

**Zhongde Wang, Ph.D.**  
USTAR Associate Professor  
Department of Animal, Dairy, and Veterinary Sciences  
Utah State University, 9825 Old Main Hill, Logan, Utah 84322-9825  
Email: [zonda.wang@usu.edu](mailto:zonda.wang@usu.edu)  
Tel: (435)-797-9668

**EDUCATION:**

- 5/2001–11/2004 **Postdoctoral Fellow**, Whitehead Institute/Massachusetts Institute of Technology (with Dr. Rudolf Jaenisch).
- 11/1999–5/2001 **Postdoctoral Associate**, Department of Veterinary and Animal Science, University of Massachusetts at Amherst (with Drs. James M. Robl and D. Joseph Jerry).
- 5/1994 – 2/2000 **Ph.D.**, Program in Molecular and Cellular Biology, University of Massachusetts at Amherst (with Dr. David I. Ratner)
- 9/1988 – 5/1991 **M.S.**, Biochemistry, Dalian Polytechnic University, China.
- 9/1981 – 7/1986 **B.S.**, Chemistry and Molecular Biology (a 5-year program with double concentrations on Chemistry and Molecular Biology), Jilin University, China.

**RESEARCH EXPERIENCE/EMPLOYMENT HISTORY:**

- 11/2011–present **Associate Professor**, Department of Animal, Dairy and Veterinary Sciences, Utah State University.  
Research topics: Genome engineering in non-murine species; Epigenetics of stem cells, early embryogenesis and animal cloning;
- 1/2009 – present **Adjunct Professor**, Department of Animal and Range Science, South Dakota State University.
- 11/2013 – present President and CSO, Auratus Bio, LLC, USA
- 1/2011 –12/2011 **Executive Director**, Department of Molecular Genetics and Immunology, Hematech, Inc.  
Research topics: Human artificial chromosome engineering; trans-chromosomal cattle cloning for producing fully humanized polyclonal and monoclonal therapeutic antibodies; Epigenetics of bovine cloning, stem cells and embryogenesis
- 1/2010 –1/2011 **Executive Director**, Department of Epigenetics and Embryo Development, Hematech, Inc.  
Research topics: Epigenetics of bovine cloning, stem cells and embryogenesis; Genome engineering in cattle
- 1/2006 –1/2010 **Director and Sr. Director**, Department of Epigenetics and Embryo Development, Hematech, Inc.  
Research topics: Epigenetics of bovine cloning, stem cells and embryogenesis; Genome engineering in cattle
- 11/2004–1/2006 **Senior Scientist**, Department of Molecular Genetics, Hematech, Inc.  
Research topics: Genome engineering in cattle; Human artificial chromosome engineering; Epigenetics of bovine cloning

- 5/1991 – 8/1993 **Lecturer and Research Fellow**, Biochemistry Section, Dalian Polytechnic University, China.
- 8/1986 – 9/1988 **Research Assistant**, Biochemistry Section, Dalian Polytechnic University, China.

#### **AD HOC REVIEWER FOR SCIENTIFIC JOURNALS:**

- Journal of Biotechnology
- Molecular Reproduction and Development
- Animal Biotechnology
- Encyclopedia of Molecular Cell Biology and Molecular Medicine
- Molecular Human Reproduction
- Theriogenology
- Veterinary Record Open
- PLOS ONE
- Biotechnology Letters

#### **TEACHING EXPERIENCE:**

- Spring, 2000 **Instructor**, Teaching **Embryology of the Frog** (a PhD level course), Department of Veterinary and Animal Science, University of Massachusetts at Amherst.
- 11/1995–11/1999 **Teaching Assistant**, Supervising Howard Hughes Medical Institute undergraduate students conducting molecular biology research at the Department of Biology, Amherst College.
- 9/1988 – 8/1993 **Lecturer**, Teaching **Enzymology**; Teaching **Biochemistry and Biochemistry Lab**. Dalian Polytechnic University, China.
- 9/1986 – 9/1988 **Teaching assistant**, Teaching **Food Chemistry Laboratory Courses**; Teaching **Biochemistry Laboratory Courses**. Dalian Polytechnic University, China.

