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<th>2019 Workshops</th>
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<td>Animal Models of Comorbidities in Fracture-Healing Research (Organized by ORS Preclinical Models Section and ORS International Section of Fracture Repair (ISFR))</td>
<td>Michael Lehmicke, PhD and Melanie Haffner-Luntzer, PhD</td>
<td>Kurt Hankenson, DVM, PhD, Anita Ignatius, DVM and Roman Pfeifer, MD</td>
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<tr>
<td>Advances of 3D Printing and Biofabrication in Orthopaedics (Organized by the ORS Women’s Leadership Forum)</td>
<td>Sophie Verrier, PhD and Deana Mercer, MD</td>
<td>Mia Woodruff, PhD, Lawrence Bonassar, PhD and Christina Salas, PhD</td>
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<td>Treating Osteoarthritis by Targeting Bone Cartilage Crosstalk: Taming TGF-beta</td>
<td>Xu Cao, PhD and Tamara Alliston, PhD</td>
<td>Tamara Alliston, PhD, Xu Cao, PhD and Farshid Guilak, PhD</td>
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<td>Zebrafish: An Emerging Model for Orthopaedic Research</td>
<td>Ronald Kwon, PhD and Ryan Gray, PhD</td>
<td>Jenna Galloway, PhD, Björn Busse, PhD, Ryan Gray, PhD and Matthew Harris, PhD</td>
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<td>Updates in multi-disciplinary approaches for stem-cell based cartilage regeneration (Organized by International Combined Orthopaedic Research Societies ICORS)</td>
<td>Gun-Il Im, MD, PhD and Ted Miclau, MD</td>
<td>Brian Johnstone, PhD, Martin Stoddart and Gun-Il Im, MD, PhD</td>
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<td>Managing Infection in Orthopaedic Trauma: Reaching Consensus and the Role of Emerging Technologies (In collaboration with Orthopaedic Trauma Association - OTA)</td>
<td>Emil Schemitsch, MD</td>
<td>David Hak, MD, Aaron Johnson, MD, Joseph Wenke, PhD, Aaron Nauth, MD and Peter Giannoudis, MD</td>
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<td>The Role of Macrophages and Immune Cells in the Progression of Osteoarthritis (Organized by the ORS Women’s Leadership Forum)</td>
<td>Jennifer Woodell-May, PhD</td>
<td>Jennifer Eliisseff, PhD, Steven Olson, MD and Christopher Little, BVMS, PhD</td>
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<td>Ex Vivo Explant Models: Unique Insights Offered by Studying Disease in a Dish</td>
<td>Spencer Szczesny, PhD</td>
<td>Jess Snedeker, PhD, X. Ed Guo, PhD and Simon Tang, PhD</td>
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<td>Can we prevent post-traumatic osteoarthritis: where are we now, and where are we going?</td>
<td>Deborah Mason, PhD</td>
<td>Fiona Watt, PhD, Deborah Mason, PhD and Christian Lattermann, MD</td>
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<td>Reproducibility in Modeling and Simulation of the Knee: Academic, Regulatory, and Industry Perspectives</td>
<td>Carl Imhauser, PhD</td>
<td>Carl Imhauser, PhD, Andrew Baumann, PhD and Cheryl Liu, PhD</td>
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<td>Plasticity of Cell Fate in Musculoskeletal Tissues (Organized by the ORS Women’s Leadership Forum)</td>
<td>Alice Huang, PhD</td>
<td>Kathryn Cheah, PhD, Benjamin Levi, MD and Jessica Lehoczky, PhD</td>
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<td>2018 Workshops</td>
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<td>The Microbiome and Musculoskeletal Disease</td>
<td>Chris Hernandez, PhD and Michael Zuscik, PhD</td>
<td>Christopher Hernandez, PhD, Julia Charles, MD, PhD and Michael Zuscik, PhD</td>
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<td>Osseointegrated Prosthetic Limbs: Recent Developments and Future Directions</td>
<td>Mark Ehrensberger, PhD and Sujee Jayapalida, PhD</td>
<td>Rickard Brånemark, MD, PhD, James P. Beck, MD Jeremy Gilillard, MD and Jonathan Forsberg, MD, PhD</td>
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<td>Regenerative Rehabilitation: The role of mechanotherapies used to optimize regenerative medicine outcomes</td>
<td>Chris Evans, PhD</td>
<td>Chris Evans, PhD, Vaida Glatt, PhD and Martin Stoddart, PhD</td>
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<td>Advances in Understanding Early Post-Traumatic Osteoarthritis</td>
<td>Dominik Haudenschild, PhD and Blaine Christiansen, PhD</td>
<td>Gabriela Loots, PhD, M Farooq Rai, PhD and Andrew Pitsilides, BSc, PhD</td>
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<td>Cell Autonomous and Non-Cell Autonomous Mechanisms of Aging</td>
<td>Johnny Huard, PhD</td>
<td>Johnny Huard, PhD, Laura Neidernhofer, PhD and Paul Robbins, PhD</td>
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<td>Limb Regeneration: What Can We Learn from Animal Models for Human Translation?</td>
<td>Jessica Lehoczky, PhD and Jessica Whited, PhD</td>
<td>Ken Muneoka, PhD, Thomas Lizito, PhD and S Randal Voss, PhD</td>
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<td>Outcome measures in Orthopaedic Research of the Joints and Spine (Organized by ORS Industry Engagement Committee (IEC) and ORS Spine Section)</td>
<td>Sally Liarno, PhD and Saeed Khayatzadeh, PhD</td>
<td>David Hamilton, PhD, BSc (hons), MCSP, Stefano Bini, PhD and Nadeen Chahine, PhD</td>
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<td>In vivo and in vitro techniques to study skeletal muscle growth and regeneration</td>
<td>Christopher Mendias, PhD and Gretchen Meyer, PhD</td>
<td>Esther Dupont-Versteegden, PhD and Gretchen Meyer, PhD</td>
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<td>The Scientific Legacy of Adele Boskey: From Biomineralization Mechanisms to Bone Quality (Organized by ORS Women’s Leadership Forum)</td>
<td>Nancy Pleshko, PhD and Susan Bukata, MD</td>
<td>Barbara Boyan, PhD, Marjolein van der Meulien, PhD and Cathleen Raggio, MD</td>
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<td>The evolution of total joint arthroplasty: a historical review of hip, knee, and shoulder prosthesis design advances (Organized by ORS Industry Engagement Committee (IEC) &amp; ORS Orthopaedic Implants Section)</td>
<td>Christopher Roche, MSE, MBA and Dennis Janssen, PhD</td>
<td>Evan Flatow, MD, John Callaghan, MD and Michael Mont, MD</td>
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<td>In vivo bone and joint loading - how and why should we measure it?</td>
<td>Karen Troy, PhD and Darryl D’Lima, PhD</td>
<td>Karen Troy, PhD, Darryl D’Lima, PhD and BJ Fregly, PhD</td>
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<td>In vivo MicroCT Imaging: Longitudinal Assessment of Skeletal Microstructure, Strength, and (Re)modeling Dynamics</td>
<td>Bettina Willie, PhD and X. Sherry Liu, PhD</td>
<td>Ralph Müller, PhD, Steven Boyd, PhD and Enrico Dall’Ara, PhD</td>
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<td>Functional analysis the key to the next revolution in the treatment and prevention of hip and knee arthritis <em>(Organized by Canadian Orthopaedic Research Society)</em></td>
<td>Fackson Mwale, PhD and Albert Yee, MD</td>
<td>Mario Lamontagne PhD, Janie Wilson, PhD, David Wilson, PhD and Paul Beaule, MD</td>
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<td>New Biological and Biomechanical Approaches to Orthopedic Management of Pediatric Neuromuscular Disorders <em>(Organized by Pediatric Orthopaedic Society of North America and ORS)</em></td>
<td>Roger Cornwall, MD and Brian Synder, MD, PhD</td>
<td>Brian Snyder, MD, PhD, Benjamin Alman, MD, Roger Cornwall, MD and James McCarthy, MD</td>
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<tr>
<td>Normal and Neoplastic Osteogenesis Signaling: Targeted Therapeutic Opportunities <em>(Organized by Musculoskeletal Tumor Society and ORS)</em></td>
<td>Francis Lee, MD, PhD and Michelle Ghert, MD</td>
<td>Hicham Drissi, PhD and Bang Hoang, MD</td>
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<tr>
<td>Evaluation of Implant Failure: The Role of MRI and Retrieval Analysis <em>(Organized for The Hip Society and ORS)</em></td>
<td>Douglas E. Padgett, MD and Timothy Wright, PhD</td>
<td>Mathias Bostrom, MD, Hollis Potter, MD and Timothy Wright, PhD</td>
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**2017 Workshops**

