



# 2018 NORTH AMERICAN VETERINARY REGENERATIVE MEDICINE CONFERENCE



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# WELCOME

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Dear Colleagues,

Welcome to Sacramento and the 2018 NAVRMA Conference!

NAVRMA held its inaugural conference in California in 2010, and it is exciting to be returning to California for this, the sixth conference. We specifically chose Sacramento for its close location to UC Davis as well as to Bay Area biomedical research institutions. We also wanted to highlight the vibrancy of a city undergoing a rebirth.

The scientific program was designed to focus on New Frontiers in Regenerative Medicine. Our hope is that the conference will help NAVRMA attendees to envision where the field of veterinary regenerative medicine will be 5, 10, and 20 years in the future. Dr. Hiro Nakauchi will present his work on interspecies organogenesis during the opening keynote lecture. Dr. Farsh Guilak will discuss his recent work using CRISPR mediated gene engineering during the closing keynote lecture. Dr. Michael Longaker will present his work on identification of skeletal stem cells during Friday morning’s plenary lecture. Dr. Brian Johnstone will discuss advances in cartilage repair during Saturday morning’s plenary lecture.

In addition to the keynote and plenary lectures, we have three New Frontiers sessions, each consisting of four 30-minute lectures. The first session (at the Cutting Edge) will feature veterinary scientists that are at the forefront of regenerative basic science. The second session (in Translation) will present research that demonstrates how basic science can be translated to clinical applications. The final session (in Clinical Trials) will permit attendees to see the newest regenerative therapeutics.

We received a record number of abstracts (46) and 25 of these were submitted by new investigators – the future of NAVRMA! New investigators will be eligible for both poster and oral awards. Concurrent with the four afternoon oral abstract sessions, there will be a series of four workshops. This is a new endeavor for NAVRMA. Attendees can attend either oral sessions or the workshops and should feel free to move between sessions.

The format of the workshops will permit discussion between moderators, presenters, and the audience. The first three workshops will focus on “Best Practices in Developing Stem Cell Therapeutics.” The final workshop is focused on increasing practitioner involvement in clinical studies. An overview of the workshops will be presented at the end of the meeting on Sunday morning.

Finally, I would like to thank The NAVRMA Board and other NAVRMA members who were indispensable in helping to develop the program. These individuals are listed in this program guide. Finally, the meeting would not be possible without the support of our sponsors and, of course, all of you, the attendees.

Sincerely,



*Kurt D. Hankenson, DVM, PhD*  
Chair-NAVRMA

# CONFERENCE AT A GLANCE

## THURSDAY

2:00 PM – 5:00 PM	Strategic Planning for NAVRMA	Sycamore
6:00 PM – 8:00 PM	Welcome Reception and Opening Keynote Lecture: Hiro Nakauchi	Maple Suite

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## FRIDAY

7:30 AM – 8:30 AM	<a href="#">Breakfast</a>	Foyer
8:30 AM – 9:30 AM	Plenary Session: Michael Longaker	Magnolia Ballroom
9:30 AM – 1:30 PM	Behind-the-Scenes Tour at UC Davis	
9:30 AM – 10:00 AM	<a href="#">Morning Break</a>	Foyer
10:00 AM – 12:00 PM	New Frontiers in Regenerative Medicine (at the Cutting Edge)	Magnolia Ballroom
12:00 PM – 1:30 PM	<a href="#">Lunch</a>	Foyer
1:30 PM – 3:00 PM	Oral Session: Stem Cell Basics	Magnolia Ballroom
	Breakout Session: Best Practices in Stem Cell Therapeutics Part 1	Alder Ballroom
3:00 PM – 3:30 PM	<a href="#">Afternoon Break</a>	Foyer
3:30 PM – 5:00 PM	Oral Session: Immunomodulation	Magnolia Ballroom
	Breakout Session: Best Practices in Stem Cell Therapeutics Part 2	Alder Ballroom
5:00 PM – 6:30 PM	Poster Judging Session	Foyer

# CONFERENCE AT A GLANCE

## SATURDAY

7:30 AM – 8:30 AM	Breakfast	Foyer
8:30 AM – 9:30 AM	Plenary Session: Brian Johnstone	Magnolia Ballroom
9:30 AM – 10:00 AM	Morning Break	Foyer
10:00 AM – 12:00 PM	New Frontiers in Regenerative Medicine (in Translation)	Magnolia Ballroom
12:00 PM – 1:30 PM	Lunch	Foyer
1:30 PM – 3:00 PM	Oral Session: Stem Cell Therapy for Soft Tissue Diseases	Magnolia Ballroom
	Breakout Session: Best Practices in Stem Cell Therapeutics Part 3	Alder Ballroom
3:00 PM – 3:30 PM	Afternoon Break	Foyer
3:30 PM – 5:00 PM	Oral Session: Musculoskeletal Regeneration	Magnolia Ballroom
	Breakout Session: Practitioner Primer on FDA Product Development	Alder Ballroom
5:30 PM – 6:30 PM	Closing Keynote Lecture: Farshid Guilak	Magnolia Ballroom
6:30 PM – 8:00 PM	Closing Remarks by Dean Michael Lairmore Closing Reception and Awards	

