

Recipient of the 2008 IETS Pioneer Award: George E. Seidel, Jr., PhD

George E. Seidel, Jr. was raised on a dairy farm in Pennsylvania. He received a BS degree from Penn State in Dairy Science in 1965, and MS (1968) and PhD (1970) degrees from Cornell University. His master's thesis concerned methodology of semen collection from bulls and biochemistry of semen, while his PhD thesis concerned the endocrinology of superovulation of prepuberal calves, and culture and transfer of the resulting embryos. He began his career as a teacher and researcher in 1970. After a year of postdoctoral studies at Harvard Medical School studying rabbit oocytes with electron microscopy, he accepted a position as an Assistant Professor at Colorado State University. He rose through the ranks to his present position as University Distinguished Professor. For the past 36 years, Dr Seidel has been on the faculty of the Animal Reproduction and Biotechnology Laboratory, College of Veterinary Medicine and Biomedical Sciences, at Colorado State University (CSU) in Fort Collins.

Dr Seidel has taught undergraduate, graduate, veterinary and postdoctoral students during his career. The subject areas have included cell biology, endocrinology, general physiology and reproductive physiology. He has also taught in numerous postgraduate short courses, particularly concerning cryopreservation, micromanipulation and various *in vitro* reproductive procedures. In 1973, he established the Bovine Embryo Transfer Laboratory on the Foothills campus at CSU. This was one of the first commercial embryo transfer facilities in the USA. Farmers, breeders and seed stock producers brought their valuable donor cows to this laboratory for superovulation, recovery and transfer of embryos. Over the next decade, more than 6000 bovine embryos were collected and transferred in this manner. This program funded research and teaching, and became an important source of unbiased information on embryo-related procedures and research. Techniques such as nonsurgical embryo recovery, embryo transfer of bovine and equine embryos, and cryopreservation of embryos were developed during those early years. These techniques were refined and taught to many others in deliberate efforts to disseminate the technology worldwide. In the early 1980s, the CSU Embryo Transfer Laboratory became recognised for developing a simple, reliable procedure for bisecting embryos to produce identical twins in a variety of species. After a decade, the commercial aspects of the program were phased-out because Dr Seidel's work to simplify the procedures and disseminate the use of the techniques was so successful that these procedures could be done on the farm.

Over the past 20 years, Dr Seidel's research program has focussed increasingly on basic science. His studies have included groundbreaking work in oocyte maturation, *in vitro* fertilisation, and culture of bovine and equine embryos. He has developed new methods for the vitrification of oocytes and embryos,

recently developing an on-farm vitrification method for equine embryos. His other areas of investigation include metabolism of embryos, abnormalities in cloned foetuses gene expression in embryos, and virus-embryo interactions. He has adapted many of his discoveries to applied agricultural practices for livestock producers. During the past decade, Dr Seidel has made a huge effort in developing methods for sex selection of sperm and applying this technology to livestock production. The procedures were refined for sexing sperm rapidly with ~90% accuracy. A key to applying this technology was developing low-dose artificial insemination procedures; under some circumstances, fertility is only slightly lower with a dose of two million frozen bovine sperm compared with the more conventional insemination doses of 10–20 sperm. This research has led to commercialisation of sexed semen for artificial insemination of cattle worldwide.

Dr Seidel has received numerous awards including the Alexander von Humboldt Award, National Association of Animal Breeders Research Award, Upjohn Physiology Award, American Dairy Science Association, University Distinguished Professor Faculty Distinguished Service Award, Gamma Sigma Delta, Honorary Lifetime Membership in the American Embryo Transfer Association and the International Embryo Transfer Society (IETS) Distinguished Service Award. He is a member of three honour societies and five professional societies. Dr Seidel has essentially done every job in the IETS including serving as its President. He has been a member of the Board of Governors, Vice President; Chair, Pioneer Award Committee, Strategic Planning Committee, Archives Committee; Chair for the Annual Meeting three times; and Chair for the Pre-Conference Satellite Symposium in 2008. Perhaps the most important honour was his election to the US National Academy of Science in 1992.

Dr Seidel has presented 128 invited papers at national or international meetings, given 218 invited presentations or seminars, published 376 articles including 6 books, 175 book chapters, 17 reports and 178 peer-reviewed journal articles. He has also published 64 popular articles and 241 meeting abstracts. One of Dr Seidel's distinguishing characteristics is his unrelenting pursuit of new knowledge. He has instilled this passion in countless number of students, colleagues, scientists and visitors over his career. He has dedicated his life to the improvement and the mainstreaming of embryo-related technologies into livestock production around the world. His passion for his work and his students has brought science fiction into science fact. Therefore, in recognition of the significant contributions he has made over the last 35 years to the international scientific, academic, medical, veterinary, embryo transfer and biotechnology communities,

the IETS is proud to award Dr George E. Seidel, Jr. with the 2007 Pioneer Award.

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