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<td>Additive Manufacturing in Orthopaedics - Current State of the Art, Future Trends, and Regulatory Oversight (Part I: Scientific Workshop)</td>
<td>Michael Lehmicke, Msc and Judd Day, PhD</td>
<td>Peter Walker, PhD; Hani Awad, PhD; James Coburn, MS</td>
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<td>Osteoarthritis: From Bench to Bedside and Back <em>(Organized by the ORS Women's Leadership Forum)</em></td>
<td>Robin Queen, PhD, FACSM and Susan Bukata, MD</td>
<td>Anna Spangnoli, MD; Constance Chu, MD; Stephen Messier, PhD</td>
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<tr>
<td>Research Gaps in Care of Hip Fracture <em>(Organized by The Hip Society and ORS)</em></td>
<td>Harry Rubash, MD and Kevn Bozic, MD, MBA</td>
<td>William Macaulay, MD and Stephen Kates, MD</td>
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<td>Instability in Total Knee Arthroplasty: Where Are We Now and Where Do We Need to Go? <em>(Organized by The Knee Society and ORS)</em></td>
<td>Timothy Wright, PhD and Guoan Li, PhD</td>
<td>Douglas Dennis, MD; Paul Rullkoetter, PhD; Scott Banks, PhD</td>
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<td>Bone Marrow Lesions - What Lies Beneath? A workshop based on the ORS/AAOS symposium: Tackling Joint Disease by Understanding Crosstalk between Cartilage and Bone, April 2016</td>
<td>Oran Kennedy, PhD and Tamara Alliston, PhD</td>
<td>David Felson, MD; David Findlay, PhD; Christopher Hernandez, PhD</td>
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<td>2016 Workshops</td>
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<td>New Horizon Workshop: Scaffolds, Bioreactors and Biologics in Orthopaedic Research (Organized by the Tissue Engineering and Regenerative Medicine International Society (TERMIS) and ORS)</td>
<td>Dimitrios Zeugolis, PhD and Mauro Alini, PhD</td>
<td>Martin Stoddart, PhD; Christopher Evans, PhD; Alicia El Haj, PhD</td>
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<td>Taper Corrosion in THA: Clinical Impact and Applying the Best Evidence into Practice (Organized by The Hip Society and ORS)</td>
<td>Harry Rubash, MD and Young-Min Kwon, MD, PhD</td>
<td>Joshua Jacobs, MD; Jeremy Gilbert, PhD, FBSE; Michael Morlock, PhD; Young-Min Kown, MD, PhD</td>
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<td>Current Status and Future Needs of Pediatric Orthopaedic Pharmacology (Organized by the Pediatric Orthopaedic Society of North America (POSNA) and ORS)</td>
<td>Jonathan Schoenecker, MD, PhD</td>
<td>Michelle Caird, MD; Benjamin Alman, MD; Jonathan Schoenecker, MD; PhD</td>
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<td>New Horizon Workshop: PRP Enigma: Biology and Clinical Use</td>
<td>Scott Rodeo, MD and Jeremy Mao, PhD</td>
<td>Scott Rodeo, MD; Constance Chu, MD; Jeremy Mao, PhD</td>
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<td>New Horizon Workshop: Drug Resistance: New Challenges and Opportunities in Biomaterials-associated Orthopaedic Infection</td>
<td>Bingyun Li, PhD and Thomas Webster, PhD</td>
<td>Bingyun Li, PhD; Thomas Webster, PhD; Dacheng Ren, PhD; Stuart Goodman, MD</td>
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<td>Driving Vascularization: The Key to Bone Repair (Organized by the ORS Women's Leadership Forum)</td>
<td>Sophie Verrier, PhD</td>
<td>Theodore Miclau, MD; Sabine Fuchs, PhD; Louis Gerstenfeld, PhD</td>
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<td>New Horizon Workshop: Functional Properties of Chondrocytes in Articular Cartilage using Optical Imaging to Scanning Probe Microscopy</td>
<td>Yang Xia, PhD and Eric Darling, PhD</td>
<td>Yang Xia, PhD; Eric Darling, PhD; Walter Herzog, PhD</td>
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<td>Cross-talk Opportunities Between Developmental Biology and Tissue Engineering</td>
<td>Joel Boerckel, PhD and Ralph Marcucio, PhD</td>
<td>Lin Qin, PhD; Eben Alsberg, PhD; Ralph Marcucio, PhD</td>
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<td>Mechanics Measurements (Part I: Scientific Workshop)</td>
<td>Christopher Mendias, ATC, PhD and Richard Lovering, PT, PhD</td>
<td>Christopher Mendias, ATC, PhD; Richard Lovering, PT, PhD; Samuel Ward, PhD, PT</td>
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<td>The Infected Implant in Orthopaedic Reconstruction: An Update on the Clinical and Molecular Approaches to Prevention and Diagnosis (Organized by the Musculoskeletal Tumor Society (MSTS) and ORS)</td>
<td>wakenda Tyler, MPH, MD and Francis Lee, MD, PhD</td>
<td>Michelle Ghert, MD; Carlos Higuera Rueda; Nicholas Bernthal, MD</td>
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<td>Advances in Identifying Early OA</td>
<td>Dominik Haudenschild, PhD and Blaine Christianson, PhD</td>
<td>Ronald June, PhD; Steven Olson, MD; Christopher Little, DVM, PhD</td>
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Clinical and Biological Challenges in Understanding Implant-Related Infection (Organized by the ORS Industry Engagement Committee)