#### **CURRENT PROFESSIONAL SOCIETY MEMBERSHIPS:**

- American Association for the Advancement of Science
- International Embryo Transfer Society

#### **PUBLICATIONS IN PEER-REVIEWED JOURNALS:**

- Wang, E., Park HS., Bang JI., Cho SJ., Ha AN., Lee KL., **Wang Z.**, Lv W., Kong IK. Nuclear remodeling of bovine tetraploid embryos produced by electrofusion of in vitro produced two-cell stage embryos. **Journal of Reproduction and Development** (Submitted).
- Ha AN., Fakruzzaman M., Bang JI., Lee KL., Cho SJ., Deb GK., Ryoo ZW., Hah DY., Cho SK., **Wang Z.**, Kong IK. Effect of co-culture of cumulus oocyte complexes with denuded oocytes on the quality of cloned bovine embryos. **Reproduction in Domestic Animals** (Submitted).

- Fan Z., Meng Q., Bunch TD., White KL., **Wang Z\***. Effective cryopreservation of golden Syrian hamster embryos by Open Pulled Straw vitrification. **Laboratory Animals** (Minor revision; \*corresponding author).
- **Wang Z.** Genome engineering in cattle: agricultural and biomedical applications. **Chromosome Research** (In press, Invited review).
- Kim SS., Bang JI., Fakruzzaman M., Lee KL., Ko DH., Ghanem N., **Wang Z.**, and Kong IK. Effects of Flunixin Meglumine and Prostaglandin F<sub>2α</sub> Treatments on the Development and Quality of Bovine Embryos *in vitro*. **Reproduction in Domestic Animals** 2014 Sep 24. doi: 10.1111/rda.12413. [Epub ahead of print].
- Fan Z., Li W., Lee SR., Meng Q., Bunch TD., White KL., Kong IK, **Wang Z\***. Efficient gene targeting in golden Syrian hamsters by the CRISPR/Cas9 system. **PLOS One** 2014 Oct 9;9(10):e109755. doi: 10.1371/journal.pone.0109755. \*corresponding author).
- Matsushita H., Sano A., Wu H., Jiao J., Kasinathan P., Sullivan EJ\*, **Wang Z.\***, Kuroiwa K. Triple immunoglobulin gene knockout transchromosomal (Tc) cattle: bovine lambda cluster deletion and its effect on fully human polyclonal antibody production. **PLOS One** (2014) 9(3):e90383. (\*corresponding authors).
- Gong J., **Wang Z.**, Polejaeva I., Salgia R., Kao C., Chen T., Chen L. Activating the expression of human K-rasG12D stimulates oncogenic transformation in transgenic goat fetal fibroblast cells. **PLOS One** (2014) 9(3):e90059.
- Ha A., Lee SR., Jeon JS., Park HS., Lee SH., Sessions B., **Wang Z.**, White KL., Kong IK. Development of a modified straw loading method for vitrification of *in vitro*-produced bovine blastocysts. **Cryobiology** (2014) 68(1):57-64.
- Jo HT., Bang JI., Kim SS., Choi BH., Jin JI., Kim HL., Jung IS., Suh TK., Ghanem N., **Wang Z.**, Kong IK. Production of female bovine embryos with sex-sorted sperm by intracytoplasmic sperm injection: efficiency and *in vitro* developmental competence. **Theriogenology** (2014) 81(5):675-82.e1.
- Sano A., Matsushita H., Wu H., Jiao J., Kasinathan P., Sullivan EJ\*, **Wang Z.\***, Kuroiwa Y. Physiological level production of antigen-specific human immunoglobulin in cloned transchromosomal cattle. **PLOS One** (2013) 8(10): e78119), (\*corresponding authors).
- Mesquita FS., Machado SA., Jenny Drnevich J., Pawel Borowicz P., **Wang Z.**, Nowak RA. Influence of cloning by chromatin transfer on placental gene expression at day 45 of pregnancy in cattle. **Animal Reproduction Science** (2013) 136(4):231-44.