## SUNDAY

7:30 AM – 8:30 AM	Breakfast	Foyer
8:30 AM – 10:30 AM	New Frontiers in Regenerative Medicine (in Clinical Trials)	Magnolia Ballroom
10:30 AM – 11:00 AM	Morning Break	Foyer
11:00 AM – 12:00 PM	Reports from Breakout Sessions	Magnolia Ballroom

# THURSDAY

- 2:00 PM – 5:00 PM      Registration Open  
Strategic Planning for NAVRMA – Open to all interested attendees
- 6:00 PM – 8:00 PM      Welcome Reception: Introduction and opening remarks by Kurt Hankenson  
Keynote Session: "Exploiting the organ niche for interspecies organogenesis" (Hiro Nakauchi)
- 

# FRIDAY

- 7:30 AM – 8:30 AM      **Breakfast**
- 8:30 AM – 9:30 AM      Plenary Session I: "Skeletal Stem Cells" (Michael Longaker)  
Introduction by Susan Volk
- 9:30 AM – 1:30 PM      Behind-the-scenes tour at University of California Davis
- 9:30 AM – 10:00 AM      **Morning Break**
- 10:00 AM – 12:00 PM      **New Frontiers in Regenerative Medicine (at the Cutting Edge)**  
Moderated by Mark Hurtig and Kyla Ortvad  
"Towards a better understanding of MSC heterogeneity using single cell RNA-sequencing" (Gerlinde R. Van de Walle)  
"Considering tissue niche and residential progenitors in tendon repair" (Mike Mienaltowski)  
"Biologically-based tissue engineering" (Susan Volk)  
"Engineering and the Cornea" (Chris Murphy)
- 12:00 PM – 1:30 PM      **Lunch**
- 1:30 PM – 3:00 PM      **Oral Session I: Stem Cell Basics**  
Moderated by Lauren Schnabel and Rebecca Harman  
"Canine Embryo-Derived and Induced Pluripotent Stem Cells: Contributions, Challenges and Perspectives" (Ian Tobias\*)  
"Generation of transgenic OCT4-eGFP canine induced pluripotent stem cell lines for pluripotency assessment" (Maria Questa\*)  
"Expansion of Canine Adipose-Derived Mesenchymal Stem Cells in an Automated, Hollow-Fiber Bioreactor System using Pooled Canine Cryoprecipitate as a Membrane Coating Reagent" (Nathan Frank)  
"Bone marrow supernatant is a suitable replacement for fetal bovine serum in the isolation of equine bone marrow derived mesenchymal stem cells" (Aileen Rowland\*)

# FRIDAY

## Oral Session I: Stem Cell Basics (continued)

"Cell Identity, proliferation, and cytogenetic assessment of equine umbilical cord blood mesenchymal stromal cells" (Hamed Alizadeh\*)

"Preliminary Experience with Positron Emission Tomography Stem Cell Tracking in the Horse" (Mathieu Spriet)

1:30 PM – 3:00 PM

## Breakout Session I: Stem Cell Therapeutics – Introduction/Perspectives (Dori Borjesson and Tracy Webb)

"Summary of ISCT experiences in developing best practices and white papers from the human side" (Jan Nolta)

"Summary of adverse events reported thus far and need for development of best practices" (Lynne Boxer)

3:00 PM – 3:30 PM

[Afternoon Break](#)

3:30 PM – 5:00 PM

## Oral Session II: Immunomodulation

Moderated by Laurie Goodrich and Jeff Mason

"Platelet-rich plasma lysate therapy increases synoviocyte proliferation and hyaluronic acid production while protecting chondrocytes from synoviocyte-derived inflammatory mediators" (Lauren Schnabel)

"Autologous protein solution mitigates the inflammatory cascade in stimulated equine chondrocytes" (Kyla Ortved)

"Mechanisms Utilized by Feline Mesenchymal Stem Cells to Inhibit T-Lymphocyte Proliferation" (Nopamane Taechangam\*)

"Equine cord blood MSCs have greater differentiation and similar immunosuppressive potential to donor-matched cord tissue MSCs" (Sarah Lepage\*)

"Untreated and TGF-beta2-treated equine bone marrow-derived mesenchymal stem cells have similar immunomodulatory properties in vitro" (Alix Berglund\*)