Jeremy Rawlinson, PhD and Michael Lehmicke, MS
Samir Mehta, MD; Edward Schwarz, PhD; Mathias Bostrom, MD

Building Better Bone: The Weaving of Biologic and Engineering Strategies for Managing Bone Loss (Collaboration of the ORS and OTA)

Jaimo Ahn, MD, PhD and Mara L. Schenker, MD
Mara L. Schenker, MD; Jaimo Ahn, MD, PhD; Nick Willett, PhD

Strategies to Improve Total Knee Arthroplasty (Collaboration of the ORS and Knee Society)

Thomas P. Vail, MD and Kevin L. Garvin, MD
Kevin Bozic, MD; Thomas P. Vail, MD; Kevin L. Garvin, MD

How to Accelerate Basic Discoveries to Patient Benefit

Jeffrey C. Lotz, PhD and Vijay K. Goel, PhD
Tamara Alliston, PhD; Sigurd Beren, MD; Hassan Serhan; Joan McGowan, PhD

The Good and The Bad - Interdependency of Bone and Immune Cells: Possibilities for Future Treatments?

Georg N. Duda, PhD and Katharina Schmidt-Bleek, PhD
Louis Gerstenfeld, PhD; Ralph Marcucio, PhD; Georg N. Duda, PhD

Should We Believe the Hype? The Influence of Vitamin D in Musculoskeletal Health and Beyond (Organized by the ORS Women's Leadership Forum)

Susan V. Bukata, MD and Robin M. Queen, PhD
John Adams, MD; Barbara Minkowitz, MD; Barbara D. Boyan, PhD

Meniscal Repair and Replacement Strategies: Where are we in 2016?

Lutz Dursele, PhD and Lawrence J. Bonassar, PhD
Marc Levenston, PhD; Robert L. Mauck, PhD; Scott A. Rodeo, MD

3-Dimensional Human Tissue Models to Study Musculoskeletal Physiology and Pathophysiology

Farshid Guilak, PhD and Rocky S. Tuan, PhD
Kevin E. Healey, PhD; Farshid Guilak, PhD; Rocky S. Tuan, PhD

Meniscal Repair and Replacement Strategies: Where are we in 2016?

Lutz Dursele, PhD and Lawrence J. Bonassar, PhD
Marc Levenston, PhD; Robert L. Mauck, PhD; Scott A. Rodeo, MD

Emerging Role of Metabolic Signaling in Synovial Joint Remodeling

Timothy M. Griffin, PhD and Konrad K. June, PhD
Timothy M. Griffin, PhD; Konrad K. June, PhD; Fanxin Long, PhD; Ru Liu-Bryan, PhD

