVF protocols and embryo freezing.

Recruited by Michel Thibier in the 1990's, Catherine has been part of the group creating the UNCEIA-UCEAR experimental station of Chateauvillain, and its main manager since the OPU-IVF story started. She implemented OPU protocols comparing different superovulation schemes and continuously improved culture media to increase blastocyst rate and their freezability. During her PhD and collaborations with Jean-Paul Renard and Yves Menezo, she successfully developed a bovine Vero cell co-culture system [2, 3] and focused on embryo cryopreservation [4]. In 1998, she demonstrated positive effects of taurine precursors, as hypotaurine, on blastocyst production and quality [5]. Another working hypothesis developed with Carmen Diez, consisted in delipidating bovine embryos at an early stage, in order to increase embryo tolerance to freezing and thawing at the blastocyst stage [6]. This was the start of a long-term friendship with Carmen and other colleagues from Spain [7]. Her work on cryopreservation allowed the development of new slow-freezing media and IVP associated protocols, which were patented in 2001 together with Brigitte Marquant-Leguienne [8].

From 1997 to 2013, while coordinating the activities of the OPU-IVF facilities of Chateauvillain, Catherine and all the group were heavily solicited due to their participation in two EU projects and a large number of projects aiming to better phenotype fertility in the framework of the French call "GENANIMAL". Genes involved in oocyte quality, fertilization and development rates, implantation were investigated through collaborations with INRA teams [9, 10, 11].

Finally, Catherine and all the personell from the experimental station have brought valuable input while combining different embryo technologies as *in vitro* production, embryo biopsy and genotyping, freezing-thawing and direct-transfer [12, 13].

During all this time, many students made a large part of their PhD work with Catherine [14, 15, 16, 17]. Students from abroad, especially Brazilian vets, through Michel Nibart's network, benefited

from the know-how and the skills shared by the team from Chateauvillain. All enjoyed this “familial” station with the overall nurturing and caring atmosphere Catherine gave together with her technician, Sylviane Ponchon. Both were a tireless duo in their roles during 20 years.

The main dimension of this experimental station was given by Catherine’s spirit. Her kindness, and her courage, gave to this small united team, richness, dignity, trust and respect abroad.

The evocation of these beautiful years reminds us of many good memories, ranging from blood sampling at night and OPU sessions, sharing a beer at AETE or IETS meetings with friends or simply our discussions through regular meetings in Chateauvillain. Catherine has been a pillar of our team, reassuring, efficient and courageous. And finally giving all of us an unbelievable life lesson during her 17-years battle with cancer.

Sad news on Wednesday, 13<sup>th</sup> of December. Today, the embryo-world is a bit like an orphan. Our warmest thoughts go to Thierry and family.

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# INVITATION TO THE 34<sup>TH</sup> ANNUAL SCIENTIFIC MEETING OF AETE – 7<sup>TH</sup>- 8<sup>TH</sup> SEPTEMBER, 2018

On behalf of the Association of Embryo Technology in Europe, the local organizing committee, chaired by M. Daniel Le Bourhis, is pleased to invite you to the 34<sup>th</sup> annual scientific meeting in the city of Nantes, West France, from the 7<sup>th</sup> to 8<sup>th</sup> of September 2018.



*The French map with Nantes's localisation*

## Some reasons to come to Nantes

Nantes, ranked 6<sup>th</sup> of the largest cities from France, is located at the mouth of La Loire, the longest river in France, and the last 'wild river' in Europe.



*Panoramic view of Nantes and its island. For more details on Nantes city, click here: <https://en.nantes.fr/home.html>*

Nantes strikes a remarkable balance between its historical heritage, innovation, economy and culture. Nantes is, by nature, a welcoming, creative and forward-looking city.

## Historical heritage

Nantes was a port city, near the Atlantic Ocean, which has developed thanks to its river La Loire. In the 15<sup>th</sup> century, Nantes became the capital of the Bretagne, a crucial place for political power and the life of the Court. This period was marked by the construction of the Castle of the Dukes of Brittany, the cathedral Saint-Pierre et Saint-Paul, that you can visit during your free time.



*View of the Castle of the Dukes of Brittany downtown of Nantes.*

Thanks to its waterways and maritime routes, Nantes has developed its commerce (essentially salt, fishes and wines) to Portugal, Holland and Spain until the 17<sup>th</sup> century. In the 18<sup>th</sup> century, a traumatic period of the Nantes history unfolded, because the city became the first French slave port. This part of history, for a long time denied, is now presented in the memorial for the abolition of slavery, unique in France.

In 1843 under the last king Louis-Philippe's reign, "le passage Pommeraye" was inaugurated. The name of this commercial passage (with 66 shops) derives from a young notary called Louis Pommeraye, who wanted to transform an unsafe and bad neighbourhood to a passage with luxurious shops as in Paris. Classified as historic monument since 1976, this commercial passage is an amazing place to stroll with an exuberant decoration from a mix between neo-classicism and Louis Philippe's eclecticism.



