

©RS 2015 Annual Meeting

*Accelerating the pace of discovery*



**PROGRAM BOOK**

MGM GRAND HOTEL | LAS VEGAS, NEVADA | MARCH 28 – 31

# ANNUAL MEETING SUPPORTERS

The Orthopaedic Research Society would like to thank the following corporate partners for their generous support.



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## THANK YOU TO OUR 2015 VIDEO OUTREACH COMPETITION SPONSORS



## THANK YOU TO OUR 2015 NIRA (NEW INVESTIGATORS RECOGNITION AWARD) SUPPORTERS



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# WELCOME TO THE ORS 2015 ANNUAL MEETING

Saturday, March 28 – Tuesday, March, 31, 2015

MGM Grand Hotel | Las Vegas, Nevada

Dear Fellow ORS Members, Colleagues, and Guests,

On behalf of the Orthopaedic Research Society, we welcome you to the ORS 2015 Annual Meeting!

For more than 60 years, the ORS Annual Meeting has been a home for those in the field of musculoskeletal research from around the globe. Providing a forum that allows communication and collaboration among our multi-disciplinary attendees has always been one of the primary purposes of the society and the Annual Meeting.

We invite you to join us for the Welcome Session where we will introduce our international partners and honor Japan as our first Guest Nation. We will also invite Mellissa Marshall to the stage. Best known for her TEDtalk, "Talk Nerdy to Me," Marshall will share how effective communication serves as the foundation to advance research. She will help attendees better communicate their science, a key challenge for the advancement of our field.

Once again, we are looking forward to offering the ORS/OREF Basic Science Course, ORS Clinical Research Forum, and the Translational Symposium, Cartilage Repair: Is it Possible? In addition to the workshops and spotlight sessions that will cover a broad spectrum of research activities, we will host a new workshop organized by *The Journal of Orthopaedic Research (JOR)* to help authors learn strategies for increasing their success of publishing their research. In addition to her keynote address, Melissa Marshall will give researchers a new skill set for communicating their science in her workshop: Present Your Science: Transforming Technical Talks.

Thank you to all of our many dedicated volunteers and to our members.  
The success of the society and the Annual Meeting would not be possible without your support!

At this year's meeting, we hope that you find many opportunities to collaborate, communicate, and gain inspiration to accelerate the pace of discovery.

Enjoy your time in Las Vegas!

Sincerely,

Mary B. Goldring, PhD  
ORS President



# SCHEDULE

## INNOVATION CENTRAL (POSTER AND EXHIBIT HALL)

*Marquee Ballroom - Complimentary Wi-Fi, Innovation Theater, Charging Stations, seating, Refreshment Breaks, Food for Purchase*

Saturday, March 28	12:00 PM – 8:00 PM
Sunday, March 29	9:00 AM – 6:00 PM
Monday, March 30	9:00 AM – 5:30 PM
Tuesday, March 31	6:00 AM – 3:30 PM ( <i>no exhibits</i> )

## SPEAKER READY ROOM

*Grand Ballroom 123*

Saturday, March 28	7:00 AM – 6:00 PM
Sunday, March 29	7:00 AM – 5:00 PM
Monday, March 30	7:00 AM – 4:30 PM
Tuesday, March 31	7:00 AM – 3:00 PM

## CHECK-IN and REGISTRATION

*Grand Ballroom Pre-Function Area*

Friday, March 27	5:00 PM – 8:00 PM
Saturday, March 28	7:00 AM – 5:30 PM
Sunday, March 29	7:00 AM – 5:30 PM
Monday, March 30	7:00 AM – 5:30 PM
Tuesday, March 31	7:00 AM – 3:00 PM

## DONATE TO THE ORS/OREF GRANTS CAMPAIGN TODAY!

By giving to the ORS/OREF Grants Campaign, you enable orthopaedic residents and post-doctoral ORS members to pursue important research that may one day translate into innovative new treatments and therapies that help patients recover their mobility and enjoy an improved quality of life.

**All donors will also receive a special thank you from the ORS.**

All donations over \$25 – you will be entered into a raffle for free registration for the ORS 2016 Annual Meeting in Orlando, Florida.

Donate \$25 – \$49 a beverage voucher to be used during one of the two ORS Poster Receptions.

Donate over \$50; an ORS fleece jacket.

**GIVE TODAY!** Please visit the ORS exhibit booth to make your donation and receive your gift.

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**TOPIC CHAIRS**

The ORS Board of Directors, Annual Meeting and Program Committees would like to acknowledge the Topic Chairs for their contribution to the 2015 Annual Meeting Program.

**TISSUE BASED TOPICS**

Biomaterials.....	Fergal J. O'Brian, PhD
Cartilage, Synovium & Osteoarthritis...	Timothy Griffin, PhD, ..... Anne-Marie Malfait, MD and Matthew Stewart, PhD
Meniscus.....	Lutz Dürselen, PhD
Tendon/Ligament.....	Helen Lu, PhD
Muscle .....	Sameer B. Shah, PhD
Bone/Bone Biology .....	Edward Purdue, PhD ..... and Vicki Rosen, PhD
Bone Fracture.....	Elise F. Morgan, PhD

**CLINICAL/ANATOMICAL TOPICS**

Hip and Knee Arthroplasty .....	John DesJardins, PhD ..... and Nico Verdonschot, PhD
Knee .....	Guoan Li, PhD
Hip .....	Lee E. Rubin, MD
Spine .....	Makarand V Risbud, PhD, ..... Ashish D. Diwan, MD, Keita Ito, MD
Shoulder and Elbow .....	C. Benjamin Ma, MD
Hand and Wrist.....	Aaron Daluiski, MD
Foot and Ankle .....	Samuel B. Adams, MD
Infection.....	Paul H. Wooley, PhD
Trauma .....	David J. Hak, MD
Cancer, Tumors .....	Richard M. Terek, MD
Diagnostic Imaging .....	Hollis Potter, MD



**“We’re developing a system that would enable physicians to make a quick and reliable analysis of a patient’s fracture risk.”**

**ORS member  
Ara Nazarian, DrSc**



Dr. Nazarian (left) and research assistant Shohreh Behrouzi  
Photo courtesy of Mr. Ohan Manoukian

### **Calculating fracture risk**

Ara Nazarian, DrSc, co-principal investigator Brian Snyder, MD, PhD, and their colleagues are using the principles of beam theory—a calculation that factors in both geometric and material properties to determine rigidity—to design a computerized tomography (CT)-based rigidity analysis that can determine the risk of fractures in bones with metastasized lesions.

An OREF Prospective Clinical Research Grant gave Dr. Nazarian and his colleagues the funding they needed to conduct a multicenter study assessing the utility of the CT-based rigidity analysis. Read more at [www.oref.org/AraNazarian](http://www.oref.org/AraNazarian).

### **Every gift makes a difference**

Since 1955, ORS and OREF have worked together to expand funding for clinically relevant research and increase opportunities for new investigators. Now, the two organizations have collaborated to create the ORS/OREF Resident Research Grant and Post-Doctoral Fellowship Grant Fund.

Gifts to this fund:

- Enable post-doctoral ORS members to devote their time and resources to research that may one day translate into innovative new treatments and therapies.
- Assist ORS resident members who are exploring careers in research.
- Support ORS and OREF missions to advance orthopaedic research.

**Make your gift today at [www.oref.org/orsgrant](http://www.oref.org/orsgrant).**

For more information, please contact:

Ed Hoover, VP, Development  
(847) 430-5105 | [hoover@oref.org](mailto:hoover@oref.org)

Angela David, Development Specialist  
(847) 430-5115 | [david@oref.org](mailto:david@oref.org)

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# Collaborating in the Science of Patient Care



Friday, March 27 and Saturday, March 28  
AAOS 2015 Annual Meeting  
Venetian/Sands EXPO, Las Vegas, Nevada

Attend the AAOS 2015 Annual Meeting on Friday, March 27 and Specialty Day, Saturday, March 28 when we invite all ORS Annual Meeting registrants to take advantage of the opportunity for orthopaedic surgeons and scientists to *collaborate in the science of patient care*.

## Complimentary Programs:

### Friday, March 27, 7:00 AM – 6:00 PM

- Symposia
- Paper Presentations
- Posters
- Scientific Exhibits
- Orthopaedic Video Theater

### Friday, March 27, 9:00 AM – 4:00 PM

- Technical Exhibits
  - Ask an Expert
  - Electronic Skills Pavilion

### Friday, March 27, 10:30 AM – 12:30 PM

- AAOS/ORS Co-branded Symposium –  
Articulations in Total Joint Replacement: Have We  
Lost Our Bearings?  
William M. Mihalko, MD, PhD and  
Stuart Goodman, MD, PhD

### Saturday, March 28, 7:00 AM – 3:00 PM

- Posters
- Scientific Exhibits
- Orthopaedic Video Theater

## HOW TO REGISTER:

A sticker on your badge is required to access the AAOS Annual Meeting on Friday, March 27 and Saturday March 28. For Specialty Day sessions on Saturday, March 28, attendees must register and pay the appropriate registration fee. To obtain a sticker or register for Specialty Day, please go to AAOS registration located at the Venetian/Sands Expo, Academy Hall G on Friday March 27 beginning at 7:00 AM. ORS attendees must have their ORS badge to receive a sticker.

## Registration Required

ORS attendees may purchase tickets, with no additional registration fee, for the following sessions:

### Friday Instructional Courses

For details go to [www.aaos.org/ameducation](http://www.aaos.org/ameducation)

### Saturday Specialty Day

ORS attendees may purchase tickets; fees apply.

For details go to [www.aaos.org/amprograms](http://www.aaos.org/amprograms)

Programming is provided by:

- American Orthopaedic Foot & Ankle Society
- American Orthopaedic Society for Sports Medicine
- American Shoulder and Elbow Surgeons
- American Society for Surgery of the Hand/American Association for Hand Surgery
- Arthroscopy Association of North America
- Federation of Spine Associations
- The Hip Society/American Association of Hip and Knee Surgeons
- The Knee Society/American Association of Hip and Knee Surgeons
- Limb Lengthening and Reconstruction Society
- Musculoskeletal Tumor Society
- Orthopaedic Trauma Association
- Pediatric Orthopaedic Society of North America

For details about the AAOS 2015 Annual Meeting go to [www.aaos.org/annual](http://www.aaos.org/annual).





**JOIN US |** AUGUST 2–5, 2015  
SUN VALLEY, IDAHO

**45TH INTERNATIONAL**

## **Sun Valley Workshop: Musculoskeletal Biology**

***New Mechanisms for Old Problems***

### **PROGRAM HIGHLIGHTS**

- Cell Signaling and the Coupling of Bone Resorption and Formation
- Nerves, Bone, Joint Pain and Skeletal Homeostasis
- The Identification, Regulation and Importance of Cortical Porosity
- Using Bioimaging and 3D Printing to Regenerate Musculoskeletal Tissue
- Perilacunar Remodeling

**Career Development  
Workshop for  
Young Investigators**

*Awards available to  
offset travel expenses  
for young and  
under-represented  
minority investigators*

**[www.ors.org/sunvalley](http://www.ors.org/sunvalley)**

# NEW INVESTIGATOR MEETING AT A GLANCE

## SATURDAY, MARCH 28

### Mentor Connect

11:00 AM – 12:00 PM

Room 115

### New Investigator Networking Session – Position Yourself for a Successful Career: Strategic Lab and Time Management

11:00 AM – 12:00 PM

Room 117

### PAS I: Career Advancement: Winning the Uphill Battle for Research Funding

3:00 PM – 4:30 PM

Room 121 – 122

### ORS PRESIDENT'S WELCOME RECEPTION

6:00 PM – 8:00 PM

Marquee Ballroom

## SUNDAY, MARCH 29

### New Investigator Networking Session – An Inside Look at Research Funding Opportunities with the National Institutes of Health (NIH)

12:45 PM – 1:45 PM

Room 115

### Poster Walking Tours

12:45 PM – 1:45 PM

Innovation Central/Marquee Ballroom

### PAS II: Finding a Partner in Research

2:00 PM – 3:30 PM

Room 121 – 122

### POSTER SESSION

4:45 PM – 6:00 PM

Innovation Central/Marquee Ballroom

## MONDAY, MARCH 30

### Industry Connect

12:30 PM – 1:30 PM

Room 116

### New Investigator Networking Session – Position Yourself for a Successful Career: Setting Foundational Early Career Goals

12:30 PM – 1:30 PM

Room 121 - 122

### Poster Walking Tours

12:30 PM – 1:30 PM

Innovation Central/Marquee Ballroom

### PAS III: Rising to the Top: Leadership Success in Academics

1:45 PM – 3:15 PM

Room 121 – 122

### POSTER RECEPTION

4:15 PM – 5:30 PM

Innovation Central/Marquee Ballroom

### Women's Leadership Forum Reception

7:30 PM – 10:00 PM

Vista Ballroom

*(Registration and Fee required)*

## TUESDAY, MARCH 31

### Poster Walking Tours

11:30 AM – 12:30 PM

Innovation Central/Marquee Ballroom

# JAPAN

## ORS GUEST NATION





The ORS welcomes Japan, the inaugural Guest Nation to be honored at the ORS 2015 Annual Meeting. The Guest Nation Program honors our colleagues in Japan, recognizes their contribution to the field of musculoskeletal research, and celebrates our long-standing partnership with the Japanese Orthopaedic Association.



The Japanese Orthopaedic Association was founded in 1926 (Year 15 of the Taisho era) in order to promote studies of orthopaedics, presentation of study results, and to strengthen contact and cooperation among organizations and individuals specializing in this discipline. Our goal is to facilitate the

maintenance and improvement of bone and joint function. To achieve this, it will be necessary to produce medical specialists who are adept at diagnosis and treatment, including conservative treatments such as therapeutic exercise, as well as pharmacotherapeutics and surgery.

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 **JOIN** the conversation on LinkedIn  **WATCH** us on YouTube

**DON'T FORGET TO DOWNLOAD THE ORS 2015 ANNUAL MEETING MOBILE APP!**

**[HTTP://ORS.SHOWPRG.COM](http://ors.showprg.com)**

# BE A PART OF THE **ORS SPINE SECTION COMMUNITY!**

The Spine Section’s mission is to advance spine research and related sciences as to improve patient care through basic, translational and clinical research. The Spine Section is also committed to providing leadership by representing researchers in the Orthopaedic Research Society

ORS Spine Section dues are \$50 for current ORS members\*. ORS Spine Section dues are in addition to ORS annual membership dues.

**Stop by the ORS Booth to find out more information on how to join the ORS Spine Section and be a part of a community of spine researchers!**

*\*Not an ORS member? Interested in joining ORS?  
Ask us how to join today or visit [ors.org](http://ors.org) for more information.*

## TRANSPORTATION INFORMATION

ORS will provide complimentary shuttle service between the MGM Grand Hotel and the Venetian/Sands EXPO (AAOS Annual Meeting) Friday, March 27 & Saturday, March 28.

### FRIDAY, MARCH 27

7:00 AM	First Bus Departs MGM Grand Conference Center to Venetian Tour Lobby Bus to depart MGM Grand Conference Center to Venetian Tour Lobby every hour on the hour
	Bus to depart Venetian Tour Lobby to MGM Grand Conference Center every hour on the ½ hour
5:00 PM	Last Shuttle Departs MGM Grand Conference Center
5:30 PM	Last Shuttle Departs Venetian Tour Lobby

### SATURDAY, MARCH 28

7:00 AM	First Bus Departs MGM Grand Conference Center to Venetian Tour Lobby Bus to depart MGM Grand Conference Center to Venetian Tour Lobby every hour on the hour
	Bus to depart Venetian Tour Lobby to MGM Grand Conference Center every hour on the ½ hour
5:00 PM	Last Shuttle Departs MGM Grand Conference Center
5:30 PM	Last Shuttle Departs Venetian Tour Lobby

Please note, bus seating is on a first come first served basis.

# FUTURE ORS ANNUAL MEETINGS!



## **ORS 2016 Annual Meeting**

**Disney's<sup>®</sup> Coronado  
Springs Resort**

**Orlando, FL March 5-8, 2016**



## **ORS 2017 Annual Meeting**

**San Diego  
Convention Center**

**San Diego, CA March 19-22, 2017**

## MISCELLANEOUS

### CONTINUING MEDICAL EDUCATION

This activity has been planned and implemented in accordance with the Essentials Areas and policies of the Accreditation Council for Continuing Medical Education through the joint sponsorship of the American Academy of Orthopaedic Surgeons and the Orthopaedic Research Society. The American Academy of Orthopaedic Surgeons is accredited by the ACCME to provide continuing medical education for physicians.

The American Academy of Orthopaedic Surgeons designates this live activity for a maximum of 25.75 **AMA PRA Category 1 Credits™**. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

Attendees will be able to claim CME from the ORS 2015 Annual Meeting by completing the CME form on the ORS website following the meeting in Las Vegas.

### SAFETY TIPS

#### DO:

- Travel with only the credit card and ID cards you will use.
- Check that the lock works and that the door closes securely in your hotel room. Put the chain or deadbolt on the door after entering the room.
- Walk with another person. Single targets are the most likely victims of crime.

#### DON'T:

- Wear your badges or carry conference bags outside.
- Walk in dark, isolated areas, such as closed plazas

Children 16 years of age and under are not permitted to enter the exhibit and poster hall area or the session rooms at any time. No supervision is offered.

### MEETING OBJECTIVES

- To present the best available research from all disciplines of musculoskeletal research.
- To promote the exchange of ideas and encourage collaborations in orthopaedic research.
- To encourage promising and emerging areas in musculoskeletal research including basic science education, and research strategies by use of forums, workshops, special sessions and special interest meetings.

### FDA

All drugs and medical devices used in the United States are administered in accordance with Food and Drug Administration (FDA) regulations. These regulations vary depending on the risks associated with the drug or medical device, the similarity of the drug or medical device to products already on the market, and the quality and scope of clinical data available. Some drugs or medical devices demonstrated at this 2015 Annual Meeting of the Orthopaedic Research Society may have not been cleared by the FDA or have been cleared by the FDA for specific purposes only. The FDA stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or medical device he or she wishes to use in clinical practice. Orthopaedic Research Society policy provides that "off label" uses of a drug or medical device may be described in the Orthopaedic Research Society's CME activities so long as the "off label" use of the drug or medical device is also specifically disclosed (i.e., it must be disclosed that the FDA has not cleared the drug or device for the described purpose). Any drug or medical device is being used "off label" if the described use is not set forth on the product's approved label.

### DISCLAIMER

The materials presented at the 2015 Annual Meeting of the Orthopaedic Research Society have been made available by the Orthopaedic Research Society for educational purposes only. The material is not intended to represent the only, nor necessarily best, method or procedure appropriate for the medical situations discussed, but rather is intended to present an approach, view, statement or opinion of the faculty, which may be helpful to others who face similar situations. The Orthopaedic Research Society disclaims any and all liability for injury or other damages resulting to any individual attending the meeting and for all claims, which may arise out of the use of the techniques demonstrated therein by such individuals, whether these claims shall be asserted by physician or any other person. No reproduction of any kind, including audiotapes and videotape, may be used in any portion of the ORS Annual Meeting. The ORS reserves all of its rights to such material, and commercial reproduction is specifically prohibited.

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### Filming/Recording Policy

The photography or recording of any kind (cell phone, camera, video recorder, etc) of a scientific presentation, educational program, workshop, posters, or meetings of the ORS is strictly forbidden without prior approval in writing by the ORS. This policy will be strictly enforced.

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Matthew P. Abdel, MD	Matt Dressler, PhD	Ali Hosseini, PhD	C. Benjamin Ma, MD	James T. Ryaby, PhD
Douglas J. Adams, PhD	Lutz Dürselen, PhD	Judith Hoyland, PhD	Henning Madry, MD	Simo Saarakkala, PhD
Samuel B. Adams, MD	Tithi Dutta Roy, PhD	Alice Huang, PhD	Suzanne A. Maher, PhD	Sophia N. Sangiorgie, PhD
Anand Agarwal, MD	Edward Ebramzadeh, PhD	James C. Iatridis, PhD	Anne-Marie Malfait, MD	Jonathan Schiller, MD
Animesh Agarwal, MD	John J. Elias, PhD	Carl W. Imhauser, PhD	Kenneth A. Mann, PhD	Tannin Schmidt, PhD
Jaimo Ahn, MD, PhD	Isaac E. Erickson, PhD	Serkan Inceoglu, PhD	Koichi Masuda, MD	Hans F. Schmotzer, PhD
Andrea I. Alford, PhD	Alejandro A. Espinoza Orias, PhD	Andreia Ionescu, PhD	Mathew T. Mathew, PhD	Joseph H. Schwab, MD
Kyle D. Allen, PhD	Brian Feeley, MD	Keita Ito, MD	Kevin McHugh, PhD	Lori Setton, PhD
Peter C. Amadio, MD	Stephen J. Ferguson, PhD	Alicia R. Jackson, PhD	Amy McNulty, PhD	Sameer B. Shah, PhD
Donald D. Anderson, PhD	David M. Findlay, PhD	Holger Jahr, PhD	John B. Medley, PhD	Gulshan B. Sharma, PhD
Hani A. Awad, PhD	Matthew Fisher, PhD	Brian Johnstone, PhD	Christopher L. Mendias, PhD	Jason Shearn, PhD
Won Bae, PhD	Daniel C. Fitzpatrick, MD	Niraj V. Kalore, MD	Meghan M. Moran, PhD	Julia C. Shelton, PhD
Chelsea Bahney, PhD	Braden C. Fleming, PhD	Amir Kamali, PhD	Elise F. Morgan, PhD	Robert A. Siston, PhD
Scott A. Banks, PhD	Lisa A. Fortier, DVM	Helen Kambic, PhD	Michael M. Morlock, PhD	Lachlan Smith, PhD
Thomas W. Bauer, MD, PhD	Kharma Foucher, PhD	Rita Kandel, MD	Annegret Muendermann, PhD	Stephen Spiegelberg, PhD
Joan E. Bechtold, PhD	Darin Friess, MD	Galateia J. Kazakia, PhD	Martha M. Murray, MD	Matthew Steensma, MD
Michael J. Bey, PhD	Leesa M. Galatz, MD	Daniel J. Kelly, PhD	Volker Musahl, MD	Matthew Stewart, PhD
Sanghita Bhattacharya, PhD	Benjamin Gantenbein-Ritter, PhD	Oliver Kessler, MD	Fackson Mwale, PhD	Aaron Stoker, PhD
Leendert Blankevoort, PhD	Michael J. Gardner, MD	Megan Killian, PhD	Raghu N. Natarajan, PhD	Hui (Herb) Sun, PhD
Joel A. Block, MD	Louis C. Gerstenfeld, PhD	Karen B. King, PhD	Rob P. Nelissen MD, PhD	Pascal Swider, PhD
Mathias P. Bostrom, MD	Jessica E. Goetz, PhD	Jenneke Klein-Nulend, PhD	Fred Nelson, MD	Michiaki Takagi, MD, PhD
Helena Brisby, MD, PhD	Garry Gold, MD	Shigeru Kobayashi, PhD	Shane J. Nho, MD	Johnna S. Temenoff, PhD
Claire Brockett, PhD	Said T. Gomaa, PhD	Matthew Koff, PhD	Philip C. Noble, PhD	Stavros Thomopoulos, PhD
Robert Brophy, MD	Enrique Gomez-Barrena, MD	Andreas Kontaxis, PhD	Niamh C. Nowlan, PhD	Jonathan I. Thompson, PhD
Sjoerd Bulstra, MD	Sibylle Grad, PhD	Rami K. Korhonen, PhD	Fergal H. O'Brian, PhD	Weidong Tong, PhD
Pieter Buma, PhD	Timothy Griffin, PhD	Kenneth M. Kozloff, PhD	A. Lee Osterman, MD	Travis Turnbull, PhD
Jarett D. Cain, DPM, MSc	Helen Gruber, PhD	Catherine K. Kuo, PhD	Saikat Pal, PhD	Gangadhar Utturkar, MS
Yupeng Chen, PhD	Teja Guda, PhD	Mario Lamontagne, PhD	Abhay Pandit, PhD	Nico Verdonschot, PhD
Wing-Hoi (Louis) Cheung, PhD	Zbigniew Gugala, MD, PhD	Lisa Larkin, PhD	O. Mark Papuga, PhD	Stephen Waldman, PhD
Susanna Chubinskaya, PhD	Farshid Guilak, PhD	Michel Laurent, PhD	Avinash G Patwardhan, PhD	Joseph Wallace, PhD
Roger Cornwall, MD	X. Edward Guo, PhD	Mitra Lavasani, PhD	Ming Pei, MD, PhD	James H. Wang, PhD
David T. Corr, PhD	Nancy Hadley-Miller, MD	Francis Y. Lee, MD	Anthony Petrella, PhD	Vincent Wang, PhD
Hayden-William C. Courtland, PhD	Lisbet A. Haglund, PhD	Bingyun Li, PhD	Robert M. Pilliar, PhD	Kurt D. Weiss, MD
Michael Cross, MD	David J. Hak, MD	Guoan Li, PhD	Robert A. Poggie PhD	Markus A. Wimmer, PhD
Magali Cucchiariini, PhD	Deborah J. Hall, BS	Yen-Shuo (Peter) Liao, PhD	Hollis Potter, MD	Jianwen Xu, PhD
Chitra L. Dahia, PhD	Moussa Hamadouche, MD, PhD	Fang (Amanda) Lin, Dsc	Edward Purdue, PhD	Shinichi Yamamoto, MD, PhD
Aaron Daluiski, MD	Hiroataka Haro, MD, PhD	Sheldon Lin, MD	Tamara K. Pylawka, MD	Liu Yang, PhD
Alexis Dang, MD	Joshua D. Harris, MD	Christopher Little, DVM, PhD	Ling Qin, PhD	Shang-You Yang, PhD
Eric Darling, PhD	Dominik R. Haudenschild, PhD	(Xiaowei) Sherry L. Liu, PhD	Robin M. Queen, PhD	Yener N. Yeni, PhD
Michael R. Dayton, MD	Tammy L. Haut Donahue, PhD	Xuhui (Phillip) Liu, PhD	Chamith S. Rajapakse, PhD	Hongchuan Yu, PhD
Richard E. Debski, PhD	Markus Heller, PhD	Mandi J. Lopez, DVM, PhD	Weiping Ren, MD	Zijun Zhang, MD, PhD
Louis E. DeFrate, PhD	Heath B. Henninger, PhD	Jeffrey C. Lotz, PhD	Douglas D. Robertson, MD, PhD	Chunfeng Zhao, MD
John D. DesJardins, PhD	Christopher Hernandez, PhD	Helen H. Lu, PhD	Duane Robinson, DVM, PhD	
Lei Ding, PhD	Howard J. Hillstrom, PhD	X. Lucas Lu, PhD	Vicki Rosen, PhD	
Ming Ding, MD, PhD	Bang Hoang, MD	Hannah J. Lundberg, PhD	Marcel E. Roy, PhD	



# BECOME A MEMBER OF THE ORTHOPAEDIC RESEARCH SOCIETY

The ORS Membership Committee will be available to discuss membership aspects and benefits as well as endorse applications during breaks and poster session in the ORS booth located in Innovation Central (Poster/Exhibit Hall).

	ACTIVE	ASSOCIATE (STUDENT)	AFFILIATE
<b>INFORMATION:</b>	Active Members are elected to the Society based on previous scientific contributions and continued participation in the field of research. Active members pay annual dues of \$240.	Associate (Student) Membership is available to trainees in the area of orthopaedic research, including individuals who are pursuing advanced degrees (e.g., MD, DDS, DO, MS, , PhD, DVM) or in post-doctoral clinical and research training programs (Residency and Fellowship). Associate (Student) Members must verify their training status in the field of orthopaedic research for membership. Associate (Student) Members are expected to apply for Active membership when their training is completed. Associate (Student) Members pay annual dues of \$50.	Affiliate Membership is available to lab technicians, lab and private practice administrators/managers, and industry representatives that make a significant scientific and/or non-scientific contribution to orthopaedic research and the ORS. Applicants must have two institutional sponsors; ORS members must write letters of recommendation including significant scientific and/or non-scientific contribution of the applicant. Letters must be on institutional letterhead. Affiliate members pay annual dues of \$240.
<b>BENEFITS:</b>			
Prestige of membership	✓	✓	✓
Reduced registration fees at the ORS Annual Meeting	✓	✓	✓
Network of Skilled Professionals	✓	✓	✓
Free subscriptions to ORS Connect	✓	✓	✓
Online Membership Directory	✓	✓	✓
Discounted rate for ORS Career Center	✓	✓	✓
Eligibility for ORS Awards, Fellowships and Grants	✓	✓	
Online Subscription to Journal of Orthopaedic Research (12 issues)	✓		✓
No fee to submit manuscripts to Journal of Orthopaedic Research	✓	✓	✓
Eligibility to serve on ORS Committees, as a reviewer and moderator	✓		Corporate Affairs Committee only
Eligibility to serve on ORS Committees as an Ad Hoc		✓	
<b>REQUIREMENTS:</b>	Presentation of a paper at an ORS Annual Meeting OR Publication of two peer-reviewed journals papers related to orthopaedic research.	A signature from your Advisor, Dean, Department or Program Chair verifying your training status is required.	Attendance at one or more prior ORS Annual Meetings.

# ORS WELCOMES OUR NEW MEMBERS

Pegah Abbasnia	Lawson Copley	Hayam Hussein	Jinjin Ma	Annie Reza	Irina Timmerman
Bernice About	Benjamin Corona	Kensuke Ikuta	Kyle MacGillis	H Duane Romo	Wei Seong Toh
Eduardo Abreu	Michele Corrigan	Andreia Ionescu	Constance Maglaras	Scott Rosenfeld	Natasha Topoluk
Cheryl Ackert-Bicknell	Juan Coruna	Cale Jacobs	Damon Mar	Ann Rosenthal	Ashley Torres
Nobuo Adachi	Mary Cowman	Amanda Jacobson	Nicholas Marais	Ryan Ross	Koji Totoribe
Andrew Adamczyk	Michelle Cruz	David Jamison	Denis Marcellin-Little	Adam Rothenberg	Francesco Travascio
Naga Suresh Adapala	Joanna Dabrowiecka	Jessica Jennings	Alejandro Marquez-Lara	Stephanie Russo	Sophia Traven
Carin Ahner	Michele D'Apuzzo	Yangzi Jiang	Deborah Mason	Fayez Safadi	Luke Tregilgas
Ameet Aiyanger	Chantal de Bakker	Ying Jin	Vicky Massicotte	David Safranski	Katie Trella
Ryuichiro Akagi	Ivan De Martino	Anthony Johnson	Daniel Massimini	Comron Saifi	Tsung-Lin Tsai
Wafa Albaluki	Karen de Mesy-Bentley	Joshua Johnson	Jonathan Matheny	Christina Salas	Tsung-Yuan Tsai
Carolyne Albert	Juan De Rivero Vaccari	Josna Joseph	Masatake Matsuoaka	Giuliana Salazar-Noratto	Toshinori Tsukanishi
Michael Albro	Danielle de Villiers	Yohei Kagawa	Andrew McCaskie	Matthew Salzer	Tadashi Tsukeoka
Mazen Al-Hajjar	Sean DeBoyace	Atsuhito Kakuta	Michael McClure	Juan Santiago-Torres	Travis Turnbull
Ron Alkalay	Agnes d'Entremont	Akinori Kan	Rachel McGuire	Rachel Sarabia-Estrada	Sardar Uddin
Devon Anderson	Matteo D'Este	Takao Kaneko	Dermott McHugh	Kimberly Sass	Keita Uetsuki
Ruhi Arslanoglu	Christopher DiGiovanni	Lana Kang	Mia McNulty	Akiko Sato	Ginu Unnikrishnan
Ashkan Aryaei	Elise Donovan	Kenji Kawate	Qingse Meng	Taishi Sato	Ashish Upadhyay
Nobuo Asai	Brinda Doshi	Serra Kaya	Gretchen Meyer	Michael Schenk	Sasidhar Uppuganti
Mohamed Attawia	Susan Drapeau	Oran Kennedy	Arthur Michalek	Jonathan R Schiller	Ani Ural
John Attenello	Guoqing Du	Mohamed Khalid	Nicholas Mignemi	Joseph Schwab	Kenneth Urish
Umur Aydogan	Rupak Dua	Bulent Kilic	Kimberly Mimnaugh	Joseph Schwab	Chandra Valmikanathan
Rikiya Baba	Elaine Duncan	Megan Killian	Peter Mittwede	Andrea Schwartz	Martijn van den Bosch
Joel Bach	Ivan Duran	Makoto Kobayashi	Eng Moo	Hazal Screen	Devika Varma
Daniel Bachman	George Dyer	Uotani Koji	Yu Moriguchi	Cynthia Secchieri	Samuel Veres
Jihye Baek	Lauren Eichaker	John Konicek	Shuichi Moriya	Anand Segar	Linda Vi
Todd Baldini	Khaled Elsaid	David Kovacevic	Jukka Morko	Shiree Segev	Hiroshi Wada
William Barfield	Jonathan Elsner	Deborah Krakow	Mark Morrey	Amee Seitz	Susumu Wada
Jennifer Barrett	Fei Fang	Kelly Krohn	Franklin Moutos	Stefania Setti	Shaowei Wang
Stephen Barrett	Michael Ferko	Chad Krueger	Iain Murray	Aksel Seyahi	Yufa Wang
Mark Barton	Elisabeth Ferreira	Natarajan Kumar	Vincent Mutiso	Ali Shahi	Tommy Washington
Nicholas Beckmann	Andrzej Fertala	Tatsuya Kunimoto	Jessica Myers	Aarti Shendy	Wei Wei
Nicole Behnke	John Fowler	Laurel Kuxhaus	Yusuke Nakagawa	David Shiovitz	Kurt Weiss
Shohreh Behrouzi	Rachel Frank	Grzegorz Kwiecien	Michael Nasr	Rohan Shirwaiker	Jason Wilken
Kevin Bell	Douglas Fredericks	Marie-Noelle Labour	Brad Nelson	Jakob Sieker	Nick Willett
Richard Bell	Hirofumi Fujie	Jean Langlois	Scott Nelson	Olof Skoldenberg	David Wolfson
Sanghita Bhattacharya	Tomohiro Fujiwara	Daniel Latt	Yutaka Nezu	Howard Slaff	Addison Wood
Paul Bills	Kiyokazu Fukui	Thomas Laumonier	Geoffrey Ng	Scott Small	Karina Wright
Joel Boerckel	Tomooki Fukui	Christine Le Maitre	Shane Nho	Harvey Smith	Ling Wu
Daniel Boguszewski	Karina Galoian	Beth Lee	Tosan Okoro	Kyle Snethen	Li Xiao
James Boorman-Padgett	Michael Geary	Peter Lee	Rene Olivares-Navarrete	James Stannard	Denghui Xie
Elizabeth Bradley	Matthew Goff	Seung Yeon Lee	Daniel Oravec	Elena Stavenschi	Lianping Xing
Peter Brett	Mathilde Granke	Whasil Lee	Diego Orozco Villasenor	Brian Stemper	Hao Xu
Caroline Brial	Dave (Xiaoyu) Gu	Padraic Levings	Patrick Orth	Laura Stoll	Ryosuke Yamaguchi
Helena Brisby	Baosheng Guo	Eric Lewallen	Jun Ouyang	Alex Stoller	Wei Yao
Jason Caffrey	David Hamilton	Cara Lewis	Thomas Owen	Alvin Su	Oui Soo Yoo
Marco Caicedo	Josa Hanzlik	Jingtao Li	Toshifumi Ozaki	Dai Sugimoto	Yuichi Yoshii
John Callaci	Emily Hargrave-Thomas	Chao Liang	Jukka Pajarinen	Yi Sun	Hongchuan Yu
Xu Cao	Joshua Harris	Huizi (Anna) Lin	Jesal Parekh	Yuya Takakubo	Chawon Yun
Connie Chamberlain	Lorena Havill	Jian Hao Lin	Saba Pasha	Karren Takamura	Terri Zachos
Deva Chan	Xiaojuan He	Brock Lindsey	Taylor Pate	Guak Kim Tan	Amine Zaoui
Steven Charlebois	Sarah Helms	Kevin Little	Manda Paul	Shih Jye Tan	Stephan Zeiter
Paul Charpentier	Corinne Henak	Erin Litts	Jeffrey Peck	Hiroshi Tanaka	Marcy Zenobi-Wong
Miriam Chaudhary	Safa Herfat	Jin Liu	Sun Peck	Kenta Tanaka	Alan Zhang
Kathryn Cheah	Marietta Herrmann	Ming Liu	Marianna Peroglio	Tingting Tang	Nianli Zhang
Ruei-Ming Chen	Marian Hettiaratchi	Sonja Lobo	Luke Pietrykowski	Arun Tatiparthi	Shurong Zhang
Yupeng Chen	Hannah Heywood	Alayna Loiselle	Breanne Przechalski	Kenneth Taylor	Xia Zhang
Nobuaki Chinzei	Malone Hill	Rose Long	Radu Racasan	Aaron Taylor	Yingze Zhang
Alexander Christ	David Hoey	Jason Longaray	Ramiro Ramirez	Matthew Teeter	Yuan Zhang
Amy Cizik	MaCalus Hogan	Huadong Lou	Austin Ramme	Yoshinori Terashima	Zhong Zheng
Paul Clark	Catherine Holt	LaQuawn Loving	Matthew Rasmussen	James Thomas	Robert Zondervan
Rasmus Cleeman	Alice Huang	Anne Lubbeke	Nakul Ravikumar	Nathan Thomas	
Daniel Cohen	Paul Huddleston	Kurt Lucas	David Reece	Chavaunne Thorpe	
Mitchell Coleman	Lisa Husak	Thomas Lufkin	Heidi Reesink	Melanie Timmen	

# FRIDAY | MEETING HIGHLIGHTS

Friday, March 27, 2015

7:00AM-6:00PM

## AAOS 2015 Annual Meeting

7:00 AM – 6:00 PM  
Venetian/Sands EXPO

6:00PM-8:00PM

## Ancillary Event

Research Interest Group: Bone Regeneration  
6:00 PM – 8:00 PM  
Room 106 - 107

Organizer:

Chelsea Bahney, PhD, Orthopaedic Trauma Institute

This is the 3rd annual Bone Regeneration RIG held at the ORS. Our mission is to provide new insights into important topics in bone repair by leading experts in field in a 1-hour panel seminar, followed by an opportunity for networking. The theme for this year's RIG is *The Mechanics of Bone Regeneration*. Our panel will cover the basic science related to how cells receive and transduce mechanical signals, as well as translational applications for improving repair by optimizing the loading microenvironment and testing the efficacy of the bone regenerate.