- **Wang Z.** Derivation of mouse embryonic stem cell lines from blastocysts produced by fertilization and somatic cell nuclear transfer. **Methods in Molecular Biology** (2011) 770:529-49.
- **Wang Z.** Cloning mice and ES cells by nuclear transfer from somatic stem cells and fully differentiated cells. **Methods in Molecular Biology** (2011) 770:551-69.
- Liu GE., Hou Y., Robl JM., Kuroiwa Y.\*, **Wang Z.\*** Assessment of genome integrity with array CGH of cattle transgenic cell lines produced by homologous recombination and somatic cell cloning. **Genome Integrity** (2011) 2(1):6-10 (\*corresponding authors).
- Wang J., Liu Y., Li Z., **Wang Z.**, Tan LX., Ryu MJ., Meline B., Du J., Young KH., Ranheim E., Chang Q., Zhang J. Endogenous oncogenic Nras mutation initiates hematopoietic malignancies in a dose- and cell type-dependent manner. **Blood** (2011) 118(2):368-79.
- Rodriguez-Sosa JR., Rathi R., **Wang Z.**, Dobrinski I. Development of bovine fetal testis tissue after ectopic Xenografting in Mice. **J Andrology** (2011) 32(3):271-81.
- McLean CA., **Wang Z.**, Babu K., Edwards A., Kasinathan P., Robl JM., Sheppard AM. Normal development following chromatin transfer correlates with donor cell initial epigenetic state. **Anim Reprod Sci.** (2010) 118(2-4):388-93.
- Rodriguez-Osorio N., **Wang Z.\***, Kasinathan P., Page GP, Robl JM., Memili E.\* Transcriptional reprogramming of gene expression in bovine somatic cell chromatin transfer embryos. **BMC Genomics** (2009) 10:190. (\*corresponding authors).
- Robl JM., **Wang Z.**, Kasinathan P., Kuroiwa Y. Transgenic animal production and animal biotechnology. **Theriogenology** (2007) 67(1):127-33.
- Blelloch R.\*, **Wang Z.\***, Meissner A., Pollard S., Smith A., and Jaenisch R. Reprogramming Efficiency following Somatic Cell Nuclear Transfer is Influenced by the Differentiation and Methylation State of the Donor Nucleus. **Stem Cells** (2006) 24(9):2007-13 (\*equal first-author contributions).
- **Wang Z.** and Jaenisch R. At most three ES cells contribute to the somatic lineages of chimeric mice and of mice produced by tetraploid complementation. **Developmental Biology** (2004) 275, 192-201.
- Kasinathan P., Knott, JG., **Wang Z.**, Jerry DJ., and Robl JM. Production of calves from G1 fibroblasts. **Nature Biotechnology** (2001) 19(12):1176-8.
- Hansen DE., Roberts RA., **Wang Z.**, Plourde R., and Sugawara RJ., RJS8-1, Mouse Monoclonal to FK-520 (Anti-Ascomycin). **Hybridoma** (2001) 20,207-208.

- **Wang Z.**, Raifu M., Ratner D., Goldsby R., and Hansen D. Universal PCR amplification of mouse immunoglobulin gene variable regions: the design of degenerate primers and an assessment of the effect of DNA polymerases 3' to 5' exonuclease activity. **J immunol methods** (2000) 233(1-2):167-177.
- Pinkham JL., **Wang Z.**, and Alsina J. Heme regulates SOD2 transcription by activation and repression in *Saccharomyces cerevisiae*. **Current Genetics** (1997) 31(4):281-91.

(The following publications are in Chinese)

- **Wang Z.**, Wang Y., Song S., Wang F., and Kuang Y., Infra-red spectrometry studies on the complex of soybean and barley hull dietary fiber with Fe(II) and Mg(II). **Food and Fermentation Industries** (1994) No.1: 8-12.
- **Wang Z.**, Song S., Wang F., and Wang F. The kinetic model of the interaction between soybean hull dietary fiber and F(II), Zn(II), Mg(II) and Ca(II). **Food and Fermentation Industries** (1993) No.6: 12-16.
- **Wang Z.**, Song S., Wang F., Xu D., and Wang F. Study on the stability of ferrous iron in soybean hulls. **Food and Fermentation Industries** (1993) No.4: 45-47.
- **Wang Z.**, Song S., Wang Y., and Wang F. Determination of the endogenous Fe, Zn, Ca, Mg and Cu contents in soybean hulls by the method of atomic absorption spectroscopy. **Journal of Chinese Condiments** (1993) 5: 28-29.
- **Wang Z.**, Song S., Wang Y. and Wang F. Study on endogenous Fe(II) and Fe(II) contents in soybean hulls by the method of post-column derivation ion exchange chromatography. **Journal of Dalian Institute of Light Industry** (1992) 11 (3/4): 25-29.
- **Wang Z.**, Song S., Wang Y. and Wang F. IR study on the complexes of soybean hull fiber with Fe(II), Zn(II) and Mg(II). **The seventh national molecular spectroscopy academic reports** Beijing University Press. (1992) 143-146.

#### **BOOK CHAPTERS:**

- Sullivan EJ., Jerry Pommer J., **Wang Z.** Commercializing genetically engineered cloned cattle. **Principle of Cloning**, 2nd Edition, (2013) Elsevier Inc.
- **Wang Z.** Meissner A. and Jaenisch R. Nuclear cloning and epigenetic reprogramming. **Handbook of Stem Cells** (2004) Vol 1, 119-127. Academic Press.

