

Melba S. Ketchum, D. V. M.
Curriculum Vitae
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Address:

DNA Diagnostics
P. O. Box 455
Timpson, TX 75975

EDUCATION

Doctor of Veterinary Medicine, 1978, Texas A&M University, College Station, TX
Bachelor of Veterinary Science, 1977, Texas A&M University, College Station, TX
Certification training at the National Veterinary Disease Laboratory, Ames, Iowa. 1985
Visiting Scientist, University of Kentucky Serology Laboratory and DNA Research Laboratory, University of Kentucky, Lexington, Kentucky. 1985, 1987
FDLE DNA Advanced PCR Training. 1995
Promega Statistical Genetics. 1996, 1997
Promega Expert Witness Training. 1998
Promega Mitochondrial DNA Training Workshop 1999
Promega Statistics and Mixture Analysis Workshop 2002
GeneCodes mtDNA Forensic Analysis Software training 2003

LICENSES

Texas State Board Veterinary License #4335
DEA License: Schedule 2, 2N, 3, 3N, 4, 5
Texas Controlled Substance License

PROFESSIONAL SOCIETIES

Association of Forensic DNA Analysts and Administrators (AFDAA)
Alpha Zeta (Agricultural Honor Fraternity)
Alpha Lambda Delta (Women's Honor Sorority GPR > 3.75)

PROFESSIONAL EXPERIENCE

1993- PRESENT:

President and Director, DNA Diagnostics, Inc., a genetics laboratory geared to state of the art genetic testing, research, diagnostics, and immunological studies as well as expert court witness and consultation.

Member, Scientific Advisory Committee, Alpaca Breeders 2011-2012

Inventor, **VeriSNP™** (patent pending), simultaneous DNA SNP and mutation array testing. 2008.

Director and owner, Shelterwood Laboratories, Carthage, TX. 1985-1993

Treasurer, Association of Forensic DNA Analysts and Administrators (AFDAA), 2006-2008.

Speaker, AFDAA (Association of Forensic DNA Analysts and Administrators) forensic meeting, January 2008, Austin, Texas.

Speaker, AFDAA (Association of Forensic DNA Analysts and Administrators) forensic meeting, January 2007, Austin, Texas.

Participant, Third International Conference on Advances in Canine and Feline Genomics, Davis, CA, 2006

Participant, Association of Forensic DNA Analysts and Administrators (AFDAA), Austin, TX, 2006.

International Academy of Plant and Animal Forensic Science (IAPAFS) North American President 2004-5.

Invited analyst to perform analysis of mtDNA sequences of human remains from victims of the 9/11 World Trade Center Disaster. March 2003. Ann Arbor, MI.

Invited Speaker NWAFS (Northwest Association of Forensic Science) Meeting, October 2004, Ashland, Oregon.

Invited speaker, AFDAA (Association of Forensic DNA Analysts and Administrators) forensic meeting, August 2004, Austin, Texas.

Invited Speaker, Fifteenth International Symposium on Human Identity, Phoenix, AZ, October 2005.

Research Presentation, Fifteenth International Symposium on Human Identity, Biloxi, MS, 2004.

Invited speaker, AFDAA (Association of Forensic DNA Analysts and Administrators) forensic meeting, August 2004, Austin Texas.

Invited speaker, AFDAA (Association of Forensic DNA Analysts and Administrators) forensic meeting, January 2003, Austin Texas.

Committee Member, For The Standing Committee for Applied Genetics in Companion Animals, International Society for Animal Genetics, 2004-2006.

Chairperson, International Society for Animal Genetics, Dog Mapping Committee. Elected chair 2000-2002. Re-elected 2002-2004 at the 2002 ISAG International Meeting in Gottingen, Germany.

Chairperson, International Society for Animal Genetics, Equine Genetics Standing Committee. Elected chair 1996. Re-elected as Chair Term 1998-2000. Re-elected 2000-2002 and 2002-2004.

Committee Member, International Society for Animal Genetics, Dog Applied Genetics Committee. Elected duty lab coordinator 2002-2004.

Chairperson, International Society for Animal Genetics, Equine Genetics Standing Committee. Elected chair

1996. Re-elected as Chair Term 1998-2000. Re-elected 2000-2002.

Chairperson, International Society for Animal Genetics, Dog Mapping Committee. Elected chair 2000-2002.