FRIDAY



# SATURDAY | MEETING HIGHLIGHTS Saturday, March 28, 2015

**8:00AM-10:30AM**

## ANCILLARY MEETINGS:

**Research Interest Group: Growth Factors**  
Room 106 - 107

**Research Interest Group: Mechanobiology**  
Room 115

**Research Interest Group: Orthopaedic Evidence**  
Room 117

**Research Interest Group: Tendon**  
Room 121 - 122

**Research Interest Group: Spine Research Community**  
Room 116 (concludes at 10am)

**ORS Advocacy Roundtable**  
Room 111 - 112

**11:00AM-12:00PM**

**New Investigator Networking Session: Strategic Lab and Time Management**  
Room 117

**Mentor Connect**  
Room 115

**12:00PM-8:00PM**

**Poster and Exhibit Hall Open**  
Marquee Ballroom

**12:00PM-1:00PM**

## SESSIONS:

**Bone Disease**  
Room 111 - 112

**Knee Kinematics and Gait**  
Room 113-114

**Hip Disease, Kinematics, FAI**  
Room 116

**Advanced Articular Cartilage Imaging Techniques**  
*Spotlight Session*  
Room 118 - 120

**Intervertebral Disc: Degeneration, Pain and Treatment**  
*Spotlight Session*  
Room 121 - 122

**1:15PM-2:15PM**

## NIRA PRESENTATIONS:

**Bone Biology & Repair**  
Room 111 - 112

**Joint Physiology & Mechanics**  
Room 113 - 114

**Cell Differentiation Fibrosis & Cancer**  
Room 116

**OA & Cartilage**  
Room 118 - 120

**Stem Cells & Tissue Repair**  
Room 121 - 122

**2:00PM-6:00PM**

**ORS/OREF Basic Science Course: Part I**  
Room 117

**2:30PM-3:00PM**

**Refreshment Break**  
Innovation Central/Marquee Ballroom

**2:45PM-3:00PM**

**Innovation Theater Presentation: THINK Surgical**  
TCAT™ as a Research Tool  
Innovation Central/Marquee Ballroom

**3:00PM-4:30PM**

## WORKSHOPS:

**Hot Topics in Regulatory Challenges within Orthopaedics**  
Room 111 - 112

**ORS/The HIP Society - Biological Aspects of Modular Implant Tribocorrosion**  
*New Horizon Workshop*  
Room 113 - 114

**Trials, Tribulations and Triumphs of Conducting Prospective Clinical Research Studies: The How and Why**  
Room 116

**Quantitative MR Imaging: Research Applications and Clinical Translation**  
Room 118 - 120

**Professional Advancement Session- Career Advancement: Winning the Uphill Battle for Research Funding**  
Room 121 - 122

**4:45PM-5:45PM**

**Welcome Session - Guest Nation, Patient Story, Presidential Guest Speaker**  
Room 118 - 120

**6:00PM-8:00PM**

**President's Welcome Reception**  
Innovation Central/Marquee Ballroom

## ANCILLARY EVENTS 8:00AM-10:30AM

### Research Interest Group: Growth Factors and Musculoskeletal Repair

Room 106 – 107

Organizers:

Lawrence J. Bonassar, PhD, Cornell University  
Johnny Huard, PhD, University of Pittsburgh

Objective:

Discuss current and future issues in growth factor research as they relate to orthopaedic problems.

### Research Interest Group: Mechanobiology and Inflammation in Cartilage

Room 115

Organizers:

Christopher T. Chen, PhD, University of Texas Southwestern Medical Center  
Alan J. Grodzinsky, ScD, Massachusetts Institute of Technology

Objectives:

1) To create a synergetic environment to present new findings in the emerging fields of mechanobiology and inflammation.

2) To discuss how mechanotransduction interacts with common signaling pathways (NF-kB, MAPK, STAT, P3K,CBP/p300 and other) and whether there are thresholds or windows (stress and strain) to activate the pro- inflammatory and anti-inflammatory signaling pathways in different connective tissues including cartilage, ligament, tendon, bone, and IVD.

3) To review our current understanding on the relationships between mechanobiology, inflammation, and tissue remodeling/healing.

### Research Interest Group: Spine Research Community

Room 116 (Concludes at 10 AM)

Organizers:

Fackson Mwale, PhD, McGill University  
Makarand V. Risbud, PhD, Thomas Jefferson University  
Daisuke Sakai, MD, PhD, University of California, San Diego  
James C. Iatridis, PhD, Icahn School of Medicine at Mount Sinai  
Sibylle Grad, PhD, AO Research Institute  
Rita Kandel, MD, Mount Sinai Hospital

Objectives:

1) To develop and strengthen collaborative research. To build international networks and foster interactions between research groups from different countries (and different continents). To avoid competition for national funding sources. To include more clinicians in the networks for identification of clinically relevant topics. To involve also industrial partners.

2) To identify underdeveloped areas.

3) To enlarge the spine research community. (a) How to recruit more people to the disc field. (b) How to improve publication efficiency of relevant journals. (c) To better involve the disc/spine research in the ORS committee and editorial board of orthopedic and other relevant journals.

### Research Interest Group: Tendon

Room 121 - 122

Organizers:

Nelly Andarawis-Puri, PhD, Mount Sinai School of Medicine  
Evan Flatow, MD, Mount Sinai School of Medicine  
Louis Soslowsky, PhD, University of Pennsylvania

Objectives:

This will be the inaugural meeting of the Tendon Research Interest Group. Anyone with interest in tendon research (basic, tissue engineering, applied, etc) is welcome to attend. This session will begin by summarizing and reporting on the ORS- ISMMS New Frontiers in Tendon Research held in NYC last fall). We will then discuss the structure of this group going forward and initiatives of interest to grow and enhance the collaborative research efforts.

### Research Interest Group: The Orthopaedic Evidence and Outcomes Education Organization

Room 117

Organizer:

Michael P. Dohm, MD, University of Arizona

Objectives:

To discuss the development of infrastructure required for outcomes projects in orthopaedics, discussion of patient reported outcome measures and functional measures, definition of data levels, promote and nurture an environment in which we can work on collaborative projects regarding applications of evidence in orthopaedic practice, promote and nurture collaborations within the discipline of orthopaedics between clinician scientists and researchers as well as in a multidisciplinary fashion with other organizations interested in the same.

### ORS Advocacy Roundtable

Room 111 – 112

Organizer:

The ORS Advocacy Committee

We need more money for orthopaedic research! Yet, we often rely on others to advocate for us. It is more important than ever to have your voice heard. Come join us to learn how to become an advocate.

The members of the ORS Advocacy Committee invite you to join them for an open discussion on advocating for research funding. Attendees will have the opportunity to hear from people who have visited Capitol Hill on behalf of orthopaedic research. This informal roundtable will offer an open discussion on their experiences and lessons learned from their advocacy efforts. Discussion topic will include how to get involved in advocacy, what you need to do to be prepared and developing relationships with those that represent you.

# SATURDAY | PROGRAM DETAILS

Saturday, March 28, 2015

## NEW INVESTIGATOR NETWORKING SESSION

**Position Yourself for a Successful Career:  
Strategic Lab and Time Management**

**11:00 AM - 12:00 PM**

Room 106 - 107

Organizers:

The New Investigator Mentoring Committee

Moderators:

Nelly Andawaris-Puri, PhD

Devina Purmessur, PhD

The demands of an early career in academics can leave you feeling overwhelmed and unproductive. Developing techniques to manage your time to accomplish what matters is crucial for your success and well-being. Creating the team that will help enhance your vision will promote an inspiring and productive environment. How do you organize your time to accomplish what matters? How do you promote excellence and inspire your research personnel? From time management to lab management strategies, this networking session will provide guidance and advice based on ORS mentors' own experiences and will focus on staffing (hiring, inspiring and firing), prioritizing and setting career goals, managing your time to maximize efficiency and knowing when to say yes and when to say no.

## AGENDA

**11:00 – 11:05AM**

***Welcome & Introductions***

Nelly Andawaris-Puri, PhD and Devina Purmessur, PhD

**11:05 – 11:20AM**

***Managing Your Time for Success***

Larry Bonassar, PhD

**11:20 – 11:35AM**

***Staffing and Promoting an Inspired Environment***

Susannah Fritton, PhD

**11:35AM – 12:00PM**

***Q&A*** Moderators: Drs. Nelly Andarawis-Puri and Devina Purmessur

## MENTOR CONNECT

**11:00 AM - 12:00 PM**

Room 115

Organizers:

The ORS New Investigator Mentoring Committee

This is an informal and interactive session between mentors and mentees. Mentees will be able to choose their mentor from a select group of ORS members who have demonstrated success in their career. The mentors and mentees will have the opportunity to discuss career establishment and how to balance competing demands in the academic and corporate environments. The discussions may also cover topics such as the importance of identifying mentors and describing the roles and functions of a mentor. This is an excellent opportunity to network with senior ORS members and ask questions of the mentors in an informal, small group environment. The Women's Leadership Forum will host two tables for interaction and mentorship with female ORS leaders.

## PAPER PRESENTATIONS

**12:00 PM – 1:00 PM**

*See page 21*

## NIRA PRESENTATIONS

**1:15 PM – 2:15 PM**

*See page 22-23*

# SATURDAY | PROGRAM DETAILS

Saturday, March 28, 2015

## ORS/OREF BASIC SCIENCE COURSE

**Part I: Saturday March 28, 2:00 PM – 6:00 PM**

**Part II: Sunday, March 29, 8:00 AM – 11:15 AM**

Room 117

Organizers:

Richard L. Lieber, PhD, Rehabilitation Institute of Chicago

Marjolein C. van der Meulen, PhD, Cornell University

Theodore Miclau, MD, Orthopaedic Trauma Institute

The ORS/OREF Basic Science Course will provide attendees with the tools to explain the functions and limitations of the science behind the decisions, treatments, and procedures that are performed in practice every day. The course content has been derived from the *Orthopaedic Basic Science: Foundations of Clinical Practice* textbook developed in partnership with the AAOS and ORS. Covered topics will include principles of orthopaedic surgery basic science, musculoskeletal tissue biology, and musculoskeletal pathophysiology. Course attendees will also receive a copy of the textbook as part of the registration fee. The knowledge of the concepts learned in this course is evaluated through the Orthopaedic In-Training Examination and the American Board of Orthopaedic Surgery Part I and Recertification Examinations. The course will benefit anyone currently in the field or entering the field of orthopaedics including orthopaedic residents and fellows, practicing orthopaedic surgeons and musculoskeletal researchers.

### Part I: Principles of Orthopaedic Surgery Basic Science

#### *Welcome and Introduction*

Richard L. Lieber, PhD, Rehabilitation Institute of Chicago

#### *Molecular and Cellular Biology*

Tamara Alliston, PhD, University of CA, San Francisco

#### *Musculoskeletal Development and Genetic Diseases*

Jennifer Westendorf, PhD, Mayo Clinic

#### *Principles of Biomechanics*

Marjolein C. van der Meulen, PhD, Cornell University

#### *Orthopaedic Biomaterials*

Kenneth A. Mann, PhD, SUNY Upstate Medical University

#### *Kinesiology*

Samuel R. Ward, PhD, University of CA, San Diego

## Musculoskeletal Tissue Physiology and Function

### *Bone*

Karl J. Jepsen, PhD, University of Michigan

### *Skeletal Muscle and Nerve*

Richard L. Lieber, PhD, Rehabilitation Institute of Chicago

### *Tendon and Ligament*

Louis J. Soslowsky, PhD, University of Pennsylvania

### *Cartilage*

Suzanne A. Maher, PhD, Hospital for Special Surgery

### *Meniscus and Intervertebral Disc*

Robert L. Mauck, PhD, University of Pennsylvania

### *Pre-registration required*

Residents/Students/Associates: \$145; ORS and/or AAOS registrants: \$195; Non-Members: \$295

All fees include Orthopaedic Basic Science: Foundations of Clinical Practice textbook

## BREAK

**2:30 PM – 3:00 PM**

Innovation Central/Marquee Ballroom

Visit with exhibitors and view posters in

Innovation Central. Refreshments will be served.

## INNOVATION THEATER PRESENTATION:

### **THINK Surgical**

#### **TCAT™ as a Research Tool**

**2:45 PM – 3:00 PM**

Innovation Central/Marquee Ballroom

THINK Surgical, Inc. develops, manufactures, and markets an active computer-assisted surgical system for orthopedic surgery and is committed to the future of orthopedic surgery and to improving patient care through the development of leading-edge precision technology. Learn about the technology and potential research collaborations with THINK.

## WORKSHOPS

3:00 PM – 4:30 PM

### Hot Topics in Regulatory Challenges within Orthopaedics

Room 111-112

Presented by:

The ORS Corporate Affairs Committee

Organizers:

David W. Schroeder, MBA, Biomet, Inc.

Jacob L. Cartner, MS, Smith & Nephew

The goal of all regulatory agencies is to have a safe and effective product in the market while not creating an overly burdensome environment that stifles innovation. Traditional orthopedic devices are becoming increasingly more interconnected with biological solutions. Therefore, regulatory submissions may be reviewed by different departments under the same regulatory agency, thus increasing burden of proof and time for approval.

This workshop will focus on the past, present, and future of global regulatory pathways and associated requirements. It will entail how to best navigate new regulatory challenges. Specifically, speakers will discuss their own experiences with navigating the FDA when submissions include biological and cell-based products, considerations for custom or compassionate use devices, and discussion on the treatment and prevention of infection. Workshop attendees will gain a better understanding of how to approach an ever-changing industrial and regulatory landscape.

#### *My Experience in Getting a Cell-Based Therapy to Market*

Chris Gemmiti, PhD, Ridgewood Consulting LLC

#### *Custom Products for Use in Orthopaedics*

William M. Mihalko, MD, PhD, Campbell Clinic Orthopaedics

#### *Current Status of Technologies to*

#### *Treat Periprosthetic Joint Infections*

Steve M. Kurtz, PhD, Exponent, Inc.

### New Horizon Workshop: ORS/The HIP Society - Biological Aspects of Modular Implant Tribocorrosion

Room 113 - 114

Organizers:

Harry E. Rubash, MD,  
Massachusetts General Hospital

Mathias P. Bostrom, MD,  
Hospital for Special Surgery



Failure of total joint replacement reconstructions due to tribocorrosion of modular hip replacement components is being observed with increasing frequency in contemporary clinical practice. Much remains to be understood regarding the pathogenesis of the adverse local tissue reactions associated with modular implant tribocorrosion. This workshop will focus on the current understanding of the cell and tissue response to

tribocorrosion, knowledge gaps that are fertile areas of future research and novel findings that challenge the current paradigms of metal implant biocompatibility.

#### *Bioreactivity of Tribocorrosion Debris: Known Unknowns*

Joshua J. Jacobs, MD, Midwest Orthopaedis at Rush

#### *Histological Correlates of Modular Implant Tribocorrosion*

Patricia A. Campbell, PhD, Orthopaedic Hospital

#### *Novel Biological Observations in Modular Implant Tribocorrosion*

Jeremy L. Gilbert, PhD, Syracuse University

### Trials, Tribulations and Triumphs of Conducting Prospective Clinical Research Studies: The How and Why

Room 116

Presented by:

The ORS Women's Leadership Forum

Organizers:

Robin M. Queen, PhD, Duke University

Karen King, PhD, University of Colorado at Denver and Health Sciences Center Orthopaedics – Bioengineering

Moderators:

The logistical challenges of planning and implementing a large scale clinical research study can be daunting. There are many aspects of study design, study implementation, and the study team assembly and dynamics that must be considered prior to study initiation. This workshop will bring together three scientists who have been highly successful in the planning, funding, and implementation of large scale clinical studies to explore all aspects of these projects including the trials and triumphs.

#### *Moving from an Idea to a Clinical Trial*

Cecilia Rogmark, MD, PhD, Skane University Hospital and Swedish Hip Arthroplasty Register

#### *Engaging Your Subjects: The Johnston County Osteoarthritis Project*

Joanne Jordan, MD, MPH, University of North Carolina

#### *Regulatory Considerations When Planning a Clinical Trial*

Gloria L. Matthews, DVM, PhD, Genzyme Corporation

### Quantitative MR Imaging:

### Research Applications and Clinical Translation

Room 118 - 120

Organizer:

Hollis G. Potter, MD, Hospital for Special Surgery

Quantitative imaging of bone, articular cartilage, meniscus, and intervertebral disc and endplate provides noninvasive insight into tissue biochemistry and structure. Basic principles of MR research sequences will be discussed in this workshop, with correlates to more traditional imaging methodologies. The application of these techniques to translational clinical application will be discussed.



# SATURDAY | PROGRAM DETAILS

Saturday, March 28, 2015

## **Quantitative Imaging of Bone**

Sharmila Majumdar, PhD, University of California, San Francisco

## **Quantitative Imaging of the Intervertebral Disc and Endplate**

Won C. Bae, PhD, University of California, San Diego

## **Quantitative MRI of the Meniscus**

Matthew F. Koff, PhD, Hospital for Special Surgery

## **PROFESSIONAL ADVANCEMENT SESSION**

### **Career Advancement:**

### **Winning the Uphill Battle for Research Funding**

**3:00 PM - 4:30 PM**

Room 121-122

#### **Organizer:**

ORS New Investigator Mentoring Committee

#### **Moderator:**

Jinxi Wang, MD, PhD, University of Kansas Medical Center

Acquiring funding for research is more competitive than ever. Budget cuts have been a threat to individual researchers and research programs that affect musculoskeletal basic scientists and physician scientists at all stages. Whether you are a postdoctoral fellow, new investigator, mid-career investigator, or established investigator, this Professional Advancement Session will provide you with the tools to meet these challenges and to streamline career advancement strategies in today's competitive funding environment.

This PAS includes brief presentations and ample discussions with the panel members who have experience with research grant policy, submission, review process, and post-award management. Topics include: What to do when you submit but don't get funded; What to do when you submit and do get funded; What to do if you are stuck after completing a small grant project; What to do if your grant is not renewed as you expected; What to do if your tenure review is approaching but your NIH grant application is still pending.

#### **Panel members:**

Henry Donahue PhD, Penn State University College of Medicine, PA

James Iatridis PhD, Icahn School of Medicine at Mount Sinai, NY

Lynn Snyder-Mackler PT, ScD, FAPTA, STAR University of Delaware, DE

Mary Goldring PhD, Hospital for Special Surgery and Weill Cornell Medical College, NY

Gayle Lester PhD, NIH/NIAMS Program Director

## **WELCOME SESSION**

**4:45 PM – 5:45 PM**

Room 118 – 120



**ORS Guest Nation –  
Japan and the Japanese  
Orthopaedic Association**

**Professor Yukihide Iwamoto,  
MD, President, Japanese  
Orthopaedic Association**



**Pamela Schroeder,  
Patient Advocate**

I have been a dedicated advocate for Orthopaedic surgery and the advancement in musculoskeletal research. I have served on The American Academy of Orthopaedic Surgeons Patient Advisory Board for five years and I have advocated on Capitol Hill for musculoskeletal research funding. I spend free time talking

to patients considering knee and ankle replacements. I am eternally grateful to have been given this opportunity to say thank you to The Orthopaedic Research Society, without all of you I would not be where I am today. Thank you for making a difference in my life and the lives of millions.



**Melissa Marshall, ORS  
Presidential Guest Speaker**

**“Science Not Communicated  
is Science Not Done”**

Important research often does not move forward because the significance of that research is not understood and appreciated by others. Melissa Marshall's will motivate listeners on the importance of communication

to the success and advancement of their research. She will explore how effective communication is the linchpin between research and those that are in a position to advance that research.

# SATURDAY | PROGRAM DETAILS Saturday, March 28, 2015

## **ORS PRESIDENT'S WELCOME RECEPTION**

**6:00 PM – 8:00 PM**

Innovation Central/Marquee Ballroom

Don't miss the excitement of the ORS Annual Meeting's largest social event! Enjoy food and drinks while meeting new people and catching up with old friends and colleagues. All ORS Meeting Attendees are welcome to attend this kick-off reception.

*Registered meeting attendees will receive 2 drink tickets for this event. Guests can register to attend the receptions. Please visit the Registration Desk for more information.*

SATURDAY



TIME	SESSION 1 Bone Disease	SESSION 2 Knee Kinematics and Gait	SESSION 3 Hip Disease, Kinematics, FAI	SPOTLIGHT SESSION 4 Advanced Articular Cartilage Imaging Techniques	SPOTLIGHT SESSION 5 Intervertebral Disc: Degeneration, Pain and Treatment
	Room # 111-112	Room # 113-114	Room # 116	Room # 118-120	Room # 121-122
<b>Moderators</b>	Edward M. Schwarz, PhD and Joseph Wallace, PhD	Kang Li, PhD and John J. Elias, PhD	Fang (Amanda) Lin, DSc, MMed, BEng and Yupeng Chen, PhD	Matthew F. Koff, PhD and Won C. Bae, PhD	Daisuke Sakai, MD, PhD and Lachlan Smith, PhD
12:00 PM	<p>Paper No. 0001</p> <p><b>Paget's Disease Of Bone-like Disorder Is Caused By Chmp5 Deletion And Reversed By The Treatment Of OPG-Fc</b></p> <p>Kwang Hwan Park, Matthew B Greenblatt, Jae-Hyuck Shim, Jae Myun Lee, Jin Woo Lee</p>	<p>Paper No. 0007</p> <p><b>Effect Of Unstable Meniscal Injury On Three-dimensional Knee Kinematics In ACL-deficient Patients During Gait</b></p> <p>Kengo Harato, Yasuo Niki, Aiko Sakurai, Yutaka Kudo, Takeo Nagura, Ko Masumoto, Toshiro Otani, Yoshiaki Toyama, Yasunori Suda</p>	<p>Paper No. 0013</p> <p><b>Effects Of Acetabular Rim Trimming on the Hip Joint Contact Pressure: How Much is Too Much?</b></p> <p>Sanjeev Bhatia, Simon Lee, Elizabeth Shewman, Michael J Salata, Charles A Bush-Joseph, Shane J Nho</p>	<p>Paper No. 0019</p> <p><b>Comparison Of Annual Changes In Knee Articular Cartilage Thickness Between The Osteoarthritis Side And The Contra-lateral Side Measured By B-mode Ultrasonography With Mechanical 3d Scanning In Osteoarthritis Patients</b></p> <p>Satoru Ohashi, Takumi Nakagawa, Shuji Taketomi, Hiroshi Inui, Kumiko Ono, Hiroyuki Oka, Koza Nakamura, Sakae Tanaka</p>	<p>Spotlight Speaker</p> <p>Howard S. An, MD</p> 
12:10 PM	<p>Paper No. 0002</p> <p><b>Moderate Chronic Kidney Disease Impairs Bone Quality in Skeletally Mature C57Bl/6 Mice</b></p> <p>Chelsea Heveran, Alicia Ortega, Andrew Cureton, Eric Livingston, Ted Bateman, Moshe Levi, Karen B King, Virginia Ferguson</p>	<p>Paper No. 0008</p> <p><b>The Effect of Cruciate Preservation on Walking Base of Support</b></p> <p>Ruaraidh Collins, Gareth Jones, Victoria Manning, Justin Cobb</p>	<p>Paper No. 0014</p> <p><b>Three-dimensional Measurement Of The Muscle Volume And The Fatty Degeneration Of The Gluteus Medius In Patients With Hip Osteoarthritis</b></p> <p>Takako Momose, Yutaka Inaba, Naomi Kobayashi, Hiroyuki Iike, Taro Tezuka, So Kubota, Tomoyuki Saito</p>	<p>Paper No. 0020</p> <p><b>Deep Imaging of Collagen- and Proteoglycan-Rich Tissues using Optical Clearing</b></p> <p>Corey Neu, Tyler Novak, Kateri Gilliland, Peter Marshall, Sarah Calve</p>	<p><b>Strategies for Treating Intervertebral Disc Degeneration: Matrix Restoration or Pain Relief?</b></p>
12:20 PM	<p>Paper No. 0003</p> <p><b>Increased Ckip-1 Expression And Decreased Phosphorylated Smad1/5 Within Osteoblasts During Bone Formation Reduction In Glucocorticoid-induced Osteoporotic Rats</b></p> <p>Changwei Lv, Jin Liu, Baosheng Guo, Defang Li, Chao Liang, Baoting Zhang, Xiaohua Pan, Lingqiang Zhang, Aiping Lu, Ge Zhang</p>	<p>Paper No. 0009</p> <p><b>Influence of Anatomy on Dynamic Tracking in Patellar Instability</b></p> <p>John J Elias, Neil T Soehnlén, Loredana M Guseila, William A Wilson, John A Carrino, Andrew J Cosgarea</p>	<p>Paper No. 0015</p> <p><b>Statistical Shape Modeling to Quantify and Comparison of Proximal Femoral Cortical Bone Thickness between Patients with Femoroacetabular Impingement and Normal Hips Analyzed by Statistical Shape Modeling</b></p> <p>Penny Atkins, Prateep Mukherjee, Shireen Elhabian, Sumedha Singla, Michael Harris, Jeffrey A Weiss, Ross Whitaker, Andrew Anderson</p>	<p>Paper No. 0021</p> <p><b>Relationship between T1ρ MRI in Cartilage of Non-Osteoarthritic Knees With and Without Posterior Meniscus Lesions</b></p> <p>Nathaniel E Calixto, Deepak Kumar, Karupppasamy Subburaj, Justin Singh, Joseph Schooler, Lorenzo Nardo, Xiaojuan Li, Richard B Souza, Thomas M Link, Sharmila Majumdar</p>	
12:30 PM	<p>Paper No. 0004</p> <p><b>Study Of Pain-related Behavior And Immunohistochemical Analysis In The Hindlimb-unloaded Mice Model Of Bone Loss</b></p> <p>Taro Nakagawa, Hiroki Wakabayashi, Yohei Naito, Sho Kato, Takahiro Iino, Akihiro Sudo</p>	<p>Paper No. 0010</p> <p><b>In-vivo Kinematics of the Knee 3 Years after ACL Reconstruction</b></p> <p>Jing-Sheng Li, Ali Hosseini, Chunbao Li, Felix Yang, Amit Chawla, Thomas J Gill, Guoan Li</p>	<p>Paper No. 0016</p> <p><b>A Novel Model For The Induction Of Hip Dysplasia In The Developing Murine Hip</b></p> <p>Megan Leigh Killian, Michael G James, Stavros Thomopoulos, John C Clohisy</p>	<p>Spotlight Speaker</p> <p>Carl Winalski, MD</p> 	<p>Paper No. 0022</p> <p><b>Responses Of Intervertebral Disc Cells To A Degenerative Tissue Environment</b></p> <p>Vivian Tam, Anita Yee, Rakesh Sharma, Kenneth Cheung, Kathryn Cheah, Yun Wah Lam, Danny Chan</p>
12:40 PM	<p>Paper No. 0005</p> <p><b>Combination Sclerostin Antibody and Zoledronic Acid Treatment Outperforms Either Treatment Alone in a Mouse Model of Osteogenesis Imperfecta</b></p> <p>David G Little, Lauren Peacock, Kathy Mikulec, Michaela Kneissel, Ina Kramer, Tegan Cheng, Aaron Schindeler, Craig Munns</p>	<p>Paper No. 0011</p> <p><b>Changes in Macrophage Decreased Dynamic Knee Joint Stiffness in Patients with Knee Osteoarthritis and Complaints of Instability</b></p> <p>Jonathan A Gustafson, G. Kelley Fitzgerald, Shawn Farrokhi</p>	<p>Paper No. 0017</p> <p><b>Relationships between Severity of Deformity and Impingement in Acute Slipped Capital Femoral Epiphysis</b></p> <p>Carly E Jones, Agnes G d'Entremont, Anthony P Cooper, Jonathan Doucette, Lawrence L Buchan, David R Wilson, Kishore Mulpuri</p>	<p><b>Imaging Approaches to Articular Cartilage Evaluation</b></p>	<p>Paper No. 0023</p> <p><b>Systemic Biomarker Profiles in Subjects with Low Back Pain Differ in Patients Treated Surgically versus with Pain Management.</b></p> <p>Kathryn T Weber, Didier O Alipui, Shina Satoh, Angelos Papatheodorou, Karen Black, Peter Hollis, Chris Overby, Shaheda Quraishi, Ona Bloom, Mitchell Levine, Nadeen O. Chahine</p>
12:50 PM	<p>Paper No. 0006</p> <p><b>Loss of TIEG and Decreases in Wnt Signaling are Substantially Abrogated by Sclerostin Antibody Therapy which Elicits a Robust Skeletal Response</b></p> <p>Anne Gingery, Kevin Pitel, Gino Gaddini, Xiaodong Li, Ke Hua, Urszula Iwaniec, Russell Turner, Thomas Spelsberg, Malayannan Subramaniam, John Hawse</p>	<p>Paper No. 0012</p> <p><b>Relationship of Biomechanical and EMG Factors to Joint Contact Forces and Early Knee OA after ACL Reconstruction</b></p> <p>Elizabeth Wellsandt, Ashutosh Khandha, Kurt Manal, Michael Axe, Thomas Buchanan, Lynn Snyder-Mackler</p>	<p>Paper No. 0018</p> <p><b>Hip Joint Stresses in Individuals with an Asymptomatic Cam Deformity during Level-Walking</b></p> <p>Geoffrey Ng, Giulia Mantovani, Mario Lamontagne, Michel R Labrosse, Paul E Beaulé</p>		<p>Paper No. 0024</p> <p><b>Reactive Oxygen Species Are Therapeutic Targets For Intervertebral Disc Degeneration</b></p> <p>Satoshi Suzuki, Nobuyuki Fujita, Naobumi Hosogane, Ken Ishii, Ryuichi Watanabe, Tomohiro Hikata, Keiyo Takubo, Kota Watanabe, Keisuke Horiuchi, Yoshiaki Toyama, Takeshi Miyamoto, Morio Matsumoto</p>