"Autologous Adipose-Derived Multipotent Stromal Cells on Xenografts Reduce the Systemic Response" (Catherine Takawira)

3:30 PM – 5:00 PM

## Breakout Session II: Best Practices in Developing Stem Cell Therapeutics: Cell Culture and Release Criteria (Dori Borjesson and Tracy Webb)

Panel Discussion for White Paper

5:00 PM – 6:30 PM

Poster Judging Session

# SATURDAY

7:30 AM – 8:30 AM	<b>Breakfast</b>
8:30 AM – 9:30 AM	Plenary Session II: "Stem Cells for Cartilage Repair: The Good, The Bad, and The Ugly" (Brian Johnstone)  Introduction by Tracy Webb
9:30 AM – 10:00 AM	<b>Morning Break</b>
10:00 AM – 12:00 PM	<b>New Frontiers in Regenerative Medicine (in Translation)</b> Moderated by Madhu Dhar and Gerlinde Van De Wale  "Cell Therapy for the Treatment of Osteoarthritis" (Jen Barrett)  "Immunomodulatory effects of canine umbilical cord tissue mesenchymal stem cells and extracellular vesicles" (Kristen Thane)  "Platelet Lysate obtained via plateletpheresis and the regulation of innate immune responses in horses" (John Peroni)  "A new approach to infectious arthritis: understanding bacterial behavior in synovial fluid and developing a novel therapeutic that is both antimicrobial and chondroprotective" (Lauren Schnabel)
12:00 PM – 1:30 PM	<b>Lunch</b>
1:30 PM – 3:00 PM	<b>Oral Session III: Stem Cell Therapy for Soft Tissue Diseases</b> Moderated by Ashlee Watts and Kate Birdwhistell  "Adipose-derived mesenchymal stem cells as a potential therapy for equine recurrent uveitis" (Laurel Saldinger*)  "Stem Cells for Neurovascular Erectile Dysfunction" (Cara Clouse)  "Homing and engraftment of intravenously administered equine cord blood derived multipotent mesenchymal stromal cells (CB-MSCs) to surgically created wounds in horses: an observational pilot project" (Suzanne Mund*)  "Equine mesenchymal stromal cell-derived PAI-1 and tenascin-C promote wound healing" (Rebecca Harman*)  "Insulin Secretion by Pancreatic Cell Clusters from Feline Adipose Derived Multipotent Stromal Cells Responds to Glucose Concentration" (Mandi Lopez)  "Progress Towards Islet and Stem Cell Therapies for the Management of Diabetes In Pets" (Francis Karanu)
1:30 PM – 3:00 PM	<b>Breakout Session III: Developing Stem Cell Therapeutics: Donor Qualifications (Dori Borjesson and Tracy Webb)</b>  "Donor selection for human and veterinary transplantation and discussing tissue donation with owners" (Helen Newman)
3:00 PM – 3:30 PM	<b>Afternoon Break</b>

\*New Investigator

# SATURDAY

3:30 PM – 5:00 PM

## Oral Session IV: Musculoskeletal Regeneration

Moderated by Scott Hopper and Hamed Alizadeh

"In Vivo Gene Therapy of the Equine Distal Extremity with a Therapeutic Viral Vector Using a Standing Regional Limb Procedure" (Jeff Mason)

"Extracorporeal shockwave promotes osteogenesis of equine bone marrow-derived mesenchymal stem cells" (Laurie Goodrich)

"Newborn tissues for cartilage regeneration: A comparative analysis of the chondrogenic potential of umbilical cord matrix and umbilical cord-derived mesenchymal stem/stromal cells (MSC)" (Stephane Maddens)

"Allogeneic Stem Cell Therapy and Joint Irrigation as an Intra-articular Adjuvant Therapy for Canine Osteoarthritis: A Safety and Efficacy Assessment" (Kristina Kiefer)

"Agmatine for Pain Management in Dogs with Coxofemoral Joint Osteoarthritis" (Takashi Taguchi\*)

"Porcine Platelet Lysate: A Culture Supplement for Porcine Osteochondral Graft Storage?" (Kate Birdwhistell\*)

3:30 PM – 5:00 PM

## Breakout Session IV: Practitioner Primer on FDA Product Development (Robert Harman)

Dos and Don'ts and How You Can Be Involved

6:00 PM – 8:00 PM

Closing Remarks by Dean Michael Lairmore

Keynote Session: "Engineering Designer Stem Cells Using CRISPR-Cas9 Genome Editing: Developing the Next Generation of Cell-based Therapies" (Farshid Guilak)

Introduction by Thomas Koch

Reception and Award Presentations

# SUNDAY

7:30 AM – 8:30 AM

Breakfast

8:30 AM – 10:00 AM

## New Frontiers in Regenerative Medicine (in Clinical Trials)

Moderated by Lauren Schnabel and Taralyn McCarrel

"A randomized, controlled trial of the effects of resveratrol administration in performance horses with lameness localized to the distal tarsal joints" (Ashlee Watts)