*View of the "passage Pommeraye".*

### **“Green and Blue city”**

In 2013, Nantes was labelled Green Capital of Europe, to reward its avant-garde environmental politics for sustainable development, which allowed a high quality of life in the metropolis. With more than 100 parks and gardens, 13,000 hectares of protected spaces and 3,000 hectares of accessible green spaces in greater Nantes, there is no lack of breathing space!



*View of botanic garden (left) and the banks of Erdre (right)*

### **Culture, gastronomy, art and creativity**

There is so much to discover in Nantes... Culture abounds in the city with 34 theatres and auditoriums, 15 museums, historic areas (as “le Quartier Bouffay” from the old Nantes) and numerous events demonstrating the Nantes’ creativity “Les Machines de l’île de Nantes”, “Estuaire”, “la Folle journée”... For more details, click on <https://en.nantes.fr/home/exploring-nantes.html>

In Nantes, you can taste local specialities: seafood, Loire valley wines (Muscadet...), Nantes cakes, boiled sweets and the famous Petit Beurre Lu biscuits!

### **The conference location**

In 2018, the meeting will take place in “La Cité, Nantes events Center”, located in the heart of Nantes on the banks of the canal Saint-Felix, facing the train station (south exit) and just 20 min from airport. This conference centre, bathed in natural daylight thanks to its glass and wood structures, is a suitable warm place to come together. It is situated very close to several historical monuments, including the Castle of the Dukes of Brittany, and the cathedral Saint-Pierre et Saint-Paul.



*View of La Cité, Nantes events Center.*

You can easily join the conference center by:

- Tramway: line1 – station “Duchesse Anne – Château des Ducs de Bretagne”( [www.tan.fr](http://www.tan.fr))
- Shuttle airport to city centre: station “Lieu Unique” about 20 minutes –of travel / every 30 minutes ([www.tan.fr](http://www.tan.fr))
- Busway: Line 4- station “cité internationale des congrès” ([www.tan.fr](http://www.tan.fr))
- Self-service bikes “Bicloo” and “Marguerite” cars: the station is at the foot of La Cité (<http://www.bicloo.nantesmetropole.fr>; <http://www.imarguerite.com>)
- Car: the parking “Cité Internationale des Congrès” with 450 parking spaces and more than 2000 places available in the surrounding parking lots ([www.parkings-nantes.fr](http://www.parkings-nantes.fr)).

### **Very easy to travel to Nantes**

#### **By Plane**

Nantes Atlantique Airport (LFRS-NTE) serves 65 national and international destinations by direct flight Madrid, London, Amsterdam are at only one hour and a half flight from Nantes! Many cities are directly connected to Nantes Atlantique Airport: from European countries (Alicante, Amsterdam, Barcelona, Berlin, Brussels, Dublin, Dusseldorf, Edinburg, Gatwick, Geneva, Hamburg, Lisbon, Liverpool, London, Luton, Madrid, Munich, Porto, Varna, Vienna, Southampton...) and from France (Lille, Lyon, Marseille, Nice, Paris Charles de Gaulle/Roissy, Paris Orly...).



*View of Nantes Atlantic Airport.*

Please click here for more details on flights (<http://www.nantes.aeroport.fr>).

#### **By train (TGV)**

The TGV train station is located in front of the City (south exit). Nantes is only 2 hours from Paris (Monparnasse station with 21 trains a day) and at 3 hours from Paris-Roissy CDG airport (4TGV a day). TGV Lines connect big cities in France (Lyon, Lille, Strasbourg, and Marseille)

Please click here for more details on travels (<http://www.voyages-sncf.com>).

#### **By car**

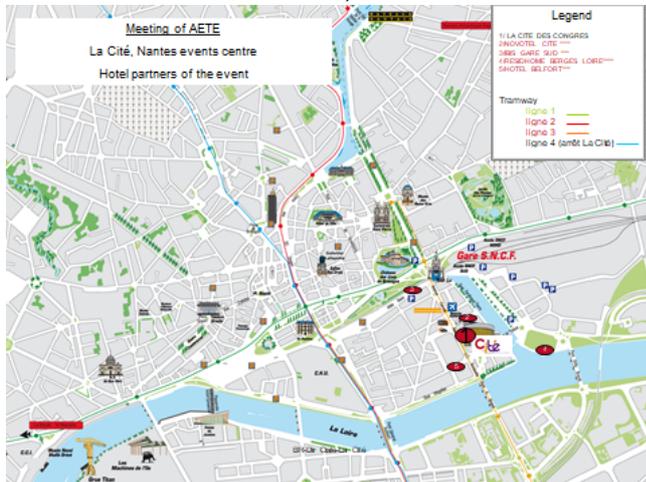
Nantes is the point of convergence of numerous highways (N165 / E60 towards Brest and Quimper, N137 towards Rennes) and

expressways (A11 towards Angers, Le Mans and Paris and A83 towards Niort, Bordeaux and Toulouse).