Elected Member, International Society for Animal Genetics, Equine Genetics Standing Committee, elected term 1994-1998, re-elected 1998-2002.

Committee member and Reporting Station for International Horse Gene Mapping Project, 1999 at the International Horse Gene Mapping Meeting in Uppsala, Sweden.

Chairperson for 1998 Horse Workshop and comparison test, ISAG International Meeting, Auckland, New Zealand, 1998.

Research Presentation, International Society for Animal Genetics International Conference, Gottingen, Germany, 2002.

Research Presentation, International Society for Animal Genetics International Conference, Minneapolis, MN, 2000.

Research Presentation, International Society for Animal Genetics International Conference, Auckland, NZ, 1998.

Participant, ISAG International Meeting, Gottingen, Germany, 2002.

Committee member and Station Report for the Horse Gene Mapping Program 1997-2001 at Plant and Animal Genome IV,V,VI,VII,VIII, and IX. San Diego, California.

Presented Seminar on Neonatal Isoerythrolysis in Horses at the Tennessee Walking Horse Celebration. Shelbyville, TN. 1999

Participant, Human Genome Tri-Conference 1999, 2000, 2001. San Francisco, CA.

Participant, ASHG (American Society for Human Genetics) Annual Meeting 1999. San Francisco, CA.

Participant, ASHG Annual Meeting 1997. Baltimore, MD.

Coordinator and duty laboratory for 1996 International Society for Animal Genetics Horse Comparison Test

Chairperson for DNA portion of 1996 ISAG horse comparison test and workshop, ISAG International Meeting, Tours, France, 1996.

Research Presentation, International Society for Animal Genetics International Conference, Tours, France, 1996.

Participant, Southwestern Technical Working Group on DNA Analysis Methods Meeting (twice each year), Austin, TX, 1996-2000.

Coordinator and duty laboratory for Southwestern Technical Working Group on DNA Analysis Methods (SWIGDAM) proficiency test, Austin, TX, 1997.

Participant, 9th International Conference on Genes, Gene Families, and Isozymes, San Antonio, TX, April, 1997.

Participant, ISAG International Meeting, Minneapolis, MN, 2000.

Participant, ISAG International Meeting, Auckland, NZ 1998.

Research Published, International Conference on Animal Biotechnology, Beijing, China, 1997.

Participant Thirteenth International Symposium on Human Identification, Phoenix, AZ, 2002.

Participant Eleventh International Symposium on Human Identification, Biloxi, MS, 2000.

Research Presentation, Eleventh International Symposium on Human Identity, Biloxi, MS, 2000.

Research Presentation, Tenth International Symposium on Human Identity, Orlando, FL. 1999.

Research Presentation, Seventh International Symposium on Human Identity, Scottsdale, AZ, 1996.

Participant, Ninth and Tenth International Symposium on Human Identity, Orlando, Florida, 1998 and 1999.

Participant, ISAG International Meeting, Tours, France 1996.

Participant, Seventh International Symposium on Human Identity, Scottsdale, AZ, 1996.

Participant, Eighth International Symposium on Human Identity, Scottsdale, AZ, 1997.

Participant, Plant and Animal Genome IX 2001. San Diego, CA.

Participant, Plant and Animal Genome VII 2000. San Diego, CA.

Research Presentation, Plant and Animal Genome V, San Diego, CA, 1998.

Research Presentation, Plant and Animal Genome IV, San Diego, CA, 1997.

Featured as a top equine professional in the book, Riding Into The 21st Century: Horse Careers, by Sue Reynolds, 1997.

Selected as National Executive of the Month by Delta Airlines for June, 1997 for achievements in business and humanitarian causes.

Participant, Plant and Animal Genome V, Horse Genome Project and Meeting, San Diego, CA. 1997-2000.

Research presentations on forensic use of microsatellites, Southwestern Technical Working Group for DNA Analysis Methods Meetings, Austin, TX 1995, 1996, and 1997.

Participant, Horse Genome Project and Meeting, Lexington, KY, 1995.

Elected to ISAG Equine Genetics Standing Committee, ISAG International Conference Prague, Czech Republic, 1994.

Participant, ISAG International Conference, Prague, Czech Republic, 1994.

Lecturer, Continuing Education Symposium, Texas Animal Health Commission/ Veterinary Services, Austin, TX, 1995.