## CONFERENCE PROCEEDINGS:

- Fan Z., Lee SR., Park H., Lucibello K., Sessions B., Meng M., White KL., Bunch TD., **Wang Z.**, Genetic inactivation of the Sry gene in Argali wild and Romney domestic sheep with CRISPR/Cas systems for producing sex-reversed female animals. Abstract (accepted), 40<sup>th</sup> of the annual conference of IETS. Reno Nevada, USA, January 11-14, 2014.
- Lee SR., Park H., Kong IK., **Wang Z.**, A TALEN-mediated universal gene knock in strategy for mammary glands-specific expression of recombinant proteins in dairy cattle. Abstract (accepted), 40<sup>th</sup> of the annual conference of IETS. Reno Nevada, USA, January 11-14, 2014.
- Polejaeva I., Ranjan R., Hall J., Rutigliano H., Thomas A., Dossdall D., MacLeod R., Marrouche N., **Wang Z.**, A. Olsen, K.L. White KL., C.J. Davies CJ. Increased susceptibility to atrial fibrillation in transgenic goats with cardiac specific overexpression of TGF- $\beta$ 1. Abstract (accepted), Scientific Sessions, American Heart Association, November, 16-20, 2013
- Hu S., **Wang Z.**, and Polejaeva, IA. Knockout of goat nucleoporin 155 (nup155) gene using crispr/cas9 systems. Abstract, The IX Transgenic Animal Research Conference, ISTT, Tahoe City, California, USA, August 11-15, 2013.
- Meng Q., Hall J., Rutigliano H., Zhou X., Sessions R.B, Stott R., Panter K., Davies C.J., Ranjan R., Dossdall D., MacLeod R., Marrouche N., White, K.L. **Wang Z.**, Polejaeva I.A. Generation of Cloned Transgenic Goats with Cardiac Specific Overexpression of Transforming Growth Factor  $\beta$ 1. Abstract, 39<sup>th</sup> of the annual conference of IETS. Hannover, Germany, January 19-22, 2013.
- Polejaeva I.A., Hall J., Meng Q., Zhou X., Sessions R.B, Stott R., Panter K., Rutigliano H., Davies C.J., **Wang Z.**, Ranjan R., Dossdall D., MacLeod R., Marrouche N., White, K.L. Development of a Transgenic Goat Model with Cardiac-specific Overexpression of Human Transforming Growth Factor Beta 1 to Study the Relationship between Atrial Fibrosis and Atrial Fibrillation. Abstract. Basic Cardiovascular Sciences conference, New Orleans, Louisiana, USA, 2012. Jul 23-26, 2012.
- Borowicz P., Johnson ML., Beraldi R., Edwards A, Grazul-Bilska AT., Thorson C, P Kasinathan, **Wang Z.**, Robl J., Redmer DA., Reynolds LP. Vascular endothelial growth factor mRNA expression in fetal membranes during early pregnancy as a biomarker for development of hydrops placenta later in pregnancy in bovine embryos created through somatic cell nuclear transfer (SCNT). Abstract. 34<sup>th</sup> of the annual conference of IETS. Denver, Colorado, USA, January 5-9, 2008.
- Beraldi R., P. Kasinathan, Robl J., Spadafora C., **Wang Z.** Role of endogenous reverse transcriptase in bovine embryogenesis and its implications in bovine

somatic cell cloning. South Dakota Biotechnology Association Annual Summit. Sioux Falls, South Dakota, USA, October, 2007.

- Machado S., Mesquita F., Edwards A, **Wang Z.**, P. Kasinathan, Robl J., and Nowak R. Differential gene expression profiling of day 45 placenta in chromatin transfer and in vitro fertilization-derived cattle fetuses evaluated by two microarray platforms. 40th Annual Meeting of the Society for the Study of Reproduction. Abstract. San Antonio, Texas, USA, July 21–25, 2007.