2015 Workshops

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<td>Trials, Tribulations and Triumphs of Conducting Prospective Clinical Research Studies: The How and Why (Presented by the ORS Women’s Leadership Forum - WLF)</td>
<td>Robin Queen, PhD and Karen King, PhD</td>
<td>Cecilia Rogmark, MD, PhD; Joanne Jordan, MD, MPH; Gloria L. Matthews, DVM, PhD</td>
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<td>Quantitative MR Imaging: Research Applications and Clinical Translation</td>
<td>Hollis G. Potter, MD</td>
<td>Sharmila Majumdar, PhD; Won C. Bae, PhD</td>
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<td>ORS/The Hip Society Biological Aspects of Modular Implant Tribocorrosion</td>
<td>Harry E. Rubash, MD and Mathias P. Bostrom, MD</td>
<td>Joshua J. Jacobs, MD; Patricia A. Campbell, PhD; Jeremy L. Gilbert, PhD</td>
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<td>Hot Topics in Regulatory Challenges within Orthopaedics (Presented by the ORS Corporate Affairs Committee - CAC)</td>
<td>David W. Schroeder, MBA and Jacob L. Cartner, MS</td>
<td>Chris Gemmiti, PhD; William M. Mihalko, MD, PhD; Steve M. Kurtz, PhD</td>
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<td>Organ Dysfunction in Multiple Injured Patients</td>
<td>Tod McKinley, MD</td>
<td>H. Christopher Pape, MD; Timothy R. Billiar, MD; Todd McKinley, MD</td>
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<td>ORS/SOMOS How an Integrated Orthosis and Rehabilitation Initiative has Improved Outcomes for Lower Extremity Limb Salvage Patients</td>
<td>Daniel J. Stinner, MD and Benjamin K. Potter, MD</td>
<td>Johnny Owens, CPT; Daniel J. Stinner, MD; Jason M. Wilken, PhD</td>
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<td>Improving the Translational Success of Cell-Based Therapies</td>
<td>Jennifer J. Bara, PhD; Marietta Herrmann, PhD; and Geoff Richards, PhD</td>
<td>Theodore Miclau, MD; Christopher H. Evans, PhD; Anthony Ratcliffe, PhD</td>
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<td>ORS/MSTS The Osteoclast and Bone Diseases</td>
<td>Richard Terek, MD, FACS and Rejis J. O’Keefe, MD, PhD</td>
<td>Wentian Yang, MD, PhD; Michelle Ghert, MD, FRCS; Franciss Y. Lee, MD, PhD</td>
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<td>ORS/POSNA Key Concepts of Musculoskeletal Infection</td>
<td>Jonathan G. Schoenecker, MD, PhD</td>
<td>Jonathan G. Schoenecker, MD, PhD; Lawson Copley, MD; Bruan Snyder, MD, PhD; Scott B. Rosenfeld, MD</td>
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<td>Animal Welfare in Orthopaedic Research: Focus on Refinement and Reduction</td>
<td>Timothy E. Cooney, MS and Laurie R. Goodrich, DVM, PhD</td>
<td>Patricia Brown, DVM; Jeremiah Easley, DVM; Stephan Zeiter, DVM, Phd, DipCLAM; Alicia L. Bertone, DVM, PhD</td>
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<td>The Realities of Commercializing Orthopaedic Technologies: Business Strategies, Funding Partnerships, and Juggling Academic &amp; Corporate Roles</td>
<td>Suzanne A. Maher, PhD</td>
<td>Tom Cirrito, PhD; Michael J. Yaszemski, MD, PhD; Gayle E. Lester, PhD</td>
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<td>Functional Imaging of Articular Cartilage by MRI</td>
<td>Yang Xia, PhD and Louis E. DeFrate, PhD</td>
<td>Yang Xia, PhD; Louis E. DeFrate, PhD; Xiaojuan Li, PhD</td>
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<td>Hip Evo Devo: Adaptation of the Hip in Phylogeny and Ontogeny</td>
<td>Sandra Shefelbine, PhD</td>
<td>Sandra Shefelbine, PhD; Jeremy M. DeSilva, PhD; Cara L. Lewis</td>
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<td>The Intervertebral Disc: From Development to Regeneration</td>
<td>Rita Kandel, MD and Makarand V. Risbud, PhD</td>
<td>Rosa Serra, PhD; Makarand V. Risbud, PhD; Rita Kandel, MD</td>
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<td>Acute Cartilage Injury: AO Foundation Collaborative Research Project</td>
<td>Martin Stoddart, PhD and George R. Dodge, PhD</td>
<td>Magali Cucchiarini, PhD; Robert Mauck, PhD; David Eglin, PhD</td>
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**2014 Workshops**