SATURDAY

# SATURDAY | NIRA SESSIONS 1:15PM–2:15PM Saturday, March 28, 2015

SATURDAY

TIME	NIRA PRESENTATION 6 Bone Biology & Repair	NIRA PRESENTATION 7 Joint Physiology & Mechanics	NIRA PRESENTATION 8 Cell Differentiation Fibrosis & Cancer
	Room # 111-112	Room # 113-114	Room # 116
<b>Moderators</b>	Andrea I. Alford, PhD and Edward Purdue, PhD	Nico Verdonschot, PhD and Kenneth A. Mann, PhD	Douglas D. Robertson, Jr., MD, PhD and Brian Snyder, MD, PhD
1:15 PM	<p>Paper No. 0025</p> <p><b>SDF-1/CXCR4 Axis in Tie2-lineage Cells Including Endothelial Progenitor Cells Regulates Bone Fracture Healing</b></p> <p>Yohei Kawakami, Masaaki Iij, Tomoyuki Matsumoto, Tomoya Kuroda, Yutaka Mifune, Taro Shoji, Tomoaki Fukui, Takayuki Asahara, Masahiro Kurosaka</p>	<p>Paper No. 0033</p> <p><b>Orthopaedic Grade Cobalt Chromium Alloy Particle Corrosion and Biological Evaluation</b></p> <p>Danielle de Villiers, Agata Nyga, Terry Tetley, Akramul Hoque, Alister Hart, Julia C Shelton</p>	<p>Paper No. 0041</p> <p><b>Distinct Patterns Of ShmC Acquisition Mark Chondrogenic Differentiation</b></p> <p>Sarah E. B. Taylor, Ye Henry Li, Piera Smeriglio, Madhusikta Rath, Wing H Wong, Nidhi Bhutani</p>
1:22 PM	<p>Paper No. 0026</p> <p><b>Collagen-Based Bone Sialoprotein Implants Promote Cranial Bone Repair by Stimulating Osteoblastic Differentiation of Dura-Derived Osteoprogenitor Cells</b></p> <p>Paul C. Cowan, Yan Wang, Qinghua Lu, John G. Yost, Yi Feng, Andrew H. Miller, Jinxi Wang</p>	<p>Paper No. 0034</p> <p><b>Early Phase of Wear Particle Induced Inflammation was inhibited by NF-<math>\kappa</math>B Decoy Oligodeoxynucleotide</b></p> <p>Taishi Sato, Jukka Pajarinen, Tzu-hua Lin, Florence Loi, Kensuke Egashira, Zhenyu Yao, Stuart B Goodman</p>	<p>Paper No. 0042</p> <p><b>Human Mesenchymal Stem Cell and Endothelial Cell Interaction through Endothelin-1</b></p> <p>Tsung-Lin Tsai, Bowen Wang, Matthew Squire, Lian-Wang Guo, Wan-Ju Li</p>
1:29 PM	<p>Paper No. 0027</p> <p><b>Identification of a Novel Regulatory Mechanism underlying PTH Anabolic Action on Bone Mass and Injury Repair via Induction of Tob Required for RANKL Expression</b></p> <p>Shuichi Moriya, Yoichi Ezura, Tadayoshi Hayata, Yayoi Izu, Kazuo Kaneko, Masaki Noda</p>	<p>Paper No. 0035</p> <p><b>Gender Differences in Knee Laxity and Stiffness: An In Vitro Study of Age Matched Specimens from a Younger Population</b></p> <p>Daniel Boguszewski, Edward Cheung, Nirav Joshi, Keith Markolf, David McAllister</p>	<p>Paper No. 0043</p> <p><b>Ex-vivo Gene Therapy-induced Cartilage Regeneration: Comparison of Different Subpopulations of Primary Muscle-Derived Cells</b></p> <p>Hongshuai Li, Aiping Lu, Ying Tang, MaCalus V Hogan, Johnny Huard</p>
1:36 PM	<p>Paper No. 0028</p> <p><b>Organ Culture Based Real-time Luminescence Imaging Revealed The Circadian Clock Exists In A Fracture Healing Site Of A Mouse Femur.</b></p> <p>Tatsuya Kunimoto, Hiroyoshi Fujiwara, Naoki Okubo, Yoichi Minami, Toshihiro Hosokawa, Ryo Oda, Toshikazu Kubo, Kazuhiro Yagita</p>	<p>Paper No. 0036</p> <p><b>Molecular Characteristics Proving Femoroacetabular Impingement As The Precursor To Hip Osteoarthritis</b></p> <p>Nobuaki Chinzei, Shingo Hashimoto, Takaaki Fujishiro, Shinya Hayashi, Noriyuki Kanzaki, Masahisa Hatakeyama, Shuhei Sakata, Shinsuke Kihara, Katsuhiko Haneda, Soshi Uchida, Ryosuke Kuroda, Masahiro Kurosaka</p>	<p>Paper No. 0044</p> <p><b>Inhibitory Effect of Photodynamic Therapy with a Novel Indocyanine Green-labeled Nanoparticle and Near-infrared Light on the Growth of Bone Metastasis of a Human Breast Cancer in vivo</b></p> <p>Toshinori Tsukanishi, Masataka Sakane, Tetsuya Abe, Toru Funayama, Shinzo Onishi, Eiichi Ozeki, Isao Hara, Masashi Yamazaki</p>
1:43 PM	<p>Paper No. 0029</p> <p><b>MT1-MMP Mediates Plasticity and Divergence of the Osteoblast and Adipocyte Lineages Through Cleavage of DLK1</b></p> <p>Jason A Horton, Heba Degheidy, Teresa Yang, Nozomi Sakakibara, Steven R Bauer, Pamela G Robey, Kenn Holmbeck</p>	<p>Paper No. 0037</p> <p><b>Sex Differences in Knee Cartilage Pressure Distribution Under Functional Loading Conditions: Implications for Knee Osteoarthritis Risk</b></p> <p>Ata M Kiapour, Carmen E Quatman, Samuel C Wordeman, Vijay K Goel, Timothy E Hewett, Constantine K Demetropoulos</p>	<p>Paper No. 0045</p> <p><b>RPN2 Gene Confers Osteosarcoma Lethal Phenotypes and Determines Clinical Prognosis</b></p> <p>Tomohiro Fujiwara, Toshiyuki Kunisada, Ken Takeda, Yutaka Nezu, Aki Yoshida, Koji Uotani, Kazuhisa Sugiu, Toshiki Omori, Takehiro Uehara, Yasuaki Yamakawa, Akira Kawai, Takahiro Ochiya, Toshifumi Ozaki</p>
1:50 PM	<p>Paper No. 0030</p> <p><b>Aptamer-Functionalized Delivery System for Osteogenic siRNAs to Achieve Osteoblast-Specific RNA Interference for Bone Anabolic Therapy</b></p> <p>Chao Liang, Baosheng Guo, Heng Wu, Lingqiang Zhang, Aiping Lu, Ge Zhang</p>	<p>Paper No. 0038</p> <p><b>Estimation Of Optimal Shoulder Orientation During The Acceleration Phase In Baseball Pitching From Minimal Shoulder Joint Load Viewpoint</b></p> <p>Hiroshi Tanaka, Toyohiko Hayashi, Hiroaki Inui, Yohei Takagi, Takanori Oi, Katsuya Nobuhara</p>	<p>Paper No. 0046</p> <p><b>Oral Administration of Losartan significantly Improves Muscle Healing after Compartment Syndrome-Like Muscle Injury</b></p> <p>Makoto Kobayashi, Yohei Kawakami, Takanobu Otsuka, Freddie H. Fu, Johnny Huard</p>
1:57 PM	<p>Paper No. 0031</p> <p><b>Macrophage-associated Osteoactivin/gpmb Mediates Mesenchymal Stem Cell Survival, Proliferation and Migration via a CD44-dependent Mechanism</b></p> <p>Bing Yu, Gregory Sondag, Christopher Malcuit, Min-Ho Kim, Faye F Safadi</p>	<p>Paper No. 0039</p> <p><b>Validation of MRI Quantification for Meniscus Volume Resection Following Partial Meniscectomy</b></p> <p>Shiree Segev, Brian T Feeley, Sharmila Majumdar, Richard B. Souza</p>	<p>Paper No. 0047</p> <p><b><math>\alpha</math>v Integrin Depletion Inhibits Profibrotic Cell Activation And Skeletal Muscle Fibrosis</b></p> <p>Iain R Murray, Zaniah Gonzalez, John Iredale, Hamish Simpson, Bruno Peault, Neil Henderson</p>
2:04 PM	<p>Paper No. 0032</p> <p><b>Therapeutic Inhibition Of Mir-214 By (asp-ser-ser)6-liposome Encapsulating Antagomir-214 In Osteogenic Cells For Promoting Bone Formation In Aged Osteoporotic Rats</b></p> <p>Baosheng Guo, Aiping Lu, Baoting Zhang, Ge Zhang</p>	<p>Paper No. 0040</p> <p><b>Identification Of An Evolutionarily Conserved Host Response Against IsdA And IsdB As A Virulence Factor Associated With Death In Patients With Staphylococcus aureus Musculoskeletal Infections</b></p> <p>Kohei Nishitani, Alexander F Rosenberg, Christopher A Beck, Hiromu Ito, Stephen L Kates, John L Daiss, Edward M. Schwarz</p>	<p>Paper No. 0048</p> <p><b>The Effect of Continuous and Local IL-4 Delivery on Systemic Macrophage Trafficking and Polyethylene Particle Induced Bone Loss</b></p> <p>Jukka Pajarinen, Taishi Sato, Tzu-hua Lin, Florence Loi, Ruth Zhang, Changchun Fan, Zhenyu Yao, Stuart B Goodman</p>

# SATURDAY | NIRA SESSIONS 1:15PM–2:15PM

Saturday, March 28, 2015

TIME	NIRA PRESENTATION 9 OA & Cartilage	NIRA PRESENTATION 10 Stem Cells & Tissue Repair
	Room # 118-120	Room # 121-122
<b>Moderators</b>	Susanna G. Chubinskaya, PhD and Anne-Marie Malfait, MD, PhD	Johnny Huard, PhD and Vicki Rosen, PhD
1:15 PM	<p>Paper No. 0049</p> <p><b>Mechanotransduction in Articular Chondrocytes: High-Strain Activates Piezo1 and Piezo2 Channels</b></p> <p>W. Lee, H. A. Leddy, Y. Chen, S. Lee, N. Zelenski, A. L. McNulty, J. Coles, J. Grandl, S. Zauscher, F. Sachs, W. Liedtke, F. Guilak</p>	<p>Paper No. 0057</p> <p><b>Wnt5a Treatment Of Embryonic Stem Cell Progenitors Promotes Cartilage Repair In A Rat Chondral Defect Model</b></p> <p>Jason D Gibson, Farhang Alaei, David N. Paglia, Ryu Yoshida, Thomas DeBerardino, Rosa Guzzo, Hicham Drissi</p>
1:22 PM	<p>Paper No. 0050</p> <p><b>Protective Mechanism Adopted by Chondrocytes through Unfolding of Surface Ruffles during Mechanical Compression</b></p> <p>Eng Kuan Moo, Walter Herzog</p>	<p>Paper No. 0058</p> <p><b>TGFβ1 Signalling in Human Mesenchymal Stem Cells is regulated by the Primary Cilium</b></p> <p>Marie-Noelle Labour, David Hoey</p>
1:29 PM	<p>Paper No. 0051</p> <p><b>Feasibility and Reproducibility of a Displacement Controlled MRI-Compatible Loading Device for Assessing Knee Articular Cartilage Deformation in Human Knees</b></p> <p>Hongsheng Wang, Matthew F Koff, Hollis Potter, Russell Warren, Scott Rodeo, Suzanne Maher</p>	<p>Paper No. 0059</p> <p><b>Intervertebral Disc Regeneration Using Mesenchymal Stem/Stromal Cells Transplanted Via The End-Plate Route in a Large Animal Model</b></p> <p>Gianluca Vadalà, Fabrizio Russo, Maria Musumeci, Francesca De Strobel, Marco Bernardini, Giulia De Benedictis, Luca Denaro, Domenico D'Avella, Rosaria Giordano, Vincenzo Denaro</p>
1:36 PM	<p>Paper No. 0052</p> <p><b>Legg-Calvé-Perthes Disease Produces Chronic Hip Synovitis and Elevation of Interleukin-6 in the Synovial Fluid</b></p> <p>Ryosuke Yamaguchi, Nobuhiro Kamiya, Naga Suresh Adapala, Elena Chen, David Neal, Hicham M Drissi, Harry Kim</p>	<p>Paper No. 0060</p> <p><b>Synovial Mesenchymal Stem Cells Enhance Healing of Meniscal Repair In The Avascular Zone of Longitudinal Tear Using A Pig.</b></p> <p>Yusuke Nakagawa, Takeshi Muneta, Shimpei Kondo, Masafumi Horie, Hideyuki Koga, Ichiro Sekiya</p>
1:43 PM	<p>Paper No. 0053</p> <p><b>Bone Marrow Stimulation Technique Augmented By Ultrapurified Alginate Gel Enhances Osteochondral Repair In A Rabbit Osteochondral Defect Model</b></p> <p>Rikiya Baba, Tomohiro Onodera, Daisuke Momma, Masatake Matsuoka, Kazutoshi Hontani, Norimasa Iwasaki</p>	<p>Paper No. 0061</p> <p><b>Total Disc Replacement Using Tissue Engineered Intervertebral Discs In An In-vivo Beagle Model</b></p> <p>Yu Moriguchi, Rodrigo Navarro, Peter Grunert, Jorge Mojica, Katherine Hudson, Thamina Khair, Marjan Alimi, Lawrence Bonassar, Roger Hartl</p>
1:50 PM	<p>Paper No. 0054</p> <p><b>Administrations Of Tenascin-c Delay Cartilage Degeneration In Murine Models Of Osteoarthritis</b></p> <p>Hironori Unno, Masahiro Hasegawa, Yuriyo Matsui, Yoshiaki Suzuki, Takahiro Iino, Toshimichi Yoshida, Akihiro Sudo</p>	<p>Paper No. 0062</p> <p><b>The Role of Prostanoid Receptor EP4 on Adhesion Formation in Flexor Tendon Healing - Differential Effects of Tendon-Specific Deletion Versus Systemic Antagonism</b></p> <p>Michael B Geary, Caitlin Orner, Fatima Bawany, Warren C Hammert, Regis J O'Keefe, Alayna E Loisel</p>
1:57 PM	<p>Paper No. 0055</p> <p><b>Endogenous Stores of Latent TGF-β Serve to Maintain the Integrity and Viability of Articular Cartilage Over Long Term Culture in Response to Physiologic and Excessive Dynamic Mechanical Loading</b></p> <p>Michael B Albro, Krista M Durney, Jay J Shim, Akaljit Singh, Gerard A Ateshian, Molly M Stevens</p>	<p>Paper No. 0063</p> <p><b>The Role of Hedgehog Signaling in Enthesis Healing</b></p> <p>Andrea G Schwartz, Leesa M Galatz, Stavros Thomopoulos</p>
2:04 PM	<p>Paper No. 0056</p> <p><b>The Synovial Lymphatic System Plays a Critical Role in the Pathogenesis of Osteoarthritis</b></p> <p>Hao Xu, Wensheng Wang, Echoe Bouta, Ronald Wood, Hengwei Zhang, Edward M. Schwarz, Micheal Zuscik, Yongjun Wang, Lianping Xing</p>	<p>Paper No. 0064</p> <p><b>Human, Muscle-derived Induced Pluripotent Stem Cells Loaded Onto Coral Scaffolds Are Osteoinductive In An Ectopic Mouse Model</b></p> <p>Karim Oudina, Joseph Paquet, Emmanuelle Massourides, Morad Bensedhoum, Nathanael Larochette, Peter Upeck, Mickael Descheppe, Delphine Logeart, Christian Pinset, Herve Petite</p>

# SUNDAY | MEETING HIGHLIGHTS Sunday, March 29, 2015

8:00AM-11:15AM

**ORS/OREF Basic Science Course: Part II\***  
Room 117

10:30AM-11:00AM

**Refreshment Break**  
Innovation Central/Marquee Ballroom

1:30PM-1:45PM

**Innovation Theater Presentation:  
AMTI**  
Refining Simulation in a  
Bio-fidelic Testing Environment  
Innovation Central/Marquee Ballroom

8:00AM-9:00AM

## SESSIONS

**Biomaterials for Bone Repair**  
Room 111-112

**Knee - Mechanics**  
Room 113-114

**Bone Necrosis**  
*Spotlight Session*  
Room 116

**Pain Pathways and Therapies  
in Experimental OA**  
*Spotlight Session*  
Room 118 - 120

**Tendon/Ligament Cell Biology**  
Room 121-122

9:00AM-6:00PM

**Poster and Exhibit Hall Open**  
Innovation Central/Marquee Ballroom

9:15AM-10:15AM

## SESSIONS

**Osteoblasts/Progenitor Cells**  
Room 111 - 112

**Total Hip Replacement  
Metal Wear Reactions**  
Room 113 - 114

**Imaging and Bone Healing**  
*Spotlight Session*  
Room 116

**Knee OA Repair**  
*Spotlight Session*  
Room 118-120

**Tendon/Ligament -  
Repair and Tissue Engineering**  
Room 121 - 122

10:45AM-11:00AM

**Innovation Theater Presentation:  
Micro Photonics**  
Advancements in Nano-Computed  
Tomography for Orthopedic Applications  
Innovation Central/Marquee Ballroom

11:15AM-12:30PM

**Kappa Delta, OREF, CORR®  
ORS Award Paper Presentations**  
Room 118 - 120

12:45PM-1:45PM

**Poster Walking Tours**  
Marquee Ballroom

**New Investigator Networking Session:  
An Inside Look at Research Funding  
Opportunities with the National  
Institutes of Health (NIH)**  
Room 115

**ORS Translational Research Symposium:  
Cartilage Repair: Is it Possible?**  
Room 121-122

12:45PM-5:00PM

**ORS Clinical Research Forum-  
The Basis for Clinical Decision Making  
in Orthopaedics**  
Room 116

1:00PM-1:15PM

**Innovation Theater Presentation:  
National Disease Research  
Interchange (NDRI)**  
Project-driven Human Biospecimen  
Service for Biomedical Research  
Innovation Central/Marquee Ballroom

2:00PM-3:30PM

## WORKSHOPS

**ORS/OTA - Systemic Inflammation  
and Organ Dysfunction  
in Multiply Injured Patients**  
*New Horizon Workshop*  
Room 113 - 114

**ORS/SOMOS - How an Integrated  
Orthosis and Rehabilitation Initiative  
has Improved Outcomes for Lower  
Extremity Limb Salvage Patients**  
Room 111 - 112

**Improving the Translational Success  
of Cell-Based Therapies**  
Room 118 - 120

**Professional Advancement Session:  
Finding a Partner in Research**  
Room 121 - 122

3:45PM-4:45PM

## SESSIONS

**Diagnostic Imaging:  
From Spine to Cartilage**  
Room 111 - 112

**Total Hip & Knee Replacement:  
Clinical Perspectives and Biomechanics**  
Room 113 - 114

**PTOA: Studies in Preclinical Models**  
*Spotlight Session*  
Room 118 - 120

**Spine Therapeutics**  
Room 121 - 122

# SUNDAY | MEETING HIGHLIGHTS CONT. Sunday, March 29, 2015

4:45PM-6:00PM

**Poster Reception I (authors present)**  
Innovation Central/Marquee Ballroom

7:00PM-10:00PM

**ORS Awards Gala Reception and Dinner**  
Vista Ballroom

## SUNDAY | PROGRAM DETAILS

### PAPER PRESENTATIONS

8:00 AM – 9:00 AM

*See page 32*

### PAPER PRESENTATIONS

9:15 AM – 10:15 AM

*See page 33*

### ORS/OREF BASIC SCIENCE COURSE PART II\*

8:00 AM – 11:15 AM (Continued from Saturday, *See page 17*)

Room 117

#### Part II: Musculoskeletal Pathophysiology

##### *Tissue Engineering in Orthopaedics*

Michael J Yaszemski, MD, PhD, Mayo Medical Center

##### *Bone Injury, Regeneration and Repair*

Ralph Marcucio, PhD, University of CA, San Francisco

##### *Molecular Basis of Cancer*

R Lor Randall, MD, University of Utah, Huntsman Cancer Institute

##### *Orthopaedic Infections*

Joseph C. Wenke, PhD, US Army Institute of Surgical Research

##### *Inflammation in the Musculoskeletal System*

Regis J O'Keefe, MD, Washington University, St. Louis

##### *Osteoporosis/Metabolic Bone*

Susan V Bukata, MD, University of CA, Los Angeles

##### *Post-Traumatic Osteoarthritis*

William Bugbee, MD, Scripps Clinic

##### *Implant Wear and Inflammatory Response*

Darryl D D'Lima, MD, PhD, Scripps Clinic

##### *Thromboembolic Disease and Fat Embolism Syndrome*

Vincent D. Pellegrini, Jr., MD, Medical University of South Carolina

*Pre-registration required*

Residents/Students/Associates: \$145; ORS and/or AAOS registrants: \$195; Non-Members: \$295

*All fees include: Orthopaedic Basic Science: Foundations of Clinical Practice textbook*

### BREAK

10:30 AM – 11:00 AM

Innovation Central/Marquee Ballroom

Visit with exhibitors and view posters in Innovation Central. Refreshments will be served.

### INNOVATION THEATER PRESENTATION:

#### Micro Photonics

**Advancements in Nano-Computed Tomography for Orthopedic Applications**

10:45 AM - 11:00 AM

Innovation Central/Marquee Ballroom

Learn how you can achieve unprecedented levels of clarity in bone-metal interfaces, obtain a high degree of accuracy in low density polymer scaffold images, and resolve submicron features in bone regeneration models. The new SkyScan 2211 brings you cutting-edge technology by combining nano and macro scale computer tomography in a single unit.

## GENERAL SESSION

**Kappa Delta, Orthopaedic Research & Education Foundation, and CORR®/ORS Richard A. Brand Award for Outstanding Orthopaedic Research Paper Presentations**

**11:15 AM - 12:30 PM**

Room 118 - 120



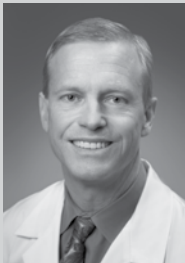
Robert L. Mauck, PhD, recipient of the **2015 Kappa Delta Young Investigator Award**

*Engineering Dense Connective Tissues: Mechanical, Material, and Mechanobiologic Considerations*



Steven A. Olson, MD, recipient of the **2015 Kappa Delta Ann Doner Vaughn Award**

*Early Inhibition of Proinflammatory Cytokines Prevents Post-Traumatic Arthritis: Insights from the Natural History of Arthritis Developing after Intra-Articular Fracture*



William D. Bugbee, MD, recipient of the **2015 Kappa Delta Elizabeth Winston Lanier Award**

*Osteochondral Allograft Transplantation in Cartilage Repair: Graft Storage Paradigm, Translational Models, and Clinical Applications*



Stuart Weinstein, MD, recipient of the **2015 OREF Clinical Research Award**

*The Evidence Base for the Prognosis and Treatment of Adolescent Idiopathic Scoliosis*



Edward M. Schwarz, MD, recipient of the **CORR® ORS Richard A. Brand Award for Outstanding Orthopaedic Research**

*A Multiplex Assay of Host Immunity against S. aureus for Osteomyelitis Patients*

## POSTER WALKING TOURS

**12:45 PM – 1:45 PM**

Innovation Central/Marquee Ballroom

### Poster Walking Tours Poster Session I

Tours will feature posters in the following topics: *(Authors may be present.)*

Biomaterials – Posters 0273, 0285 and 0286  
Bone Biology – Posters 0537, 0572, 0574 and 0589  
Bone Fracture – Posters 0633 and 0642  
Cancer/Tumors – Posters 1060 and 1069  
Cartilage, Synovium & Osteoarthritis – Poster 0435  
Diagnostic Imaging – Posters 1114 and 1119  
Hip and Knee Arthroplasty – Posters 0869 and 0970  
Infection – Posters 1044 and 1045  
Knee – Posters 0763, 0802 and 0811  
Meniscus – Poster 0459  
Muscle – Posters 0521, 0522 and 0523  
Spine – Poster 0759  
Tendon/Ligament – Poster 0500

Tours are subject to change. Check sign-up board in Marquee Ballroom for confirmation of tours.

## NEW INVESTIGATOR NETWORKING SESSION

**An Inside Look at Research Funding Opportunities with the National Institutes of Health (NIH)\***

**12:45 PM - 1:45 PM**

Room 115

Organizers:  
The New Investigator Mentoring Committee

Moderators:  
Jinxi Wang, MD, PhD  
Diana Glaser, PhD

This NIH Networking Session will provide ORS meeting attendees with an opportunity to better understand NIH funding policy through one-on-one personal interactions with NIH staff. This session will allow you to ask specific questions and participate in small group discussions with NIH grant review administrators and program officers. Get your questions answered and learn what funding opportunities are available and which grant mechanisms are right for you. The workshop will include representatives from NIAMS, NIA, NIDCR and NIH-CSR.



## ORS TRANSLATIONAL RESEARCH SYMPOSIUM CARTILAGE REPAIR: IS IT POSSIBLE?

12:45 PM – 1:45 PM

Room 121-122

Organizer:

The ORS New Initiatives Committee

Moderator:

George R. Dodge, PhD



This innovative program brings together speakers to present different views on the topic while inspiring attendees to continue the discussion and apply new ideas to their own research. This year, the topic of cartilage repair will be discussed from the point of view of an orthopaedic surgeon and a bioengineer. Both presentations will focus on innovative approaches to this perplexing clinical problem.

*A Physician-Scientist's Prospective:  
25 Years of Clinical Effort*

Kevin R. Stone, MD,  
The Stone Clinic (Above)



*Cracking the  
Cartilage Conundrum:*

*A Bioengineer's View*  
Gordana Vunjak-Novakovic, PhD,  
Columbia University (Below)

### *Sources of Uncertainty in Randomized Controlled Studies*

Roy K. Aaron, MD, Warren Alpert Medical School of Brown University

### *Changing Federal Regulations for Clinical Research*

Jennifer Racine, MBA, Warren Alpert Medical School of Brown University

### **Session II: Comparative Effectiveness Research**

Moderator: Kristy Weber, MD, University of Pennsylvania

#### *What is Comparative Effectiveness Research?*

James O. Sanders, MD, University of Rochester

#### *A Practical Approach to Determining Effectiveness in Treating Hip and Knee Arthritis*

David S. Jevsevar, MD, Intermountain Zion Orthopaedics & Sports Medicine

#### *From Gaps in Knowledge to Translation of Effectiveness to Patients with ACL Injuries*

Kevin G. Shea, MD, St. Luke's Clinic

### **Session III: Economic Analysis**

Moderators: Saam Morshed, MD, University of California and Kurt Spindler, MD, Cleveland Clinic Foundation

#### *Defining Effectiveness Evaluation, Comparative Effectiveness and Economic Analysis of Clinical Literature and Practice*

James Slover, MD, MS, NYU Hospital for Joint Diseases

#### *Basic and Definitions*

Amy M. Cizik, MPH, University of Washington

#### *Putting it All Together – the MOON experience*

Richard C. Mather, MD, Duke University

## ORS CLINICAL RESEARCH FORUM:

### **The Basis for Clinical Decision Making in Orthopaedics**

12:45 PM – 5:00 PM

Room 116

Organizer:

The ORS Clinical Research Committee  
Kurt Spindler, MD, Chair

The ORS Clinical Research Forum will bring together key clinical research leaders to discuss the design, evaluation and reporting of clinical studies. Furthermore they will discuss comparative effectiveness research and explore the emerging field of economic analysis.

#### **Session I: Design, Evaluation, and Reporting of Clinical Studies**

Moderator: Roy K. Aaron, MD, The Warren Alpert Medical School of Brown University

##### *Principals of Observational Studies*

Kurt P. Spindler, MD, Cleveland Clinic Foundation

##### *Design, Strengths, and Limitations of Observational Trials*

Morgan H. Jones, MD, MPH Cleveland Clinic for Sports Health

##### *Structure of Randomized, Controlled Studies*

Marc F. Swiontkowski, MD, University of Minnesota Medical Center

## INNOVATION THEATER PRESENTATION:

### **National Disease Research Interchange (NDRI)**

#### **Project-driven Human Biospecimen Service for Biomedical Research**

1:00 PM – 1:15 PM

Innovation Central/Marquee Ballroom

The National Disease Research Interchange (NDRI) is a 501(c)(3) not-for-profit, NIH-funded organization that provides project-driven human biospecimen service to academic and corporate scientists. NDRI has over 30 years of experience internationally distributing anatomical structures, organs, and tissues for biomedical research. Please by stop to discuss how our programs can help advance your research.

## INNOVATION THEATER PRESENTATION:

### AMTI

#### Refining Simulation in a Bio-fidelic Testing Environment

1:30 PM – 1:45 PM

Innovation Central/Marquee Ballroom

The past decade has seen a shift in the type of failure modes and thus an evolution of the functional evaluation of prosthetic designs. True simulation of the complexity of the surrounding joint tissues, kinematics and kinetics relevant to the patient, is the focus of this presentation. We will be highlighting the importance of testing joint implants in a more bio-fidelic environment and how this will set the testing benchmark for potential failure modes improving the implant's function and durability.

## WORKSHOPS

2:00 PM – 3:30 PM

### New Horizon Workshop: ORS/OTA - Systemic Inflammation and Organ Dysfunction in Multiply Injured Patients

Room 113 - 114

Organizer:

Todd McKinley, MD, Indiana University Methodist

Multiply injured patients sustaining major orthopaedic injuries are at risk to develop sustained high magnitude inflammation and organ dysfunction. Evidence continues to accumulate demonstrating that endogenous inflammation secondary to tissue damage and ischemia plays a central pathoetiologic role in propagating inflammation leading to organ dysfunction. This workshop will highlight scientific progress in understanding the mechanisms causing systemic inflammation and to discuss the clinical significance of basic scientific progress.

#### *Systemic Inflammation and Organ Dysfunction: Clinical Manifestations in Multiple Injured Patients Sustaining Major Fractures*

H. Christopher Pape, MD, University of Aachen

#### *Molecular Mechanisms of Systemic Inflammation in Multiply Injured Patients*

Timothy R. Billiar, MD, University of Pittsburgh Medical Center

#### *Therapeutic Interventions: Pre-Clinical Models to Treat Systemic Inflammation and Damaged Associated Molecular Patterns*

Todd McKinley, MD, Indiana University Methodist

### ORS/SOMOS - How an Integrated Orthosis and Rehabilitation Initiative has Improved Outcomes for Lower Extremity Limb Salvage Patients

Room 111 - 112

Organizers:

Daniel J. Stinner, MD, United States Army

Benjamin K. Potter, MD, Walter Reed National Military Medical Center



High-energy lower extremity trauma is common during military combat. Only recently have studies begun to evaluate the outcomes of those service members who have chosen a limb salvage instead of an amputation. A custom energy-storing ankle-foot orthosis (Intrepid Dynamic Exoskeletal Orthosis, IDEO) was developed at our institution to be used in conjunction with a high-intensity rehabilitation program (Return to Run Clinical Pathway, RTR) designed to return injured service members to pre-injury, high-level physical activities. The purpose of this workshop is to highlight the outcomes, future research directives, and clinical applications of the IDEO and RTR. Multiple research studies have been conducted to evaluate the effectiveness of the IDEO and the RTR to evaluate the efficacy, utilization, and benefits of the IDEO and RTR. This workshop will help the audience understand the biomechanics behind the IDEO, physiology behind the RTR, the effective ways both have been used to improve the clinical outcomes of our severely wounded service members and the future applications of both innovations.

#### *The Return to Run Pathway - The Physiology of a Successful Rehabilitation Program*

Johnny Owens, CPT, Brooke Army Medical Center

#### *The Clinical Effects of Return to Run Pathway and IDEO on Patient Outcomes*

Daniel J. Skinner, MD, United States Army

#### *The Biomechanics of the IDEO: How Does it Work?*

Jason M. Wilken, PhD, United States Army



# ORS GRANTS THE ORS WOULD LIKE TO CONGRATULATE ALL GRANT RECIPIENTS!

## ORS Collaborative Exchange Grant

The ORS Collaborative Exchange Grants foster orthopaedic research by supporting interaction between research institutions. This grant, of up to \$7,500, provides investigators at any stage of their career an opportunity to visit a research lab for the purpose of collaboration and knowledge exchange.

### 2015 Recipients:



Dominik R. Haudenschild, PhD



Virginia Ferguson, PhD

## ORS/RJOS Young Female Investigator Travel Grant

The ORS/RJOS Young Female Investigator Travel Grant promotes and supports young female investigators in the field of orthopaedic research. This \$1,000 grant represents the synergy of female leadership in the act of inspiring the younger generation of women in the field. The RJOS and WLF/ORS will present one travel award to a young female trainee whose abstract is accepted to an ORS annual Meeting.

### 2015 Recipient:



Chantal M. de Bakker

**FOR MORE INFORMATION ON ORS GRANTS, ELIGIBILITY AND DEADLINES, PLEASE VISIT**

<http://www.ors.org/early-careernew-investigators-awards/>



## Improving the Translational Success of Cell-Based Therapies

Room 118 - 120

### Organizers:

Jennifer J. Bara, PhD, AO Research Institute  
Marietta Herrmann, PhD, AO Research Institute  
Geoff Richards, PhD, AO Research Institute

This workshop will address the clinical, scientific, and industrial requirements for the successful translation of cell-based therapies into both the clinic and market with an emphasis on educating investigators new to the translational process. By identifying current challenges and ascertaining the perceptions and needs of future investigators, we will make suggestions and encourage workshop participants to put forward innovative ideas on how to improve our rates of translational success in the future.

### *Clinical Considerations for Translational Success*

Theodore Miclau, MD, University of California, San Francisco

### *Scientific Considerations for Translational Success*

Christopher H. Evans, PhD, Mayo Clinic

### *Industrial Considerations for Translational Success*

Anthony Ratcliffe, PhD, Synthasome, Inc.

## PROFESSIONAL ADVANCEMENT SESSION

### Finding a Partner in Research

**2:00 PM - 3:30 PM**

Room 121 - 122

### Organizer:

The ORS Corporate Affairs Committee

### Moderators:

Jeremy Rawlinson, PhD  
Michael Ominsky, PhD

Collaboration is one hallmark of good research and research is strengthened when it is collaborative. Most challenging research problems are multi-disciplinary and multi-factorial. This requires researchers to reach outside their core expertise to make common connections. Why is it important to collaborate? What are the best ways to find a partner in research? These and other questions will be considered in this workshop. Participants will learn about modern tools that assist in the collaborative process, understand the impact of collaboration on advancing science and obtaining grant funding, and compare collaborative approaches from both academic and industrial perspectives.

### *Importance of Collaboration in Academia*

Jeff Lotz, PhD, UCSF, CA

### *The ORS and its Role in Encouraging Collaboration*

Tammy L. Haut Donahue, PhD, Colorado State University

### *Collaboration Between Industry and Academia: Guidelines for a Successful Relationship*

Dick Tarr, MS, Kannapolis, NC

## PAPER PRESENTATIONS

**3:45 PM – 4:45 PM**

See page 34

## POSTER RECEPTION I

**4:45 PM – 6:00 PM**

Marquee Ballroom

Poster Session I presenters should be available at their posters during this reception to answer questions.

Poster Session I removal is 6:00 PM – 6:30 PM

## ORS AWARDS GALA

**7:00 PM – 10:00 PM**

Vista Ballroom

Join us for an elegant evening honoring these outstanding leaders in the Orthopaedic Research Community: The recipients of the William Harris Award, Marshall Urist Award, Alfred Shands Award, Kappa Delta Research Awards, OREF Clinical Research Award, CORR® ORS Richard A. Brand Award for Outstanding Research ORS/OREF Distinguished Investigator Award, ORS Women's Leadership Award, the ORS New Investigator Recognition Awards (NIRA), the ORS Outstanding Achievement in Mentoring Award and the ORS Video Outreach Competition Awards.

New this year, The ORS New Initiatives Committee will be holding a Silent Auction during the Gala to benefit orthopaedic research and the ORS/OREF Grants Campaign.