"MSC and IBD in the CAT" (Tracy Webb)

"Double-blinded, Placebo Controlled Study Evaluating the Safety and Efficacy of Intravenous Allogeneic Adipose Stromal Cell Therapy for Canine Osteoarthritis" (Kristina Keifer)

"Results of GLP Canine Stem Cell Safety Study of Intraarticular Stem Cells" (Robert Harman)

10:30 AM – 11:00 AM

Afternoon Break

11:00 AM – 12:00 PM

Reports from Breakout Sessions

# POSTER PRESENTERS

- P1 – "MicroRNAs as prognostic markers for chondrogenic potency of mesenchymal stromal cells derived from equine cord blood" (Hamed Alizadeh\*)
- P2 – "Cell Identity, Proliferation, and Cytogenetic Assessment of Equine Umbilical Cord Blood Mesenchymal Stromal Cells" (Hamed Alizadeh\*)
- P3 – "Optimization of Fibrinogen Depletion from Platelet Concentrate" (Alysha Berezny\*)
- P4 – "Enzyme and Cryoprotectant Effects on Equine Adipose Tissue-Derived Multipotent Stromal Cells" (Wei Duan)
- P5 – "Generation of transgenic OCT4-eGFP canine induced pluripotent stem cell lines for pluripotency assessment" (Maria Questa\*)
- P6 – "Bone marrow supernatant is a suitable replacement for fetal bovine serum in the isolation of equine bone marrow derived mesenchymal stem cells" (Aileen Rowland\*)
- P7 – "Stem cell plasticity determines immunogenicity of allogeneic equine mesenchymal stem cells" (Aileen Rowland\*)
- P8 – "Canine Embryo-Derived and Induced Pluripotent Stem Cells: Contributions, Challenges and Perspectives " (Ian Tobias\*)
- P9 – " Untreated and TGF-beta2-treated equine bone marrow-derived mesenchymal stem cells have similar immunomodulatory properties in vitro" (Alix Berglund\*)
- P10 – " Autologous and Pooled-Allogeneic Equine Bone Marrow-Derived Mesenchymal Stem Cells Elicit Equivalent Clinical and Cytological Effects in an Interleukin-1 Beta Inflammatory Joint Model" (Aimee Colbath)
- P11 – "Preliminary results of the direct transplantation of mesenchymal stem cells injected into the compressed spinal cord during inter body fusion using Seattle Slew implants in 3 horses" (Barrie Grant)
- P12 – "Intra-articular cell therapy alters the synovial fluid immune profile in osteoarthritis" (Kristen Lamers\*)
- P13 – "Mesenchymal Stem Cell transplantation under endoscopic guidance into the spinal cord of healthy adult horses undergoing cervical vertebral interbody fusion" (Sarah Lepage\*)
- P14 – "Equine cord blood MSCs have greater differentiation and similar immunosuppressive potential to donor-matched cord tissue MSCs" (Sarah Lepage\*)
- P15 – "Oral reserpine administration in horses results in low plasma concentrations that alter platelet biology" (Lauren Schnabel)

# POSTER PRESENTERS

- P16 – "Mechanisms Utilized by Feline Mesenchymal Stem Cells to Inhibit T-Lymphocyte Proliferation" (Nopamane Taechangam\*)
- P17 – "Equine mesenchymal stromal cell-derived PAI-1 and tenascin-C promote wound healing" (Rebecca Harman\*)
- P18 – "The responsiveness of mares with chronic degenerative endometritis to platelet-rich plasma infusion based on severity of degenerative changes" (Elizabeth Metcalf)
- P19 – "Homing and engraftment of intravenously administered equine cord blood derived multipotent mesenchymal stromal cells (CB-MSCs) to surgically created wounds in horses: an observational pilot project" (Suzanne Mund\*)
- P20 – "Novel Identification of mRNA of the Inflammation-associated Proteins CXCL8, CXCR2, CXCL10, CXCR3, and B-Arrestin-2 in Equine Wounded Cutaneous Tissue after Intravenous CB-MSC therapy: a Preliminary Study" (Suzanne Mund\*)
- P21 – "Adipose-derived mesenchymal stem cells as a potential therapy for equine recurrent uveitis" (Laurel Saldinger\*)
- P22 – "Naturally occurring diabetes mellitus in dogs as a translational model for iPSC based therapies" (Maryam Moshref\*)
- P23 – "Assessment of extracellular matrix proteins expressed by human mesenchymal stromal cells exposed to low oxygen functionalized graphene to evaluate osteogenic potential" (Madhu Dhar)
- P24 – "Desmitis of the collateral ligament of the distal interphalangeal joint in horses: regenerative medicine techniques and outcome" (Pablo Espinosa Mur)
- P25 – "Serial imaging and arthroscopy provides evidence that intra-articular cell therapy changes the trajectory of osteoarthritis" (Candace Flynn\*)
- P26 – "Safety and clinical efficacy of a single intra-articular injection of allogeneic neonatal mesenchymal stem cells for the treatment of osteoarthritis in dogs" (Stephane Maddens)
- P27 – "Commercially Available Acellular Desiccant and Morselized Liquid Amnion Accelerate Bone Regeneration in Rams without Adverse Clinical Effects" (Ramon Rivera-Barreno)
- P28 – "Development of a safer calvaria critical-sized defect model in rats using piezoelectric surgery" (Rafael Senos\*)
- P29 – "Agmatine for Pain Management in Dogs with Coxofemoral Joint Osteoarthritis" (Takashi Taguchi\*)
- P30 – "Progenitor Cells from Normal and Inflamed Equine Hooves Have Characteristics of Two Tissue Lineages" (Qingqiu Yang)