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<td>New Horizon Workshop: Nanotechnology and Tissue Engineering: Hope or Hype?</td>
<td>Elizabeth Loboa, PhD</td>
<td>Elizabeth Loboa, PhD; Molly Stevens, PhD; Joachim Kohn, PhD</td>
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<td>Tissue Level Composition and Mechanical Measurements: What Could Possibly Go Wrong?</td>
<td>Michael D. Morris, PhD</td>
<td>Christopher J. Hernandez, PhD; Joseph M. Wallace, PhD; Michael D. Morris, PhD</td>
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<td>Immune Modulation as Therapeutical Strategy in Bone Regeneration</td>
<td>Georg N. Duda, PhD and Stuart B. Goodman, MD, PhD</td>
<td>Georg N. Duda, PhD; Stuart B. Goodman, MD, PhD; Gordana Vunjak-Novakovic, PhD</td>
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<td>New Horizon Workshop: Open Source Computational Mechanics Tools for Orthopaedics</td>
<td>Gerard A. Ateshian, PhD</td>
<td>Scott L. Delp, PhD; Jeffrey A. Weiss, PhD; Gerard A. Ateshian, PhD</td>
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<td>Orthopaedic Combat-Casualty Care: Research Progress and Persistent Gaps after More than a Decade of Conflict</td>
<td>Collaboration of the ORS and the Society of Military Orthopaedic Surgeons - SOMOS</td>
<td>Benjamin Kyle Potter, MD; Joseph C. Wenke, PhD; Leon J. Nesti, MD, PhD; Jonathan A. Forsberg, MD</td>
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<td>Understanding Early Onset Scoliosis - From Bench Top to Bedside - The Evolution from genetics to Animal Models to Clinical Trials</td>
<td>Collaboration of the ORS, the Scoliosis Research Society - SRS, and the Pediatric Orthopaedic Society of North America - POSNA</td>
<td>Brian Snyder, MD, PhD; Benjamin A. Alman, MD; Brian Snyder, MD, PhD; Peter O. Newton, MD</td>
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<td>Osteosarcoma: Future Directions in the Targeting of Micrometastases</td>
<td>Collaboration of the ORS and Musculoskeletal Tumor Society - MSTS</td>
<td>Kristy L. Weber, MD; Richard M. Terek, MD; Richard M. Terek, MD; John H. Healey, MD; C. Parker Gibbs, MD</td>
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<td>Tissue Engineered Medical Products</td>
<td>Organized by the ORS Corporate Affairs Committee</td>
<td>Jeremy J Rawlinson, PhD; Jack E. Lemons, PhD; Lawrence J bonassar, PhD; Mauro R Alini, PhD; Michael J Yaszemski, MD, PhD</td>
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<td>Fibrochondrocytes in Meniscus, IVD and Beyond: Biology, Pathology, and Regeneration</td>
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<td>Darryl D. D'Lima, MD, PhD; Scott Rodeo, MD; Scott Rodeo, MD; Jeremy J Mao, PhD; Irving M Shapiro, PhD</td>
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<td>New Horizon Workshop: Bio-Tribocorrosion: Fundamentals and Advances in Orthopaedics</td>
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<td>Mathew T. Mathew, PhD; Jean Geringer, PhD, ENSM-SE/CIS/STBio; Stefano Mischler, PhD; Jeremy L. Gilbert, PhD; Joshua J. Jacobs, MD</td>
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<td>Patient-Reported Outcomes in Orthopaedic Research</td>
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<td>Patricia D. Franklin, MD; MD; Sohail K. Mirza, MD; Ewa M Roos, PhD</td>
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<td>Cell and Tissue Engineering for Annulus Fibrosus Repair</td>
<td>AO Foundation Collaborative Research Project</td>
<td>Sibylle Grad, PhD; James C. Iatridis, PhD; Daisuke Sakai, MD, PhD; Stephen J. Ferguson, PhD; Dirk W. Grijpma, PhD; Abhay Pandit, PhD</td>
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<td>Investigating Polytrauma and Orthopaedic Injuries with Animal Models</td>
<td>Collaboration of the ORS and the Orthopaedic Trauma Association - OTA</td>
<td>Todd McKinley, MD; Frank Hildebrand; H Christopher Pape; Joseph C Wenke, PhD</td>
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<tr>
<td>New Horizon Workshop: Multi-Scale Adaptive Remodeling Simulations in Musculoskeletal Regenerative Medicine</td>
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<td>Barbara Boyan, PhD; Douglas Robertson, MD, PhD; Dennis Carter, PhD; Robert L Sah, MD, ScD</td>
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<td>2013 Workshops</td>
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<tr>
<td>1</td>
<td>Current Management, Clinical Controversies, and Basic Scientific Understanding of Polytraumatized Patients with Major Skeletal Trauma</td>
<td>Todd McKinley, MD</td>
<td>Adam J Starr, MD; Robert V O’Toole, MD; H Christopher Pape, MD</td>
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<td>2</td>
<td>Cartilage Regeneration: Can We Repair the Whole Joint Surface?</td>
<td>Jeremy Mao, DDS, PhD</td>
<td>Bradley Estes, PhD; James L Cook, DVM, PhD; Jeremy Mao, DDS, PhD</td>
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<td>3</td>
<td>Tribocorrosion in Orthopedic Implants – A New Approach to an Old Problem</td>
<td>Markus A Wimmer, PhD and Michael M Morlock, PhD</td>
<td>John Antonio, MD; PhD; Michael M Morlock; PhD, Nuria Espallargas</td>
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<td>4</td>
<td>Obesity and Biomechanics Presented by the ORS Corporate Affairs Committee</td>
<td>Harrold Aberman</td>
<td>Hani Haider, PhD; Amy L Lerner, PhD; Tim Griffin, PhD</td>
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<td>5</td>
<td>Investigating the Vasculature of Bone</td>
<td>David M Findlay, PhD and Larry J Suva, PhD</td>
<td>Marie-Hélène Lafage-Proust, James F Griffith, Robert A Skinner, HTL (ASCP)</td>
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<td>6</td>
<td>Patient Reported Outcome Measures in Orthopedics: The New Knee Society Score Presented by the ORS and the Knee Society</td>
<td>Philip C Noble, PhD</td>
<td>Giles R Scuderi, MD; Philip C Noble, PhD; Alla Sikorskii, PhD</td>
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<td>7</td>
<td>Fabrication Technologies – Refining Resolution in Tissue Engineering</td>
<td>Timothy Ganey, PhD and Lisa Ferrara, PhD</td>
<td>Frank E Livinston, PhD; Tony Decarmine; David Rowe, MD</td>
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<td>8</td>
<td>In Vivo Models of Increased Loading for Studying Skeletal Mechanobiology</td>
<td>Matthew J Silva, PhD and Marjolein C van der Meulen, PhD</td>