*Pre-registration required*

\$115 ORS Members/\$125 Non-Members/  
\$1,000 for a table of 10

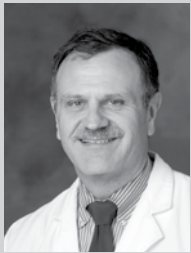
# CONGRATULATIONS TO ALL OF THE 2015 AWARD RECIPIENTS



## 2015 Kappa Delta Young Investigator Award

Robert L. Mauck, PhD,  
University of Pennsylvania  
Co-Authors: Dawn

M. Elliott, PhD and Jason A. Burdick, PhD Engineering Dense **Connective Tissues: Mechanical, Material, and Mechanobiologic Considerations**



## 2015 Kappa Delta Ann Doner Vaughan Award

Steven A. Olson, MD,  
Duke University  
Co-Authors: Farshid Guilak, PhD, Virginia Kraus, MD, PhD,

Bridgette Furman, BS, and Janet Huebner, MS

**Early Inhibition of Proinflammatory Cytokines Prevents Post-Traumatic Arthritis: Insights from the Natural History of Arthritis Developing after Intra-Articular Fracture**



## 2015 Kappa Delta Elizabeth Winston Lanier Award

William D. Bugbee, MD,  
Scripps Clinic  
Co-Authors: Andrea L. Pallante-Kichura, PhD,

Simon Görtz, MD, Robert Sah, MD, ScD, and David Amiel, PhD

**Osteochondral Allograft Transplantation in Cartilage Repair: Graft Storage Paradigm, Translational Models, and Clinical Applications**



## 2015 OREF Clinical Research Award

Stuart L. Weinstein, MD,  
University of Iowa  
Co-Author: Lori A. Dolan, PhD

**The Evidence Base for the Prognosis and Treatment of Adolescent Idiopathic Scoliosis**



## 2015 CORR® ORS Richard A. Brand Award for Outstanding Orthopaedic Research

Edward M. Schwarz, PhD,

University of Rochester

**A Multiplex Assay of Host Immunity against S. aureus for Osteomyelitis Patients**



## Women's Leadership Forum Award

Marjolein van der Meulen, PhD,  
Cornell University



## Alfred R. Shands, Jr., MD Award

Linda Sandell, PhD,  
Washington University in St. Louis



## 2015 Video Outreach Competition First Place

Emily Hargrave-Thomas

**The Rhythm of the Joints**



## 2015 Video Outreach Competition Second Place

Nico Verdonschot, PhD

**TLEMsafe Patient-Specific Surgical Navigation**



## ORS/OREF Distinguished Investigator Award

Adele Boskey, PhD,  
Hospital for Special Surgery



## ORS William H. Harris, MD Award

Marco Caicedo, PhD,  
Orthopedic Analysis, LLC



## ORS Marshall R. Urist, MD Award

Mauro Alini, PhD,  
AO Research Institute Davos



## ORS Outstanding Achievement in Mentoring Award

Dawn Elliott, PhD,  
University of Delaware



## ORS Outstanding Achievement in Mentoring Award

Steven A. Goldstein, PhD,  
University of Michigan



## AAOS Women's Health Issues Advisory Board Award

Douglas J. Adams, PhD,  
University of Connecticut Health

# SUNDAY | SESSIONS 8:00AM–9:00AM Sunday, March 29, 2015

TIME	SESSION 11 Biomaterials for Bone Repair	SESSION 12 Knee Mechanics	SPOTLIGHT SESSION 13 Bone Necrosis	SPOTLIGHT SESSION 14 Pain Pathways & Therapies in Experimental OA	SESSION 15 Tendon/Ligament Cell Biology
	Room # 111-112	Room # 113-114	Room # 116	Room # 118-120	Room # 121-122
<b>Moderators</b>	Joel Boerckel, PhD and Fergal J. O'Brien, PhD	Sally Arno, PhD and Helen E. Kambic, PhD	Lee E. Rubin, MD and Claudia Loebel, MD	C. Wayne McIlwrath, DVM, PhD and Kyle D. Allen, PhD	Hani A. Awad, PhD and Nelly Andarawis-Puri, PhD
8:00 AM	<p>Paper No. 0065</p> <p><b>Response to Laser Sintered 3D Porous Trabecular Titanium Constructs Occurs in a Cell Maturation Dependent Manner</b></p> <p>Alice Cheng, Aiza Humayun, Barbara D. Boyan, Zvi Schwartz</p>	<p>Paper No. 0071</p> <p><b>Trochlea Morphology Is Correlated With Proximal Femur Geometry.</b></p> <p>Tim A.E.J. Boymans, Samantha J. Wright, Bernd Grimm, Anthony W. Miles, Oliver Kessler</p>	<p>Paper No. 0077</p> <p><b>Factors In The Necrotic Bone Mediate Uncoupled Bone Remodeling By Increasing Migration And Differentiation Of Osteoclast Precursors And Decreasing The Expression Of Osteogenic Coupling Factors From Osteoclasts Following Ischemic Osteonecrosis Of The Femoral Head</b></p> <p>Naga Suresh Adapala, Ryosuke Yamaguchi, Simone Arvisais-Anhalt, Olumide Aruwajoye, Matthew Phipps, Harry Kim</p>	<p>Spotlight Speaker</p> <p>Anne-Marie Malfait, MD, PhD</p> 	<p>Paper No. 0083</p> <p><b>Disruption of TGFβ Signaling in the Scx Cell-lineage Leads to Tenocyte Dedifferentiation and Tendon Degeneration</b></p> <p>Guak-Kim Tan, Anna G Stabio, Brian A Pryce, Doug R Keene, Ronen Schweitzer</p>
8:10 AM	<p>Paper No. 0066</p> <p><b>Novel In-Situ Setting Bioglass based Calcium Phosphate Bone Cements.</b></p> <p>Melanie J Coathup, Niall Kent, Robert Hill, Roberta De Godoy, Wen-Yu Quak, Lyris Onwordi, Gordon W Blunn</p>	<p>Paper No. 0072</p> <p><b>Repetitive Stress Cycle Numbers Greater Than Physiologic Decrease Tibial Metaphyseal Bone Volume and Density In Growing Knees</b></p> <p>Austin V. Stone, David L Glos, Aron Berz, Kevin Little, Donita I Bylski-Austrow, Eric J. Wall</p>	<p>Paper No. 0078</p> <p><b>Genome Wide Association Study Of Osteonecrosis Of Femoral Head In The Korean</b></p> <p>Seung-Hoon Baek, Tae-Ho Kim, Jun Young Kim, Shin-Yoon Kim</p>	<p>Pain Pathways in Experimental</p>	<p>Paper No. 0084</p> <p><b>Adult Mesenchymal Stem Cells Mimic Embryonic Tendon Progenitor Cell Responses to Tendon Development Factors</b></p> <p>Jeffrey P Brown, Thomas V Galassi, Catherine K Kuo</p>
8:20 AM	<p>Paper No. 0067</p> <p><b>The effect of local delivery of Iron Chelators on Bone Regeneration and Osteoclast Mediated Bioceramic Bone Graft Resorption.</b></p> <p>Justin Drager, Zeeshan Sheikh, Yu Ling Zhang, Abhishek Kumar, Edward Harvey, Jake Barralet</p>	<p>Paper No. 0073</p> <p><b>Novel In Vivo Micro-Computed Tomography Metrics of Joint Incongruity Predict Arthritis in a Knee Fracture Model</b></p> <p>Tyler J Vovos, Bridgette D Furman, Kelly A Kimmerling, Gangadhar Utturkar, Louis E DeFrate, Farshid Guilak, Steven A Olson</p>	<p>Paper No. 0079</p> <p><b>A Combined Treatment of Gene-Modified Stem Cells and Oxygenated Scaffolds for Scapoid Nonunion with Avascular Necrosis</b></p> <p>Wafa Tawackoli, Doron Cohn Yakubovich, David Kulber, Dan Gazit, Zulma Gazit</p>		<p>Paper No. 0085</p> <p><b>Sox9-lineage Cells Are Activated And Recruited During Neonatal Tendon Healing</b></p> <p>Kristen Howell, Ronen Schweitzer, Alice H Huang</p>
8:30 AM	<p>Paper No. 0068</p> <p><b>Extrinsic-based Three-dimensional Printing Of Porous Bone Extracellular Matrix Scaffolds</b></p> <p>Ben P Hung, Joshua P Temple, Vincent Beachley, Jennifer H Elisseeff, Warren L Grayson</p>	<p>Paper No. 0074</p> <p><b>Gait Comparison of Bicruciate Retaining and Cruciate Sacrificing Knee Arthroplasties Using Machine Learning</b></p> <p>Gareth G Jones, Margarita Kotti, Ruairaidh Collins, Justin Cobb</p>	<p>Spotlight Speaker</p> <p>Edward J. Harvey, MD, FRCS</p> 	<p>Paper No. 0080</p> <p><b>A Novel, Locally Delivered TrkA Inhibitor for the Treatment of Joint Pain: Efficacy in Preclinical Models of Arthritis</b></p> <p>Carl R Flannery, Nance Moran, Dominick Blasoli, Kerry Donahue, John Kane, Tatiana Gladysheva, Rafiq Dagher, Rick Fang, Anna Vardanyan, Dinesh Bangari, Chris Ho, Andre Bourque, Michael Santos, Michael Philbrook, Gloria L Matthews</p>	<p>Paper No. 0086</p> <p><b>The Cellular and Matrix Dynamics of Entesis Growth</b></p> <p>Nathaniel A Dyment, Andrew P Breidenbach, Andrea G Schwartz, Ryan P Russell, Lindsey Aschbacher-Smith, Han Liu, Yusuke Hagiwara, Rulang Jiang, Stavros Thomopoulos, David L Butler, David W Rowe</p>
8:40 AM	<p>Paper No. 0069</p> <p><b>Accelerated Neutral Atom Beam Processing Improves PEEK In Vivo Osseointegration</b></p> <p>Joseph Khoury, Cathy Tkaczyk, Art Kurz, James Bachand, Richard Svruga, Michel Assad</p>	<p>Paper No. 0075</p> <p><b>Joint Residual Luxity and Increased Cartilage Contact Deformation in ACL Reconstructed Knees</b></p> <p>Ali Hosseini, Guoan Li</p>	<p><b>Avascular Necrosis : Not Just Bone Death Anymore</b></p>	<p>Paper No. 0081</p> <p><b>Intra-Articular Depot Delivery of Curcumin Attenuates Pain and Dysfunction in a Rat Model of Osteoarthritis</b></p> <p>Richard D Bell, Robby D Bowles, Timothy K Mwangi, Lori A Setton, Samuel B Adams</p>	<p>Paper No. 0087</p> <p><b>Insulin Target Tissue: Impaired Flexor Tendon Gliding and Attenuated Insulin Receptor Signaling in a Murine Model of Type II Diabetes Mellitus</b></p> <p>Fatima Bawany, Michael Geary, Caitlin Orner, Michael J Zuscik, Robert A Mooney, Alayna E Loisel</p>
8:50 AM	<p>Paper No. 0070</p> <p><b>Local Delivery Of Mutant Mcp-1 Protein Reduced Osteolysis Induced By Wear Particles Orthopaedic Implant Wear Particles In Vivo</b></p> <p>Xinyi Jiang, Taishi Sato, Michael Keeney, Zhenyu Yao, Kensuke Egashira, Stuart Goodman, Fan Yang</p>	<p>Paper No. 0076</p> <p><b>Walking Decreases T1rho Relaxation Times in the Articular Cartilage of the Knee</b></p> <p>Lindsey C. Michel, Charles E Spritzer, Gangadhar M. Utturkar, Sophia Y Kim, Claude T. Moorman, William E. Garrett, Louis E DeFrate</p>		<p>Paper No. 0082</p> <p><b>Absence of CC - Chemokine Receptor 7 (CCR7) is Linked to Reduced Structural and Functional Manifestations of Knee Osteoarthritis in a Murine Model</b></p> <p>Carla R Scanzello, Justin Gan, Vu T. Nguyen, Charles A Bush-Joseph, Nikhil N Verma, Susanna G Chubinskaya, Anne-Marie Malfait, George R Dodge</p>	<p>Paper No. 0088</p> <p><b>microRNA and Associated Tissue Remodeling Genes in Rotator Cuff Repair - A Rat Model</b></p> <p>Erik Contreras, Fuxin Wei, Michael Khazzam, Christopher Chen</p>

TIME	SESSION 16 Progenitor Cells	SESSION 17 Total Hip Replacement Metal Wear Reactions	SPOTLIGHT SESSION 18 Imaging and Bone Healing	SPOTLIGHT SESSION 19 Knee OA Repair	SESSION 20 Tendon/Ligament Repair & Tissue Engineering
	Room # 111-112	Room # 113-114	Room # 116	Room # 118-120	Room # 121-122
<b>Moderators</b>	Jinxi Wang, MD, PhD and Nicola Partridge, PhD	Michael M. Morlock, PhD, Claire Brockett, PhD	Jeffrey S. Nyman, PhD and Simon Tang, PhD	Louis E. DeFrate, PhD and Bingyun Li, PhD	Stavros Thomopoulos, PhD and Chunfeng Zhao, MD
9:15 AM	<p>Paper No. 0089</p> <p><b>Mechanical Loading Attenuates Radiation-Induced Bone Loss in Bone Marrow Transplanted Mice</b></p> <p>Peter M Govey, Henry J Donahue</p>	<p>Paper No. 0095</p> <p><b>One Third of 395 Failed MOM-THR Hips have Severely Corroded Taper Junctions: An Elevated Blood Co/Cr Ratio is a Biomarker for this</b></p> <p>Harry Hothi, Reshid Berber, Robert Whittaker, Kevin Ilo, Jay Meswania, Gordon Blunn, John Skinner, Alistair Hart</p>	<p>Spotlight Speaker</p> <p>Elise F. Morgan, PhD</p>  <p><b>Image Assessments of the Biomechanics and Biology of Bone Healing</b></p>	<p>Paper No. 0104</p> <p><b>Within Subject Changes To Tibial Articular Cartilage Thickness 4-5 Years Post Ac-injury</b></p> <p>Erin C Argentieri, Daniel R. Sturnick, Mack Gardner-Morse, Mike DeSarno, Timothy W. Touville, Michael P Wright, James R. Slaughterbeck, Robert J. Johnson, Bruce D. Beynnon</p>	<p>Paper No. 0107</p> <p><b>Surface Modification with Chemically Modified Synovial Fluid for Flexor Tendon Reconstruction in a Canine Model In Vivo</b></p> <p>Xiaoxi Ji, Ramona L Reisdorf, Andrew R Thoreson, Steven L Moran, Gregory D Jay, Kai-Nan An, Peter C Amadio, Chunfeng Zhao</p>
9:25 AM	<p>Paper No. 0090</p> <p><b>Oxygen Tension Regulates Human Mesenchymal Stem Cell (hmsc) Paracrine Functions</b></p> <p>Joseph Paquet, Mickael Deschepere, Adrien Moya, Delphine Logeart-Avramoglou, catherine Boisson-Vidal, Herve Petite</p>	<p>Paper No. 0096</p> <p><b>What is the Prevalence of "Asymptomatic Pseudotumours" in THA Patients with Corrosion of Dual Taper Modular Femoral Stem?</b></p> <p>Young-Min Kwon, Tsung-Yuan Tsai, William Leone, Guoan Li, Andrew A Freiberg, Harry E Rubash</p>		<p>Paper No. 0105</p> <p><b>Whole Blood Stimulates ACL Repair in Pigs as Effectively as Mesenchymal Stem Cells</b></p> <p>Benedikt L Proffen, Patrick Vavken, Braden C Fleming, Carla M Haslauer, Chad Harris, Jason T Machan, Martha M Murray</p>	<p>Paper No. 0108</p> <p><b>Harnessing Endogenous Stem/Progenitor Cells For Tendon Regeneration</b></p> <p>Chang H Lee, Kristy Kao, Yena Jun, David Joo, Jeremy Mao</p>
9:35 AM	<p>Paper No. 0091</p> <p><b>Early Identification and Characterization of Colony Founding Connective Tissue Progenitors</b></p> <p>Edward Kwee, Kimerly Powell, George Muschler</p>	<p>Paper No. 0097</p> <p><b>The Immune Response in Patients with Adverse Reactions to Metal Debris</b></p> <p>Masahiro Hasegawa, Shinichi Miyazaki, Takahiro Iino, Noriki Miyamoto, Hiroki Wakabayashi, Akihiro Sudo</p>		<p>Paper No. 0106</p> <p><b>ACL Degeneration As An Early Marker Of Future Osteoarthritic Changes In The Knee</b></p> <p>Eric Duerr, Ata A Rahnemai-azar, Freddie H. Fu, James J Irrgang</p>	<p>Paper No. 0109</p> <p><b>Enhancement of Achilles Tendon Repair Viscoelasticity with Blockade of Matrix Metalloproteinase</b></p> <p>Jolanta Norelli, John Schwartz, Mark Drakos, Nadine Chahine, Daniel Grande</p>
9:45 AM	<p>Paper No. 0092</p> <p><b>Activating Canonical Wnt/<math>\beta</math>-catenin Pathway Enhances DNA Repair and Promotes Cell Survival in Osteoblasts: a Novel Anabolic Treatment for Radiotherapy Associated Bone Damage</b></p> <p>Abhishek Chandra, Tiao Lin, Wei-Ju Tseng, Ji Zhu, Keith Cengel, Bing Xia, X. Sherry Liu, Ling Qin</p>	<p>Paper No. 0098</p> <p><b>Damage-associated Molecular Patterns (damps) Of Toll-like Receptors In Aseptic Loosened Total Hip Arthroplasty</b></p> <p>Yasunobu Tamaki, Yuya Takakubo, Tomoyuki Hirayama, Hiroharu Oki, Yasushi Naganuma, Kan Sasaki, Stuart B Goodman, Yrjö T Konttinen, Michiaki Takagi</p>	<p>Paper No. 0101</p> <p><b>Modification Of En Bloc Staining And Clearing Techniques For Improved 3D Imaging Of Musculoskeletal Cell Properties In Situ</b></p> <p>Ian Berke, Melanie Smith, Christopher Price</p>	<p>Spotlight Speaker</p> <p>Ichiro Sekiya, MD, PhD</p>  <p><b>Synovial Mesenchymal Stem Cells to Repair/Reverse Knee OA: From Bench to Clinic</b></p>	<p>Paper No. 0110</p> <p><b>Alteration In Neuronal Signaling During Diabetic Tendon Repair: A Study In Rat</b></p> <p>Paul W Ackermann, Aisha Ahmed, Jian Li, Mahmood Ahmed, Claes-Göran Östenson, Carol Hewitt, Paul T Salo, David A Hart</p>
9:55 AM	<p>Paper No. 0093</p> <p><b>The Role of Transduced Bone Marrow Cells Over-Expressing BMP-2 in Healing Critical Sized Defects in a Mouse Femur</b></p> <p>Michael J Pensak, Seung-Hyun Hong, Alex G Dukas, Brian Tinsley, Hicham M Drissi, Amy Tang, Mark Cote, Osamu Sugiyama, David W Rowe, Jay Lieberman</p>	<p>Paper No. 0099</p> <p><b>Females with Painful TJAs Exhibit a Higher Incidence and Severity of Hypersensitivity to Implant Metals Compared to Males: Implications for Sex Differences in Risk of Implant Failure</b></p> <p>Marco Caicedo, Edward Solver, Latasha Coleman, Nadim Hallab</p>	<p>Paper No. 0102</p> <p><b>Multi-modal Imaging For Structure-Function Characterization Of Periosteum's Smart Properties</b></p> <p>Renee Whan, Joanna L. Ng, Ulf Knothe, Melissa Knothe Tate</p>		<p>Paper No. 0111</p> <p><b>The Effect of Sex on the Biomechanical Outcomes of Bio-enhanced Anterior Cruciate Ligament Repair: A Large Animal Pre-clinical Study</b></p> <p>Ata M Kiapour, Braden C Fleming, Martha M Murray</p>
10:05 AM	<p>Paper No. 0094</p> <p><b>Macrophage Migration Inhibitory Factor Regulates Senescence of Human Mesenchymal Stem Cells under Hypoxia</b></p> <p>SunMi Palumbo, Tsung-Lin Tsai, Wan-Ju Li</p>	<p>Paper No. 0100</p> <p><b>Will New Metal Heads Restore the Mechanical Integrity of Corroded Trunnions at Revision THR?</b></p> <p>Philip C Noble, Aditya Derasari, Jonathan E Gold, Jerry Alexander, Sangwoo Kim, Stephen Incavo</p>	<p>Paper No. 0103</p> <p><b>Fatigue Failure in Cancellous Bone is Primarily Due to Propagation of Microdamage from Pre-existing Microdamage Sites</b></p> <p>Ashley M Torres, Jonathan B. Matheny, Marysol Luna, Clare M Rimnac, Christopher J Hernandez</p>		<p>Paper No. 0112</p> <p><b>Elongation Of The Anteromedial And Posterolateral Bundles Of The Acl During Hyper-extension Of The Knee: Implication To Double-bundle Acl Reconstruction</b></p> <p>Yong Feng, Tsung-Yuan Tsai, Jing-Sheng Li, Xudong Liu, Hai Hu, Changqing Zhang, Guoan Li</p>

SUNDAY

# SUNDAY | SESSIONS 3:45PM–4:45PM Sunday, March 29, 2015

TIME	SESSION 21 Diagnostic Imaging: From Spine to Cartilage	SESSION 22 Total Hip & Knee Replacement: Clinical Perspectives and Biomechanic	SPOTLIGHT SESSION 23 PTOA; Studies in Preclinical Models	SESSION 24 Spine Therapeutics
	Room # 111-112	Room # 113-114	Room # 118-120	Room # 121-122
<b>Moderators</b>	Simo Saarakkala, PhD and Melissa L. Knothe Tate, PhD	J. Mark Wilkinson, PhD (FRCS) and Mario Lamontagne, PhD	Christopher B. Little, DVM and Dominik R. Haudenschild, PhD	Koichi Masuda, MD and Nadeen O. Chahine, PhD
3:45 PM	<p>Paper No. 0113</p> <p><b>qMRI T2 Texture Change To Articular Cartilage In Humans Over 6 Months Predicts Change To Knee Health And Cartilage Thickness Over 2 Years Following ACL Injury And Reconstruction</b></p> <p>Ashley A Williams, Carl S Winalski, Constance R Chu</p>	<p>Paper No. 0119</p> <p><b>Total Joint Arthroplasty in Smokers: Should We Wait for Patients to Quit Before Operating?</b></p> <p>Andrew James Pugely, Christopher Martin, Yubo Gao, Melissa Willenborg, Kyle Duchman, John Callaghan</p>	<p>Spotlight Speaker</p> <p>Donald D. Anderson, PhD</p> 	<p>Paper No. 0128</p> <p><b>Anti-Inflammatory Effect of Hepatocyte Growth Factor in Acute Phase of Spinal Cord Injury</b></p> <p>Kentaro Yamane, Yohei Kagawa, Kensuke Shinohara, Noriyuki Watanabe, Aki Yoshida, Akihiro Matsukawa, Toshifumi Ozaki</p>
3:55 PM	<p>Paper No. 0114</p> <p><b>Changes in Tibiofemoral Gait Kinematics Are Associated with Regional Cartilage Morphological Changes</b></p> <p>Eric Thorhauer, Kimberly Sass, Andrew Sivaprakasam, James J Irrgang, Freddie H. Fu, Scott Tashman</p>	<p>Paper No. 0120</p> <p><b>Clinically Anchored Benchmarks for Gait Improvement after Total Hip Arthroplasty</b></p> <p>Kharna C Foucher</p>	<p><b>Progress Toward Better Understanding, Predicting, and Preventing Post-Traumatic OA</b></p>	<p>Paper No. 0129</p> <p><b>Low-energy Extracorporeal Shock Wave Therapy Promotes VEGF Expression and Angiogenesis and Improve Locomotor and Sensory Functions after spinal cord injury</b></p> <p>Kenichiro Yahata, Hiroshi Ozawa, Haruo Kanno, Seiji Yamaya, Satoshi Tateda, Kenta Ito, Hiroaki Shimokawa, Eiji Itoi</p>
4:05 PM	<p>Paper No. 0115</p> <p><b>The Relationship Between Cartilage And Subchondral Bone And Their Effect On The Mechanical Properties Of Human Metacarpophalangeal Joint Cartilage</b></p> <p>Daniel Ellis, Ben Lakin, Joshua Shelofsky, Mark Grinstaff, Brian Snyder</p>	<p>Paper No. 0121</p> <p><b>Modern Implants Facilitate Enhanced Patient Outcomes: Results of A Prospective Double-Blind Randomised Controlled Trial</b></p> <p>David F Hamilton, Hamish Simpson, Colin R Howie, Richard Burnett, James T Patton, Matthew Moran, Paul Gaston</p>		<p>Paper No. 0130</p> <p><b>Annulus Fibrosus Cells And II-1beta Independently Regulate 3d Axonal Outgrowth From The Cultured Dorsal Root Ganglions (DRG)</b></p> <p>Hyunchul Kim, Sameer B. Shah, Adam H Hsieh</p>
4:15 PM	<p>Paper No. 0116</p> <p><b>Digital Tomosynthesis and High Resolution Computed Tomography as Clinical Tools for Vertebral Endplate Topography Measurements: Comparison with Microcomputed Tomography</b></p> <p>Daniel Oravec, Abrar Quazi, Angela Xiao, Ellen Yang, Michael J Flynn, Yener N Yeni</p>	<p>Paper No. 0122</p> <p><b>Ti-33.6Nb-4Sn Alloy Femoral Stem With Gradation of Young's Modulus Reduces Stress Shielding After Total Hip Arthroplasty: A Biomechanical Study</b></p> <p>Go Yamako, Etsuo Chosa, Koji Totoribe, Shuji Hanada, Norikazu Yamada, Eiji Itoi</p>	<p>Paper No. 0125</p> <p><b>Nanomechanical Symptoms in Cartilage Precede Histological Osteoarthritis Signs after the Destabilization of Medial Meniscus in Mice</b></p> <p>Basak Doyran, Wei Tong, Qing Li, Haoruo Jia, Xianrong Zhang, Motomi Enomoto-Iwamoto, Ling Qin, Lin Han</p>	<p>Paper No. 0131</p> <p><b>Changes In Synaptic Transmission Of Substantia Gelatinosa Neurons In A Rat Model Of Lumbar Radicular Pain</b></p> <p>Yoshinori Terashima, Tsuyoshi Miyakawa, Tsuneko Takebayashi, Izaya Ogon, Toshihiko Yamashita</p>
4:25 PM	<p>Paper No. 0117</p> <p><b>High Field MRI Studies Demonstrate Differences in Vascular Architecture in Humans, Pigs, and Goats at a Predilection Site of Osteochondrosis</b></p> <p>Ferenc Toth, Mikko J. Nissi, Luning Wang, Jutta M Ellermann, Kevin Shea, John Polousky, Cathy S Carlson</p>	<p>Paper No. 0123</p> <p><b>Biomechanical Optimization of the Angle and Position for Surgical Implantation of a Straight Short Stem Hip Implant</b></p> <p>Gillian E. Cook, Saeid Samieezadeh, Zachary Morison, Mina S.R. Aziz, Habiba Bougherara, Radovan Zdero, Emil H. Schemitsch</p>	<p>Paper No. 0126</p> <p><b>Cartilage-specific Eif3 Knockout Mice are Protected from Cartilage Degradation in a Surgically-induced Osteoarthritis Model.</b></p> <p>Elisabeth Wondimu, Jun Chang, Kirsty Culley, Cecilia Dragomir, Darren Plumb, Justin Quinn, Mary B Goldring, Miguel Otero</p>	<p>Paper No. 0132</p> <p><b>Effects of Single Local Injection of Local Anesthetic Agents on Intervertebral Disc Degeneration: Ex Vivo and Long-Term In Vivo Experimental Study</b></p> <p>Koji Iwasaki, Hideki Sudo, Katsuhisa Yamada, Takashi Ohnishi, Takeru Tsujimoto, Norimasa Iwasaki</p>
4:35 PM	<p>Paper No. 0118</p> <p><b>Neutrophil-specific, Near-infrared Fluorescence Imaging of Acute Intervertebral Disc Herniation</b></p> <p>Li Xiao, Mengmeng Ding, Yi Zhang, Mahendra D Chordia, Tao Wang, Francis H Shen, Li Jin, Xudong J Li</p>	<p>Paper No. 0124</p> <p><b>The Effect of Stem Length on Strain and Micromotion in the Proximal Femur following Total Hip Arthroplasty</b></p> <p>Scott R Small, Sarah E Hensley, Paige L Cook, Rebecca A Stevens, Renee D Rogge, Michael E Berend</p>	<p>Paper No. 0127</p> <p><b>Absence of CC - Chemokine Receptor 7 (CCR7) is Linked to Reduced Structural and Functional Manifestations of Knee Osteoarthritis in a Murine Model</b></p> <p>Carla R Scanzello, Justin Gan, Vu T. Nguyen, Charles A Bush-Joseph, Nikhil N Verma, Susanna G Chubinskaya, Anne-Marie Malfait, George R Dodge</p>	<p>Paper No. 0133</p> <p><b>Effective Systemic Mesenchymal Stem Cell Therapy for Vertebral Compression Fractures</b></p> <p>Dmitriy Sheyn, Wafa Tawackoli, Galina Shapiro, Deuk Soo Jun, Young Doo Koh, Susan Su, Maxim Bez, Zachary Sharfman, Zulma Gazit, Gadi Pelled, Hyun W Bae, Dan Gazit</p>



# MONDAY | MEETING HIGHLIGHTS Monday, March 30, 2015

**6:30AM-7:45AM**

**Research Interest Group (RIG):  
Good and Bad Animal Models**  
Room 106 - 107

**7:00AM-9:45AM**

**Present Your Science: Transforming  
Technical Talks with Melissa Marshall**  
Room 117

**8:00AM-9:00AM**

## SESSIONS

**Mediators of Joint Repair**  
Room 118-120

**Osteocytes and Mechanobiology**  
Room 111-112

**Shoulder and Elbow Arthroplasty**  
Room 113-114

**Tendon/Ligaments-Mechanics**  
Room 121-122

**Biglycan in Bone Healing**  
*Spotlight Session:*  
Room 116

**9:00AM-5:30PM**

**Poster and Exhibit Hall Open**  
Innovation Central/Marquee Ballroom

**9:15AM-9:45AM**

**Refreshment Break**  
Innovation Central/Marquee Ballroom

**10:00AM-11:00AM**

**General Session: Shands Lecture,  
Presidential Address, 1st Vice  
Presidential Address, and ORS  
Business Meeting**  
Room 118 - 120

**11:15AM-12:15PM**

## SESSIONS

**Aging & OA**  
Room 118-120

**Genetics: Bone Development,  
Bone Aging**  
Room 111-112

**Shoulder and Elbow - Disease Process**  
Room 113-114

**Spine Disc Biology and Repair**  
Room 121-122

**Muscle/Tendon Biology and Repair**  
Room 116

**12:30PM-1:30PM**

**Poster Walking Tours**  
Marquee Ballroom

**New Investigator Networking Session:  
Position Yourself for a Successful Career:  
Setting Foundational Early Career Goals**  
Room 121-122

**Industry Connect**  
Room 116

**1:45PM-3:15PM**

## WORKSHOPS

**ORS/POSNA Key Concepts of  
Musculoskeletal Infection**  
Room 113 - 114

**Animal Welfare in Orthopaedic Research:  
Focus on Refinement and Reduction**  
Room 116

**The Realities of Commercializing  
Orthopaedic Technologies: Business  
Strategies, Funding, Partnerships, and  
Juggling Academic & Corporate Roles**  
Room 111-112

**ORS/MSTS The Osteoclast  
and Bone Diseases**  
Room 118 - 120

**Publications Workshop: Improve Your  
Chances of Getting Published**  
Room 117

**Professional Advancement Session:  
Rising to the Top: Leadership Success  
in Academics**  
Room 121-122

**3:30PM-4:15PM**

**Awards Session: Urist Lecture, NIRA  
Awards, Video Outreach Competition  
Awards, Harris Award, WLF Award,  
ORS/OREF Collaborative Exchange  
Award, Distinguished Investigator  
Award, ORS Outstanding  
Achievement in Mentoring Award**  
Room 118 - 120

**4:15PM-5:30PM**

**Poster Reception II (authors present)**  
Innovation Central/Marquee Ballroom

**7:30PM-10:00PM**

**Women's Leadership Forum Reception**  
Vista Ballroom

MONDAY

# MONDAY | PROGRAM DETAILS

Monday, March 30, 2015

## ANCILLARY EVENT

### Good and Bad Animal Models for Orthopaedic Research: Scientific and Ethical Considerations

**6:30 AM – 7:45 AM**

Room 106 - 107

Organizer:

Stephan Zeiter, PhD, AO Research Institute

Objectives:

There is a scientific and ethical imperative that clinically most relevant models are used for orthopaedic research. Scientifically, the models should mimic as much as possible the (human) clinical situation. Ethically, according to the 3R principle, the number of animals used should be kept a minimum and potential pain, suffering, or distress should be minimized in all animals used in order to enhance animal welfare.

## COMMUNICATIONS WORKSHOP

### Present Your Science: Transforming Technical Talks with Melissa Marshall

*(Formerly The Craft of Scientific Presentations Workshop)*

**7:00 AM – 9:45 AM**

Room 117

Melissa Marshall, Penn State University

This workshop has three goals: (1) to teach participants effective strategies for structuring their research presentations; (2) to have participants completely rethink the design of presentation slides; and (3) to have participants analyze what would be their best delivery style. These goals are reached through lecture, discussion, analysis of filmed presentations, and exercises. In addition, workshop attendees will learn effective strategies for making an "elevator pitch" (a 1 – 2 minute summary) about their research. Video examples of effective elevator pitches will be shown and analyzed.

*Pre-registration required*

\$20 ORS Members /\$25 Non-Members

## PAPER PRESENTATIONS

**8:00 AM – 9:00 AM**

*See page 40*

## BREAK

**9:15 AM – 9:45 AM**

Innovation Central/Marquee Ballroom

*Visit with exhibitors and view posters in Innovation Central. Refreshments will be served.*

## GENERAL SESSION

**10:00 AM – 11:00 AM**

Room 118 – 120



### ORS Shands Lecture

Linda J. Sandell, PhD



### ORS Presidential Address

Mary B. Goldring, PhD



### Incoming Presidential Address

Mathias P. G. Bostrom, MD

## ORS 2015 ANNUAL BUSINESS MEETING AGENDA

Year in Review – Mary B. Goldring, PhD, ORS President

ORS Priorities – Mathias Bostrom, PhD, 1st Vice President

Collaborations – Farshid Guilak, PhD, 2nd Vice President

Finance Report – Gloria Matthews, PhD, Treasurer

ORS Newly Elected Officers, Committee Members

Welcome to New Members

## PAPER PRESENTATIONS

**11:15 AM – 12:15 PM**

*See page 41*

# MONDAY | PROGRAM DETAILS

Monday, March 30, 2015

## POSTER WALKING TOURS

12:30 PM – 1:30 PM

Innovation Central/Marquee Ballroom

### Poster Walking Tours Poster Session II

Tours will feature posters in the following topics:  
(Authors may be present.)

Biomaterials – Posters 1125, 1127, 1155 and 1182  
Bone Biology – Posters 1402, 1419, 1440, 1452 and 1476  
Bone Fracture – Poster 1506  
Cartilage, Synovium  
& Osteoarthritis – Posters 1199, 1204, 1274 and 1304  
Foot and Ankle – Posters 1899 and 1902  
Meniscus – Posters 1321 and 1372  
Spine – Posters 1578, 1593 and 1597  
Trauma – Posters 1915 and 1916

Tours are subject to change. Check sign-up board in Marquee Ballroom for confirmation of tours.

## NEW INVESTIGATOR NETWORKING SESSION

**Position Yourself for a Successful Career: Setting Foundational Early Career Goals**

12:30 PM - 1:30 PM

Room 121-122

Organizer:

The New Investigator Mentoring Committee

Moderators:

Nelly Andawaris-Puri, PhD  
Devina Purmessur, PhD

As a young investigator, establishing early career goals can be challenging as you juggle setting-up your own program and teaching/service commitments. What types of grants you should apply for as a junior PI and when you should apply are critical decisions faced in the early stages. In addition, establishing yourself for success and promotion is dependent on becoming a leading expert in your field at the national and international level. How can you become recognized across the globe? How do you maximize my chances of getting a funded grant? From deciding when to submit your first grant to establishing yourself in the national and international arena, this networking session will provide guidance and advice based on ORS mentors own experiences and will focus strategic grant submissions, maximizing your chances of getting funded, establishing effective collaborations and opportunities to network at home and overseas.

*Pre-registration required*

## AGENDA

12:30 – 12:35PM

**Welcome & Introductions**

Nelly Andawaris-Puri, PhD and Devina Purmessur, PhD

12:35 – 12:50PM

**Grant Submissions Strategies**

Stavros Thomopoulos, PhD

12:50 – 1:05PM

**Gaining National and International Reputation**

Gordana Vunjak-Novakovic, PhD

1:05 – 1:30PM

**Q&A**

*Moderators:* Nelly Andawaris-Puri, PhD and Devina Purmessur, PhD

## INDUSTRY CONNECT

12:30 PM – 1:30 PM

Room 116

Organizer:

The ORS Corporate Affairs Committee

The ORS Corporate Affairs Committee (CAC) believes that collaboration between industry and academic or medical research institutions plays a critical role in furthering research efforts and accelerating innovative patient care. Industry Connect is an excellent opportunity for ORS attendees currently affiliated with industry, directly through employment or indirectly through joint research programs, to network and discuss opportunities to advance the development of partnerships in orthopaedic research. In addition, attendees will have the opportunity to give the

CAC feedback on how the ORS can better meet their needs as industry representatives.

*Pre-registration required*

## WORKSHOPS

1:45 PM – 3:15 PM

**ORS/POSNA Key Concepts of Musculoskeletal Infection**

Room 113-114

Organizer: Jonathan G. Schoenecker, MD,  
PhD, Vanderbilt University



Musculoskeletal infection is an unremitting process which, if not rapidly identified and treated, results in substantial morbidity and mortality. Although the immune system has a great capacity to eradicate infection, for unknown reasons it is particularly inefficient at resolving infections of musculoskeletal tissue, especially in bone. Prior to the development of antibiotics and the capacity to perform surgical excision/drainage, the mortality rate of osteomyelitis was reported as high as 40%. Medical and surgical

advances during the 20th century dramatically improved outcomes of these patients. However, since infection of musculoskeletal tissue remains a significant global health care burden, there is a continued and substantial need for development of novel diagnostic, pharmaceutical, surgical, tissue regenerative and clinical practice guidelines to improve and potentially save the lives of patients inflicted with infection of musculoskeletal tissue. In this ORS/POSNA forum we will discuss key advances and unanswered questions in order to continue the advancement in clinical care of patients with musculoskeletal infection in the 21st century.