# KEYNOTE SPEAKERS



## **HIRO NAKAUCHI**

After earning M.D. and a Ph.D. in Japan, Dr. Nakauchi went to Stanford University as a postdoctoral scholar and isolated CD8 genes. After returning to Japan, he started working on hematopoietic stem cells in his laboratory at RIKEN. In 1994, he became a Professor of Immunology at the University of Tsukuba where he demonstrated that a single hematopoietic stem cell could reconstitute the entire hematopoietic system, a definitive experimental proof for “stemness.” Since April 2002, he has been a Professor of Stem Cell Therapy in the Institute of Medical Science at The University of Tokyo (IMSUT). In 2014, he returned to Stanford University to continue his stem cell research at the Institute of Stem Cell Biology and Regenerative Medicine. Goals of his work are to translate discoveries in basic research into practical medical applications.



## **FARSHID GUILAK**

Dr. Farshid Guilak is a Professor in the Department of Orthopaedic Surgery at Washington University and Director of Research for the Shriners Hospitals for Children - St. Louis Shriners. He is also the co-director of the Washington University Center of Regenerative Medicine and has appointments in the Departments of Developmental Biology and Biomedical Engineering. His laboratory is pursuing a multidisciplinary approach to investigate the etiology and pathogenesis of osteoarthritis, as a basis for the development of new pharmacologic and stem-cell therapies. He is currently PI of grants from the NIH, NSF, DOD, and several foundations. He has published over 300 articles in peer-reviewed journals and has co-edited four books. He is the editor-in-chief of the Journal of Biomechanics, Associate editor for Osteoarthritis & Cartilage, and serves on numerous other journal editorial boards. He is also the past-President of the Orthopaedic Research Society and former Chair of the Skeletal Biology Structure and Regeneration NIH Study Section. He is the first PhD member of the executive committee of the Orthopaedic Research and Education Foundation (OREF).

