

## Recipient of the 2017 IETS Pioneer Award: Prof. Dr. Heiner Niemann

Heiner Niemann was born on 7th January 1953 in Münster, Westphalia, Germany. After completing obligatory military service, he began to study Veterinary Medicine at the Veterinary University Hannover in 1973. In 1978, Heiner Niemann graduated and started the experiments for his doctoral thesis at the Institute for Farm Animal Breeding and Behaviour (FAL) in Mariensee. Two years later, in 1980, he received his doctoral degree (Dr med. vet.), from the University of Veterinary Medicine in Hannover for his thesis entitled 'Fluorescence microscopic evaluation of the viability of early embryonic stages of rabbits and cattle by FDA [3'6'-Fluorescein-Diacetyl]- and DAPI [4'6'-Diamidino-2-Phenylindol]-Test'. In 1984, he became a Veterinary specialist in reproductive medicine and in 2001 in molecular genetics and gene technology. Heiner finalised his habilitation thesis entitled 'Biotechnological studies on preimplantation embryos from cattle and swine' in 1984 and received the *Venia legendi* in reproductive medicine from the Veterinary University Hannover. Since then he has been a Faculty member of this University. He teaches general and specific aspects of animal breeding, holds clinical demonstrations about reproductive biotechnology and seminars within the PhD program. In parallel, he gives lectures and seminars within the PhD programs 'Molecular Medicine' and 'Regenerative Sciences' at the Medical University Hannover. Furthermore, he is a lecturer at the Christian Albrecht University Kiel (Germany) and at the University of Applied Sciences South Westphalia (Germany). He has been the supervisor for more than 85 dissertations (mainly Dr med. vet.), three diploma theses and three habilitations.

In 1980, Heiner Niemann became a member of the scientific staff at the Institute for Farm Animal Breeding and Behaviour (FAL) in Mariensee, since 2008 he has been the Head of the Institute, now called Institute of Farm Animal Genetics of the Friedrich-Loeffler-Institute (FLI). The Institute advises the Federal Ministry of Agriculture on all aspects of farm animal genetics.

In 1985–1986, he spent some months at the Veterinary College, Texas A&M University as a Visiting Professor. Since 1994, he has been an Adjunct Professor for Reproductive Biology at the Veterinary University Hannover. During 2004 to 2007, he was appointed as Adjunct Professor at the Monash University in Melbourne, Australia. Furthermore, since 2008 Heiner has been a Faculty member and since 2016 Honorary Professor of the Medical University Hannover (MHH).

Heiner stayed at the Institute in Mariensee despite receiving several offers for academic positions from all over the world, by the Royal Veterinary and Agricultural University Copenhagen, Denmark (1998); the Monash University Melbourne, Australia (2001); the Faculty of Veterinary Medicine of Utrecht University, the Netherlands (2006), and the University of Adelaide, Australia (2007). Since 2007, he has been a Visiting Professor at the



Institute of Advanced Technologies of Kinki University Wakayama, Japan.

Heiner's expertise to conduct, organise and lead research competitively has led to appointments in several national and international committees, including Arpac International (1987), WHO Expert Committee (Transgenic animals and safety of products thereof, 2007), EFSA (European Food Safety Authority) expert committee (Safety of somatic cloning of animals and their products, GM animals, 2007/2008; 2009/2010). In 2007, 2010 and 2013 he was elected as Chairperson of the DGfZ (Deutsche Gesellschaft für Züchtungskunde, German Society for Animal Production) Advisory Board. This brief list shows that he became widely recognised, not only in Germany.

He was able to successfully apply for competitive third-party and external funding from the DFG (Deutsche Forschungsgemeinschaft, German Research Foundation), the European Union (EU), the Federal government, animal breeding organisations and industry. In the Excellence in Science and Research Initiative from the DFG at the Medical University of Hannover, he participated in 'Rebirth I and II' (2006–2017). Recently, Heiner was granted financial support for a Reinhart Koselleck Project for innovative and high risk research (2016–2020).