### ***Improved Recognition and Treatment of Infection Induced Comorbidity and Mortality***

Jonathan Schoenecker, MD, PhD, Vanderbilt University

### ***Identifying and Targeting Bacterial Factors***

Lawson Copley, MD, Children's Medical Center of Dallas

### ***Repairing the Damage Caused by Infection***

Brian Snyder, MD, PhD, Children's Hospital

### ***Imaging Musculoskeletal Infection***

Scott B. Rosenfeld, MD, Texas Children's Hospital

### **Animal Welfare in Orthopaedic Research: Focus on Refinement and Reduction**

Room 116

Organizers:

Timothy E. Cooney, MS, UPMC Hamot Medical Center

Laurie R. Goodrich, DVM, PhD, Colorado State University

It remains a foregone conclusion that animals have helped to advance knowledge in the area of medical sciences. Ethically, the welfare of research animals should form the basis for conducting in vivo studies. The '3R's', Replacement, Reduction, and Refinement, constitute the principal tenets to assure conformance to this ethical principal of animal welfare. This workshop will focus on Refinement and Reduction. Specifically, we will focus our attention on institutional compliance with PHS guidelines for the reduction of pain and distress in animals, generalized approaches to refining animal-based protocols, and methods and unique opportunities to reduce animal use in experiments. Attendees will also be provided with a listing of references and resources to allow them to further their understanding of animal welfare issues and how to implement changes that will simultaneously benefit their animal study subjects and the quality of outcomes obtained from experimentation.

### ***A Look at Complying with PHS Requirements for Managing Pain and Distress in Laboratory Animals***

Patricia Brown, DVM, NIH, Office of Laboratory Animal Welfare

### ***Refinement of Induced Animal Models***

Jeremiah Easley, DVM, Colorado State University

### ***The Team Approach to Implementing the 3R's***

Stephan Zeiter, DVM, PhD, DipECLAM, AO Research Institute Davos

### ***Controlled Veterinary Clinical Trials: Is There a Role for Natural Models in Proving Efficacy of Therapeutics in Orthopaedics?***

Alicia L. Bertone, DVM, PhD, Ohio State University

### **The Realities of Commercializing Orthopaedic Technologies: Business Strategies, Funding, Partnerships, and Juggling Academic & Corporate Roles**

Room 111-112

Organizer:

Suzanne A. Maher, PhD, Hospital for Special Surgery

Despite the wealth of innovation in the orthopaedic sciences, few technologies are translated to clinical use. This is in part caused by the philosophical divide that exists between orthopedic scientists and entrepreneurs, the fact that the path required to commercialize technology is opaque, and that funding mechanisms are complex. This workshop aims to de-myth the process of commercializing technology. Our goal is to highlight successful commercialization strategies, common challenges in the translation of orthopaedic science to industry, and new funding initiatives that are being launched at the local and federal levels.

### ***The Realities of Commercializing Orthopaedic Technologies: Business Strategies, Funding, Partnerships, and Juggling Academic & Corporate Roles***

Tom Cirrito, PhD, New York

### ***Bedside to Bench and Back: Translation and Commercialization of Novel Treatments from the Perspective of an Academic Medical Center***

Michael J. Yaszemski, MD, PhD, Mayo Medical Center

### ***The Role of the National Institutes of Health in Translating Research from the Bench to the Bedside***

Gayle Lester, PhD, Institute of Arthritis and Musculoskeletal and Skin Diseases, National Institutes of Health

### **ORS/MSTS The Osteoclast and Bone Diseases**

Room 118-120

Organizers:

Richard K. Terek, MD, FACS, Brown University

Regis J. O'Keefe, MD, PhD, Washington University in St. Louis



Osteoclast related diseases span a wide spectrum of clinical problems including giant cell tumor of bone and periprosthetic osteolysis. The mechanisms of osteoclastogenesis are not fully understood, nor is the extent to which the mechanisms share similarities in these different scenarios. Treatment options for inhibiting osteoclast activity are only partially effective, highlighting the need for a better understanding of osteoclast biology and targeted therapy. This MSTS sponsored symposium will review the current understanding of osteoclastogenesis and the interaction of giant cells and stromal cells in giant cell tumor of bone and periprosthetic osteolysis. Potential new therapeutic targets will also be highlighted.

### ***Osteoclast Biology and Clinical Challenges***

Wentian Yang, MD, PhD

### ***Osteoclast-like Cells in Giant Cell Tumor of Bone***

Michelle Ghert, MD, FRCS

# MONDAY | PROGRAM DETAILS

Monday, March 30, 2015

## *Role of Osteoprogenitor Cells and Inflammatory Signaling in Perioperative Osteolysis*

Francis Y. Lee, MD, PhD

## **Publications Workshop: Improve Your Chances of Getting Published**

Room 117

Organizer:

Linda Sandell, PhD, Washington University in St. Louis

Meet with JOR® Editor-in-Chief Linda Sandell, PhD at this year's Publications Workshop. You'll learn how to improve the quality of your journal manuscripts, what JOR® is looking for and how to increase your chances of getting published. Wiley staff will also update you on maximizing visibility for your paper, navigating the submission process and timeline, and taking advantage of the latest technology. Whether you're a new author considering submitting a paper or a seasoned journal contributor, don't miss this unique opportunity to hear directly from and interact with JOR®'s editor! Seating is limited

## **PROFESSIONAL ADVANCEMENT SESSION**

### **Rising to the Top: Leadership Success in Academics**

**1:45 PM - 3:15 PM**

Room 121-122

Organizer:

ORS Women's Leadership Forum

Moderator:

Karen B. King, PhD, University of Colorado School of Medicine

Many individuals aspire to higher leadership roles within academics. The WLF Committee will engage ORS members who are in high-level academics positions to discuss how to navigate academic medicine and rise to leadership in the clinical, basic science and engineering arenas. The speakers will discuss how they balance academic leadership with their active research programs as well as provide practical advice for those who are interested in obtaining similar leadership roles. An open panel discussion will follow the presentations. Open to meeting attendees at any career stage, this session will explore the challenges and successes of academic leadership while illustrating the importance of career-long mentorship and sponsorship from a leadership position.

#### ***Making an Impact in the Dean's Office***

Clare M. Rinnac, Ph.D., Associate Dean of Research, Case Western Reserve University (ORS Past President)

#### ***Servant Leadership***

Joshua Jacobs, MD, Chair, Department of Orthopedic Surgery, Rush University; Director, Section of Biomaterials; Chair, Scientific Leadership Council for the RTSC (ORS Past President, AAOS Past President)

#### ***It Takes a Village to Make a Dean***

Barbara D. Boyan, Ph.D. Dean, School of Engineering, Virginia Commonwealth University

## ***My American Dream: from Immigration to Leadership***

Susan Chubinskaya, PhD, Associate Provost, Academic Affairs, Rush University; The Ciba-Geigy Professor of Biochemistry with conjoint appointments at the Departments of Orthopedic Surgery & Medicine (Section of Rheumatology)

## **ORS AWARDS SESSION**

**3:30 PM – 4:15 PM**



### **Marshall R. Urist, MD**

#### **Award and Lecture**

Mauro Alini, PhD

### **ORS Women's Leadership**

#### **Forum Award**

Marjolein van der Meulen, PhD

### **William H. Harris, MD Award**

Marco S. Caicedo, PhD

### **ORS/OREF Distinguished Investigator Award**

Adele Boskey, PhD

### **ORS Outstanding Achievement in Mentoring Award**

Dawn M. Elliott, PhD

Steven A. Goldstein, PhD

### **New Investigator Recognition Awards (NIRA)**

TBD

### **Video Outreach Competition (VOC)**

First Place: Emily Hargrave-Thomas

Second Place: Nico Verdonschot, PhD

## **POSTER RECEPTION II**

**4:15 PM – 5:30 PM**

Innovation Central/Marquee Ballroom

Poster Session II presenters should be available at their posters during this reception to answer questions.

## **WOMEN'S LEADERSHIP FORUM RECEPTION\***

**7:30 PM – 10:00 PM**


Vista Ballroom

Join us in celebrating women in science! Join the members of the Women's Leadership Forum (WLF) at this event celebrating women in science. This reception is an excellent opportunity to discuss the challenges facing today's female scientists. The 2015 Women's Leadership Forum Award Winner, Marjolein C. van der Meulen, PhD, will be honored for her role as an outstanding mentor to fellow female scientists.

*Pre-registration required*

\$60 ORS Members/\$65 Non-Members

# MONDAY | SESSIONS 8:00AM–9:00AM Monday, March 30, 2015

TIME	SESSION 25 Osteocytes and Mechanobiology	SESSION 26 Shoulder and Elbow Arthroplasty	SPOTLIGHT SESSION 27 Biglycan in Bone Healing	SESSION 28 Mediators of Joint Repair	SESSION 29 Tendon/Ligament – Mechanics
	Room # 111-112	Room # 113-114	Room # 116	Room # 118-120	Room # 121-122
<b>Moderators</b>	Liyun Wang, PhD and Sara H. McBride, PhD	Ara Nazarian, PhD and Ryan Willing, PhD	Louis C. Gerstenfeld, PhD and Girish Pattappa, PhD	Tannin Schmidt, PhD and Bernd Rolauuffs, MD	Vincent Wang, PhD and Dianne Little, PhD, DVM
8:00 AM	<p>Paper No. 0134</p> <p><b>Tissue-level Mechanotransduction in Cancellous Bone Submitted to Mechanical Overload In Vivo</b></p> <p>Erin N Litts, Matthew G. Goff, Thu M Nguyen, Wei X Lee, Christopher J Hernandez</p>	<p>Paper No. 0140</p> <p><b>Quantitative Assessment And Characterization Of Glenoid Bone Loss For A Spectrum Of Disease In Glenohumeral Osteoarthritis</b></p> <p>Beau J Prey, Daniel J Lombardo, Vani Sabesan</p>	<p>Paper No. 0146</p> <p><b>A Cross-Sectional Age-Wise Assessment of Morphology and Bone Formation in Perlecan-Deficient Mice</b></p> <p>Ashutosh Parajuli, Xiaoyu Gu, Xiaohan Lai, Zhishui Zheng, Catherine Kim-Safran, Liyun Wang</p>	<p>Paper No. 0149</p> <p><b>Improved Cartilage Defect Repair Using a RHAMM-mimetic Peptide</b></p> <p>Thorsten Kirsch, Natalie Danna, Bryan Beutel, Eric Strauss, Eva Turley, Cornelia Toelg, Leonard Luyt, Mary Cowman</p>	<p>Paper No. 0155</p> <p><b>Exercise Promotes Adaptation and Improved Mechanical Properties in Fatigue Damaged Tendons</b></p> <p>Rebecca Bell, Remi Gendron, Kristen Esannason, Matthew Anderson, Damien Laudier, Evan L Flatow, Nelly Andarawis-Puri</p>
8:10 AM	<p>Paper No. 0135</p> <p><b>3d Imaging Of Bone Adaptation In Response To Loading</b></p> <p>Alessandra Carriero, Andre Pereira, Amanda Wilson, Behzad Javaheri, Andrew Pitsillides, Massimo Marenzana, Sandra Shefelbine</p>	<p>Paper No. 0141</p> <p><b>Inlay vs. Onlay: A Comparison of Two Glenoid Systems in Total Shoulder Arthroplasty</b></p> <p>Sarah M Helms, Gregory P Colbath, Jeffrey R Gagliano, Richard J Hawkins, Luke W Pietrykowski, Breanne T Przeszelski, John D Desjardins</p>	<p>Paper No. 0147</p> <p><b>Cross-Species Transcriptomic Analysis Reveals Homologous Transcriptional Stages and Conserved Gene Co-Expression Dynamics During Zebrafish and Rat Bone Regeneration</b></p> <p>Ronald Y Kwon, Amarjit Viridi, D. Rick Summer</p>	<p>Paper No. 0150</p> <p><b>Oral Administration of Pirfenidone Prevents Chronic Inflammation and Fibrosis in a Murine Model of Post-traumatic Osteoarthritis (PTOA)</b></p> <p>Deva D Chan, Jun Li, Dan N. PreDESCU, Anna H.K. Plaas</p>	<p>Paper No. 0156</p> <p><b>Loss of Mohawk Homeobox Gene Function Leads to Morphological and Biomechanical Deficiencies in the Adult Murine Patellar Tendon</b></p> <p>Andrea Lalley, Han Liu, Rulang Jiang, Jason Shearn</p>
8:20 AM	<p>Paper No. 0136</p> <p><b>Targeted Disruption of BMP Signaling Through Type IA Receptor (BMPRIA) in Osteocyte Leads to Dramatic Increase in Bone Density and Mechanical Strength</b></p> <p>Nobuhiko Kamiya, Lin Shuxian, Matthew Phipps, Olumide Aruwajoye, Jerry Feng, Harry Kim</p>	<p>Paper No. 0142</p> <p><b>Bearing Surface Damage Analysis of Total Shoulder Replacement Retrievals Across Fixation Designs and UHMWPE Composition</b></p> <p>Louis G Malito, Farzana Ansari, Lulu Li, Taylor Lee, Helen Park, Steve Gunther, Tom Norris, Michael Ries, Lisa Pruitt</p>	<p>Paper No. 0148</p> <p><b>Improved Vascularisation And Repair Of Bone Defects By Mimicking Endochondral Ossification Using Mesenchymal Stem Cells In Combination With Collagen-based Scaffolds</b></p> <p>Amos Matsiko, Emmet Thompson, Daniel Kelly, John Gleeson, Fergal J O'Brien</p>	<p>Paper No. 0151</p> <p><b>Administration of Adipose Derived Stem Cells Decreases Fibrosis Following Chronic Rotator Cuff Tear</b></p> <p>Jonathan Gumucio, Michael Flood, Stuart Roche, Asheesh Bedi, Christopher L Mendias</p>	<p>Paper No. 0157</p> <p><b>Achilles Tendons From Decorin And Biglycan Deficient Mice Demonstrate Inferior Mechanical And Structural Properties Predicted By An Image-based Empirical Damage Model</b></p> <p>Joshua A Gordon, Benjamin R Freedman, Andrey Zuskov, Renato V Iozzo, David E Birk, Louis J. Soslowsky</p>
8:30 AM	<p>Paper No. 0137</p> <p><b>[Ca2+]i and Actin Dynamics in Osteocytes in Intact Mouse Tibiae under Cyclic Mechanical Loading</b></p> <p>Andrea E Morrell, Da Jing, Andrew D. Baik, X. Edward Guo</p>	<p>Paper No. 0143</p> <p><b>Influence of Reverse Shoulder Arthroplasty Lateralization on Glenohumeral Muscle Moment Arms</b></p> <p>Jean-David Werthel, Alexander Hooke, Taku Hatta, Eric Wagner, Kai-Nan An, Bassem Elhassan, John Spering</p>	<p>Spotlight Speaker</p> <p>Marian F. Young, PhD</p> 	<p>Paper No. 0152</p> <p><b>Cited2 Mediates A Novel Chondroprotective Pathway Involving Cross-talk Between Mechanical Loading And Il-4 To Suppress Mmp-13</b></p> <p>Zhiyong He, Daniel Leong, Lin Xu, John A Hardin, Robert J. Majeska, Mitchell Schaffler, Mia Thi, Luis Cardoso, Mary B Goldring, Neil Cobelli, Hui B Sun</p>	<p>Paper No. 0158</p> <p><b>Quantitative Ultrasound Elastography Can Quantify Mechanical Tendon Healing In A Rabbit Achilles Tendon Transection Model.</b></p> <p>Yohei Yamamoto, Satoshi Yamaguchi, Takahisa Sasho, Taisuke Fukawa, Yorikazu Akatsu, Jo Katsuragi, Jun Endo, Hiroko Hoshi, Kazuhisa Takahashi</p>
8:40 AM	<p>Paper No. 0138</p> <p><b>Pharmacologically Increasing Primary Cilia Length Enhances Osteocyte Mechanotransduction</b></p> <p>Milos Spasic, Christopher Jacobs</p>	<p>Paper No. 0144</p> <p><b>An In-Vitro Study of the Effect of Reverse Shoulder Arthroplasty Glensphere Size on Joint Load, Muscle Force, and Range of Motion</b></p> <p>G. Daniel G. Langohr, Joshua William Giles, George S Athwal, James A Johnson</p>	<p><b>Small Leucine-Rich Proteoglycans: Fine Tune Regulators of Skeletal Function</b></p>	<p>Paper No. 0153</p> <p><b>Intra-articular Depletion of Macrophages following Articular Fracture Results in Bone Resorption and Altered Synovial Macrophage Polarity</b></p> <p>Karsyn N Bailey, Bridgette D Furman, Kelly A Kimmerling, Chia-Lung Wu, Janet L. Huebner, Virginia B. Kraus, Farshid Guilak, Steven A Olson</p>	<p>Paper No. 0159</p> <p><b>Early Versus Standard Weightbearing In Achilles Tendon Ruptures: An Assessment Of Tendon Length And Ankle Function 8 Weeks After Percutaneous Repair</b></p> <p>Alison N. Agres, Sebastian Manegold, Tobias J. Gehlen, William R Taylor, Adamantios Arampatzis, Georg N. Duda</p>
8:50 AM	<p>Paper No. 0139</p> <p><b>A Specialized <math>\beta 3</math> Integrin-based Mechanotransduction on Osteocyte Processes In Situ</b></p> <p>Pamela Cabahug-Zuckerman, Robert J. Majeska, Mia M Thi, Dave C Spray, Sheldon Weinbaum, Mitchell B Schaffler</p>	<p>Paper No. 0145</p> <p><b>Eccentric Reaming is Biomechanically Superior to Posterior Augment for Posterior Glenoid Wear</b></p> <p>Tianyi Wang, Geoffrey Abrams, Anthony Behn, Emilie Cheung</p>		<p>Paper No. 0154</p> <p><b>Hybrid Nano-Matrix Enables Growth Plate Repair by Selectively Promoting Chondro-Lineage Cell Growth</b></p> <p>Yupeng Chen, Travis Spangler, Philip McClure, Scott McAllister, Hongchuan Yu, Douglas Moore, Michael G Ehrlich, Qian Chen</p>	<p>Paper No. 0160</p> <p><b>The Biomechanical Function of the Anterolateral Ligament in the Setting of ACL Reconstruction</b></p> <p>Evan Meeks, Ardavan Saadat, Jonathan E Gold, Sabir Ismaily, Adam Brekke, Philip C Noble, Walter Lowe</p>

MONDAY

# MONDAY | SESSIONS 11:15AM–12:15PM Monday, March 30, 2015

TIME	SESSION 30 Genetics: Bone Development, Bone Aging	SESSION 31 Shoulder and Elbow - Disease Process	SESSION 32 Muscle/Tendon Biology and Repair	SESSION 33 Aging & OA	SESSION 34 Spine Disc Biology and Repair
	Room # 111-112	Room # 113-114	Room # 116	Room # 118-120	Room # 121-122
<b>Moderators</b>	Jaimo Ahn, MD, PhD and D. Rick Sumner, PhD	Samuel R. Ward, PhD and Louis J. Soslowsky, PhD	Xuhui (Phillip) Liu, MD and Megan Killian, PhD	Amy McNulty, PhD and Qian Chen, PhD	James C. Iatridis, PhD and Lisbet A. Haglund, PhD
11:15 AM	<p>Paper No. 0161</p> <p><b>Early Onset of Bone Pathology in a Murine Model of Duchenne Muscular Dystrophy</b></p> <p>Daniel March, Clifford Voigt, Hongshuai Li, Xueqin Gao, Aiping Lu, Ying Tang, Bing Wang, Johnny Huard</p>	<p>Paper No. 0167</p> <p><b>Effect of the L-type Calcium Channel Modulators Nifedipine, Verapamil and Bay K8644 on Human Joint Capsule Cell based Collagen Gel Contraction</b></p> <p>Kevin A Hildebrand, Andrew R Buckley, Paul T Salo, Mei Zhang, A. Dean Befus, David A Hart</p>	<p>Paper No. 0173</p> <p><b>mTOR Is Involved In The Chondrogenic And Adipogenic Differentiation Of Muscle-derived Stem/progenitor Cells Isolated From Zmpste-deficient Mice</b></p> <p>Yohei Kawakami, Koji Takayama, Makoto Kobayashi, Aiping Lu, Xiaodong Mu, Jessica Tebbets, James Cummins, Ryoosuke Kuroda, Masahiro Kurosaka, Freddie H Fu, Johnny Huard</p>	<p>Paper No. 0179</p> <p><b>Overexpression Of Mechano-sensitive MicroRNA-365 Promotes The Onset Of Osteoarthritis In Vivo By Up-regulating Indian Hedgehog And Type X Collagen During Aging</b></p> <p>Kun Yang, Yun Gao, Wentian Yang, Qian Chen</p>	<p>Paper No. 0185</p> <p><b>TLR4 Inhibitor Prevents Biophysical Changes in Nucleus Pulposus Mechanobiology Induced by Inflammatory Stimulation</b></p> <p>Timothy Jacobsen, Nadeen O. Chahine</p>
11:25 AM	<p>Paper No. 0162</p> <p><b>Developmental and Postnatal Cartilage Remodeling and Homeostasis are Mediated by Synergistic Membrane-type MMP Activity</b></p> <p>Andrew Pak, Joanne Shi, Pamela G Robey, Kenn Holmbeck</p>	<p>Paper No. 0168</p> <p><b>Correlation of Rotator Cuff Muscle Degeneration and Tear Size with Myogenic and Lipogenic Gene Expression in Human Biopsies</b></p> <p>Shivam A Shah, Ioannis Kompakis, Stavros Thomopoulos, Leesa Galatz</p>	<p>Paper No. 0174</p> <p><b>Novel Transgenic Physiological Model of Skeletal Muscle Contracture</b></p> <p>Matthew C Kinney, Sudarshan Dayanidhi, Peter B. Dykstra, John J. McCarthy, Charlotte A Peterson, Richard L Lieber</p>	<p>Paper No. 0180</p> <p><b>Transcriptomics to Identify Synovial Changes Associated with Disease Progression in a Cohort of Early Osteoarthritis Patients (CHECK)</b></p> <p>Arjen B Blom, Peter L van Lent, Martijn H van den Bosch, Hans Cats, Frank H van den Hoogen, Floris P Lafaber, Esmeralda N Blaney Davidson, Wim B van den Berg, Peter M van der Kraan</p>	<p>Paper No. 0186</p> <p><b>Brachyury Is An Essential Transcription Factor For Maintaining Homeostasis In Notochordal Cells</b></p> <p>Nobuyuki Fujita, Ryuichi Watanabe, Satoshi Suzuki, Tomohiro Hikata, Kota Watanabe, Ken Ishii, Takeshi Miyamoto, Yoshiaki Toyama, Morio Matsumoto</p>
11:35 AM	<p>Paper No. 0163</p> <p><b>Trabeculae Bone Structure Analysis in Individuals Affected by Type 1 Gaucher Disease using Micro Magnetic Resonance Imaging</b></p> <p>Gulshan B Sharma, Douglas D Robertson, Jr., Minzhi Xing, Elie Harmouche, Yegor Podgorsky, Dawn A Laney, Michael J Gambello, Emily Lisi, Valynne Long, Jad Chamieh, Michael Terk</p>	<p>Paper No. 0169</p> <p><b>Prediction of Extensibility of the Supraspinatus Musculotendinous Unit using Ultrasound Image with Shear Wave Elastography</b></p> <p>Yoshiaki Itoigawa, John W Sperling, Scott Steinmann, Qingshan Chen, Hugo Giambini, Alexander Hooke, Shigao Chen, Eiji Itoi, Kai-Nan An</p>	<p>Paper No. 0175</p> <p><b>Myoblast-Seeded, Prevascularized Constructs Augment Healing of Volumetric Muscle Loss in the Biceps Femoris</b></p> <p>Mon-Tzu A Li, Laxminarayanan Krishnan, Nicholas Servies, Robert E Goldberg, Gordon L Warren</p>	<p>Paper No. 0181</p> <p><b>Regulation Of Osteoarthritis-associated Genes By DNA Hydroxymethylation</b></p> <p>Sarah E. B. Taylor, Ye Henry Li, Lakshmi Dhulipala, Wing H Wong, Nidhi Bhutani</p>	<p>Paper No. 0187</p> <p><b>Mitochondrial Membrane Potential and Nuclear Changes During Human Disc Cell Apoptosis: In Vitro and in Vivo Annulus Findings</b></p> <p>Helen Elizabeth Gruber, Gretchen Hoelscher, Synthia Bethea, Edward Hanley</p>
11:45 AM	<p>Paper No. 0164</p> <p><b>Identification of New Models for Bone Research via High-Throughput Screening of Mice from the Knockout Mouse Project</b></p> <p>Douglas J Adams, Renata Rydzik, Dana A Godfrey, Li Chen, Zhihua Wu, Caibin Zhang, Seung-Hyun Hong, Pujan Joshi, Xi Jiang, Dong Guk Shin, John P Sundberg, David W Rowe, Cheryl L Ackert-Bicknell</p>	<p>Paper No. 0170</p> <p><b>Minimally Important Differences In The WORC and ASES In Patients Treated Surgically Or Non-surgically For Full Thickness Rotator Cuff Tears</b></p> <p>Joel J Gagnier, Christopher B Robbins, Asheesh Bedi, James Carpenter, Bruce Miller</p>	<p>Paper No. 0176</p> <p><b>Functional and Cellular Analysis of Engineered Skeletal Muscle Units following 28 days In Vivo</b></p> <p>Keith W VanDusen, Brian C Syverud, Jonah D Lee, Lisa M Larkin</p>	<p>Paper No. 0182</p> <p><b>Reduced Epidermal Growth Factor Receptor (EGFR) Signaling Enhances Cartilage Destruction in Mouse Osteoarthritis Model</b></p> <p>Haoruo Jia, Xianrong Zhang, Ji Zhu, Frank Beier, Motomi Enomoto-Iwamoto, Ling Qin</p>	<p>Paper No. 0188</p> <p><b>In Vitro Growth Trajectory and In Vivo Implantation of a Cell-Based Disc-like Angle Ply Structure for Total Disc Replacement</b></p> <p>John T Martin, Kensuke Ikuta, Dong Hwa Kim, Christian G Pfeifer, Lachlan J Smith, Dawn M Elliott, Harvey E Smith, Robert L Mauck</p>
11:55 AM	<p>Paper No. 0165</p> <p><b>A Genetic Variant in the Gamma Glutamyl Carboxylase Gene Affects Bone Quality in a Pediatric African American Cohort</b></p> <p>Jacqueline McKesey, Courtney Sprouse, Heather Gordish-Dressman, Elizabeth Dominic, Elizabeth Hedges, Zachary Kendrick, Michael Liu, Leticia Ryan, Eric Hoffman, Joseph M. Devaney, Laura L Tosi</p>	<p>Paper No. 0171</p> <p><b>Are The Symptoms Of Calcific Tendonitis Due To Neoinnervation And/or Neovascularisation?</b></p> <p>Lisa Hackett, Neal L Millar, Patrick H Lam, George AC Murrell</p>	<p>Paper No. 0177</p> <p><b>Saline Injection And Needling Improve Tendon Healing In A Collagenase-induced Tendinopathy Model</b></p> <p>Xiangyu Gu, Richard Ma, Michael Schaefer, Lilly Ying, Jeffrey Ngeow, Xiang-Hua Deng, Scott Rodeo</p>	<p>Paper No. 0183</p> <p><b>BAPX1/NKX3.2; a Novel Chondrocyte Hypertrophy Molecular Switch in Osteoarthritis</b></p> <p>Marjolein MJ Caron, Pieter J. Emans, Don A.M. Surtel, Peter M van der Kraan, Lodewijk W van Rhijn, Tim J Welting</p>	<p>Paper No. 0189</p> <p><b>Tissue Engineering a Mechanically Robust De Novo Intervertebral Disc Using Silk-Based Biomaterials, Adipose-derived Stem Cells and Physiologically Mimetic Culture</b></p> <p>Puay Yong Neo, James CH Goh, Siew Lok Toh</p>
12:05 PM	<p>Paper No. 0166</p> <p><b>Novel Nfatc1-Cre/caALK2 Enhancer Mice Produce Heterotopic Ossification Localized To Joints Through Cartilage Intermediary</b></p> <p>Shailesh Agarwal, Shawn Loder, Jonathan R Peterson, Oluwatobi Eboda, Cameron Brownley, Satoru Hayano, Shuli Li, Kaitlyn Stettinichs, Kavitha Ranganathan, David Fine, Stewart Wang, Steven R Buchman, Paul Cederna, Yuji Mishina, Benjamin Levi</p>	<p>Paper No. 0172</p> <p><b>Prediction of Scapular Notching using 3D CT Simulation Software and Video-Based Motion Analysis</b></p> <p>Joel Kolmodin, Iyooch Davidson, Bong-Jae Jun, Nipun Sodhi, Naveen Subhas, Thomas E. Pateson, Zong-Ming Li, Joseph P Iannotti, Eric T. Ricchetti</p>	<p>Paper No. 0178</p> <p><b>Electropun Nanofibrous Scaffolds Enhanced with Decellularized Extracellular Matrix to Promote Tissue-Specific Bioactivity for Tendon and Cartilage Repair</b></p> <p>Benjamin Rothrauff, Guang Yang, Rocky Iuan</p>	<p>Paper No. 0184</p> <p><b>Galectin-1 Is A Novel Marker For Cartilage Degeneration In Osteoarthritis And Induces Pro-inflammatory And Catabolic Responses In Chondrocytes In Vitro</b></p> <p>Stefan Toegel, Daniela Bieder, Sabine André, Hans-Joachim Gabius, Sonja M Walzer, Idriss M Bennani-Baiti, Martin Bilban, Reinhard Windhager</p>	<p>Paper No. 0190</p> <p><b>Stem Cells Contribution to the Restoration of Degenerated Intervertebral Discs Depends on their Degenerative State</b></p> <p>Marianna Peroglio, Stephanie Caprez, Lorin M Benneker, Mauro Alini, Sibylle Grad</p>

# TUESDAY | MEETING HIGHLIGHTS Tuesday, March 31, 2015

**6:00AM-3:30PM**

**Poster Hall Open (no exhibits)**  
Marquee Ballroom

**8:00AM-9:00AM**

## SESSIONS

**Tendon/Ligament -  
Collagen Structure – Function**  
*Spotlight Session*  
Room 111-112

**Bone Tissue Engineering**  
Room 113-114

**Biomolecular Approaches  
to Bone Fragility**  
*Spotlight Session*  
Room 116

**Cartilage Matrix Biology**  
*Spotlight Session*  
Room 118-120

**Spine Mechanics**  
*Room 121-122*

**9:15AM-9:45AM**

**Refreshment Break**  
Marquee Ballroom

**9:45AM-11:15AM**

## WORKSHOPS

**The Intervertebral Disc From:  
Development to Regeneration**  
Room 121 - 122

**Functional Imaging of  
Articular Cartilage by MRI**  
Room 113 - 114

**Hip Evo Devo: Adaptation of the Hip in  
Phylogeny and Ontogeny**  
Room 116

**Acute Cartilage Injury: AO Foundation  
Collaborative Research Project**  
Room 111 - 112

**11:30AM-12:30PM**

**Poster Walking Tours**  
Marquee Ballroom

**12:45PM-1:45PM**

## SESSIONS

**Ankle Arthritis, Arthroplasty, and  
Arthrodesis**  
Room 111-112

**Late Breaking Paper Presentations**  
Room 113-114

**Repair of Bone Fractures**  
*Spotlight Session*  
Room 116

**Chondro-Progenitors and  
Chondrogenesis**  
Room 118-120

**Tissue Engineering: Models of Bone  
Injury**  
Room 121-122

**2:00PM-2:30PM**

**Posters**  
Marquee Ballroom

**2:30PM-3:30PM**

## SESSIONS

**Knee - Mechanics and Modeling**  
Room 111-112

**Bone Mechanics and  
Finite Element Analysis**  
Room 113-114

**Knee Ligaments and Meniscus**  
Room 116

**Cartilage Mechanobiology**  
Room 118-120

**Biomaterials for Cartilage Repair**  
Room 121-122



## BREAK

9:15 AM – 9:45 AM

Marquee Ballroom

Visit with exhibitors and view posters in Innovation Central. Refreshments will be served.

## PAPER PRESENTATIONS

8:00 AM – 9:00 AM

See page 49

## WORKSHOPS

9:45 AM – 11:15 AM

### The Intervertebral Disc: From Development to Regeneration

Room 121-122

Organizers:

Rita Kandel, MD, Mount Sinai Hospital

Makarand V. Risbud, PhD, Thomas Jefferson University

The IVD is composed of three different tissues, each of different origins, that merge together to form a functional tissue anchored to bone. Intervertebral disc (IVD) degeneration has a lifetime prevalence of 80% and about 1 in 50 individuals become disabled by this disease resulting in annual direct and indirect costs in the United States alone of over \$118 billion. Until recently little was known about the IVD but recent advances have increased our understanding of disc biology and how development can inform disc repair. This workshop will focus on the research related to maintaining a functional disc, specifically the advances and challenges related to understanding IVD development, regulation of disc degeneration, and biological repair or replacement of the degenerate disc.

#### *Intervertebral Disc Development*

Rosa Serra, PhD, University of Alabama at Birmingham

#### *Syncecan4: Regulation and Function in Intervertebral Disc Health and Disease*

Makarand V. Risbud, PhD, Thomas Jefferson University

#### *Biological Disc Repair: The Good, Bad and the Promising*

Rita Kandel, MD, Mount Sinai Hospital

### Functional Imaging of Articular Cartilage by MRI

Room 113-114

Organizers:

Yang Xia, PhD, Oakland University

Louis E. DeFrate, PhD, Duke University Medical Center

Magnetic resonance imaging (MRI) is one of the few imaging techniques that is highly sensitive to the molecular environment in soft tissues and is totally non-invasive. MRI of articular cartilage in response to loading allows for functional study of cartilage. Specifically, external loading becomes an adjustable tool to force the tissue to reach a new equilibrium with the environment so that the re-distribution of the tissue's intrinsic properties and structural adaptability can be probed in a depth-dependent manner. Clearly, healthy and diseased tissue will respond to the loading differently. This workshop aims to review the new knowledge and latest results in the area, and to discuss possible applications based on the recent studies. Three presentations are included, ranging from the functional studies of cartilage-bone blocks by microscopic MRI, biomechanical measurement of knee cartilage deformation by MRI, to the in-vivo functional MRI in human subjects.

#### *The Deformation of Cartilage by Microscopic MRI*

Yang Xia, PhD, Oakland University

#### *In Vivo Biomechanics of Knee Cartilage by MRI*

Louis E. DeFrate, PhD, Duke University Medical Center

#### *Towards In Vivo Weight-Bearing MRI for Knee OA*

Xiaojuan Li, PhD, University of California, San Francisco

### Hip Evo Devo: Adaptation of the Hip in Phylogeny and Ontogeny

Room 116

Organizer:

Sandra Shefelbine, PhD, Northeastern University

Understanding changes in hip morphology and what causes them is critical in evaluating etiology of hip osteoarthritis. This workshop will review current concepts of normal and abnormal hip joint structure including femoroacetabular impingement (FAI) and dysplasia. The topics will be discussed in the context of evolutionary changes (phylogeny) as well as changes within a person's life time (ontogeny).