Research presentation, International Society for Animal Genetics (ISAG) International Conference, Turin, Italy. 1988

Participant, ISAG conference in East Lansing, Michigan. 1990

Participant, ISAG International Equine Comparison Test, 1992-2000.

Presentation of equine genetics and disease research to Equine Practice Committee, Texas Veterinary

Medical Association, Annual Convention, Dallas, TX.1990

Guest speaker, Veterinary Continuing Education, Northeast Texas Veterinary Medical Association. 1992

Guest speaker, NE Texas Equine Practitioners Association. 1993

Participant in Equine Immunogenetics Symposium at Louisiana State University, Baton Rouge, Louisiana. 1990

Consultations and referrals received from numerous professors at major universities and veterinarians on various research topics. 1985-1997

1980-2002: Owner and administrator, Shelterwood Animal Hospital, Carthage, TX.

2002-present: Owner and administrator, Piney Woods Veterinary Clinic, Timpson, TX and Shelterwood Animal Hospital, Timpson, TX.

1978 - 1984:

Owner and administrator, Piney Woods Veterinary Clinic, Timpson, TX and Shelterwood Animal Hospital, Carthage, TX.

Clinical research in equine medicine.

Clinical Veterinarian, practicing large animal, small animal, and exotic animal medicine and surgery.

Provided medical treatment, rehabilitation, surgery, and critical care for wildlife in cooperation with Texas Parks and Wildlife.

**FORENSIC CASEWORK, REFERENCES AND TESTIMONY
(FOR REFERENCE ONLY, NOT A COMPLETE LIST)**

1. Texas Vs. Ryan James Frazier: Animal mitochondrial DNA, STRs, Human mitochondrial DNA. (Death penalty case) Contact Dexter Eaves, Victoria Co., Victoria, TX

2. Florida Vs. Woodruff: Animal STRs and Human STRs Contact Joe Rinella, former public defender (Frye Hearing)

3. Louisiana Vs. Nathaniel Carson: Animal mito, Human STRs Contact Ted DeLacerda, Investigator for DeSoto Parish.

4. WI vs. Evan Zimmerman, an Innocence Project Case Keith Findley, Clinical Associate Professor, Co-Director, Wisconsin Innocence Project, University of Wisconsin Law School, 975 Bascom Mall, Madison, WI 53706

5. HI vs. Garth Coleman, petition for a new trial, Contact Dale Ross or Linda Walton.

RESEARCH EXPERIENCE

Genetic Research:

Developed simultaneous SNP and mutation array testing for forensics, identity, parent verification, disease, traits (physical attributes), ancestry, breed and sex determination, **VeriSNP™** (patent pending).

DNA Analysis Methods in animal forensics.

Research in use of multi-species mitochondrial DNA for forensic use.

Research for the horse gene map.

Research in forensic analysis methods for STRs in multiple animal species.

Multiple research studies on DNA analysis methods on horses, mammoth jackstock, and white-tailed deer (pending) for identity, traits, and paternity.

Gene research on target genes for various traits and diseases in horses.

Performed population study of serologic phenotypes in *Equus asinus*.

Reported two new phenotypes in the protease inhibitory system of *Equus asinus*.

Adapted 1D Acid PAGE technique for use at Shelterwood Laboratories as a viable method of determining serologic phenotype.

Provided system techniques for 1D Acid PAGE to Professor Youchun Chen of The Chinese Academy of Agricultural Sciences, Beijing, China and to Dr. Faruk Dogrul, Arastirma Enstitusu, Ankara, Turkey.

Adapted current Equine blood typing techniques and methods for the determination of parentage for use at Shelterwood Laboratories.

Continuing study of blood groups and DNA on *Equus asinus* and collaboration of findings with Dr. E. G. Cothran, University of Kentucky Serology laboratory, Lexington, KY.

Equine Medicine Research:

Developed method for treatment of *Brucella abortus* in horses.

Performed a study projecting possible public health aspects of *Brucella abortus* in horses.

Performed population study of rate of infection of *Brucella abortus* in horses in Texas.

Performed study of the effects of various antibiotics on *Brucella abortus* infection in horses.

Collaborated with Dr. William McMullen, Texas A&M University, College Station, Texas and published research on various treatment techniques for *Brucella abortus* infection in horses.

Equine Infectious Anemia:

Collected serum samples of suspect animals for determination of reactor status using experimental Western blot technique in coordination with Louisiana State University, Baton Rouge, LA.