# PLENARY SPEAKERS



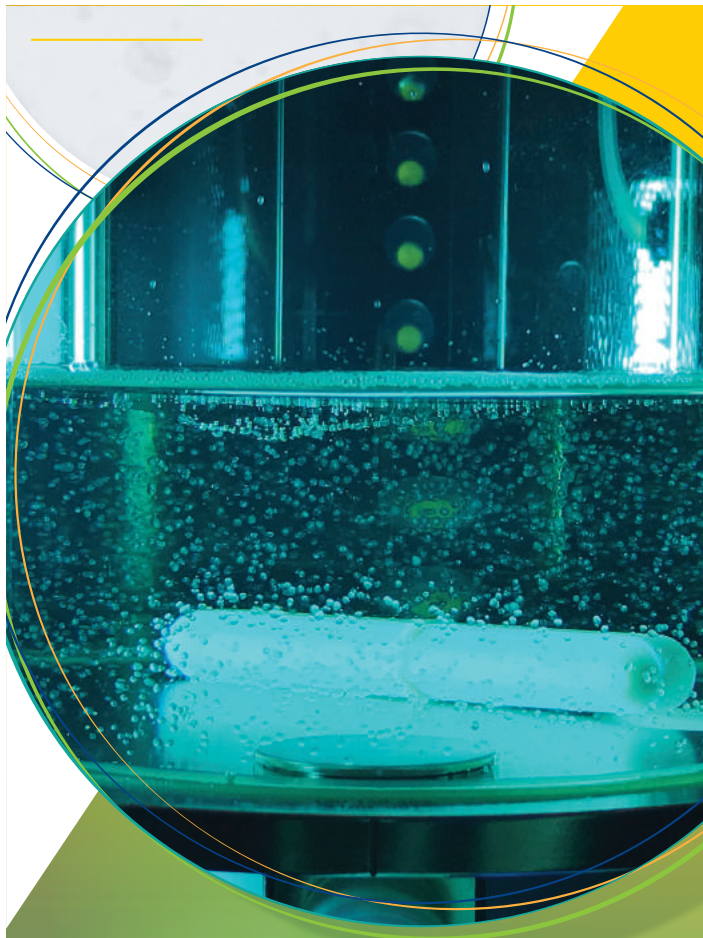
## **BRIAN JOHNSTONE**

Dr. Brian Johnstone, PhD, FIOR, FORS, did his predoctoral research at the Kennedy Institute of Rheumatology, London, England and postdoctoral work at West Virginia University and the University of North Carolina at Chapel Hill, USA. His work on intervertebral disc biology was acknowledged with two Volvo prizes for spine research. He moved to Case Western Reserve University in 1993 where he developed and patented the in vitro system for the chondrogenic induction of adult stem cells. In 2004, he became Director of Research in the Department of Orthopaedics and Rehabilitation at Oregon Health & Science University, Portland, Oregon where he continues his work on stem cells in skeletal tissue repair and regeneration. He served as the President of the Orthopaedic Research Society for 2011-2012. In 2016, he was elected into the inaugural class of Fellows of International Orthopaedic Research (FIOR), and in 2018, the inaugural class of Orthopaedic Research Society Fellows (FORS). In 2017 he was awarded the Marshall R. Urist Award for his contributions to tissue regeneration research.



## **MICHAEL LONGAKER**

Dr. Michael T. Longaker earned his undergraduate degree at Michigan State University, (where he played varsity basketball and was a member of the 1979 NCAA Men's Basketball Championship Team) and his medical degree at Harvard Medical School. He completed his surgical residency at the University of California, San Francisco, a residency in Plastic Surgery at NYU and a craniofacial fellowship at UCLA. 2003, Dr. Longaker earned his M.B.A. from University of California – Berkeley and Columbia University. Dr. Longaker joined the Stanford University School of Medicine in 2000, as Director of Children's Surgical Research in the Department of Surgery. He is the Co-Director of the Stanford Institute for Stem Cell Biology & Regenerative Medicine, as well as the Director of the Program in Regenerative Medicine. Michael Longaker's research experience focuses on wound repair and fibrosis, with specific applications to the differences between fetal and post-natal wound healing, the biology of keloids and hypertrophic scars.



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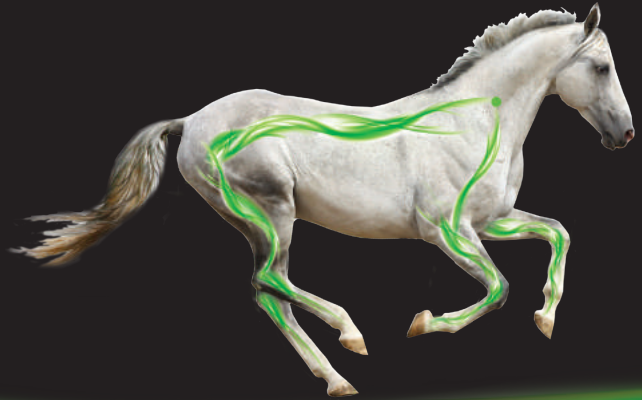
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# INVITED SPEAKERS

## JENNIFER BARRETT

Dr. Jennifer Barrett is the Theodora Ayer Randolph Professor of Equine Surgery at Virginia Tech's Marion duPont Scott Equine Medical Center (EMC). She received a doctorate in molecular and cell biology from Yale University in 1999, and a doctor of veterinary medicine degree from Cornell University in 2002. Dr. Barrett completed her internship in equine medicine and surgery at Rood & Riddle Equine Hospital in Lexington, Kentucky and her residency in equine surgery at the University of Illinois in Urbana. Her orthopedic postdoctoral research position was at the University of Wisconsin in Madison. Dr. Barrett joined the Marion duPont Scott Equine Medical Center's faculty in August 2007 and achieved Diplomate status through the American College of Veterinary Surgeons in 2008 and the American College of Veterinary Sports Medicine and Rehabilitation in 2013. She is a member of the American Veterinary Medical Association, the American Association of Equine Practitioners, Tissue Engineering and Regenerative Medicine International Society, the Veterinary Orthopedic Society and the Phi Zeta Honor Society.

## ASHLEE WATTS

Dr. Ashlee Watts attended veterinary school at Colorado State University, performed an internship at Pioneer Equine Hospital and completed a surgical residency and PhD at Cornell University. She is currently an Associate Professor of Equine Surgery and director of the Comparative Orthopedics and Regenerative Medicine Laboratory at Texas A&M University. Her interests are in performance horse diagnostics and care, regenerative medicine in cartilage, bone and tendon repair and osteoarthritis prevention.