#### *The Role of Mechanical Loading in the Prenatal Hip*

Niamh C. Nowlan, PhD, Imperial College London

#### *The Role of Mechanical Loading in the Postnatal Hip*

Sandra Shefelbine, PhD, Northeastern University

#### *Evolutionary Changes in Hip Structure*

Jeremy M. DeSilva, PhD, Boston University

#### *The Role of Neuromuscular Control in Joint Forces*

Cara L. Lewis, PhD, Boston University

## **Acute Cartilage Injury: AO Foundation Collaborative Research Project**

Room 111-112

Organizers:

Martin Stoddart, PhD, AO Research Institute

George R. Dodge, PhD, University of Pennsylvania

The repair of acute cartilage injuries is still a significant challenge in orthopedics. Current methods do not reproducibly result in hyaline like repair tissue, and the repair is often short lived. A more active, yet aging, population is increasing the frequency of injury and the longer term effect of osteoarthritis is becoming more prevalent. The economic burden due to the ever increasing need is enormous.

This workshop will highlight the influence of cell, materials and mechanical environment in the repair of cartilage defects. In addition, strategies for screening the large number of potential combinatorial devices will be emphasized. Interdisciplinary and international collaborations are needed to bring diverse ideas and technologies to bear. In this workshop we will describe the outcome of multidisciplinary, multinational consortium with complementary expertise as a collaborative research project of the AO Foundation.

### ***Enhancing the Biology of Cartilage Regeneration***

Magali Cucchiari, PhD, Saarland University Medical Center

### ***In Vitro and In Vivo Screening of Cartilage Repair Products***

Robert Mauck, PhD, University of Pennsylvania

### ***Hard and Soft Materials for Articular Cartilage Repair***

David Elgin, PhD, AO Research Institute

## **POSTER WALKING TOURS**

**11:30 AM – 12:30 PM**

Innovation Central/Marquee Ballroom

### **Poster Walking Tours Poster Session II**

Tours will feature posters in the following topics:

*(Authors may be present.)*

Biomaterials – Posters 1125, 1127, 1155 and 1182

Bone Biology – Posters 1402, 1419, 1440, 1452 and 1476

Bone Fracture – Poster 1506

Cartilage, Synovium

& Osteoarthritis – Posters 1199, 1204, 1274 and 1304

Foot and Ankle – Posters 1899 and 1902

Meniscus – Posters 1321 and 1372

Spine – Posters 1578, 1593 and 1597

Trauma – Posters 1915 and 1916

Tours are subject to change. Check sign-up board in Marquee Ballroom for confirmation of tours.

## **PAPER PRESENTATIONS**




**12:45 PM – 1:45 PM**

*See page 50*

## **PAPER PRESENTATIONS**

**2:30 PM – 3:30 PM**

*See page 51*

TIME	SPOTLIGHT SESSION 35 Tendon/Ligament - Collagen Structure - Function	SESSION 36 Bone Tissue Engineering	SPOTLIGHT SESSION 37 Biomolecular Approaches to Bone Fragility	SPOTLIGHT SESSION 38 Cartilage Matrix Biology	SESSION 39 Spine Mechanics
	Room # 111-112	Room # 113-114	Room # 116	Room # 118-120	Room # 121-122
<b>Moderators</b>	Evan L. Flatow, MD and Siddhesh R. Angle, PhD	Mathias P. G. Bostrom, MD and Dominique P. Pioletti, PhD	Pamela G. Robey, PhD and Chris Arts, PhD	Anand Agarwal, MD and Timothy M. Griffin, PhD	Alejandro A. Espinoza Orias, PhD and Brian D. Stemper, PhD
8:00 AM	Spotlight Speaker David E. Birk, PhD 	Paper No. 0194 <b>In Vivo Re-Vascularization And Osteogenesis Of Human Mesenchymal Stem Cells Mediated By Micro-Topography and Biochemical Cues</b> Shang Song, Eun Jung Kim, Chelsea S Bahney, Ralph Marcucio, Shuvo Roy	Spotlight Speaker Deepak Vashishth, PhD 	Paper No. 0203 <b>Chondrocyte Expression of SIRT-1, an Enzyme Vital to Cartilage Homeostasis, is Regulated by Osmolarity and Glucose Levels</b> Hannah K Heywood, David A Lee	Paper No. 0206 <b>Three-Dimensional Micro- Computed Tomography Analysis for Spinal Instability after Lumbar Facetectomy in the Rat</b> Daisuke Fukui, Koichiro Murata, Shintaro Shoji, Kevin Cheng, Keianne Yamada, Rinoka Sato, Mitsuru Naiki, Nozomu Inoue, Koichi Masuda, Mamoru Kawakami
8:10 AM	<b>Regulated Assembly of the Hierarchical Structure of Tendons and Ligaments</b>	Paper No. 0195 <b>Effects of Structural Polymer vs. Non-structural Hydrogel Scaffolds on BMP-2- and Mechanical Load- mediated Bone Regeneration</b> Anna McDermott, Angela Lin, Robert E Goldberg, Joel Boerckel	<b>Biomolecular Aspects of Bone Quality: Strategies for Prediction and Prophylactic Treatment of Fragility Fractures</b>	Paper No. 0204 <b>Oxidative Stress-induced Apoptosis And Matrix Loss Of Chondrocytes Is Inhibited By Eicosapentaenoic Acid</b> Masahiko Haneda, Shinya Hayashi, Shuhei Sakata, Takaaki Fujishiro, Noriyuki Kanzaki, Shingo Hashimoto, Nobuaki Chinzei, Shinsuke Kihara, Ryosuke Kuroda, Masahiro Kurosaka	Paper No. 0207 <b>Repeated Nonpainful Joint Loading Can Induce Behavioral Sensitivity: A Potential Mechanism of Joint- Mediated Pain</b> Ben A Bulka, Beth A Winkelstein
8:20 AM		Paper No. 0196 <b>Development of Heparin Microparticles for Enhanced Delivery of Bone Morphogenetic Protein-2 (BMP-2)</b> Marian H Hettiaratchi, Johnna S Temenoff, Robert E Goldberg, Todd C McDevitt		Paper No. 0205 <b>Hif-1<math>\alpha</math> fine-tune Sox9-dependent Extracellular Matrix Production in Chondrocytes</b> Wai Kit Tam, Kenneth Cheung, Victor Leung	Paper No. 0208 <b>Spaceflight Decreases Bending Strength and Alters Failure Mode in Murine Spinal Segments</b> Britta Berg-Johansen, Ellen C Liebenberg, Brandon R Macias, Alan R Hargens, Jeffrey C Lotz
8:30 AM	Paper No. 0191 <b>Critical Regulatory Role for Collagen V in Establishing the Unique Mechanical Properties of Joint Stabilizing Tendons</b> Brienne K Connizzo, Joanna H Fried, Mei Sun, David E Birk, Louis J. Soslowsky	Paper No. 0197 <b>Bone Morphogenetic Protein-2 Non-viral Gene Therapy In A New Screening Model For Orthotopic Bone Formation In The Goat</b> Loek Loozen, Cumhur F Oner, Wouter JA Dhert, Moyo C Kruyt, Jacqueline Alblas	Paper No. 0200 <b>Age-related Changes in Mouse Bone at Multiple Levels of Organization</b> Sasidhar Uppuganti, Madeline R Girard, Siegfried G Schlunk, Alexander J Makowski, Mathilde Granke, Jeffrey S Nyman	Spotlight Speaker Suneel S. Apte, MD, PhD 	Paper No. 0209 <b>The Effect of Joint Angle Calculation Method on Intervertebral Range of Motion in the Lower Cervical Spine</b> Yashar Assi, William Anderst
8:40 AM	Paper No. 0192 <b>Multiscale Analysis of Tendon Subjected to Shear and Compression Demonstrates Strain Attenuation, Uncrimping, and Sliding</b> Fei Fang, Amrita S. Sawhney, Spencer Park Lake	Paper No. 0198 <b>SDF-1<math>\alpha</math> Enhances Low Dose BMP-2 Mediated Bone Regeneration In Vivo</b> Stefan Zwingenberger, Robert Langanke, Corina Vater, Eik Niederlohmann, Markus Sensenschmidt, Ricardo Bernhardt, Stefan Rammelt, Sven Knaack, Michael Gelinsky, Klaus-Peter Günther, Stuart B Goodman, Maik Stiehler	Paper No. 0201 <b>Parathyroid Hormone Improves Fatigue Life But Not Whole Bone And Tissue Mechanics</b> Julia Chen, Shefford Baker, Elizabeth Pluhar, Adele L Boskey, Marjolein C.H. van der Meulen	<b>Extracellular Matrix: Assembly, Proteolytic Turnover and its Contributions to Degenerative and Inflammatory Disorders</b>	Paper No. 0210 <b>Adjacent Segment Range of Motion Does Not Increase 2 Years After Single-Level Cervical Arthrodesis</b> Tyler West, William Anderst, Joon Lee, William Donaldson, James D Kang
8:50 AM	Paper No. 0192 <b>Finite Element Model Of Achilles Tendon Captures Experimentally Observed Cyclic Tensile Behaviour</b> Hanifeh Khayyeri, Anna Gustafsson, Ashley Heuvelink, Marko K Matikainen, Petro Julkunen, Pernilla Eliasson, Per Aspenberg, Hanna Isaksson	Paper No. 0199 <b>Immunomodulation Of Encapsulated MSCs And Osteogenically Differentiating MSCs In Synthetic Hydrogels For Bone Tissue Engineering</b> Luke Amer, Mark Swartzlander, Anna Blakney, Themis Kyriakides, Kurt Hankenson, Stephanie Bryant	Paper No. 0202 <b>Tissue Mineral Density and Cortical Porosity Predicts Bone Toughness and Fragility in Post Menopausal Women</b> Adam C Abraham, Aditya Yadavalli, Simon Tang		Paper No. 0211 <b>The In Vivo Effects of Exogenous Crosslinking on the Mechanical Function of Injured Rat Tail Discs under the Short-Term, Diurnal Compression Loading</b> Hsiu-Jen Lin, Leou-Chyr Lin, Weng-Pin Chen, Shih-Youeng Chuang

TUESDAY

TIME	SESSION 40 Ankle Arthritis, Arthroplasty, and Arthrodesis	LATE BREAKING 41 PODIUM PRESENTATIONS	SPOTLIGHT SESSION 42 Repair of Bone Fractures	SESSION 43 Chondro-Progenitors and Chondrogenesis	SESSION 44 Tissue Engineering: Models of Bone Injury
	Room # 111-112	Room # 113-114	Room # 116	Room # 118-120	Room # 121-122
<b>Moderators</b>	Sheldon Lin, MD and Jarrett D. Cain, DPM, MSc., FACFAS	Ronald K. June, PhD and Matthew J. Silva, PhD	Juan Taboas, PhD and Anita Ignatius, DVM	Andrea M. Ionescu, PhD and Magali Cucchiari, PhD	David A. Hoey, PhD and Michael Cross, MD
12:45 PM	<p>Paper No. 0212</p> <p><b>Accuracy and Feasibility of Dual Fluoroscopy to Quantify In-Vivo Kinematics of the Tibiotalar and Subtalar Joints</b></p> <p>Koren E Roach, Bibo Wang, Ashley Lynn Kapron, Niccolo Fiorentino, Madeline Singer, Charles Saltzman, Andrew Anderson</p>	<p>Paper No. 1986</p> <p><b>Deterioration of Trabecular and Cortical Microarchitecture and Reduced Bone Stiffness at Distal Radius and Tibia in Postmenopausal Women with Vertebral Fractures</b></p> <p>Ji Wang, Emily Stein, Bin Zhou, Kyle Nishiyama, Elizabeth Shane, X. Edward Guo</p>	<p>Spotlight Speaker</p> <p>Per Aspenberg, MD, PhD</p> 	<p>Paper No. 0221</p> <p><b>Reoxygenation Enhances TNF-alpha-induced Degradation of the Extracellular Matrix Produced by Chondrogenic Cells</b></p> <p>Brandon D Markway, Holly Cho, Paul Holden, Varshini Ravi, Christopher B Little, Brian Johnstone</p>	<p>Paper No. 0227</p> <p><b>Development of Pro-Resorptive Therapy for the Treatment of Heterotopic Ossification</b></p> <p>Song Xue, Roberto J Fajardo, Kevin P McHugh</p>
12:55 PM	<p>Paper No. 0213</p> <p><b>Dynamic Gait Simulation with Frontal Plane Misaligned Cadaveric Ankle Arthrodesis</b></p> <p>Whitney A Wright, William R Ledoux, Eric Whittaker, Calvin Hu, Dan Thuillier, Bruce J Sangeorzan</p>	<p>Paper No. 1987</p> <p><b>Connexin 43 is Necessary for the Development of a Functional Tendon Enthesis</b></p> <p>Hua Shen, Andrea G Schwartz, Roberto Civitelli, Stavros Thomopoulos</p>	<p><b>NSAIDs and Healing: Different Effect in Different Situations</b></p>	<p>Paper No. 0222</p> <p><b>Cell Cycle Synchronization During 2d Growth Enhances 3d Chondrogenesis</b></p> <p>Andrea R Tan, Martin Knight, J Chloe Bulinski, Clark Hung</p>	<p>Paper No. 0228</p> <p><b>Angiogenesis Is Required for the Earliest Phases of Chondrogenesis During Ectopic Bone Formation Induced by Demineralized Bone Matrix</b></p> <p>Beth Bragdon, Stephanie Lam, Sherif Aly, Elise F Morgan, Louis Gerstenfeld</p>
1:05 PM	<p>Paper No. 0214</p> <p><b>Step-off Vs. Contact Stress Following Articular Fracture Reduction: Which Measure Is Better For Predicting PTOA?</b></p> <p>Andrew M Kern, Donald Anderson</p>	<p>Paper No. 1988</p> <p><b>Single Dose of Bisphosphonate Preserves Long-term Gains in Bone Mass Following Cessation of Sclerostin Antibody in Osteogenesis Imperfecta Model</b></p> <p>Joseph E Perosky, Bethany Meyer, Terese Jenks, David K Barton, Benjamin P Sinder, Joan C Marini, Michelle S Caird, Kenneth M Kozloff</p>		<p>Paper No. 0223</p> <p><b>Matrilin-3 Stimulates Chondrogenesis by Activating Epidermal Growth Factor Signaling in Chondroprogenitor Cells.</b></p> <p>Chathuraka Teekshana Jayasuriya, Nicholas J Lemme, Zhengke Wang, Qian Chen</p>	<p>Paper No. 0229</p> <p><b>Microvascular Constructs Increase Early Vascularity in the Limb but Impede Bone Regeneration in a Composite Bone and Muscle Injury Model</b></p> <p>Mon-Tzu A Li, Laxminarayanan Krishnan, Nick J Willett, Gordon Warren, Robert E Goldberg</p>
1:15 PM	<p>Paper No. 0215</p> <p><b>Post-traumatic Inflammatory Cytokine Profile in Synovial Fluid Following Intra-Articular Ankle Fracture</b></p> <p>Samuel B Adams, Richard Bell, Dana L Nettles, Mark Easley, Janet Huebner, Virginia B. Kraus, Steven A Olson, Lori A. Setton</p>	<p>Paper No. 1989</p> <p><b>Tendon Mineralization Is Progressive And Detrimental To Tendon Biomechanical Properties</b></p> <p>Kairui Zhang, Michael W Hast, Louis J. Soslosky, Motomi Enomoto-Iwamoto</p>	<p>Paper No. 0218</p> <p><b>Cells of the Innate AND Adaptive Immune System jointly Influence the Endochondral Ossification in Bone Regeneration</b></p> <p>Sebastian Wendler, Claudia Schlundt, Alessandro Serra, Hanna Schell, Hans-Dieter Volk, Georg Duda, Katharina Schmidt-Bleek</p>	<p>Paper No. 0224</p> <p><b>Stable And Efficient Differentiation Of Human Induced Pluripotent Stem Cells Toward Articular Chondrocytes By Defined Growth Factors</b></p> <p>Jieun Lee, Piera Smeriglio, Sarah E. B. Taylor, Janice H Lai, William Maloney, Fan Yang, Nidhi Bhutani</p>	<p>Paper No. 0230</p> <p><b>Cyclooxygenase 2 Deficient Muscle Derived Stem Cells Exhibit an Impaired Bone Regeneration Capacity via Cell Autonomus and Non-Autonomus Mechanisms</b></p> <p>Xueqin Gao, Arvydas Usas, Aiping Lu, Ying Tang, Johnny Huard</p>
1:25 PM	<p>Paper No. 0216</p> <p><b>Comparative Analysis of Fixed and Mobile Bearing Total Ankle Prostheses: Effect on Tibial Bone Strain and Tibial Component Fixation</b></p> <p>Alexandre Terrier, Maika Guilemin, Caroline Sieger Fernandes, Xavier Crovoisier</p>	<p>Paper No. 1990</p> <p><b>Exercise Protects Against TRPA1 Induced Joint Pain in Mice</b></p> <p>Erika Barboza Prado Lopes, Joanna Hudson, Carlton Fernandes, Kevin Gaffney, Paige Parrack, Michael Kinter, Timothy Griffin</p>	<p>Paper No. 0219</p> <p><b>Youthful Factors Secreted by Macrophages Rejuvenate Fracture Healing in Aged Mice</b></p> <p>Linda Vi, Gurpreet S Baht, Heather Whetstone, Adeline H Ng, Raymond Poon, Benjamin Alman</p>	<p>Paper No. 0225</p> <p><b>Purinergic Signaling Regulates The Chondrogenic Response Of MSCs To Hydrostatic Pressure</b></p> <p>Andrew J Steward, Daniel J Kelly, Diane R Wagner</p>	<p>Paper No. 0231</p> <p><b>Tissue Engineered Periosteum Modulates Allograft Healing Via Elaboration Of Angiogenic Growth Factors</b></p> <p>Michael D. Hoffman, Regine Choe, Danielle S.W. Benoit</p>
1:35 PM	<p>Paper No. 0217</p> <p><b>Gait and Functional Outcomes 5 years After Total Ankle Replacement</b></p> <p>Robin M Queen, Abigail L Carpenter, Robert J Butler, Samuel B Adams</p>	<p>Paper No. 1991</p> <p><b>Mechanically-induced Changes In Serum Cartilage Matrix Biomarkers Predict Regional Changes In Cartilage Thickness 5 Years Later In Human Subjects With Knee OA</b></p> <p>Shikha Sheth, Jennifer Erhart-Hledik, Bao Do, Matthew Titchenal, Thomas P Andriacchi, Constance R Chu</p>	<p>Paper No. 0220</p> <p><b>Systemic Bone Loss Following Femoral Fracture in Mice: A Mechanism for Increased Fracture Risk</b></p> <p>Armaan J Emami, Chrisoula A Toupadakis, Clare E Yellowley, David P Fyhrie, Blaine A Christiansen</p>	<p>Paper No. 0226</p> <p><b>Pathway Analysis to Identify Co-Culture Generated Factors Involved in the Rejuvenation of Adult MSCs for Cartilage Tissue Engineering</b></p> <p>Minwook Kim, Jason A Burdick, Robert Mauck</p>	<p>Paper No. 0232</p> <p><b>Autogenic Mesenchymal Stem/Stromal Cells (MSC) are Superior to Allogeneic MSC in Regeneration of Large Bone Defects</b></p> <p>Anna E Rapp, Ronny Bindl, Markus Rojewski, Julia Kemmler, Annika Erbacher, Hubert Schrezenmeier, Ingo Mueller, Anita Ignatius</p>

TIME	SESSION 45 Knee - Mechanics & Modeling	SESSION 46 Bone Mechanics and Finite Element Analysis	SESSION 47 Knee Ligaments & Meniscus	SESSION 48 Cartilage Mechanobiology	SESSION 49 Biomaterials for Cartilage Repair
	Room # 111-112	Room # 113-114	Room # 116	Room # 118-120	Room # 121-122
<b>Moderators</b>	Aidin Masoudi, MD and Donald D. Anderson, PhD	Kenneth M. Kozloff, PhD and Mathew T. Mathew, PhD	Jason Shearn, PhD and Matthew Fisher, PhD	Timothy E. Hewett, PhD and Alicia R. Jackson, PhD	Douglas J. Adams, PhD and Ferris M. Pfeiffer, PhD
2:30 PM	<p>Paper No. 0233</p> <p><b>Simultaneous Evaluation Of Jump-landing Task With Three-dimensional Kinematic Analysis And Landing Error Scoring System. Correlation Of The Results Obtained From The Two Evaluation Methods.</b></p> <p>Takatoshi Morooka, Hiroshi Nakayama, Kaori Kashiwa, Shunichiro Kambara, Tomoya Iseki, Takeo Nagura, Shinichi Yoshiya</p>	<p>Paper No. 0239</p> <p><b>Pregnancy, Lactation, and Weaning Induce a Physiological Redistribution of Bone Mass at Multiple Skeletal Sites with Minimal Impact on Bone Quality</b></p> <p>Chantal M de Bakker, Connie Li, Allison Altman, Juhanna Robberts, Wei-Ju Tseng, X. Sherry Liu</p>	<p>Paper No. 0245</p> <p><b>Long-term In-vivo Evaluation Of A Resorbable PLLA Device For Regeneration Of The Anterior Cruciate Ligament</b></p> <p>William R Walsh, Nicky Bertollo, Robert Arciero, Robert Stanton, Robert A Poggie</p>	<p>Paper No. 0251</p> <p><b>Time Scales in Cartilage Impact Injury and Chondrocyte Death</b></p> <p>Lena R Bartell, Michelle L Delco, Lawrence J Bonassar, Lisa A Fortier, Itai Cohen</p>	<p>Paper No. 0257</p> <p><b>Adhesive Barrier: Anisotropic Controlled Release for Cartilage Repair by Endogenous Progenitor Cell Recruitment</b></p> <p>Jong-Min Lee, Eun-Ah Kim, Gun-Il Im</p>
2:40 PM	<p>Paper No. 0234</p> <p><b>A Combined Experimental and Computational Approach to Subject-Specific Analysis of Human Knee Joint Laxity</b></p> <p>Michael D Harris, Adam J Cyr, Azhar Ali, Clare K Fitzpatrick, Paul J Rullkoetter, Kevin B Shelburne</p>	<p>Paper No. 0240</p> <p><b>Effect Of Diabetes On Bone In The ZDSR Rat</b></p> <p>Jeffrey S Nyman, Sasidhar Uppuganti, Mathilde Granke, Alexander Makowski, Barbara Rowland, Paul Vozizyan</p>	<p>Paper No. 0246</p> <p><b>Anteromedial and Posterolateral Bundles of the Anterior Cruciate Ligament Exhibit Different Microstructural and Material Properties</b></p> <p>Nathan W Skelley, Ryan M Castile, Timothy E York, Viktor Gruve, Robert H Brophy, Spencer P Lake</p>	<p>Paper No. 0252</p> <p><b>Mechanically Induced Purinergic and Calcium Signaling Directs Chromatin Condensation in Mesenchymal Stem Cells</b></p> <p>Su-Jin Heo, Tristan Driscoll, Woojin M Han, Stephen D Thorpe, Dawn M Elliott, David A Lee, Robert L Mauck</p>	<p>Paper No. 0258</p> <p><b>Comparison of Cartilage Damage from Articulation with Peek or CoCr Implants</b></p> <p>Philip J Chuang, Carlos Aponte, Zongtao Zhang, Lin Song</p>
2:50 PM	<p>Paper No. 0235</p> <p><b>Computational Analysis of Factors Contributing to Patellar Dislocation</b></p> <p>Clare K Fitzpatrick, Aruna Tumuluri, Robert Steensen, Thai Trinh, Jared Bentley, Paul J Rullkoetter</p>	<p>Paper No. 0241</p> <p><b>Development of a Controlled Damaging Cyclic Loading Model of the Rabbit Ulna</b></p> <p>Evan G Buettmann, Matthew Silva</p>	<p>Paper No. 0247</p> <p><b>Sex Influences the Biomechanical Outcomes of Anterior Cruciate Ligament Reconstruction in a Pre-Clinical Large Animal Model</b></p> <p>Ata M Kiapour, Braden C Fleming, Martha M Murray</p>	<p>Paper No. 0253</p> <p><b>Dynamic Compression Results in Metabolomic Changes in Agarose-Encapsulated Primary Human OA Chondrocytes</b></p> <p>Donald Zignego, Jonathan Hilmer, Ronald K June</p>	<p>Paper No. 0259</p> <p><b>Silk Fibroin Sponges that Cover Articular Cartilage Defects of the Knee Enhance Cartilage Repair in a Canine Model</b></p> <p>Masahiko Saito, Arata Nakajima, Masato Sonobe, Ryouusuke Nakagawa, Shinji Taniguchi, Manabu Yamada, Naohide Tomita, Yasushi Tamada, Koichi Nakagawa</p>
3:00 PM	<p>Paper No. 0236</p> <p><b>Quantifying the Relationship between Pre-Operative Knee Joint Function during Gait with Improved Joint Function Due to Primary TKA.</b></p> <p>Jereme Outerleys, Cheryl Kozey, Michael Dunbar, Janie Astephen Wilson</p>	<p>Paper No. 0242</p> <p><b>Prediction of Vertebral Wedge Strength Using Density, Morphometric and Microstructural Properties Derived from DXA, HRCT and DTS</b></p> <p>Woong Kim, Daniel Oravec, Mary Nixon, George Divine, Michael J Flynn, Yener N Yeni</p>	<p>Paper No. 0248</p> <p><b>The Anterolateral Ligament Carries Load And Provides Additional Stability In The ACL-deficient Knee But Carries Minimal Load When The ACL Is Intact</b></p> <p>Kyle Stone, Ran Thein, James Boorman-Padgett, Mohammad Kia, Thomas Wickiewicz, Andrew Pearle, Carl Imhauser</p>	<p>Paper No. 0254</p> <p><b>Alterations in In Vivo Knee Cartilage Contact After Anterior Cruciate Ligament Reconstruction and Correlations to Clinical Outcomes</b></p> <p>Eric Thorhauer, Kimberly Sass, Andrew Sivaprakasam, James J Irrgang, Freddie H. Fu, Scott Tashman</p>	<p>Paper No. 0260</p> <p><b>Biomechanical Evaluations Of A Novel Hydroxyapatite-coated PAMPS/PDMAAm Double-network Hydrogel As A Potential Artificial Cartilage Having Adhesive Ability To The Bone</b></p> <p>Susumu Wada, Nobuto Kitamura, Takayuki Nonoyama, Ryuji Kiyama, Shingo Semba, Jun Onodera, Yasuyuki Kawaguchi, Kotaro Higa, Takayuki Kurokawa, Jian Ping Gong, Kazunori Yasuda</p>
3:10 PM	<p>Paper No. 0237</p> <p><b>In Vivo Kinematics for Customized, Individually Made vs. Traditional TKA During a Chair Rise and Deep Knee Bend Activity</b></p> <p>Bradley A Meccia, Harold Gates, Matthew Anderle, William Hamel, Adrija Sharma, Richard D Komistek</p>	<p>Paper No. 0243</p> <p><b>Application of Artificial Neural Networks to Improve Predictive Ability of Computational Joint Models</b></p> <p>Ruchi Chande, Norma Ortiz-Robinson, Rosalyn Hobson Hargraves, Jennifer S Wayne</p>	<p>Paper No. 0249</p> <p><b>Site-Specific Biomechanical Properties of Human Meniscus - Importance of Collagen and Fluid Nonlinearities</b></p> <p>Elvis K Danso, Janne T.A. Mäkelä, Petri Tanska, Mika E Mononen, Juuso T.J. Honkanen, Jukka S Jurvelin, Juha Töyräs, Petro Julkunen, Rami K Korhonen</p>	<p>Paper No. 0255</p> <p><b>Alterations in In Vivo Knee Cartilage Sub-Critical Impact Inhibits Cartilage Lubrication Mechanisms</b></p> <p>Edward D Bonnevie, Michelle L Delco, Lisa A Fortier, Devis Galesso, Cynthia Secchieri, Lawrence J Bonassar</p>	<p>Paper No. 0261</p> <p><b>Evaluation of Porcine Collagen Matrix for Cartilage Regeneration : Comparison of Two Different Membranes in Cartilage Defect Model</b></p> <p>Yoorim Choi, Sung-Hwan Kim, Dong Suk Yoon, Ji-Hoon Joo, Woo Jin Choi, Seung Hwan Han, Moses Lee, Jaewon Suh, Jin Woo Lee</p>
3:20 PM	<p>Paper No. 0238</p> <p><b>Progression of Micro-motion, Micro-gaps, and Trabecular Strain Shielding in Cemented Knee Replacements</b></p> <p>Mark A Miller, Priyanka Srinivasan, Dennis Janssen, Kenneth A. Mann</p>	<p>Paper No. 0244</p> <p><b>Computer-based 3d Puzzle Solving For Pre-operative Planning Of Articular Fracture Reductions In The Ankle, Knee, And Hip</b></p> <p>Andrew M Kern, Donald Anderson</p>	<p>Paper No. 0250</p> <p><b>Lateral Meniscal Graft Transplantation: Effect Of Fixation Method On Joint Contact Mechanics During Simulated Gait</b></p> <p>Caroline Brial, Moira McCarthy, Tony Chen, Hongsheng Wang, Russell F Warren, Suzanne A Maher</p>	<p>Paper No. 0256</p> <p><b>Articulation-Induced Responses of Superficial Zone Chondrocytes in Human Knee Articular Cartilage: Effects of Shear and Sliding</b></p> <p>Felix H Hsu, Alexander Y Hui, Albert C Chen, Martin K Lotz, Robert Sah</p>	<p>Paper No. 0262</p> <p><b>Mimicking Cartilage Tissue Zonal Organization by Engineering Hydrogels with Dual Gradient of Biochemical and Mechanical Cues</b></p> <p>Danqing Zhu, Fan Yang</p>

# POSTER SESSIONS: The ORS will have two Poster Sessions in Las Vegas.

Posters are located in the Marquee Ballroom.

Poster Session 1 (PS1): Posters will be displayed on Saturday and Sunday.

Poster Session 2 (PS2): Posters will be displayed on Monday and Tuesday.

## Poster Presenter Hours:

Authors will be available to answer questions during the following time.

### POSTER SESSION 1

Sunday, March 29

**EVEN** numbered poster presenters 4:45PM–5:25PM

**ODD** numbered poster presenters 5:20PM–6:00PM

### POSTER SESSION 2

Monday, March 30

**EVEN** numbered poster presenters 4:15PM–4:55PM

**ODD** numbered poster presenters 4:50PM–5:30PM

POSTER CATEGORIES	POSTER SESSION 1 #'S	POSTER SESSION 2 #'S
American Academy of Orthopaedic Surgeons (AAOS) Best Posters	AAOS1 - AAOS7	AAOS1 - AAOS7
Biomaterials - Other	263 - 319	1125 - 1186
Board of Specialty Society (BOS) Best Posters	BOS1 - BOS9	BOS1 - BOS9
Bone Fracture	628 - 671	1493 - 1538
Bone/Bone Biology	537 - 627	1402 - 1492
Cancer, Tumors	1060 - 1086	1923 - 1950
Cartilage, Synovium & Osteoarthritis	320 - 452	1187 - 1320
Diagnostic Imaging	1087 - 1122	1951 - 1985
Foot and Ankle	1034 - 1043	1894 - 1905
Hand and Wrist	1022 - 1033	1880 - 1893
Hip	831 - 848	1699 - 1713
Hip and Knee Arthroplasty	849 - 980	1714 - 1840
Infection	1044 - 1052	1906 - 1914
Knee	762 - 830	1630 - 1698
Late Breaking Poster Session	1992 - 2031	1992 - 2031
Meniscus	453 - 466	1321 - 1335
Muscle	518 - 536	1384 - 1401
New Investigator Recognition Award Finalists	25 - 64	25 - 64
Policies/Guidelines/Leadership	1123 - 1124	Not in PS2
Shoulder and Elbow	981 - 1021	1841 - 1879
Spine	672 - 761	1539 - 1629
Tendon/Ligament	467 - 517	1336 - 1383
Trauma	1053 - 1059	1915 - 1922
Women's Health Issues Board (WHIAB) Best Poster	WHIAB	WHIAB

**INTERNATIONAL COMBINED ORTHOPAEDIC  
RESEARCH SOCIETY (ICORS)  
BEST POSTERS**

- ICORS1 *Chinese Orthopaedic Research Society (CORS)*  
**A novel bone targeting delivery system carrying bone-forming and anti- bone resorption phytomolecule icaritin for prevention of steroid-associated osteonecrosis in rat model**  
Shi Hui Chen, Xin Luan Wang, Li Zhen Zheng, Nan Wang, Jiayong Zhang, Zhijun Yang, Ling Qin
- ICORS2 *Chinese Orthopaedic Research Society (CORS)*  
**TBX6 Variants: a Key Etiology for Congenital Scoliosis**  
Nan Wu, Zhihong Wu, Sen Liu, Jiaqi Liu, Zhenlei Liu, Yuzhi Zuo, Xuan Ming, Jianqiu Xiao, Xiaoli Chen, Feng Zhang and Guixing Qiu
- ICORS3 *International Chinese Musculoskeletal Research Society (ICMRS)*  
**Chondrocytes Directly Form Osteocytes in the Calcified Articular Cartilage in vivo**  
Y. Jing, Y. Ren, J. Borrelli, Y. Xiao, Y. Liu, C. Liu, J. Feng
- ICORS4 *International Chinese Musculoskeletal Research Society (ICMRS)*  
**Pregnancy, Lactation, and Weaning Induce Substantial Changes in Bone Microarchitecture and Remodeling in Rat Tibiae**  
Chantal de Bakker, Allison Altman, Connie Li, X. Sherry Liu
- ICORS5 *Japanese Orthopaedic Association (JOA)*  
**Elimination of BMP7 from the developing limb mesenchyme leads to articular cartilage degeneration and synovial inflammation with increased age**  
Kahaer Abula, Takeshi Muneta, Kazumasa Miyatake, Jun Yamada, Yu Matsukura, Makiko Inoue, Ichiro Sekiya, Daniel Graf, Aris N. Economides, Vicki Rosen, and Kunikazu Tsuji
- ICORS6 *Japanese Orthopaedic Association (JOA)*  
**Tumor Necrosis Factor- $\alpha$  Modulates Wnt Signaling in Nucleus Pulposus Cells by Activation of Cyclooxygenase 2 and Prostaglandin E<sub>2</sub>**  
Akihiko Hiyama, Daisuke Sakai, Joji Mochida
- ICORS7 *Korean Orthopaedic Research Society (KORS)*  
**Activation of G protein-coupled receptor 84 with capric acid inhibits RANKL-induced osteoclast differentiation via the suppression of NF- $\kappa$ B signaling and blocks cytoskeletal organization and survival in mature osteoclasts**  
Hyun-Ju Kim, Hye-Jin Yoon, Shin-Yoon Kim
- ICORS8 *Taiwan Orthopaedic Research Society (TORS)*  
**The use of demineralized bone matrix for anterior cruciate ligament reconstruction: a radiographic, histologic, and immunohistochemical study in rabbits**  
Shan-Ling Hsu, Ching-Jen Wang
- ICORS9 *Taiwan Orthopaedic Research Society (TORS)*  
**A facile approach toward protein-resistant biointerfaces based on photo definable poly-p-xylylene coating**  
Chih-Hao Chang, Chiao-Tzu Su, Bing-Heng Lee, Pin-Chun Chou, Hsien-Yeh Chen