#### **INVITED PRESENTATIONS:**

- **Wang Z.** Genetic engineering in golden Syrian hamsters and cats: developing better animal models for human diseases. The 4<sup>th</sup> International Symposium of Center for the Animal Bioreactor & Xenotransplantation (CABX): Transgenic Animals for Human Disease. Jeju, Republic of Korea, December 19, 2014.
- **Wang Z.** Genetically engineered golden Syrian hamsters as models for the study of human diseases. Seminar at Laboratory of Reproductive Biotechnology, Department of Animal Science, Division of Applied Life Science, Gyeongsang National University. Republic of Korea, December 18, 2014.
- **Wang Z.** Gene targeting in non-murine species for biomedical applications. Seminar at Department of Animal Sciences, University of Wisconsin-Madison. Madison, WI. November 18, 2014.
- **Wang Z.** Genome engineering for biomedical applications. Seminar at College of Veterinary Medicine, Zhengzhou University, Zhengzhou, P.R. China. October 27, 2014.
- **Wang Z.** Genetically engineered non-murine animals as models of human diseases. Seminar at College of Veterinary Medicine, China Agricultural University. Beijing, P.R. China. October 27, 2014.
- **Wang Z.** Gene targeting in non-murine species for modeling human diseases. Seminar at Knight Cardiovascular Institute, Oregon Health and Science University. Portland, OR. July 16, 2014.
- **Wang Z.** Genetically engineered golden Syrian hamsters as animal models of human diseases. Annual International Symposium, Korean Society of Animal Reproduction. Jeju National University, Jeju, Republic of Korea. July 3, 2014
- **Wang Z.** Genetic inactivation of the Sry gene in Argali wild and Romney domestic sheep with CRISPR/Cas and TALEN systems for producing sex-reversed female animals. 40th Annual Conference of the International Embryo Transfer Society. Reno, NV. January 12, 2014.

- **Wang Z.** Genome Engineering in Cattle for Biomedical Applications. Seminar at College of Bioengineering, Dalian Polytech University. Dalian, P.R. China. October 27, 2013.
- **Wang Z.** Transchromosomal cattle for fully human antibody production. The 13th International Symposium on Developmental Biotechnology. Korean Society of Animal Reproduction. Cheongju, Republic of Korea. October 25, 2013.
- **Wang Z.** Creating transgenic animal models for human diseases. Seminar at Division of Applied Life Science, Gyeongsang National University. Jinju, Republic of Korea. October 24, 2013.
- **Wang Z.** Animal transgenesis for biomedical applications. Research seminar at National Institute of Animal Science, Korean Society of Animal Reproduction. Suwon, Republic of Korea. October 24, 2013.
- **Wang Z.** Animal transgenesis and cell reprogramming in livestock: creating new biomedical models. Spring Seminar Series, Department of Biomedical Engineering, University of South Dakota, Graduate Education and Applied Research Center, Sioux Falls, SD, USA. March 5, 2013.
- **Wang Z.** Producing better and safer biomedical products from livestock species. 7th Annual Biotech Summit & Meeting, South Dakota Biotechnology Association. Sioux Falls, SD, USA. October 25, 2012.
- **Wang Z.** Genome engineering in livestock: biomedical applications. Livestock Biotech Summit, Biotechnology industry organization. Kansas City, MO, USA, September 19-21, 2012.
- **Wang Z.** Engineering Trans-chromosome (Tc) Bovine For Fully Human Polyclonal Antibody Production. 2nd SKLAB international symposium, Beijing, China. October 16-17, 2010.
- **Wang Z.** Gene targeting in cattle—a genetic issue with an epigenetic facet. South Dakota Academy of Science Signal Transduction Symposium, Sioux Falls, SD., USA, April 13, 2007.
- **Wang Z.** Sequential Gene Targeting in Cattle. Activated Egg Symposium, The Bedford Stem Cell Research Foundation. Boston, MA., USA, November 4, 2005.

**PATENTS FILED (provisional):**

- **Wang Z.**, “Transgenic Hamsters” U.S. App No. 61/976,784. Docket Number: P14038.01. April 8, 2014.
- Chen L., **Wang Z.**, Polejaeva I., Gong J “Transgenic Goat Model Expressing An



Oncogene” U.S. App No.:61/918,873. Docket Number: P13044.01. December 20, 2013.

- **Wang Z.**, Lee SR., Kong IL. “Transgenic Non-human Mammals, Cells, and Methods of Making the Same” U.S. App No.: 61/858,499. Docket Number: P13042.01. July 25, 2013.
- Polejaeva I., **Wang Z.**, Hu S., Thomas A., Davies C., and White K. “Model and method for a transgenic goat expressing cardiac fibrosis and associated pathology”. U.S. App No.: 61/858,430. Docket Number: P14005.01. July 25, 2013.
- **Wang Z.**, and Robl JM. “Imprinted genes as epigenetic markers for use in cloning and regenerative cell procedures”. U.S. App No.: 61/179,130. May 18, 2009.