Currently collaborating with Dr. C. J. Issel, University of Kentucky, Lexington, KY, on EIA research project.

RESEARCH FUNDING GRANTED

FY 2003:

Havemeyer Grant for research associated with the International Horse Genome Project.

FY 2001:

Havemeyer Grant for research associated with the International Horse Genome Project.

FY 2000:

Havemeyer Grant for research associated with the International Horse Genome Project.

FY 1999:

Havemeyer Grant for research associated with the International Horse Genome Project.

FY 1998:

Havemeyer Grant for research associated with the International Horse Genome Project.

FY 1997:

Havemeyer Grant for research associated with the International Horse Genome Project.

FY 1988:

Examination of the protease inhibitor system in *Equus asinus*. International Society for Animal Genetics bursary.

CONSULTING

Expert Witness for the biological sciences (DNA) in legal cases.

Genetic consulting to horse breed registries, veterinarians, universities, private individuals, attorneys,

prosecutors and law enforcement.

Consultant to various research facilities worldwide on developing 1D Acid PAGE for use in their laboratories.

Consultant to veterinarians nationwide on *Brucella abortus* infection in horses.

Regional consultation on equine infectious anemia to veterinarians, Texas Animal Health Commission, and private individuals.

PUBLICATIONS and ABSTRACTS

Robert Pomeroy¹, George Duncan², Bulbin Reeder³, Elen Ortenberg⁴, **Melba Ketchum⁵**, Hannah Wasiluk⁵, and Dennis Reeder³, A Low Cost, High-Throughput, Automated SNP Assay for Forensic Human DNA Applications. *Analytical Biochemistry*. 2009 Jul 29. [Epub ahead of print]

Bruce Budowle¹, Paolo Garofano², Andreas Hellman³, **Melba Ketchum⁴**, Sree Kanthaswamy⁵, Walther Parsons⁶, Wim van Haeringen⁷, Steve Fain⁸, and Tom Broad⁹, Recommendations for Animal DNA Forensic and Identity Testing. *Int. J. Leg. Med.* (2005)

KETCHUM, M., and P. GAROFANO, Bringing Non-Human Forensic Testing into Compliance: Solutions and Challenges. *Proceedings of the Northwest Association of Forensic Science*. (2004)

KETCHUM, M., and M. KONIECZNY. Combining Novel Techniques to Achieve Consistent Results in Cases Where Degraded Human / Animal Mixes are Present in the Same Sample. *Proceedings of the Northwest Association of Forensic Science*. (2004)

Ketchum, M., Konieczny, M., et al, Combining Novel Methods to Achieve Reliable Results in Extremely Low Yield Human/Animal Mixes *Proceedings 15th International Symposium on Human Identity*. (2004)

Ketchum, M., Konieczny, M., et al, Voodoo, a Dog, and Amplifying Trace Evidence, a Case Study. *Proceedings 14th International Symposium on Human Identity*. (2003)

Guérin, G.; Bailey, E.; Bernoco, D.; Anderson, I.; Antczak, D.F.; Bell, K.; Biros, I.; Bjørnstad, G.; Bowling, A.T.; Brandon, R.; Caetano, A.R.; Cholewinski, G.; Colling, D.; Eggleston, M.; Ellis, N.; Flynn, J.; Gralak, B.; Hasegawa, T.; **Ketchum, M.**; Lindgren, G.; Lyons, L.A.; Millon, L.V.; Mariat, D.; Murray, J.; Neau, A.; Røed, K.; Sandberg, K.; Skow, L.C.; Tammen, I.; Tozaki, T.; VanDyk, E.; Weiss, B.; Young, A.; Ziegler, J. (2003) The second generation of the International Equine Gene Mapping Workshop half-sibling linkage map. *Animal Genetics* 34:161-168

Ketchum, M., Konieczny, M., et al., Contribution to the Equine Half Sibling Linkage Map. *International Plant and Animal Genome Conference*, 2003.

Ketchum, M., Alvarez, M., Alvarez, J., Konieczny, M., et al *Forensics and Animal Genetics: Case Studies International Society for Animal Genetics, Gottingen, Germany* 2002.

Ketchum, M., Thompson, D., et al. *Forensics and Animal Genetics: An Emerging Science. Proceedings 12th International Symposium on Human Identity*.(2001)

Ketchum, M., et al., Contribution to the Half Sibling Linkage Map. *Proceedings from the International Horse*

Gene Mapping Consortium, Brisbane, Australia, 2001.