<td>Marjolein C van der Meulen, PhD; Matthew J Silva, PhD; Alexander Robling, PhD</td>
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<td>9</td>
<td>Challenges in Total Hip Replacement Presented by the ORS and the Hip Society</td>
<td>Harry E Rubash, MD and Mathias P Bostrom, MD</td>
<td>Daniel J Berry, MD; Orhun K Muratoglu, PhD; Harry A McKellop, PhD; Joshua J Jacobs, MD; Mark W Pagnano, MD</td>
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<td>10</td>
<td>Antioxidant Stabilization of Highly Cross-Linked UHMWPE</td>
<td>Ebru Oral, PhD and Douglas W Van Citters, PhD</td>
<td>Joanne Tipper, PhD; Orhun K Muratoglu, PhD; Venkat Narayan, PhD</td>
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<td>11</td>
<td>Fourier-Transform Infrared Imaging of Articular Cartilage and Bone</td>
<td>Yang Xia, PhD and Adele K Boskey, PhD</td>
<td>Yang Xia, PhD; Jukka Jurvelin; Adele L Boskey, PhD</td>
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<td>12</td>
<td>Advanced Design, Implementation, Statistical Analysis and Reporting Issues of Clinical Trials in Orthopaedics</td>
<td>Joel J Gagnier, PhD</td>
<td>Joel J Gagnier, PhD; Joseph Beyene, PhD; Mohit Bhandari, MD</td>
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<td>13</td>
<td>Biology and Biomechanics of Ligament and Tendon Development</td>
<td>Catherine K Kuo, PhD and David L Butler, PhD</td>
<td>Ronen Schweitzer, PhD; Elazar Zelzer, PhD; Catherine K Kuo, PhD</td>
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<td>2012 Workshops</td>
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<td>1</td>
<td>Biomaterial Based Approaches Towards Minimally Invasive Treatment of IVD Degeneration</td>
<td>Wouter J Dhert, PhD and Laura Creemers, PhD</td>
<td>Mauro R Alini, PhD; Kirk Grijpma, PhD; Daniel G Anderson, PhD</td>
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<tr>
<td>2</td>
<td>Personalized Fracture Risk Assessment and Treatment in Osteoporosis: From Population-Based to Patient-Specific Medicine</td>
<td>Keita Ito, MD and Ralph Müller, PhD</td>
<td>Marco Viceconti, MSc, PhD; William Taylor, PhD; Stephen Ferguson, PhD</td>
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<td></td>
<td>Current Insights on the Regenerative Potential of the Periosteum: Molecular, Cellular &amp; Endogenous Engineering Approaches (Presented by the ORS Women’s Leadership Forum)</td>
<td>Melissa L Knothe Tate, PhD</td>
<td>Xingping Zhang, PhD; Celine Colnot, PhD; Melissa L Knothe Tate, PhD</td>
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<td>4</td>
<td>New Insights into the Effects of Spaceflight in Musculoskeletal Tissues</td>
<td>Jamie Fitzgerald, PhD and Stavros Thomopoulos, PhD</td>
<td>Jamie Fitzgerald, PhD; Stavros Thomopoulos, PhD; Jeffrey C Lotz, PhD; Eduardo Almeida, PhD</td>
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<tr>
<td>5</td>
<td>Bone Infection: An Unresolved Problem</td>
<td>Geoff Richards, PhD</td>
<td>Mark E Shilliff, PhD; Noreen J Hickok, PhD; Fintan Moriarty, PhD</td>
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<td>6</td>
<td>CT and MRI Metal Artifact Reduction Update: Relevance to Orthopaedic Research</td>
<td>Douglas D Robertson, MD, PhD and Gulshan B Sharma, PhD</td>
<td>Yiannis Kyriakou; Brian A Hargreaves</td>
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<td>7</td>
<td>Translational Animal Models in Orthopaedic Research</td>
<td>Laurie R Goodrich, DVM and Kurt D Hankenson, DVM, PhD</td>
<td>Christopher Jerome, PhD; James L Cook, DVM, PhD</td>
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<td>8</td>
<td>Heterotopic Ossification in Orthopaedic Trauma (Presented by the Orthopaedic Trauma Association - OTA)</td>
<td>Emil H Schemitsch, MD</td>
<td>Leon Nesti, MD; Aaron Nauth, MD; Emil H Schemitsch, MD; Benjamin Potter, MD</td>
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<td>9</td>
<td>Focus Areas for Future Research in Total Knee and Total Hip Replacements (Presented by the Hip Society and Knee Society)</td>
<td>Juan J Rodrigo, MD and Harry E Rubash, MD</td>
<td>Clifford W Colwell, Jr., MD; Michael D Ries, MD; David G Lewallen, MD; Young-Min Kwon, MD</td>
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<td>10</td>
<td>Building a Successful Research Program: Decisions, Victories and Pitfalls (Presented by the ORS Advocacy Committee)</td>
<td>Stuart B Goodman, MD, PhD, Cathleen L Raggio, MD</td>
<td>Steven A Goldstein, PhD; Constance Chu, MD; Rocky Tuan, PhD; Michael Yaszemski, MD, PhD</td>
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<tr>
<td>11</td>
<td>Design, Implementation, Execution and Reporting of Clinical Trials in Orthopaedics: A How To for Clinical Trialists</td>
<td>Joel J Gagnier, PhD</td>
<td>Joel J Gagnier, PhD; Joseph Beyene, PhD; Mohit Bhandari, MD</td>
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<td>12</td>
<td>Recent Changes at the US Food and Drug Administration with Respect to Orthopaedic Devices (Presented by the ORS Corporate Affairs Committee)</td>
<td>James J Mason, PhD and Katy Georgiadiis, PhD</td>
<td>Aric D Kaiser, MS; Floyd G Larson; Laura Williams</td>
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<td>Workshop</td>
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<td>1</td>
<td>New Insights into Inflammatory Arthritides</td>
<td>John O'Shea, MD and Joshua J Jacobs, MD</td>
<td>John O'Shea, MD, Robert Colbert, Michael Ward</td>
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<td>2</td>
<td>Genesis of Cells of the Intervertebral Disc: Role of the Notochord</td>
<td>Irving Shapiro, PhD</td>
<td>Makarand V Risbud, Brian Harfe, PhD, Judith A Hoyland</td>
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<td>3</td>
<td>New Horizon Workshop - Leveraging Probabilistic Methods in Orthopaedic Biomechanics</td>
<td>Anthony Petrella, PhD and Peter Laz, PhD</td>
<td>Anthony Petrella, PhD, Daniel P Nicoletta, PhD, Peter Laz, PhD, Joseph E Langenderfer, PhD</td>
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<td>4</td>
<td>Biology and Biomechanics of Cartilage and Bone Development Supported by: The US National Committee on Biomechanics (USNCB)</td>
<td>X Edward Guo, PhD and Farshid Guilak, PhD</td>
<td>Di Chen, MD, PhD, Paula Murphy, PhD, Patrick J Prendergast, PhD, Robert L Mauck, PhD</td>
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<td>5</td>