**BOARD OF SPECIALTY SOCIETY (BOS)  
BEST POSTERS**

- BOS1 *American Association for Hand Surgery (AAHS)*  
**Does SLAC IV Exist? A Radiographic and Magnetic Resonance Imaging Analysis**  
Alexia Marie Hernandez-Soria, MD; Steve Lee, MD; Lauren E. Lamont, MD; Nadja Farshad-Amacker, MD, Hollis Potter; Scott W. Wolfe, MD
- BOS2 *Arthroscopy Association of North America (AANA)*  
**Repeat Meniscus Repair: What Result Can We Expect**  
Paul Sousa, Benjamin Allen, Bruce Levy, Diane Dahm, Michael Stuart, Aaron Krych
- BOS3 *American Orthopaedic Foot & Ankle Society (AOFAS)*  
**The Effect of a Calcaneal Osetotomy in a Novel Asymmetric Ankle Arthritis Model**  
Jack Anavian, MD; Todd A. Fellars, MD; Heather Gotha, MD; Sarah Koruprolu, MS; David Paller, MS; Ryan Rich, MS; and Christopher W. DiGiovanni, MD
- BOS4 *American Society for Surgery of the Hand (ASSH)*  
**A Comparative Study of the Effects of Muscle-derived stem cell seeded Fibrin Gel and Collagen Gel Interposition in an in vitro Tendon Healing Model**  
Yasuhiro Ozasa, Anne Gingery, Chunfeng Zhao, Andrew Thoreson, Kai-Nan An, Peter C. Amadio
- BOS5 *Cervical Spine Research Society (CSRS)*  
(Basic Science Poster)  
**Effect of rhBMP-2 on Lung Cancer Spine Metastasis in Rodents**  
Abhishek Kannan, BS, Kevin Sonn, MD, Sharath S. Bellary, MD, Chawon Yun, PhD, Sohaib Hashmi, MD, John T. Nelson, MD, Amruta Ashtekar, MS, Anjan Ghosh, Nicholas Shawen, BS, Michael S. Nickoli, MD, Jason H. Ghodasra, MD, MSCI, Michael Okoli, Stuart Stock, PhD, Erin L. Hsu, PhD, and Wellington K. Hsu, MD
- BOS6 *Cervical Spine Research Society (CSRS)*  
(Clinical Poster)  
**Full Body Eos Analysis Of The Maintenance Of Functional Cbva And Horizontal Gaze Among Hypo-lordotic Verses Hyper-lordotic Patients**  
Vincent Challier, MD, Renaud Lafage, MS, Emmanuelle Ferrero, MD, Barthelemy Liabaud, MD, Bassel G. Diebo, MD, Shian Liu, BS, Justin S. Smith, MD, PhD, Christopher P. Ames, MD, Eric O. Klineberg, MD, Peter Passias, MD, Themistocles S. Protopsaltis, MD, Thomas J. Errico, MD, Frank J. Schwab, MD, and Virginie C. Lafage, PhD
- BOS7 *James Robert Gladden Orthopaedic Society (JRGOS)*  
**Grafting Articular Defects in the Acetabulum: Is the Medial Tibial Plateau a Suitable Donor Site for Osteochondral Allografts?**  
Perry S. Bradford, BA, Hugh L. Jones, BS, Jesal N. Parekh, PhD, Melvyn A. Harrington, MD, Philip C. Noble, PhD

BOS8 *Pediatric Orthopaedic Society of North America (POSNA)*  
**Angiographic Documentation of Restoration of Blood Flow to an Ischemic Proximal Femoral Epiphysis by Modified Dunn Procedure for Unstable Slipped Capital Femoral Epiphysis**  
J. Benjamin Jackson, III, Steven L. Frick, Scott Broadwell, Eric Wang, Brian K. Brighton, Virginia F. Casey

BOS9 *Orthopaedic Trauma Association (OTA)*  
**In Vivo Chemistry and Implantable Biomaterial for Targeting Therapeutics**  
José M. Mejía Oneto, MD, PhD; Munish C. Gupta, MD; Kent Leach, PhD; Mark A. Lee, MD; Maksim Royzen, PhD

## AMERICAN ACADEMY OF ORTHOPAEDIC SURGEONS (AAOS) BEST POSTERS

- AAOS1 *AAOS Best Hip Poster*  
**Reliability of Modern Ceramic Femoral Heads in over 5.7 Million Hip Implants**  
Gwo-Chin Lee, MD, Raymond H. Kim, MD
- AAOS2 *AAOS Best Knee Poster*  
**Routine Examination of Tissue from Total Knee Arthroplasty is Not Cost Efficient and does Not Affect Patient Care**  
David Liebelt, MD, PhD, Joseph Greene, MD, Theofanis Zois, PA-Cm Didi Omiyi, MD, Fred D. Cushner, MD, Giles R. Scuderi, MD
- AAOS3 *AAOS Best Foot & Ankle Poster*  
**Advanced Glycation End Products Inhibitor Protects Against Diabetic Skeletal Muscle Atrophy**  
Rong-Sen Yang, MD, Shing-Hwa Liu, PhD
- AAOS4 *AAOS Best Hand and Wrist Poster*  
**An Outcome Analysis of 75 Consecutive Cases of Revision Proximal Interphalangeal Arthroplasty**  
Robert Van Demark, MD
- AAOS5 *AAOS Best Shoulder and Elbow Poster*  
**Quantification of the Position, Orientation, and Surface Area of Posterior Bone Loss in Type B2 Glenoids**  
Nikolas Knowles, Louis Ferreira, MSc, Jay D. Keener, MD, George S. Athwal, MD
- AAOS6 *AAOS Best Spine Poster*  
**Do Upper Instrumented Vertebra Selection Recommendations Predict Shoulder Imbalance?**  
Benjamin Bjerke-Kroll, MD, Zoe B. Cheung, BS, MS, Grant Shifflett, MD, Sravisht Iyer, MD, Peter Derman, MD, Joseph Liu, MD, Matthew E. Cunningham, MD, PhD
- AAOS7 *AAOS Best Tumor Poster*  
**Impact of Advanced Age and Comorbidity Burden on Morbidity and Mortality after Musculoskeletal Tumor Surgery**  
Koichi Ogura, MD, Hideo Yasunaga, MD, PhD, Yusuke Shinoda, MD, PhD, Hirotaka Kawano, MD, PhD, Sakae Tanaka, MD, PhD

## AAOS WOMEN'S HEALTH ISSUES ADVISORY BOARD (WHIAB) BEST POSTER

*This poster will be presented at the podium on Monday, March 30 in Session 30: Genetics: Bone Development, Bone Aging*

WHIAB  
**Identification of New Models for Bone Research via High-Throughput Screening of Mice from the Knockout Mouse Project**  
Douglas J Adams, Renata Rydzik, Dana A Godfrey, Li Chen, Zhihua Wu, Caibin Zhang, Seung-Hyun Hong, Pujan Joshi, Xi Jiang, Dong Guk Shin, John P Sundberg, David W Rowe, Cheryl L Ackert-Bicknell

## ORTHOPAEDIC RESEARCH SOCIETY BEST POSTERS

*The following posters have been chosen as the "Best" of the ORS and were displayed at the American Academy of Orthopaedic Surgeons (AAOS) meeting, March 25-28 at the Venetian/Sands Expo.*

- Poster No. 0963 *ORS Best Hip Poster*  
**Modularity of Metal-on-Metal Hip Implants Increases Cobalt:Chromium Ratio**  
Kevin Ilo, Karim Aboelmagd, Harry Hothi, Robert Whittaker, Asaad Asaad, Gordon Blunn, John Skinner, Alister Hart
- Poster No. 0867 *ORS Best Knee Poster*  
**Factors Influencing TKR Joint Mechanics in the Varus Knee**  
Clare K Fitzpatrick, Sherrod Woods, Paul J Rullkoetter
- Poster No. 1902 *ORS Best Foot and Ankle Poster*  
**Predicting Tibial Stress Fields Around Total Ankle Replacements**  
Matthew A Hamilton, Phong Diep, James Nunley, James DeOrio, Mark Easley, Victor Valderrabano
- Poster No. 1117 *ORS Best Hand and Wrist Poster*  
**Multidimensional Ultrasound Imaging of the Wrist: Changes of Shape and Displacement of the Median Nerve and Tendons in Carpal Tunnel Syndrome**  
Anika Filius, Peter C. Amadio, Marjan Scheltens, Hans G. Bosch, Pieter A. van Doorn, Henk J. Stam, Steven E.R. Hovius, Ruud W. Selles
- Poster No. 1013 *ORS Best Shoulder and Elbow Poster*  
**Are The Brains Of Patients With Complex Shoulder Instability Wired Differently?**  
Anthony Howard, Joanne Powell, David Hawkes, Alison Kinghorn, Jo Gibson, Omid Alizadehkhayat, Graham Kemp, Simon Frostick



Poster No. 0697 *ORS Best Spine Poster*

**Progressive Pattern of Vertebral Deformity in a Population-based Cohort Study of Vertebral Fracture: Association with Bone Mineral Density**  
Junichi Yamada, Koji Akeda, Norihiko Takegami, Toshihiro Kato, Koichiro Murata, Akinobu Nishimura, Ko Kato, Akihiro Sudo

Poster No. 1060 *ORS Best Tumors Poster*

**The Epigenetic Regulation Of SOX9 By MiR-145 In Human Chondrosarcoma**  
Isabella Mak, Shalini Singh, Robert Turcotte, Michelle Ghert

## NEW INVESTIGATOR RECOGNITION AWARD (NIRA) POSTERS

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*The following posters will also be presented in the NIRA Presentations on Saturday, March 28 from 1:15 PM - 2:15 PM*

### NIRA 6 - BONE BIOLOGY & REPAIR

Poster No. 0025

**SDF-1/CXCR4 Axis in Tie2-lineage Cells Including Endothelial Progenitor Cells Regulates Bone Fracture Healing**

Yohei Kawakami, Masaaki Ii, Tomoyuki Matsumoto, Tomoya Kuroda, Yutaka Mifune, Taro Shoji, Tomoaki Fukui, Takayuki Asahara, Masahiro Kurosaka

Poster No. 0026

**Collagen-Based Bone Sialoprotein Implants Promote Cranial Bone Repair by Stimulating Osteoblastic Differentiation of Dura-Derived Osteoprogenitor Cells**  
Paul C. Cowan, Yan Wang, Qinghua Lu, John G. Yost, Yi Feng, Andrew H. Miller, Jinxi Wang

Poster No. 0027

**Identification of a Novel Regulatory Mechanism underlying PTH Anabolic Action on Bone Mass and Injury Repair via Induction of Tob Required for RANKL Expression**  
Shuichi Moriya, Yoichi Ezura, Tadayoshi Hayata, Yayoi Izu, Kazuo Kaneko, Masaki Noda

Poster No. 0028

**Organ Culture Based Real-time Luminescence Imaging Revealed The Circadian Clock Exists In A Fracture Healing Site Of A Mouse Femur**  
Tatsuya Kunimoto, Hiroyoshi Fujiwara, Naoki Okubo, Yoichi Minami, Toshihiro Hosokawa, Ryo Oda, Toshikazu Kubo, Kazuhiro Yagita

Poster No. 0029

**MT1-MMP Mediates Plasticity and Divergence of the Osteoblast and Adipocyte Lineages Through Cleavage of DLK1**  
Jason A Horton, Heba Degheidy, Teresa Yang, Nozomi Sakakibara, Steven R Bauer, Pamela G Robey, Kenn Holmbeck

Poster No. 0030

**Aptamer-Functionalized Delivery System for Osteogenic siRNAs to Achieve Osteoblast-Specific RNA Interference for Bone Anabolic Therapy**  
Chao Liang, Baosheng Guo, Heng Wu, Lingqiang Zhang, Aiping Lu, Ge Zhang

Poster No. 0031

**Macrophage-associated Osteoactivin/gpnmB Mediates Mesenchymal Stem Cell Survival, Proliferation and Migration via a CD44-dependent Mechanism**  
Bing Yu, Gregory Sondag, Christopher Malcuit, Min-Ho Kim, Faye F Safadi

Poster No. 0032

**Therapeutic Inhibition Of Mir-214 By (asp-ser-ser)6-liposome Encapsulating Antagomir-214 In Osteogenic Cells For Promoting Bone Formation In Aged Osteoporotic Rats**  
Baosheng Guo, Aiping Lu, Baoting Zhang, Ge Zhang

### NIRA 7 - JOINT PHYSIOLOGY & MECHANICS

Poster No. 0033

**Orthopaedic Grade Cobalt Chromium Alloy Particle Corrosion and Biological Evaluation**  
Danielle de Villiers, Agata Nyga, Terry Tetley, Akramul Hoque, Alister Hart, Julia C Shelton

Poster No. 0034

**Early Phase of Wear Particle Induced Inflammation was inhibited by NF- $\kappa$ B Decoy Oligodeoxynucleotide**  
Taishi Sato, Jukka Pajarinen, Tzu-Hua Lin, Florence Loi, Kensuke Egashira, Zhenyu Yao, Stuart B Goodman

Poster No. 0035

**Gender Differences in Knee Laxity and Stiffness: An In Vitro Study of Age Matched Specimens from a Younger Population**  
Daniel Boguszewski, Edward Cheung, Nirav Joshi, Keith Markolf, David McAllister

Poster No. 0036

**Molecular Characteristics Proving Femoroacetabular Impingement As The Precursor To Hip Osteoarthritis**  
Nobuaki Chinzei, Shingo Hashimoto, Takaaki Fujishiro, Shinya Hayashi, Noriyuki Kanzaki, Masahisa Hatakeyama, Shuhei Sakata, Shinsuke Kihara, Katsuhiko Haneda, Soshi Uchida, Ryosuke Kuroda, Masahiro Kurosaka

Poster No. 0037

**Sex Differences in Knee Cartilage Pressure Distribution Under Functional Loading Conditions: Implications for Knee Osteoarthritis Risk**  
Ata M Kiapour, Carmen E Quatman, Samuel C Wordeman, Vijay K Goel, Timothy E Hewett, Constantine K Demetropoulos

Poster No. 0038

**Estimation Of Optimal Shoulder Orientation During The Acceleration Phase In Baseball Pitching From Minimal Shoulder Joint Load Viewpoint**  
Hiroshi Tanaka, Toyohiko Hayashi, Hiroaki Inui, Yohei Takagi, Takanori Oi, Katsuya Nobuhara

Poster No. 0039

**Validation of MRI Quantification for Meniscus Volume Resection Following Partial Meniscectomy**

Shiree Segev, Brian T Feeley, Sharmila Majumdar, Richard B. Souza

Poster No. 0040

**Identification Of An Evolutionarily Conserved Host Response Against IsdA And IsdB As A Virulence Factor Associated With Death In Patients With Staphylococcus aureus Musculoskeletal Infections**

Kohei Nishitani, Alexander F Rosenberg, Christopher A Beck, Hiromu Ito, Stephen L Kates, John L Daiss, Edward M. Schwarz

NIRA 8 - CELL DIFFERENTIATION FIBROSIS & CANCER

Poster No. 0041

**Distinct Patterns Of 5hmC Acquisition Mark Chondrogenic Differentiation**

Sarah E. B. Taylor, Ye Henry Li, Piera Smeriglio, Madhusikta Rath, Wing H Wong, Nidhi Bhutani

Poster No. 0042

**Human Mesenchymal Stem Cell and Endothelial Cell Interaction through Endothelin-1**

Tsung-Lin Tsai, Bowen Wang, Matthew Squire, Lian-Wang Guo, Wan-Ju Li

Poster No. 0043

**Ex-vivo Gene Therapy-induced Cartilage Regeneration: Comparison of Different Subpopulations of Primary Muscle-Derived Cells**

Hongshuai Li, Aiping Lu, Ying Tang, MaCalus V Hogan, Johnny Huard

Poster No. 0044

**Inhibitory Effect of Photodynamic Therapy with a Novel Indocyanine Green-labeled Nanoparticle and Near-infrared Light on the Growth of Bone Metastasis of a Human Breast Cancer in vivo**

Toshinori Tsukanishi, Masataka Sakane, Tetsuya Abe, Toru Funayama, Shinzo Onishi, Eiichi Ozeki, Isao Hara, Masashi Yamazaki

Poster No. 0045

**RPN2 Gene Confers Osteosarcoma Lethal Phenotypes and Determines Clinical Prognosis**

Tomohiro Fujiwara, Toshiyuki Kunisada, Ken Takeda, Yutaka Nezu, Aki Yoshida, Koji Uotani, Kazuhisa Sugiu, Toshiki Omori, Takehiro Uehara, Yasuaki Yamakawa, Akira Kawai, Takahiro Ochiya, Toshifumi Ozaki

Poster No. 0046

**Oral Administration of Losartan significantly Improves Muscle Healing after Compartment Syndrome-Like Muscle Injury**

Makoto Kobayashi, Yohei Kawakami, Takanobu Otsuka, Freddie H. Fu, Johnny Huard

Poster No. 0047

**$\alpha$ v Integrin Depletion Inhibits Profibrotic Cell Activation And Skeletal Muscle Fibrosis**

Iain R Murray, Zaniah Gonzalez, John Iredale, Hamish Simpson, Bruno Peault, Neil Henderson

Poster No. 0048

**The Effect of Continuous and Local IL-4 Delivery on Systemic Macrophage Trafficking and Polyethylene Particle Induced Bone Loss**

Jukka Pajarinen, Taishi Sato, Tzu-hua Lin, Florence Loi, Ruth Zhang, Changchun Fan, Zhenyu Yao, Stuart B Goodman

NIRA 9 - OA & CARTILAGE

Poster No. 0049

**Mechanotransduction in Articular Chondrocytes: High-Strain Activates Piezo1 and Piezo2 Channels**

W. Lee, H. A. Leddy, Y. Chen, S. Lee, N. Zelenski, A. L. McNulty, J. Coles, J. Grandl, S. Zauscher, F. Sachs, W. Liedtke, F. Guilak

Poster No. 0050

**Protective Mechanism Adopted by Chondrocytes through Unfolding of Surface Ruffles during Mechanical Compression**

Eng Kuan Moo, Walter Herzog

Poster No. 0051

**Feasibility and Reproducibility of a Displacement Controlled MRI-Compatible Loading Device for Assessing Knee Articular Cartilage Deformation in Human Knees**

Hongsheng Wang, Matthew F Koff, Hollis Potter, Russell Warren, Scott Rodeo, Suzanne Maher

Poster No. 0052

**Legg-Calvé-Perthes Disease Produces Chronic Hip Synovitis and Elevation of Interleukin-6 in the Synovial Fluid**

Ryosuke Yamaguchi, Nobuhiro Kamiya, Naga Suresh Adapala, Elena Chen, David Neal, Hicham M Drissi, Harry Kim

Poster No. 0053

**Bone Marrow Stimulation Technique Augmented By Ultrapurified Alginate Gel Enhances Osteochondral Repair In A Rabbit Osteochondral Defect Model**

Rikiya Baba, Tomohiro Onodera, Daisuke Momma, Masatake Matsuoka, Kazutoshi Hontani, Norimasa Iwasaki

Poster No. 0054

**Administrations Of Tenascin-c Delay Cartilage Degeneration In Murine Models Of Osteoarthritis**

Hironori Unno, Masahiro Hasegawa, Yuriyo Matsui, Yoshiaki Suzuki, Takahiro Iino, Toshimichi Yoshida, Akihiro Sudo

Poster No. 0055

**Endogenous Stores of Latent TGF- $\beta$  Serve to Maintain the Integrity and Viability of Articular Cartilage Over Long Term Culture in Response to Physiologic and Excessive Dynamic Mechanical Loading**

Michael B Albro, Krista M Durney, Jay J Shim, Akaljot Singh, Gerard A Ateshian, Molly M Stevens

Poster No. 0056

**The Synovial Lymphatic System Plays a Critical Role in the Pathogenesis of Osteoarthritis**

Hao Xu, Wensheng Wang, Echoe Bouta, Ronald Wood, Hengwei Zhang, Edward M. Schwarz, Micheal Zuscik, Yongjun Wang, Lianping Xing

Poster No. 0057

**Wnt5a Treatment Of Embryonic Stem Cell Progenitors Promotes Cartilage Repair In A Rat Chondral Defect Model**

Jason D Gibson, Farhang Alaee, David N. Paglia, Ryu Yoshida, Thomas DeBerardino, Rosa Guzzo, Hicham Drissi

Poster No. 0058

**TGFβ1 Signalling in Human Mesenchymal Stem Cells is regulated by the Primary Cilium**

Marie-Noelle Labour, David Hoey

Poster No. 0059

**Intervertebral Disc Regeneration Using Mesenchymal Stem/Stromal Cells Transplanted Via The End-Plate Route in a Large Animal Model**

Gianluca Vadalà, Fabrizio Russo, Maria Musumeci, Francesca De Strobel, Marco Bernardini, Giulia De Benedictis, Luca Denaro, Domenico D'Avella, Rosaria Giordano, Vincenzo Denaro

Poster No. 0060

**Synovial Mesenchymal Stem Cells Enhance Healing of Meniscal Repair In The Avascular Zone of Longitudinal Tear Using A Pig**

Yusuke Nakagawa, Takeshi Muneta, Shimpei Kondo, Masafumi Horie, Hideyuki Koga, Ichiro Sekiya

Poster No. 0061

**Total Disc Replacement Using Tissue Engineered Intervertebral Discs In An In-vivo Beagle Model**

Yu Moriguchi, Rodrigo Navarro, Peter Grunert, Jorge Mojica, Katherine Hudson, Thamina Khair, Marjan Alimi, Lawrence Bonassar, Roger Hartl

Poster No. 0062

**The Role of Prostanoid Receptor EP4 on Adhesion Formation in Flexor Tendon Healing - Differential Effects of Tendon-Specific Deletion Versus Systemic Antagonism**

Michael B Geary, Caitlin Orner, Fatima Bawany, Warren C Hammert, Regis J O'Keefe, Alayna E Loiselle

Poster No. 0063

**The Role of Hedgehog Signaling in Entesis Healing**

Andrea G Schwartz, Leesa M Galatz, Stavros Thomopoulos

Poster No. 0064

**Human, Muscle-derived Induced Pluripotent Stem Cells Loaded Onto Coral Scaffolds Are Osteoinductive In An Ectopic Mouse Model**

Karim Oudina, Joseph Paquet, Emmanuelle Massourides, Morad Bensidhoum, Nathanael Larochette, Peter Upex, Mickael Deschepper, Delphine Logeart, Christian Pinset, Herve Petite

## POSTER SESSION 1

*Posters Will Be Displayed Saturday And Sunday*

PS1 BIOMATERIALS - OTHER

Poster No. 0263

**Mechanical And Chemical Analyses In Highly Cross-linked Polyethylene By Raman Spectroscopy**

Yoshihiro Miura, Masahiro Hasegawa, Leonardo Puppulin, Akihiro Sudo, Giuseppe Pezzotti

Poster No. 0264

**Metallic Surface Modifications Reduce Immune Response to Orthopedic Implants**

Kelly M Hotchkiss, Sharon L Hyzy, John J Ryan, Zvi Schwartz, Barbara D Boyan, Rene Olivares-Navarrete

Poster No. 0265

**Investigation Of Fretting-corrosion Behavior Of Peek-metal Interfaces And Comparison With Fretting-Corrosion of Metal-metal Interfaces**

Sevi Kocagoz, Eric Ouellette, Sachin A Mali, Jeremy L Gilbert, Steven M Kurtz

Poster No. 0266

**An Impact Testing Protocol for Evaluating the Fracture Resistance of Ceramic Femoral Components for Use in TKA**

Marcel E Roy, Leo A Whiteside, Kasisin Klunklin, Christina M Schmidt, Paul Begeman

Poster No. 0267

**Decellularized Pericardium as a Biologic Patch for Annulus Fibrosus Repair**

Rachel McGuire, Sanjitpal Gill, Dan Simionescu, Jeremy Mercuri

Poster No. 0268

**Reduced Taper Fretting Corrosion Using a Zirconia-toughened Alumina Femoral Head in a Hip Joint Simulator Study**

Masayuki Kyomoto, Yuichi Shoyama, Junji Ikeda, Mikio Iwamoto

Poster No. 0269

**The Apatite-forming Ability of The New Ti-Nb-Sn Alloy With low Young'S Modulus Via Anodic Oxidation And Hot Water Treatment**

Hidetatsu Tanaka, Yu Mori, Atsushi Noro, Norikazu Yamada, Shuji Hanada, Naoya Masahashi, Eiji Itoi

Poster No. 0270

**Mechanically Assisted Crevice Corrosion on CoCrMo Heads after Long-term Hip Simulator Wear Testing**

Chenxi Li, Amit Parikh, Jeff Sprague, Vivek Pawar

Poster No. 0271

**Metal Ion Release In Urine And Blood From Titanium Cups Cith Different Surface**

Alessandro Bistolfi, Andrea Cimino, davide deledda, alessandro masse, filippo castoldi, giuseppe massazza

PS1 BIOMATERIALS - CARTILAGE

Poster No. 0272

**Functionalizing Fibrin Hydrogels with Cartilage ECM Microparticles Enhances Chondrogenesis of Human Infrapatellar Fat Pad Stem Cells In Vitro and In Vivo**  
Henrique V Almeida, Rajalakshmanan Eswaramoorthy, Grainne Cunniffe, Fergal J O'Brien, Daniel J Kelly

Poster No. 0273

**Ex Vivo Performance of an Injectable Zwitterionic Polymer Network to Supplement the Tribological Properties of Articular Cartilage**  
Benjamin G Cooper, Brian D Snyder, Mark W Grinstaff

Poster No. 0274

**Real Time Assessment Of A New Hydrolytically Degradable And Photo-clickable Hydrogel For Cartilage Tissue Engineering**  
Alexander J Neumann, Timothy Quinn, Stephanie Bryant

Poster No. 0275

**Superior Tribological Performance of Poly(vinyl alcohol) Hydrogels for Artificial Cartilage**  
Teruo Murakami, Seido Yarimitsu, Kazuhiro Nakashima, Tetsuo Yamaguchi, Yoshinori Sawae, Nobuo Sakai, Atsushi Suzuki

Poster No. 0276

**3d-printed ABS And PLA Scaffolds For Cartilage And Intervertebral Disc Tissue Regeneration**  
Derek H Rosenzweig, Eric Carelli, Thomas Steffen, Peter Jarzem, Lisbet Haglund

Poster No. 0277

**In Vitro Maturation and In Vivo Delivery of Cartilage Repair Composites composed of Minced Cartilage in a Photopolymerizable Hyaluronic Acid Hydrogel**  
Christian G Pfeifer, Anish G.R. Potty, Vishal Saxena, Alexander L. Neuwirth, Minwook Kim, Niobra M. Keah, Rebekah S. Decker, Matthew B Fisher, Maurizio Pacifici, Robert L. Mauck

Poster No. 0278

**Development of a Cartilage-interpenetrating Hydrogel For Augmentation of Equilibrium and Time-dependent Mechanical Properties**  
Andrea M Simi, Shikha Sharma, Benjamin G Cooper, Rachel C Stewart, Mark W Grinstaff, Brian D Snyder

Poster No. 0279

**Chondrogenic Differentiation Of Genetically Modified hMSC Via Controlled Release Of rAAV Vectors From Self-assembling Peptide Hydrogels**  
Ana Rey Rico, Jagadeesh Venkatesan, Janina Frisch, Gertrud Schmitt, Amália Monge-Marcet, Alvaro Mata, Carlos Semino, Henning Madry, Magali Cucchiari

Poster No. 0280

**Ibuprofen Impairs Capsulolabral Healing in a Rat Model of Anterior Glenohumeral Instability**  
Jonathan D Packer, Arya V Varthi, Frances Javier, David Zhu, Jennifer V. Garver, Steven M Tommasini, Theodore A Blaine

Poster No. 0281

**A Simulated Long-Term Degradation Study of a Novel Artificial Medial Meniscus Implant**  
Jonathan J Elsner, Maoz Shemesh, Adaya Shefy-Peleg, Eyal Zylberberg, Eran Linder-Ganz

Poster No. 0282

**Synthetic PAMPS Gel Activates TGF-beta/BMP Signaling Pathway During The Chondrogenic Differentiation Of ATDC5 Cells**  
Keiko Goto, Nobuto Kitamura, Taichi Kimura, Shingo Semba, Takayuki Kurokawa, Jian P Gong, Shinya Tanaka, Kazunori Yasuda

Poster No. 0283

**Controlled Release Of Raav Vectors From Alginate-polyoxamer Complex Systems**  
Patricia Diaz-Rodriguez, Ana Rey Rico, Henning Madry, Mariana Landin, Magali Cucchiari

PS1 BIOMATERIALS - BONE

Poster No. 0284

**Inflammatory Responses of Osteocytes to Mechanical Perturbation and Wear Particles**  
Heon Goo Lee, Lee Song, Jungho Back, Francis Y Lee

Poster No. 0285

**Does Locally Delivered Zoledronate Influence Peri-implant Bone Formation? - Spatio-temporal Monitoring Of Bone Remodeling In Vivo**  
Ulrike Kettenberger, Julien Ston, Eric Thein, Philip Procter, Dominique Pioletti

Poster No. 0286

**Enhanced Peri-implant Osteogenesis by Synthetic Peptide Conjugation**  
Jeong Joon Yoo, Ji-Hye Lee, Jinwoo Nam, Soong Joon Lee, Hee Joong Kim

Poster No. 0287

**The Interactions Between BMP-2 and Hydrogel Stiffness in Stimulating Bone Formation**  
Shih Jye Tan, Josephine Fang, Zhi Yang, Marcel Nimni, Bo Han

Poster No. 0288

**Intraosseous Injections of rhBMP-2 Induces Periosteal Bone Formation in a Mouse Model of Osteogenesis Imperfecta**  
Tegan L Cheng, Aaron Schindeler, Craig M Munns, David G Little

Poster No. 0289

**Spinal Fusion With Bone Morphogenetic Protein-2 Delivered by hydroxyapatite/collagen in a Rabbit**  
Yasuda Hiroaki, Tomokazu Masaoka, Takashi Taniyama, Tsuyoshi Yamada, Wei Xuetao, Toshitaka Yoshii, Atsushi Okawa, Shinichi Sotome

Poster No. 0290

**Enrichment of DBM with BMP-2: Burst Release Combined with Long Term Binding**  
Nicole Bormann, Philipp Schwabe, Britt Wildemann

Poster No. 0291

**Osseoinductive, Osseoconductive And Antimicrobial Acrylate Hydrogel As Bone Graft Material**

Nathanael G Morris, Stefano Perni, Polina Prokopovich

Poster No. 0292

**Elution Characteristics of PMMA Bone Cement IM Spacers Impregnated with Vancomycin and Tobramycin**

Andrew G Patton, Brandon A. Perez, William L. Buford, Jr.

Poster No. 0293

**Surface Construction Of Zn Doped Hydroxyapatite/mg2 Multilayer Coatings For The Biomedical Mg Materials By A Novel Conversion/sol-gel Method**

Heng Jui Liu, Da Jun Lin, Subhaini Jakfar, Fei Yi Hung, Ming-Long Yeh

Poster No. 0294

**Implant Coating Technology with New Bioadhesive Materials**

Yohei Kagawa, Kentaro Yamane, Kensuke Shinohara, Noriyuki Watanabe, Aki Yoshida, Akihiro Matsukawa, Toshifumi Ozaki

Poster No. 0295

**Implantation of an Osteoconductive Additive Manufactured Titanium Alloy Implant Leads to Osteointegration Outside the Bone Envelope in Rats and Rabbits**

David J Cohen, Alexander Whitehead, Sharon L Hyzy, Barbara D Boyan, Zvi Schwartz

Poster No. 0296

**Engineered Magnesium-based Resorbable Porous Scaffold For Bone Tissue Engineering**

Hoi Man Wong, Paul K Chu, Frankie KL Leung, Kenneth MC Cheung, Keith DK Luk, Kelvin Wai Kwok Yeung

Poster No. 0297

**Collagen Plasma Treatment Of Poly-(ether-ether)-ketone For Improved Outcomes Of Osseointegration**

Jessica S Hayes, Seán Gaynard, Declan M Devine, Mary Murphy

Poster No. 0298

**Mechanical Properties of Rough and Surface Porous Polyether-ether-ketone**

Nathan Evans, David Safranski, F Brennan Torstrick, Christopher S.D. Lee, Kenneth M Dupont, W. Chang, Annie Macedo, Jennifer Boothby, Angela Lin, Kenneth Gall

Poster No. 0299

**The Effects Of Hyaluronic Acid And Poly-d,l-lactic Acid Coatings On Titanium Implant Fixation In Sheep**

Christina M Andreasen, Susan S. Henriksen, Ming Ding, Thomas Levin Andersen, Soeren Overgaard

Poster No. 0300

**The Optimization of Porosity and Pore Patterning for Ti-6Al-4V Bone Constructs Using Additive Manufacturing**

Glenn Sanders, Matthew DiCaprio, Ronald Bucinell, Stephen A Paolicelli

Poster No. 0301

**Cell Behaviors on Grit-blasted Titanium Disc with or without Platelet-rich Plasma Pretreatment**

Ji-Hye Lee, Jinwoo Nam, Soong Joon Lee, Hee Joong Kim, Jeong Joon Yoo

Poster No. 0302

**The Effects Of Cobalt Chromium Molybdenum Surface Topography On Mesenchymal Stromal Cells In Vitro**

Niall Logan, Alison Traynor, Laurent Bozec, Peter Brett

Poster No. 0303

**Effect Of Calcination Temperature On phase transformation, Corrosion Resistance And Cytocompatibility Of CaP-coated Magnesium Materials For Orthopaedic Application**

Da-Jun Lin, Subhaini Jakfar, Fei-Yi Hung, Ming-Long Yeh

Poster No. 0304

**Intramedullary Boron Containing Nano-Hydroxyapatite Bioceramic Application Improves Bone Mineral Density, Volume and Surface of Ovariectomized Rabbit Femurs**

Eda Çiftci, Feza Korkusuz, Petek Korkusuz, Hakan Hamdi Çelik, Alper Mehmet Çetinkaya

Poster No. 0305

**Mesenchymal Stem Cell Response To Uv-photofunctionalized Tio2 Coated Cobalt-chromium-molybdenum**

Niall Logan, Alison Cross, Alison Traynor, Laurent Bozec, Ivan Parkin, Peter Brett

Poster No. 0306

**Is Nano-Rough Topography A Solution For Enhanced And Stable Femoral Bone-Implant Interface In A Hip Implant?**

Sweetu B Patel, Farid Amirouche, Mathew Mathew, Tolou Shokuhfar

Poster No. 0307

**Allograft Bone Tissue Reconstitution Time and Associated Compressive Strength: A Biomechanical Analysis**

Mark D Barton, Amir H. Qureshi, Loren Latta, H. Thomas Temple

Poster No. 0308

**Development of a Novel Method for the Strengthening and Toughening of Irradiation-Sterilized Bone Allografts used in Orthopaedic Reconstructions**

Tarik Attia, Marc Grynepas, Thomas Willett

Poster No. 0309

**Intramedullary Wire Fixation of Bone Allograft for Reconstruction of Critically-Sized Radius Segmental Defect in a New Zealand White Rabbit Model**

Sam Si-Hyeong Park, Kate Banks, Peter Salat, Adeline H Ng, Christopher Kim, Marc Grynepas, Thomas Willett

Poster No. 0310

**Cortical Bone Mimetic Matrix for Regeneration of Segmental Bone Defects**

Danial Barati, Jeremiah T Easley, Ross H Palmer, Cecily Broomfield, Kirk McGilvray, EJ Ehrhart, Esmail Jabbari

Poster No. 0311

**Combined Use of Platelet-rich Plasma (PRP) and Autologous Bone Grafts for Regeneration of Long Bone Critical-size Defects**

Pascal Jungbluth, Johannes Schneppendahl, Simon Thelen, Mohssen Hakimi, Joachim Windolf, Jan Grassmann

Poster No. 0312

**Fluid Shifts And Microvascular Blood Flow In The Tibia Using Body Tilt And Lower Body Negative Pressure**

Jamila H Siamwala, Paul Lee, Brandon Macias, Alan Hargens

Poster No. 0313

**WITHDRAWN**

Poster No. 0314

**Faster Bone Healing Can Be Achieved By Using a Bone Marrow Stem Cells Concentrate Glass-Reinforced Hydroxyapatite Scaffold: An In Vivo Ovine Study**

Joao Torres, Manuel Gutierrez, Luis Atayde, Paulo Cortez, Maria Ascencao Lopes, Jose Domingo Santos, Abel Trigo Cabral, Carola F van Eck

PS1 BIOMATERIALS - TENDON AND LIGAMENT

Poster No. 0315

**Effect of Two Terminal Sterilization Techniques on the Functional Performance of Extracellular Matrix Scaffolds**

Gabriel S Perrone, Benedikt L. Proffen, Braden Fleming, Jakob Sieker, Joshua Kramer, Michael Hawes, Gary Badger, Martha Murray