M. KETCHUM¹, R. BRANDON¹, D. THOMPSON¹, & P. WOJTKIEWICZ²· Crime and Animal Genetics, Use of Canine Mitochondrial DNA as Supporting Evidence. Proceedings, Eleventh International Symposium on Human Identity. 2000.

M. S. KETCHUM, D. THOMPSON, & P. W. WOJTKIEWICZ, Canine Mitochondrial DNA, a Novel Criminal Case Study. Proceedings from International Society for Animal Genetics International Meeting. 2000.

Guérin G., Bailey E., Bernoco D., Anderson I., Antczak D.F., Bell K., Binns M.M., Bowling A.T., Brandon R., Cholewinski G., Cothran E.G., Ellegren H., Förster M., Godard S., Horin P., **Ketchum M.**, Lindgren G., McPartlan H., Mériaux J.-C., Mickelson J.R., Millon L.V., Murray J., Neau A., Røed K., Sandberg K., Shiue Y.-L., Skow L.C., Stott M., Swinburne J., Valberg S.J., Van Haeringen H., Van Haeringen W.A., Zeigle J. (1999) Report of the International Equine Gene Mapping Workshop: Male Linkage Map. *Animal Genetics* 30: 341-354.

Ketchum, M., Iwanczyk, E., (1999) Use of 11 Fluorescently Labeled Canine STRs in a Single Lane Analysis to Solve a Criminal Case. Proceedings from the Tenth International Symposium on Human Identification. Promega Corporation.

Bellone, R. R., Cothran, E. G., **Ketchum, M. S** (1998) Genetic Variation in the Rare Donkey Breed, Baudet du Poitou. *Animal Genetics* 1998 Supplement

G. GUÉRIN, E. BAILEY¹, I. ANDERSON, D. F. ANT CZAK, K. BELL, D. BERNOCO, M.M. BINNS, A.T. BOWLING, R. BRANDON, G. CHOWLEWINSKI, E.G. COTHRAN, H. ELLEGREN, M. FÖRSTER, S. GODARD, P. HORIN, **M. KETCHUM**, G. LINDGREN, H. MCPARTLAN, J.-C. MÉRIAUX, J. MICKELSON, L.V. MILLON, A. NEAU, K. RÖED, K. SANDBERG, L. SKOW, M. STOTT, J. SWINBURNE, H. VAN HAERINGEN, W.A. VAN HAERINGEN, J. ZEIGLE. Report of the International Equine Gene Mapping Workshop : First Linkage Map : *Animal Genetics* 1998 Supplement

Ketchum, M. S., Morton, T. A. (1996) Use of Fluorescently Labeled Dinucleotide Repeats in a 10-Multiplex, Single Lane Analysis for Post-Mortem Identification and Parentage Verification in the Equine Species. In *Proceedings from the Seventh International Symposium on Human Identification*, 1996. Promega Corporation. 168.

Ketchum, M. S., Morton, T. A. (1997) Use of Fluorescently Labeled Dinucleotide Repeats as a Method of Identification and Parentage Verification in Mammoth Jackstock. In *Proceedings from the International Conference for Animal Biotechnology*, 1997. China Agricultural University.

Ketchum, M. S. (1996) Neonatal Isoerythrolysis: Is Your Foal at Risk? *Voice of the Tennessee Walking Horse*. August, 1996:154-155.

Ketchum, M. S. (1997) It's in the Blood, Understanding Genetic Testing for Homozygous Tobiano Coloration *Paint Horse Journal*, April 1997:134-138.

Bozzini, M., Fantin, D., Ziegler, J., Van Haeringen, H., Jacobs, W., **Ketchum, M.**, et al; (1996) Automated Equine Paternity Testing. *Animal Genetics* 27:32.

Ketchum, M. S., Cothran, E. G. Examination of the Protease Inhibitor System of *Equus asinus* Using 1-D Acid PAGE. *Animal Genetics*. 20:66.

Ketchum, M. S., Cothran, E. G., Colling, D. T. (1994) Recent Developments in DNA Based Parentage Testing of Horses. *American Saddlebred*. 1994.

Ketchum, M.S. (1993) Unraveling the Mystery of Bloodtyping. *Voice of the Tennessee Walking Horse*, April 1993.