<td>A New Look at Osteoarthritis Presented by: The Osteoarthritis Research Society International (OARSI) and the ORS</td>
<td>Linda J Sandell, PhD and George R Dodge, PhD</td>
<td>Joseph A Buckwalter, MD, Leif Dahlberg, MD, PhD, Linda Sandell, PhD</td>
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<td>6</td>
<td>Developmental Biology as a Blueprint for Tissue Regeneration Presented by: the ORS Women’s Leadership Forum</td>
<td>Karen M Lyons, PhD</td>
<td>Chia Soo, MD FACS, Molly Stevens, PhD, Lisa Fortier, DVM</td>
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<td>7</td>
<td>New Horizon Workshop - Implantable Sensor Technology: From Research to Clinical Practice</td>
<td>Eric Ledet, PhD</td>
<td>Darryl D. D'Lima, MD, PhD, Peter Georg Westerhoff, Dipl.-Ing., Mark Allen, PhD</td>
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<td>8</td>
<td>MRI of Articular Cartilage – On the Path to Early Detection of Osteoarthritis</td>
<td>Yang Xia, PhD and Garry Gold, MD</td>
<td>Brian Hargreaves, PhD, Didier Laurent, Yang Xia, PhD</td>
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<td>9</td>
<td>The Role of Biofabrication to Make Progress in Bone, Cartilage/Meniscus, Ligament/ Tendon Reconstruction</td>
<td>Michael A K Liebschner, PhD and Scott J Hollister, PhD</td>
<td>Vladimir Mironov, MD, PhD, Wei Sun, PhD, Thomas Boland, Scott J Hollister, PhD</td>
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<td>No.</td>
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<td>10</td>
<td>&quot;Atypical&quot; Subtrochanteric Femoral Shaft Fractures: The What, the How, and Where Do We Go Now?</td>
<td>Susan V Bukata, MD and Joseph M Lane, MD</td>
<td>Regis J O'Keefe, MD, PhD, Adele L Boskey, PhD, Marjolein C van der Meulen, PhD</td>
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<td>2010 Workshops</td>
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<tr>
<td>1</td>
<td>Biomechanics and Inflammation in Health and Diseases of Musculoskeletal System: Anti-Inflammatory Component of Mechanosignaling</td>
<td>Christopher T Chen, PhD and Christopher H Evans, PhD</td>
<td>Bente K Pedersen, MD DMSc, David A Lee, PhD, Sudha Agarwal, PhD</td>
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<tr>
<td>2</td>
<td>Adaptation in Articular Cartilage - Evidence, Assessment and Interpretation</td>
<td>Mark Hurtig, DVM and Stephen Waldman, PhD</td>
<td>Jukka Jurvelin, Felix Eckstein, MD, Mark Hurtig, DVM</td>
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<td>3</td>
<td>Evaluation and Manipulation of Angiogenesis in Bone Regeneration</td>
<td>Kurt D Hankenson, DVM, PhD and Shawn R Gilbert, MD</td>
<td>Ralph Marcucio, PhD, Robert E Guldberg, PhD, Thomas L Clemens, PhD</td>
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<td>4</td>
<td>Protecting and Marketing Your Ideas: Intellectual Property Considerations (Presented by the ORS Corporate Affairs Committee)</td>
<td>Gloria L Matthews, DVM, PhD</td>
<td>John Calvert, Todd Dawson, Glenn Prestwich, PhD</td>
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<td>5</td>
<td>New Horizon Workshop - Chondrocyte Motility in Development and Disease</td>
<td>Charles W Archer, PhD</td>
<td>Teresa I Morales, PhD, Teresa I Morales, PhD, Nicolai Miosge</td>
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<td>6</td>
<td>New Horizon Workshop - Imaging Stem Cell Fate and Function</td>
<td>Dan Gazit, PhD, DMD, Los Angeles, CA and Edward M Schwarz, PhD</td>
<td>Douglas J Wagenaar, Christopher H. Contag, Douglas J Wagenaar</td>
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<td>7</td>
<td>Hypersensitivity and Biomaterials: What are the Facts, Myths and Legends?</td>
<td>A Seth Greenwald, DPhil (Oxon), Lynne C Jones, PhD, and Warren O Haggard, PhD</td>
<td>Stuart B Goodman, MD, PhD, David W Murray, MD, FRCS, Patricia A Campbell, PhD, Joshua J Jacobs, MD</td>
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<td>8</td>
<td>The Armed Forces Institute of Regenerative Medicine: Its Structure, Operations, and Goals</td>
<td>Michael J. Yaszemski, MD, PhD and George F Muschler, MD</td>
<td>Michael J. Yaszemski, MD, PhD, George F Muschler, MD, Col James R Ficke, MD</td>
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<td>9</td>
<td>Functional Attachment of Soft Tissues to Bone: Development, Healing, and Tissue Engineering</td>
<td>Stavros Thomopoulos, PhD and Louis J Sosowsky, PhD</td>
<td>Stavros Thomopoulos, PhD, Scott A Rodeo, MD, Helen Lu, PhD</td>
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<td>10</td>
<td>Post-Traumatic Osteoarthritis: Improved Understanding and Opportunities for Early Intervention</td>
<td>Donald D. Anderson, PhD, Iowa City, IA and Joseph A. Buckwalter, MS, MD</td>
<td>Joseph A. Buckwalter, MS, MD, Farshid Guilak, PhD, Susanna G Chubinskaya, PhD</td>
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<td>2009 Workshops</td>
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<tr>
<td>1</td>
<td>Emerging Imaging Tools To Characterize Cartilage Damage</td>
<td>Markus A. Wimmer, PhD and Carol Muehleman, PhD</td>
<td>Carol Muehleman, PhD, Nancy Pleshko, PhD, Michel P. Laurent, PhD, Alan J Grodzinsky, ScD</td>
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<tr>
<td>2</td>
<td>Primary Cilia: The Cell's Antenna for Sensing the External Environment?</td>
<td>Cornelia E. Farnum, DVM, PhD and Christopher R. Jacobs, PhD</td>
<td>Bradley K. Yoder, PhD, Christopher R. Jacobs, PhD, Anthony Poole, PhD</td>
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<td>3</td>
<td>Preclinical Considerations for Orthopedic Product Development Presented by the ORS Corporate Affairs Committee</td>
<td>Gabriele G. Niederauer, PhD and Gloria L. Matthews, DVM, PhD</td>
<td>Harold M. Aberman, DVM, MSE, Richard D. Coutts, MD, Janice M. Hogan, JD, BSME</td>
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<td>4</td>
<td>Physical Activity Assessment- Monitoring Patients During Activities of Daily Living</td>
<td>Dieter Rosenbaum, PhD</td>
<td>Gregory J. Welk, PhD, Soren Brage, PhD, Dieter Rosenbaum, PhD</td>
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<td>5</td>
<td>Orthopaedic Complications in Animal Models of Aging</td>
<td>Christopher H. Evans, PhD</td>
<td>Laura J. Niedernoifer, MD, PhD, Regis J. O'Keefe, MD, PhD, Joseph A. Buckwalter, MD, James D. Kang, MD</td>
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<td>6</td>