## KRISTINA KEIFER

Dr. Kristina Kiefer is a University of Minnesota College of Veterinary Medicine graduate, earning her DVM in 2006. She advanced her training further with a small animal internship at Red Bank Veterinary Hospital, and a surgical internship at Gulf Coast Veterinary Medicine. She returned to the University of Minnesota, where she completed a surgical residency, and a PhD in Veterinary Medicine. Her research studies and interests lie in surgical disease and regenerative medicine. She has completed multiple studies evaluating canine adipose derived stem and progenitor cells to treat osteoarthritis. Her surgical interests include management of polytraumatic cases, reconstructive and minimally invasive surgical procedures, and surgical oncology.

## MICHAEL LAIRMORE

Dr. Michael Lairmore is the Dean of the School of Veterinary Medicine at UC Davis and oversees all teaching, research and service activities, personnel, facilities and funding resources. Dean Lairmore earned his Doctor of Veterinary Medicine degree from the University of Missouri at Columbia before working as a dairy and small animal veterinarian. Following private practice, he completed a residency and PhD in experimental pathology at Colorado State University at Fort Collins. Dean Lairmore is a scientist who bridges multiple disciplines to address basic questions related to viral causes of cancer. His research has provided significant breakthroughs in the biology of human retroviruses and the understanding of viral-associated carcinogenesis. He has authored or co-authored 190 scientific publications.

# INVITED SPEAKERS

## **GERLINDE VAN DE WALLE**

Dr. Van de Walle was awarded her DVM degree in 1999 from the Faculty of Veterinary Medicine, Ghent University, Belgium, and received her PhD from the same institution, in 2003. In 2013, Dr. Van de Walle was offered a position as Assistant Professor at the Baker Institute for Animal Health, where she established her research lab working in the fields of Veterinary Virology and Stem Cell Biology. Dr. Van de Walle has published over 80 papers in peer-reviewed journals thus far and has presented at national and international conferences.

## **KRISTEN THANE**

Dr. Thane completed veterinary school at Tufts University and remained at the Cummings School for internship and residency training in Large Animal Internal Medicine. Dr. Thane is currently working as a NIH-funded Postdoctoral Scholar in the Regenerative Medicine Laboratory at Tufts, investigating the safety and efficacy of autologous lung-derived mesenchymal stromal cell therapy for emphysema in a sheep model, with an ex vivo model of LMSCs-scaffold interactions. Additionally, Dr. Thane is collaborating on several projects exploring characterization of extracellular vesicles produced from MSC cell culture and extracted from biofluids.

## **MICHAEL MIENALTOWSKI**

Dr. Michael Mienaltowski is an assistant professor of applied physiology in Animal Science at UC Davis. He received his DVM from Michigan State University and his PhD from the Gluck Equine Research Center at the University of Kentucky. Afterward, he did his postdoctoral training jointly appointed in the Departments of Molecular Pharmacology & Physiology and Orthopaedics & Sports Medicine at the University of South Florida. At UC Davis he uses horse samples and mice to study tendon stem cell biology and tendon maturation, and as a tool to assist in the development of therapeutic approaches for tendon healing.

## **CHRIS MURPHY**

Dr. Chris Murphy received his BS, DVM, and PhD at Cornell University, and he completed his residency in Comparative Ophthalmology at the University of California, Davis. He was a Corneal Fellow at the University of California, Davis Medical School and he is currently a faculty member at both the Medical School and the Veterinary Medicine School. He has published over 230 peer reviewed papers, and he started the Avian Clinic at Cornell University with his wife, Dr. Joanne Paul-Murphy, who is also a faculty member at the UC Davis Veterinary Medicine School.

## **LAUREN SCHNABEL**

Dr. Schnabel is an Assistant Professor of Equine Orthopedic Surgery at NC State University. Her specific interests are in the use of regenerative therapies for the treatment of musculoskeletal injuries and in the rehabilitation of elite athletes. Her research expertise includes mesenchymal stem cell (MSC) biology and immunology as well as the use of large animal models for assessing treatment efficacy in-vivo. Dr. Schnabel's laboratory is currently focused on two major projects: improving the safety and efficacy of MSC therapies for the treatment of tendon injuries; and understanding the pathogenesis of infectious arthritis and identifying novel therapeutic strategies for the disease.