### Various opportunities to stay in Nantes

For the AETE meeting, several hotels located near La Cité, Nantes events center have been selected as privileged partners. With the “AETE2018” code, you will have attractive prices by reserving by email or by phone for the following hotels:

- **Novotel Cité des congrès** (4\*, Phone: 02 51 82 00 00, h1571@accor.com)
- **Residence Resihome Berges de la Loire** (4\*, Phone: 02 40 99 07 07, antes-bergesdelaloire@residhome.com)
- **Ibis gare** (3\*, Phone: 02 40 20 21 20, h0892@accor.com)
- **Hôtel Belfort** (3\*, Phone: 02 40 47 05 57, contact@hotelbelfortnantes.fr)



*Localisation of hotel partners of the AETE congress.*

Later on the AETE website, you will find more information about address and characteristics of these hotels. We will also provide you a supplementary list of other hotels or apartment hotels near the congress center.

### Evenings of AETE congress in Nantes

Before the Gala Dinner at “les salons du Nantilus” (floating restaurant on La Loire), you can discover the Great Elephant from “les Machines de l’île”, born from the François Delarozière and Pierre Orefice’s imagination. You will immersed in the worlds of Jules Verne, of Leonardo da Vinci, and of Nantes’ industrial history, on the exceptional site of the former shipyards.



*Views of “les salons du Nantilus”*



*The Great Elephant from “les Machines de l’île”.*

The farewell party will take place at “Les Salons des Floralies”, where you can taste the regional speciality “les crêpes” in its salty and sweet forms!

André Breton, French poet, writer and surrealism theorist said of Nantes: “Nantes, alongside Paris, is perhaps the only town in France where I got the feeling that something worthwhile might happen to me”.

Therefore, we look forward to welcome you in Nantes in 2018 for the 34<sup>th</sup> AETE meeting. We hope that you will have a successful meeting and will enjoy your stay in the beautiful city of Nantes.

### **The local organizing committee**

LOC representatives (in alphabetic order):

L. Amirat-Briand, J-F. Bruyas, O. Desnoé, S. Elis, F. Fieni, D. Le Bourhis (chair), V. Maillard, P. Mermillod, M. Saint-Dizier, P. Salvetti and H. Quinton.

For any assistance from the LOC, please email: daniel.lebourhis@alice.fr

## **UPCOMING EVENTS**

### **Fertility 2018 – Joint meeting of the SRF, BFS and UK ACE**

The ACC Liverpool, UK

January 4-6, 2018

<http://www.fertilityconference.org>

### **44<sup>th</sup> IETS Annual Conference**

Shangri-La Hotel, Bangkok, Thailand

January 13-16, 2018

<http://www.iets.org/2018/>

### **International Bull Fertility Conference**

Castle Court Hotel, Westport, Co Mayo, Ireland

May 27-30, 2018

<https://bsas.org.uk/bull-fertility>

### **45th Annual Meeting of the AET-d (Association Embryo transfer in German speaking countries)**

FLI Mariensee Höltyst. 10 31535 Neustadt-Germany

June 7-8., 2018

[www.aet-d.de](http://www.aet-d.de)

### **51<sup>st</sup> Annual Meeting of SSR**

Hilton New Orleans Riverside, New Orleans, Louisiana, US

July 10-13, 2018

<http://www.ssr.org/18meeting>

### **34<sup>th</sup> Annual Meeting of the AETE**

La Cité Events Centre, Nantes, France

September 7-8, 2018

<http://www.aete.eu/index.php/meetings>

### **10<sup>th</sup> International Ruminant Reproduction Symposium**

Wish Resort Golf and Convention Centre,

Foz do Igyaçu, Brazil

September 16-20, 2018

<http://www.sbte.org.br/IRRS2018/>

### **22<sup>nd</sup> Annual Meeting of ESDAR**

University of Córdoba, Córdoba, Spain

September 27-29, 2018

<http://www.esdar.org/esdar-conference-2018/announcement-2018-gb-1.html>

### **AETA-CETA/ACTE Joint Annual Convention**

Hotel Bonaventure Montreal,

Montreal, Quebec, Canada

September 27-29, 2018

[http://www.aeta.org/mtg\\_future.asp](http://www.aeta.org/mtg_future.asp)

## **AETE CONFIRMED SPEAKERS - 2018**

### **Pioneer award - 2018**



**Dr. Patrice Humblot**  
Department of Clinical Sciences  
Swedish University of Agricultural Sciences  
Uppsala (Sweden)



**Dr. Pablo Bermejo-Álvarez**  
Department of Animal Reproduction  
National Institute for Agriculture and Food Research and  
Technology (INIA) Madrid (Spain)

### **Invited Speakers**



**Dr. Marcelo M. Seneda**  
Reproduction and Obstetrics of Large Animals  
Laboratory of Animal Biotechnology  
University of Londrina  
Londrina (Brazil)



**Dr. Fabienne Nuttinck**  
Biologie du Developpement et de la Reproduction  
INRA Jouy-en-JosasENVA Maisons-AlfortFrance



**Prof. Helen M. Picton**  
Division of Reproduction and Early Development  
Leeds Institute of Cardiovascular and Metabolic  
Medicine  
School of Medicine University of Leeds  
Leeds (United Kingdom)