<td>BMPs: Current Evidence and Future Solutions ORS/Orthopaedic Trauma Association Joint Workshop</td>
<td>Emil H. Schemitsch, MD and Theodore Mclau, III, MD</td>
<td>Theodore Mclau, MD, Paul Tornetta, III MD, Harry K. Genant, MD, Marc F. Swiontkowski, MD, Mohit Bhandari, MD</td>
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<td>7</td>
<td>The Art of Bone and Cartilage Histology and Histomorphometry Presented by the ORS Women's Leadership Forum</td>
<td>Gloria Gronowicz, PhD and Cathy S. Carlson, DVM, PhD, Diplomate ACVP</td>
<td>Cathy S. Carlson, DVM, PhD, Diplomate ACVP, Urszula T. Iwaniec, PhD, Gloria A. Gronowicz, PhD</td>
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<td>8</td>
<td>Biomaterials for Tendon and Ligament Repair: Current Status and Future Directions ORS/Society for Biomaterials/Orthopaedic Device Forum Joint Workshop</td>
<td>Lynne C Jones, PhD, Baltimore, MD and Jack E Lemons, PhD</td>
<td>Kathleen Derwin, PhD, Warren O. Haggard, PhD, Scott Steinmann, MD</td>
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<tr>
<td>1</td>
<td>Osteoarthritis: The Impact of Sexual Dimorphism - Presented by the ORS Women's Leadership Forum</td>
<td>Adele L. Boskey, PhD and Barbara D. Boyan, PhD</td>
<td>Sonya S. Glasson, BVSc, Amy L. Lerner, PhD, and Joy Blair-Levy, MD</td>
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<tr>
<td>2</td>
<td>Impact of Environmental Factors on Intervertebral Disc Health</td>
<td>Irving Shapiro, PhD</td>
<td>Makarand V. Risbud, Kita Kandel, MD, Dan Gazit, PhD</td>
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<td>3</td>
<td>Epigenetic Regulatory Mechanisms in Musculoskeletal Development and Disease</td>
<td>Matthew Stewart</td>
<td>Peter L. Jones, Hiroshi Asahara, MD, PhD, David J. Hall, PhD</td>
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<td>4</td>
<td>Wnt Signaling in Skeletal Development and Diseases</td>
<td>Motomi Enomoto-Iwamoto, DDS, PhD</td>
<td>Regis J. O'Keefe, MD, PhD, Yingzi Yang, PhD, alini Sen</td>
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<td>5</td>
<td>Wear Resistant Polyethylene for Joint Replacement: Current Status and Future Directions - ORS/Society for Biomaterials/Orthopaedic Device Forum Joint Workshop</td>
<td>Warren O. Haggard, PhD and A. Seth Greenwald, D. Phil. (Oxon)</td>
<td>Harry McKellop, PhD, Henrik Malchau, MD, Michael D. Ries, MD, Thomas P. Schmalzried, MD, Thomas P. Sculco, MD</td>
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<td>6</td>
<td>Assessment of Fracture Healing in Clinical Trials: Methodological Challenges - ORS/Orthopaedic Trauma Association Joint Workshop</td>
<td>Emil H. Schemitsch, MD and Theodore Mclau, MD</td>
<td>Thomas A. Einhorn, MD, Emil H. Schemitsch, MD, Marc F. Swiontkowski, MD, Alan L. Jones, MD, Mohit Bhandari, MD</td>
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<tr>
<td>7</td>
<td>Systems Biology Approaches for Studying the Genetic Basis of Complex Conditions</td>
<td>Karl J. Jepsen, PhD</td>
<td>Joseph H. Nadeau, PhD, Dean H. Lang, PhD, Karl J Jepsen, PhD</td>
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<td>8</td>
<td>Pain as a Critical Component to Understanding Musculoskeletal Disorders - TMJDs as a Model</td>
<td>Stephen L. Gordon, PhD</td>
<td>Peter Grigg, PhD, Ronald Dubner, William Maixner</td>
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<tr>
<td>1</td>
<td>Live Cell and Tissue Imaging: Applications in Orthopedics</td>
<td>Anna Plaas, PhD, Tampa, FL and Barbara M. Vertel, PhD</td>
<td>Barbara M. Vertel, Jeffrey Segall, Peter So</td>
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<td>6</td>
<td>Distraction Osteogenesis – A Most Advanced Form of Tissue Engineering</td>
<td>Gang Li</td>
<td>Gang Li, Dror Paley, Lutz Claes, Natsuo Yasui</td>
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<td>7</td>
<td>Radiostereometry (RSA): An Accurate Tool to Assess Micromotion of Orthopaedic Implants</td>
<td>Johan Kaarholm</td>
<td>Johan Kaarholm, Rob Nelissen, Edward Valstar, Natsuo Yasui</td>
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<tr>
<td>8</td>
<td>Environmental Agents Affecting the Skeleton: Unrecognized Contributors to Musculoskeletal Diseases</td>
<td>J. Edward Puzas</td>
<td>Charles H. Turner, David Chettle, Elizabeth Ryan</td>
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<th>2006 Workshops</th>
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<tr>
<td>1</td>
<td>Regenerative Medicine in Orthopaedic Surgery</td>
<td>Johnny Huard, PhD</td>
<td>David Mooney, MD, Edward Schwarz, PhD, Johnny Huard, PhD</td>
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<td>2</td>
<td>Cartilage Lubrication</td>
<td>Carl R. Flannery, PhD</td>
<td>Gregory D. Jay, MD, PhD, Robert L-Y. Sah, MD, Gerard A. Ateshian, PhD</td>
</tr>
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<td>3</td>
<td>Pain and Inflammation</td>
<td>Steven Bain, PhD</td>
<td>Garth Whiteside, PhD, Patrick W. Mantyh, PhD, JD</td>
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<td>4</td>
<td>Total Disc Replacements</td>
<td>Steve M. Kurtz, PhD</td>
<td>Hallett H. Mathews, MD, Peter A. Cripton, PhD, Michele Marcolongo, PhD</td>
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<tr>
<td>5</td>
<td>Nanobiomaterials Applications in Orthopaedics</td>
<td>Antonios G. Mikos, PhD</td>
<td>Rocky S. Tuan, PhD, Rena Bizios, PhD</td>
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<td>6</td>
<td>Growth Factors – TCF Beta</td>
<td>Rik Derynck</td>
<td>Rik Derynck, Hiroshi Asahara, Pamela G. Robey, PhD</td>
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<td>7</td>
<td>Educational Paradigms in Orthopaedic Research</td>
<td>Regis J. O’Keefe, MD, PhD</td>
<td>David B. Burr, PhD, James N. Weinstein, DO, MS, Joseph P. Iannotti, MD, PhD,</td>
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<td>8</td>
<td>Nerve/Muscle</td>
<td>Richard L. Lieber, PhD</td>
<td>Richard L. Lieber, PhD, Scott L. Delp, PhD</td>
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<tr>
<td>1</td>
<td>Sexual Dimorphism in Musculoskeletal Systems</td>
<td>Adele L. Boskey, PhD and Barbara D. Boyan, PhD</td>
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<td>Surface Damage in Total Joint Replacement: Kinematic Issues</td>
<td>Donald L. Bartel, PhD; Thomas D. Brown, PhD; Thomas P. Andriacchi, PhD</td>
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