# INVITED SPEAKERS

## JOHN PERONI

Dr. John Peroni's research interest has been in the area of development of animal models for the implementation of regenerative therapies aimed at the repair of musculoskeletal disorders primarily fracture repair. Two additional areas that have occupied much of his recent interest and efforts have been the study of (i) the anti-inflammatory and immunomodulatory effects of mesenchymal stem cells and (ii) the interaction between delivered cellular therapies and the host environment. His background includes twenty years teaching experience in clinical and didactic settings at the University of Georgia Veterinary Medical Teaching Hospital, numerous related professional conference presentations, textbook chapters and peer reviewed articles related to the topic. Grant funded research totals from 2004 to current date totals \$2,695,525.

## ROBERT HARMAN

Dr. Robert Harman, DVM, MPVM founded and is the CEO of VetStem Biopharma, the first US-based commercial veterinary stem cell company. For 15 years prior to that, he was the CEO of HTI-Bio-Services, a preclinical research company for veterinary and human pharmaceutical development. He has authored 13 peer-reviewed publications on stem cell therapy. He received his Doctor of Veterinary Medicine and Master's in Epidemiology from the University of California, Davis.

## SUSAN VOLK

Dr. Susan Volk VMD, PhD, DACVS is an Associate Professor of Small Animal Surgery at the University of Pennsylvania School of Veterinary Medicine. As a clinician-scientist, she has had a long-standing clinical interest in wound healing and surgical oncology, with a complimentary basic research program focused on the role of the extracellular matrix in modulating progenitor and reparative cell activities during tissue repair and evaluating the utility of adult stem cells to promote regenerative responses. Recent work from her laboratory has defined cell-matrix interactions that regulate the wound healing-fibrosis-cancer triad. This NIH, private foundation, and industry sponsored research has basic and translational components, including clinical trials in veterinary patients. Dr. Volk is an active member of a number of national and international societies and has served as a member of the Board of Directors of both the Wound Healing Society and the North American Veterinary Regenerative Medical Association.

## TRACY WEBB

Dr. Tracy Webb received her DVM degree from The Ohio State University and completed a small animal internship and emergency/critical care residency at Angell Animal Medical Center. Tracy then received a PhD in Immunology/Pathology from CSU where she remained in a Research Scientist role. With over 10 years of research effort in regenerative medicine, Tracy has performed many in vitro studies and clinical trials looking at a variety of disease processes in several animal species. She has recently been involved in efforts to encourage and support quality clinical trials and the use of natural animal models to accelerate translational research. Tracy is the Vice Chair Elect of the North American Veterinary Regenerative Medical Association.

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VetStem Biopharma is a veterinarian-lead Company that was formed in 2002 to bring regenerative medicine to the profession. This privately held biopharmaceutical enterprise, based near San Diego, California currently offers veterinarians an autologous stem cell processing service (from patients’ own fat tissue) among other regenerative modalities. With a unique expertise acquired over the past 16 years and 14,000 patients treated by veterinarians for joint, tendon or ligament issues, VetStem has made regenerative medicine applications a therapeutic reality beyond the realm of research. The VetStem team is focused on developing new clinically practical and affordable veterinary solutions that leverage the natural restorative abilities present in all living creatures. The Company’s stated mission is “to extend and enhance the lives of animals by improving the quality of recovery in acute conditions, but also by unlocking ways to slow, stop and ultimately revert the course of chronic diseases”.

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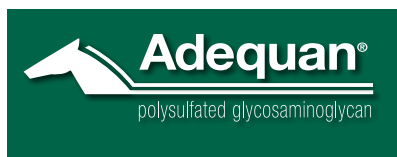
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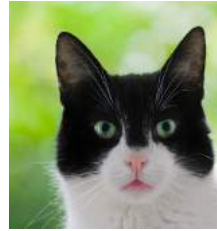
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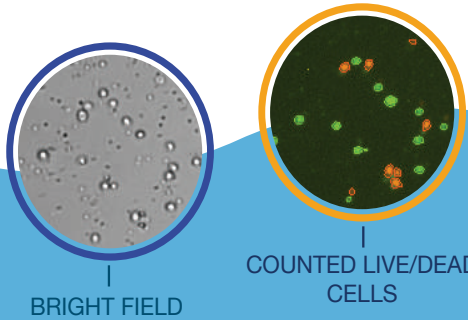


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As an independent, nonprofit organization, NAVRMA encourages professional improvement and the exchange of knowledge and ideas among people interested in veterinary regenerative medicine. The organization seeks to achieve the following goals:

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- Develop and exchange expertise in veterinary regenerative medicine through periodic meetings and publications
- Encourage and foster collaborative efforts and clinical trials in the field of veterinary regenerative medicine
- Help support research and clinical dissemination of information on veterinary regenerative medicine within North America and beyond
- Encourage training of young veterinarians and research scientists in veterinary regenerative medicine
- Consider and make recommendations on policies and regulations pertaining to veterinary regenerative medicine as necessary
- Interact in an appropriate manner with other scientific organizations as required



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