Heiner has published more than 600 articles, ~370 in international peer-reviewed journals of various research fields, more than 250 abstracts, and around 90 book contributions. Therefore, he is listed among the top ten most cited scientists in

Germany in the areas 'Reproductive Biology' and 'Veterinary Medicine'. He has given almost 700 oral presentations, of which more than 250 were presented as an invited speaker at preeminent international meetings around the globe.

Heiner Niemann is a member of several editorial boards. He is an *ad hoc* reviewer of numerous international scientific journals in the field of animal reproduction/biotechnology, developmental biology and for national and international grant agencies.

Heiner has been a member of the IETS since 1981 and has been a regular participant of the IETS meetings since then. He served as a member of the Board of Governors twice and was IETS President from 1988 to 1989. He acted as a Program Chairman for the 19th IETS conference in 1993 in Baton Rouge, Louisiana, USA, and for the 31st conference held in Copenhagen, Denmark, in 2005. From 1989 to 1994, he was the Chair of the IETS publications committee and in 1990, he served as Vice president of the IETS Foundation. In 2013, he was the head of the local organising committee for the 39th meeting, which took place in Hannover, Germany. He has presented three invited talks at the annual conferences in 1984, 1991 and 2000.

Heiner Niemann's scientific interests are in the various fields of reproductive biotechnology, including the regulation of oocyte and preimplantation development in livestock species, transgenic livestock, somatic cloning, epigenetic reprogramming and pluripotent stem cells, as well as the characterisation and maintenance of genetic resources. His research is primarily focused on expanding the repertoire of techniques available for the generation and improvement of embryos *in vitro*. With the refinement of molecular technologies, they could be applied to early embryos to assess embryo quality at the molecular level. He has carried out studies to understand the mechanisms that regulate development of embryos, to improve the efficiency of *in vitro* production and nuclear transfer and to develop biomedical applications of nuclear transfer procedures. He believes that understanding the underlying mechanisms of the cloning process, e.g. epigenetic reprogramming, has many applications in basic and applied research for both human medicine and agriculture. The successful application of the nuclear transfer procedure in his laboratory led to the birth of first cloned calf 'Blondie' in Mariensee in 2000 and the birth of the first cloned piglets in Germany in 2003 called 'Björna' and 'Michaela'. Heiner also pioneered somatic cell nuclear transfer (SCNT) for the production of transgenic pigs. Organs from these pigs could be used for xenotransplantation. The first transgenic piglets (generated via microinjection) were born in Mariensee in 1997. Most recently, biallelic knockout pigs were generated via cytoplasmic microinjection of CRISPR/Cas9 into zygotes. The combination of recent discoveries in molecular genetics with the latest reproduction technologies permits the production of transgenic animals for research and for the development of novel biomedical applications, such as gene pharming and xenotransplantation.

In summary, several of the significant advancements accomplished by Dr Niemann and his students, colleagues and collaborators in the areas of basic and applied reproductive biology have made him a well-recognised person in the scientific community. He has received numerous awards and recognitions, including the Biotechnology Award of the H.W. Schaumann Foundation in 1987 and the Federation Fellowship

from the Australian Research Council in 2007. One year later, he was elected to the German National Academy of Sciences 'Leopoldina'. And in 2012, he received the Martin-Lerche Forschungspreis of the German Veterinary Medical Society (Deutsche Veterinärmedizinische Gesellschaft, DVG), the most prestigious research award in Veterinary Sciences in Germany.

One of Dr Niemann's characteristics is his unrelenting pursuit of new knowledge, being open-minded about new technologies to improve embryo technologies and cattle and pig genetics. Therefore, in recognition of the significant contributions he has made over the last 35 years, the IETS is proud to award Heiner Niemann with the 2017 Pioneer Award.

Heiner's career as a high-level scientist is documented by his impressive list of publications. Selected pertinent references are shown below.

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