Poster No. 0316

**ACL Replacement Using a Decellularised Xenograft Tendon**

Karin Hing, Gordon W Blunn

Poster No. 0317

**Human Fascia Lata ECM Scaffold Augmented with Immobilized Hyaluronan: Inflammatory Response and Remodeling in the Canine Body Wall and Shoulder Implantation Sites**

Diane Leigh, Myung-Sun Kim, David Kovacevic, Andrew Baker, Carmela Tan, Anthony Calabro, Kathleen Derwin

Poster No. 0318

**Biomechanical Properties of an Artificial Ligament Produced from Demineralized Bone for Anterior Cruciate Ligament Reconstruction**

Anita Vijapura, Ali Alhandi, David Kaimrajh, Edward Milne, Loren Latta, H. Thomas Temple

Poster No. 0319

**Effect of Electron Beam Sterilization on the In Vivo Function of Extracellular Matrix Scaffolds**

Gabriel S Perrone, Benedikt L. Proffen, Braden Fleming, Jakob Sieker, Joshua Kramer, Michael Hawes, Gary Badger, Martha Murray

PS1 CARTILAGE, SYNOVIUM & OSTEOARTHRITIS - CELL AND MOLECULAR IMAGING

Poster No. 0320

**Applying Three-Dimensional Confocal Imaging to Study Articular Cartilage**

Minjie Zhang, S. Balaji Mani, Amber Hall, Lin Xu, Yefu Li, David Zurakowski, Gregory Jay, Matthew Warman

Poster No. 0321

**3-D Organization of Cells and Matrix in Human Articular Cartilage**

Neil Chang, Van Wong, Esther Cory, Felix Hsu, Robert Sah

Poster No. 0322

**Contrast-enhanced  $\mu$ CT Arthrography (CE- $\mu$ CTA) Of Musculoskeletal Tissues In Mice**

Luis Cardoso, Daniel Leong, Hui Bin Sun

Poster No. 0323

**Raman Spectrographic Characterization of Cartilage Matrix Swelling via Lysyl Oxidase Inhibition in Immature Explants and Tissue Constructs**

Krista M. Durney, Robert J Nims, Michael Albro, Tingyi Gu, Lucie Karbowski, Akaljot Singh, Sinisa Vukelic, Clark Hung, Gerard Ateshian

Poster No. 0324

**Pathological and MR Imaging Evaluation of Articular Cartilage Degeneration in the Human Zygapophysial Joint**

Daisuke Yamabe, Hideki Murakami, Hirooki Endo, Koou Choukan, Itsuko Tsukimura, Minoru Doita

PS1 CARTILAGE, SYNOVIUM & OSTEOARTHRITIS - POST TRAUMATIC OA

Poster No. 0325

**Serum Biomarkers In A Novel In Vivo Model Of Post-traumatic Osteoarthritis**

Carin E Ahner, Aaron Stoker, Ferris Pfeiffer, Farrah Monibi, Seth Sherman, Chantelle Bozynski, James L Cook

Poster No. 0326

**In vivo Evidence of a Shift in Tibiofemoral Contact in ACL-Reconstructed Knees During Dynamic Motion**

Jarred Kaiser, Richard Kijowski, Geoffrey Baer, Darryl Thelen

Poster No. 0327

**IL-10 Reduces Apoptosis And Extracellular Matrix Degeneration After Injurious Compression Of Bovine Articular Cartilage**

Peter Behrendt, Andre Preusse-Prange, Alan J Grodzinsky, Bodo Kurz

Poster No. 0328

**Analysis of the Metabolic Response of Cartilage Tissue to Injury and Inflammation in vitro**

Aaron Stoker, Kathleen James, Ferris Pfeiffer, Keiichi Kuroki, Chantelle Bozynski, James Cook

Poster No. 0329

**P38 Mitogen-activated Protein Kinase Regulates HDAC4 Degradation In Growth Plate Chondrocytes**  
Jingming Zhou, Pengcui Li, Qian Chen, Xiaochun Wei, Ting Zhao, Zhengke Wang, Lei Wei

Poster No. 0330

**Influence of ACL Reconstructive Surgery on Tibiofemoral and Patellofemoral Kinematics: A Dynamic MRI Study**  
Jarred Kaiser, Arezu Monawer, Richard Kijowski, Geoffrey Baer, Darryl Thelen

Poster No. 0331

**The Correlation Of Cartilage Damage With Mechanical Properties In Early Stages Of Osteoarthritis Using A Mechanical Loaded Mouse Model**  
Hongsik Cho, Yong-Hoon Jeong, Do-Gyoon Kim, Karen A Hasty

Poster No. 0332

**Bone Morphological Changes Correlate with Reduction in PTA after Articular Fracture in the MRL/MpJ Mouse**  
Kelly A Kimmerling, Bridgette D Furman, Tyler J Vovos, Janet L Huebner, Virginia B Kraus, Farshid Guilak, Steven A Olson

Poster No. 0333

**Abnormal Mechanical Loading Induces Cartilage Degeneration By Accelerating Meniscus Hypertrophy And Mineralization After Acl Injury In Vivo**  
Guoqing Du, Hongsheng Zhan, Shaowei Wang, Fangyuan Wei, Jianzhong Zhang, Xiaochun Wei, Anthony M Reginato, Braden C Fleming, Bahar Bilgen, Lei Wei

Poster No. 0334

**Conditional And Cartilage-specific Expression Of Mechanosensitive Microrna-365 Accelerates Meniscus Injury Induced Osteoarthritis In A Murine Model**  
Rajiv J Iyengar, Kun Yang, Yun Gao, Zehong Yang, Wentian Yang, Qian Chen

Poster No. 0335

**Characterization of Cartilage-specific IKK $\beta$  and IKK $\kappa$  Inducible Knockout Mice in a Surgical Model of Osteoarthritis**  
Kirsty L Culley, Miguel Otero, Eleonora Olivotto, Jun Chang, Cecilia Dragomir, Kenneth B Marcu, Mary B Goldring

PS1 CARTILAGE, SYNOVIUM & OSTEOARTHRITIS - MATRIX PROTEINS, COLLAGEN AND PROTEOGLYCANS

Poster No. 0336

**Galectin-3 Enhances Cartilage Lubrication via Lubricin Binding**  
Heidi L. Reesink, Edward D Bonnevie, Sherry Liu, Lawrence Bonassar, Alan J Nixon

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**The Anabolic Effects Of Hif-1 $\kappa$ -induced Hsp70 In Rabbit Articular Chondrocyte Under Hypoxic Conditions**  
Shohei Ichimaru, Shinji Tsuchida, Yuji Arai, Shuji Nakagawa, Hiroaki Inoue, Tomohiro Matsuki, Kuniaki Honjo, Keiichiro Ueshima, Osam Mazda, Toshikazu Kubo

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**Lubricin/Proteoglycan 4 Binding to Cluster Determinant-44 (CD 44) Receptor and The Contribution of Central Mucin Domain Glycosylations**  
Maha Jamal, Tannin Schmidt, Gregory Jay, Khaled A Elsaid

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**Matrilin-3 Is An Inhibitor Of Angiogenesis In Vivo**  
Linda H Chao, Samir K Trehan, Qian Chen

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Yoshikazu Ogawa, Toshihisa Kojima, Nobunori Takahashi, Toki Takemoto, Naoki Ishiguro

PS1 CARTILAGE, SYNOVIUM & OSTEOARTHRITIS - FOCAL DEFECT REPAIR

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**The Functional Assessment Of A Bi-layered Implant For The Repair Of Osteochondral Defects**  
Tony Chen, Caroline Brial, Hongsheng Wang, Russell Warren, Suzanne Maher

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**Platelet-rich Plasma Impregnated Porous PVA Scaffolds Improve Integration With Cartilage Explants In A Dose-dependent Manner**  
Tony Chen, Supansa Yodmuang, Kyra Caldwell, Miguel Otero, Erik Attia, Russell Warren, Suzanne Maher

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**Detection and Characterization of Local Interfacial Mechanics in a Cartilage Defect Repair Model**  
Darvin Griffin, Amanda M Meppelink, Mark A Randolph, Itai Cohen, Lawrence Bonassar

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**Design and Fabrication of Minced Engineered Cartilage Fragments for Joint Repair**  
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**Chondroprotection of Tissue-Engineered Cartilage via Internal Delivery of Dexamethasone**  
Brendan L Roach, Arta Kelmendi-Doko, Elaine C Balutis, Brian K Jones, Gerard A Ateshian, Kacey G. Marra, Clark T Hung

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**Validation of Long-Term Preservation of Osteochondral Allografts at Room Temperature**  
Aaron Stoker, Clark Hung, Eric G Lima, James P Stannard, James L Cook

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**The Effect of Using Collagen Vitrigel Containing Transforming Growth Factor Beta 1 on Articular Cartilage Repair**  
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**Influence of Photosensitizer Concentration and Irradiance on Articular Cartilage Bond Strength**

Alberto L Arvayo, Chun Hua Zheng, Michelle Deng, Marc Levenston

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**Boundary Lubrication by Synovial Fluid in TMJ Disc and Condylar Cartilage**

Hunter Bachman, Brandon K Zimmerman, Eric J Granquist, David L Burris, X. Lucas Lu

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**Deleterious Effects of Blood on Cartilage Lubrication by Synovial Fluid: Friction and Wear are Impaired but not Correlated**

Michele M Temple-Wong, Ellie A Hofer, Haoran Qiu, Robert L Sah

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Jason P Caffrey, Bradley C Hansen, Kristina L Shia, Daniel P Arnold, Karen E Samy, Albert C Chen, Esther Cory, Shyni Varghese, Koichi Masuda, William D Bugbee, Robert L Sah

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**Sprifermin (rhFGF18) Preserves Articular Cartilage Depth-Dependent Properties During in Vitro Culture**

Gregory R Meloni, Alexandra Farran, Bhavana Mohanraj, Anne Gigout, Robert L Mauck, George R Dodge

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**Cartilage Deformation in ACL-Deficient Knees: A Dynamic In Vitro Model**

Justin W Arner, James N. Irvine, Liying Zheng, Margaret Hankins, Robert E. Carey, Eric D Thorhauer, Scott Tashman, Christopher D Harner, Xudong Zhang

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**Mechanically Aided Transport of Antibodies through Articular Cartilage**

Chris DiDomenico, Zhen Xiang Wang, Lawrence Bonassar

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**Subject-Specific 3D T2 Relaxation Mapping Of The Tibiofemoral Cartilage Contact Regions During Walking: A Dual Fluoroscopy And Magnetic Resonance Imaging Approach**

Gulshan B Sharma, Gregor Kuntze, Jillian E Beveridge, Chris Bhatla, Richard Frayne, Janet L Ronsky

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**Fabella Size: A Marker for Specific Compartment Osteoarthritis and Mechanics**

Douglas D Robertson, Jr., Elie Harmouche, Jad Chamieh, Walter Carpenter, Michael Terk, Scott A Banks

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**Contrast Agent's Transport Across Healthy Articular Cartilage Under Various Bath Conditions**

Behdad Pouran, Vahid Arbabi, Joaquin Villamar, Amir Abbas Zadpoor, Harrie Weinans

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**Impact Of The Synovial Fluid On Temperature Increase Due To Cartilage Viscoelastic Properties**

Mohamadreza Nassajian Moghadam, Philippe Abdel-Sayed, Valérie Malfroy Camine, Dominique P Pioletti

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**Relevance of the Spatial Distribution Pattern of Mechanical Properties of Articular Cartilage in Animal Studies**

Sotcheadt Sim, Insaf Hadjab, Martin Garon, Eric Quenneville, Michael D Buschmann

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**Improved Conditions To Enhance The Chondrogenic Differentiation Processes In Human Primary Bone Marrow Aspirates Via rAAV-mediated Gene Transfer**

Ana Rey Rico, Janina Frisch, Jagadeesh Venkatesan, Gertrud Schmitt, Henning Madry, Magali Cucchiarini

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**Enhanced Chondrogenic Differentiation Processes In Bone Marrow Aspirates From Minipigs Following rAAV-mediated Gene Transfer And Overexpression Of The Transcription Factor Sox9**

Janina Frisch, Ana Rey-Rico, Jagadeesh K Venkatesan, Gertrud Schmitt, Henning Madry, Magali Cucchiarini

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**Influence Of IGF-I Overexpression Via rAAV Gene Transfer Upon The Chondrogenic Differentiation Potential Of Human Bone Marrow Aspirates**

Janina Frisch, Ana Rey-Rico, Jagadeesh K Venkatesan, Gertrud Schmitt, Henning Madry, Magali Cucchiarini

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**Effect Of Inhibiting Mmp13 And Adamts5 Small Interference Rna (sirna) By Intra-articular Injection In A Surgically Induced Osteoarthritis Model Of Mice**

Hiroko Hoshi, Takahisa Sasho, Ryuichiro Akagi, Yuta Muramatsu, Yorikazu Akatsu, Joe Katsuragi, Taisuke Fukawa

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**Detection of Elevated CTXII Levels within the Knee Joint of a Rat Monoiodoacetate OA Model using a Novel Magnetic Capture Technique**

Elena G Yarmola, Yash Shah, David P. Arnold, Jon Dobson, Kyle D Allen

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**Multi-scale Delineation of Articular Cartilage Deterioration in Aging and Osteoarthritis**

Neil Chang, Esther Cory, Albert C Chen, Martin K Lotz, Robert Sah

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**In vitro Degradation and In Vivo Deterioration Analysis of a Bioluminescent Cartilage Reporter Mouse Model**

Sarah Mailhot, Garcia Allen, Donald Zignego, Ronald June



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**Intra-articular Injection Of Rebamipide Prevents Articular Cartilage Degeneration In Murine Models Of Osteoarthritis**

Yoshiaki Suzuki, Masahiro Hasegawa, Yuriyo Matsui, Hironori Unno, Takahiro Iino, Toshimichi Yoshida, Akihiro Sudo

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**Low Dosage Of Monoiodoacetic Acid Induces Arthritis Without Bone Defect In A Rat Model**

Mio Udo, Ichiro Sekiya, Kunikazu Tsuji, Nobutake Ozeki, Yusuke Nakagawa, Toshiyuki Ohara, Ryusuke Saito, Katsuaki Yanagisawa, Takeshi Muneta

PS1 CARTILAGE, SYNOVIUM & OSTEOARTHRITIS - TISSUE ENGINEERING AND REPAIR

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**Active: Preliminary Results At 5 Years Of A Randomized Trial Of Autologous Chondrocyte Implantation In The Knee Where Previous Surgery Has Failed**

James B Richardson, Jan Herman Kuiper, Martyn Snow, Hamish Simpson

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**Identification Of Prognostic Biomarkers For Autologous Chondrocyte Implantation In Cartilage Repair**

Karina T Wright, James B Richardson, Heidi Fuller, Sally Roberts

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**Cartilage Regenerative Capacity of Amnion-derived ECM-coated PLGA Scaffold in a Cartilage Defect Model in Nonhuman Primates**

Makiko Nogami, Shoji Seki, Hiraku Motomura, Ryuichi Gejo, Hiroto Makino, Toshio Nikaido, Tomoatsu Kimura

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**Scaffold-free Cell-matrix Bead-type Autologous Chondrocyte Implantation, Cartilifetm For Cartilage Repair: Early Clinical Results**

Kee Yun Chung, Sahnghoon Lee, Jungsun Lee, Jin-Yeon Lee, Byung-Chul Chae, Youngsook Son, Kyoung Ho Yoon, Myung Chul Lee

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**The Repair Of Articular Cartilage Defects Using A Transglutaminase 4 And Hydrogel Embedded With Synovium-derived Stem Cells In Rabbit Model**

Hyunjin Min, Sun Young Wang, Hee Jung Park, Yu Jung Kim, Kee Yun Chung, Hyuk Soo Han, Sahnghoon Lee, Myung Chul Lee

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**Repair Of Chronic Osteochondral Defect Using Magnetically Labeled Mesenchymal Stem Cells**

Elhussein Elbadry Mahmoud, Goki Kamei, Yohei Harada, Naosuke Kamei, Nobuo Adachi, Mitsuo Ochi

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**Comparison and Characterization of In Vitro and In Vivo Treatments of Lubricin-Mimetics on Articular Cartilage**

Kirk J Samaroo, Mingchee Tan, Marco Demange, Ashley Titan, Camila Carballo, Marco Sisto, Scott Rodeo, David Putnam, Lawrence Bonassar

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**TGF- $\beta$  induced Synergy Between Chondrocytes and Stem Cells for Articular Cartilage Repair In Vivo**

Janice H Lai, Lisa Su, R Lane Smith, William Maloney, Fan Yang

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**Enzymatically Treated Adult Cartilage Fragments for Cartilage Regeneration - Is Fibrin Glue Appropriate for Cartilage Repair?**

Alex J McNally, Jennifer Van Deven, Chris Chapman, Steve Lin, Kurt Sly

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**Hypoxia Enhances Colony Formation And Proliferation With Chondrogenic Potential In Passage 0 Human Synovial Mesenchymal Stem Cells**

Toshiyuki Ohara, Takeshi Muneta, Yu Matsukura, Kunikazu Tsuji, Ichiro Sekiya

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**Unraveling Chondrocyte and MSC Cocultures: Direct Cell-Cell Contact is Essential for Optimal Cartilage Regeneration**

Tommy S de Windt, Daniel B Saris, Ineke C Slaper-Cortenbach, Mattie H van Rijen, Wouter J Dhert, Lucienne A Vonk

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**Towards an Extracellular Matrix Based, In-situ Crosslinkable Scaffold for Cartilage Repair**

Emma Cavalli, Claudia Loebel, David Eglin, Marcy Zenobi-Wong

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**Optimization of a Novel Scaffold for Cartilage Repair**

Sarav Shah, Sandeep Pandit, Z Parikh, John A. Schwartz, Todd A Goldstein, L.P. Lavelle, Arindam Datta, Haixiang Liang, Daniel Grande

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**WITHDRAWN**

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**Treatment of Cartilage Defects With 3D Bio-Printed Scaffolding**

Todd A Goldstein, Benjamin Smith, John A. Schwartz, Jonathan Berkowitz, Daniel Grande

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**Enhanced Expression of Type II Collagen with a Micronized Cartilage Matrix and Platelet Derived Growth Factor**

James R Mullen, Kevin Myers, Zalak Parikh, Haixiang Liang, Daniel Grande

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**Magnetic Targeting of Chondrocyte Sheet for the Treatment of Osteoarthritis**

Seiju Hayashi, Yasunari Ikuta, Ryo Shimizu, Naosuke Kamei, Nobuo Adachi, Masataka Deie, Mitsuo Ochi

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**Age Independent Cartilage Generation for Synovium Based Autologous Chondrocyte Implantation**

Nahoko Shintani, Marius J.B. Keel, Kurt Lippuner, Ernst B Hunziker

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**Tissue Engineered Human Cartilage Sheets are Significantly Stiffer When Re-Differentiated at Low Oxygen Tension**

Thomas J Kean, G A Whitney, Geoff Traeger, Russell J Fernandes, James E Dennis

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**Physical Forces Modulate the Tissue Engineered Cartilage Ultrastructure**

Erica Kahn, Amy X Mei, Robert Stefani, Carol Ayala, Roy K Aaron, Bahar Bilgen

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**Chondrogenic Differentiation Of Bone Marrow-derived Mesenchymal Stem Cells Regulated By Wnt/beta-catenin Signaling Pathway**

Peng Cheng, Anmin Chen, Fengjing Guo, Hui Huang, Qing Yang, Weikai Zhang

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**Dynamic Axial Loading Disrupts Lateral Integration of Arthritic Human Articular Cartilage and Synthetic Tissue Engineered Scaffolds in an Ex Vivo Ring Model**

Benjamin R Mintz, Dean Papaliodis, Smelker Jordan, Garrett Leonard, Michael Mulligan, James A Cooper

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**Kartogenin Enhance Chondrogenic Differentiation of MSCs in 3-D Tri-copolymer Scaffold and Functional-Closed Perfusion System**

Chun-Ching Li, Ching-Yun Chen, Cherng-Jyh Ke, Feng-Hui Lin, Jui-Sheng Sun

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**MIAMI Cell hyaline cartilage formation is enhanced by TGF- $\beta$ 3-Releasing Pharmacologically Active Microcarriers And Human Cartilage Microparticles**

Gaetan J Delcroix, Gianluca D'Ippolito, Teresita Reiner, Theodore Malinin, H. Thomas Temple, Claudia N Montero-Menei, Paul C Schiller

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**Development Of An Ex-vivo Organ Culture Model Of The Femoral-tibial Joint**

Natalie Fox, Martin Stanley, Daniel S Thomas, John Fisher, Eileen Ingham

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**Develop Surface Treated Biphasic Poly (lattice-co-glycolic) Acid (PLGA) Scaffold to Maintain Chondrocyte Phenotype and Interface Integration**

Meng-Chian Wu, Wen-Hui Cheng, Hsueh-Chun Wang, Tzu-Hsiang Lin, Jhih-Jhan Lin, Horng-Chaung Hsu, Ming-Long Yeh

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**The Effect On Articular Cartilage Repair Using Collagen Vitrigel And Chondrocyte Sheets**

Yoshiki Tani, Masato Sato, Toshiaki Takezawa, Munetaka Yokoyama, Miyuki Kobayashi, Eriko Toyoda, Tomoko Kawake, Eri Okada, Joji Mochida

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**Depletion Of GD3 Synthase Enhances Osteoarthritis Development In Mice**

Dausuke Momma, Tomohiro Onodera, Fumio Sasazawa, Masatake Matsuoka, Shinji Matsubara, Norimasa Iwasaki

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**A Transcriptomic and Proteomic Analysis of Acute Changes in a Pig Model of Post-Traumatic Osteoarthritis**

Ugur M Ayturk, Carla M Haslauer, Tue Bennike, Jakob T Sieker, Benedikt L. Proffen, Matthew L Warman, Braden C Fleming, Martha M Murray

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**Endoplasmic Reticulum Stress-induced Apoptosis Contributes To Articular Cartilage Degeneration Via C/EBP Homologous Protein**

Yusuke Uehara, Jun Hirose, Hiroshi Mizuta

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**Genome-wide MicroRNA Expression Profiling And Pathway Analysis Reveal Progressive Changes In Epidermal Growth Factor Signaling In Experimental Osteoarthritis**

Paul J Fanning, Christopher Raskett, Yukiko Maeda, Nicholas Farina, Ellen Gravallese, Gary Stein, Janet Stein, David Ayers, Jane Lian

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**Deletion of the PH-domain and Leucine Rich Repeat Protein Phosphatase 1 (Pllpp1) Increases Fibroblast Growth Factor (Fgf) 18 Expression and Protects Against Surgically-Induced Osteoarthritis**

Elizabeth W. Bradley, Meghan E McGee-Lawrence, Lomeli R. Carpio, Derek F. Amanatullah, Sanjeev Kakar, Lauren E. Ta, Alexandra C. Newton, Jennifer J. Westendorf

PS1 CARTILAGE, SYNOVIUM & OSTEOARTHRITIS - GROWTH PLATE AND ENDOCHONDRAL OSSIFICATION

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**Meclozine, Motion Sickness Medicine, Has The Therapeutic Potential In Achondroplasia**

Masaki Matsushita, Hiroshi Kitoh, Kenichi Mishima, Yoshihiro Nishida, Naoki Ishiguro, Kinji Ohno

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**Loss Of Tet1 Impairs Endochondral Ossification In The Embryonic Growth Plate**

Piera Smeriglio, Sarah E. B. Taylor, Madhusikta Rath, Nidhi Bhutani

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**Promoting Endogenous Repair in a Rat Growth Plate Injury Model by Enhancing Mesenchymal Stem Cell Recruitment and Chondrogenesis**

Nichole Shaw, Michelle Sauque, Michael S Riederer, Nancy Hadley-Miller, Melissa D Krebs, Karin A Payne

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**Zonal and Regional Variations in Growth Plate Chondrocyte Deformation under Compression as Predicted by 3D Multiscale Simulations**

Jie Gao, Esra Roan, John L Williams

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**Bone-Like Microenvironment Induces Hypertrophy in Phenotypically Stable Nasal Chondrocytes**

Melika Sarem, Andrea Barbero, Neha Arya, Ivan Martin, V. Prasad Shastri

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**Characterization Of A 3d Model Of Mineralization In Atdc5 Cells**

Biming Wu, Rhima M Coleman

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**Growth Plate Chondrocyte Biomechanics and Mechanobiology: A Multi-Scale Study**

Jie Gao, Esra Roan, John L Williams

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**A Novel Mechanism of Chondrocyte Death in Cartilage Subjected to Extreme Loads**

Alexander Kotelsky, Andrea Lee, Mark Buckley

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**Age Dependent Cartilage Repair and Subchondral Bone Remodeling in a Minipig Defect Model**

Christian G Pfeifer, Matthew B Fisher, Vishal Saxena, Minwook Kim, Elizabeth A. Henning, George R Dodge, David R. Steinberg, Robert L. Mauck

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**Flux Calculations Based on Metabolomic Data for Human Chondrocyte Central Energy Metabolism in Response to Applied Compression**

Daniel Salinas, Cody Minor, Ross Carlson, Brendan Mumeay, Ronald June

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**Mechano-regulation Of NFATc In Articular Cartilage**

Ayesha Al-Sabah, Vic Duance, Emma Blain

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**Oa Chondrons: A Biosynthetically Active Cell Population Capable Of Responding To Biomechanical Loads Within The Implant**

Miriam Rothdiener, Tatiana Uynuk-Ool, Tino Felka, Bjoern Gunnar Ochs, Ulrich Stoeckle, Alan J Grodzinsky, Bernd Rolauuffs

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**The Role of Prenatal Movements in Promoting Postnatal Hip Joint Stability**

Mario Giorgi, Alessandra Carriero, Niamh C. Nowlan, Sandra Shefelbine

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**How Does The Actin Cytoskeleton Modulate The Local Elastic And Time-dependent Properties Of Chondrocytes During AFM Nanoindentation?**

Cristina Florea, Mika E Mononen, James M Fick, Janne Ylärinne, Cheng J Qu, Mikko J Lammi, Rami K Korhonen

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**Morphology Of Chondrocytes Within Articular Cartilage Affects The Solid But Not The Fluid Microenvironment Under Compression**

Hongqiang Guo, Suzanne Maher, Peter Torzilli

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**A Smart Aptamer Facilitates The Conjugated-Triptide Selectively Targeting Joint To Enhance Efficacy And Reduce Hepatotoxicity In Mice**

Biao Liu, Junzhe Huang, Jun Lu, Defang Li, Xiaojuan He, Ge Zhang, Aiping Lu

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**Bmp-2 Stimulation Works In A Cox-2 Dependent Manner To Promote Chondrocyte Maturation**

Jessica Cottrell, James O'Connor

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**Synovial Macrophages Promote TGF- $\beta$  Activation After Intra-Articular Injections of Oxidized LDL in Naïve Murine Knee Joints, Preventing Production of Pro-Inflammatory Factors S100A8/9, Chemokines and Aggrecanase-Induced Neo-Epitopes**

Wouter de Munter, Arjen B Blom, Peter M van der Kraan, Johannes Roth, Thomas Vogl, Wim B van den Berg, Peter L van Lent

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**Notch1 Negatively Mediates Mesenchymal Progenitor Cell Chondrogenic differentiation Mainly through Up-Regulation of Twist1**

Bo Tian, Yongjun Wang, John Marymont, Yufeng Dong

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**The Role Of The Tetraspanin CD9 In A Mouse Model Of Antigen-induced Arthritis**

Norihiko Sumiyoshi, Shigeru Miyaki, Hiroyuki Ishitobi, Tomoyuki Nakasa, Kenji Miyado, Mitsuo Ochi

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**Progranulin Protects Against Osteoarthritis Through Interacting With Tnf- $\kappa$  And  $\beta$ -catenin Signaling Pathway**

Jianlu Wei, Yunpeng Zhao, Qingyun Tian, Chuanju Liu

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**Salubrinal Suppresses Cartilage Degeneration in a Murine Knee Osteoarthritis Model**

Akinobu Nishimura, Kazunori Hamamura, Masahiro Hasegawa, Akihiro Sudo, Hiroki Yokota

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**High Systemic LDL Cholesterol Levels during Experimental Osteoarthritis Lead to Increased Synovial Activation and Ectopic Bone Formation at End-Stage Osteoarthritis, While Excessive Levels Accelerate Development of Joint Pathology Already at Early-Stage Osteoarthritis**

Wouter de Munter, Martijn H van den Bosch, Annet W Sloetjes, Peter M van der Kraan, Thomas Vogl, Johannes Roth, Wim B van den Berg, Peter L van Lent

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**Interaction With Macrophages Attenuates Fibroblast-like Synoviocyte Adamts5 (aggrecanase-2) Gene Expression Following Inflammatory Stimulation**

Rhiannon E Morgan, Peter D Clegg, John A Hunt, Simon R Tew

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**Characterization of a Model System to Study Synovial Membrane Transport Properties**

Robert Stefani, Andrea R Tan, Adam B Nover, J Chloe Bulinski, Gerard Ateshian, Clark Hung

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**Cdk9 Inhibitors Preserve the Mechanical Properties of Osteochondral Explants After Prolonged Storage**

Jasper Yik, Nina Liu, Kie Shidara, Derek Cissell, Kyriacos A Athanasiou, Dominik R Haudenschild

Poster No. 0427

**Endocannabinoid Anandamide and Fatty Acid Amide Hydrolase Inhibitor URB597 Prevent Interleukin-1 $\beta$ -Induced Cartilage Degradation While Enhancing Mesenchymal Stem Cell Chondrogenesis**

Stephen D Thorpe, Aoife Gowran, Jung H Kim, David A Lee

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**Low-Dose Preconditioning of Engineered Cartilage with Interleukin-1 $\kappa$  Provides Sustained Protection Against Subsequent Cytokine Exposure**

Andrea R Tan, Mukundan Attur, Steven Abramson, Martin M Knight, J Chloe Bulinski, Gerard Ateshian, Clark T Hung

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**Effects of Oxidized Low Density Lipoprotein on an in vitro Model of Canine Osteoarthritis**

Keiichi Kuroki, Chris Kennedy, Aaron Stoker, James L Cook

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**The Neuropeptide Substance P Suppresses Articular Chondrocyte Differentiated Activity**

Yurong Ouyang, Juan Taboas

Poster No. 0431

**Symptomatic Characterization Of Animal Model With Lumbar Facet Joint Osteoarthritis Induced By Non-invasive Needle Puncture**

Jae-Sung Kim, Jeffrey Kroin, Hong-Moon Sohn, Jae-Won You, Sang Soo Park, Dahye Oh, In-A Cho, Kyeong-Rok Kang, Sook-Young Lee, Do Kyung Kim, Chun Sung Kim, Su-Gwan Kim, Hee-Jeong Im

PS1 CARTILAGE, SYNOVIUM & OSTEOARTHRITIS - AGING

Poster No. 0432

**Proteomic Analysis Of Mesenchymal Stem Cell Ageing And Their Musculoskeletal Differentiation**

Mandy J Peffers, John Collins, Peter D Clegg

Poster No. 0433

**Methylation Profiling Of Mesenchymal Stem Cells And Their Musculoskeletal Differentiation With Ageing**

Mandy J Peffers, John Collins, Peter D Clegg

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**Effect of Osmotic Stress on Intracellular Calcium Signaling of In Situ Juvenile and Mature Chondrocytes**

Yilu Zhou, Michael A. David, Jie Ma, Liyun Wang, X. Lucas Lu

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**Comprehensive Transcriptome Analysis of Aging-related Change in Early Phase of Post-traumatic Osteoarthritis**

Tomoaki Fukui, Alesha B Castillo, Ashley Russell, Jasper HN Yik, Dominik R Haudenschild

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**Cannabinoid Receptor Expression in OA cartilage**

Sara L Dunn, Aileen Crawford, J Mark Wilkinson, Rowena A.D Bunning, Christine L Le Maitre

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**Thermally Responsive Pluronic-Chitosan-Small Molecular Drug Conjugated Nanocapsules with Controlled Dual Release for Combined Therapy of Osteoarthritis**

Mi Lan Kang, Ji Eun Kim, Gun-Il Im

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**Intra-articular Injection Of Magnesium Chloride (MgCl<sub>2</sub>) Attenuates The Progression Of Osteoarthritis Through Suppressing The Expression Of Nucleostemin**

Jerry Jiankun Xu, Yifeng Zhang, Jiali Wang, Kelvin Ho, Bruma Saichuen Fu, Kaiming Chan, Ling Qin

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**Synergistic Regulation of Chondrocytes by Progranulin Growth Factor and Low Intensity Pulsed Ultrasound**

Sardar Muhammad Zia Uddin, Chuanju Liu, Brendon Richbrough

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**Flavopiridol Restores Global Metabolome in Mouse Post-Traumatic Osteoarthritis**

Ronald June, Dominik R Haudenschild, Donald Zignego, Ziang Hu, Jasper Yik

Poster No. 0441

**Green Tea Polyphenol Treatment Is Chondroprotective, Anti-inflammatory And Palliative In A Mouse Post-traumatic Osteoarthritis Model**

Daniel Leong, Marwa Choudhury, Regina Hanstein, Lin Xu, David Hirsh, Sun J Kim, Robert J. Majeska, Mitchell B Schaffler, John A Hardin, David Spray, Mary B Goldring, Neil Cobelli, Hui Bin Sun

Poster No. 0442

**Intra-articular Delivery of Kartogenin Conjugated Chitosan Nano/microparticles for Cartilage Repair**

Mi Lan Kang, Ji-Yun Ko, Ji Eun Kim, Gun-Il Im

PS1 CARTILAGE, SYNOVIUM & OSTEOARTHRITIS - OSTEOARTHRITIS - CLINICAL

Poster No. 0443

**Correlations between Patient Reported Outcome and Gait Alterations Pre- and Post- Anterior Cruciate Ligament Reconstruction**

Aisia R Azus, Hsiang-Ling Teng, Lauren Tufts, Benjamin Ma, Richard Souza, Xiaojuan Li

Poster No. 0444

**Effect Of Obesity And Vitamin E On Mitochondrial Function In Human Chondrocytes**

Saran Tantavisut, Mitchell C Coleman, James A Martin, John Callaghan

Poster No. 0445

**Strenuous Running Enhances Degeneration Of Articular Cartilage In A Rat Mia-induced Arthritis Model**

Ryusuke Saito, Ichiro Sekiya, Nobutake Ozeki, Yusuke Nakagawa, Mio Udo, Katsuaki Yanagisawa, Kunikazu Tsuji, Takeshi Muneta

Poster No. 0446

**A Prospective Evaluation of Three Serum Biomarkers in Hip Arthroscopy Patients and Matched Controls**

Austin V. Stone, Christopher Stem, Elizabeth A Howse, Allston J. Stubbs

PS1 CARTILAGE, SYNOVIUM & OSTEOARTHRITIS - PROGENITORS AND STEM CELLS

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**After Repeated Division, Bone Marrow Stromal Cells Express Inhibitory Factors With Osteogenic Capabilities, And Epha5 Is A Primary Candidate.**

Tsuyoshi Yamada, Shinichi Sotome, Toshitaka Yoshii, Atsushi Okawa

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Sandra J Siatkowski, Taylor Pate, Richard J Hawkins, Michael Kissenberth, Stefan Tolan, Gregory P Colbath, Jeremy Mercuri

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Tony Lin, Erica Giles, Michael Glick, Charles Godbout, Sarah Ketcheson, Vladimir Iakovlev, Emil H Schemitsch, Aaron Nauth

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**Cited2 Is A Principal Regulator Of Telomerase Expression, A Representative Feature Of A Functionally Active Tendon Stem Progenitor Cell Population**

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Corina A Ghebes, Nathalie Groen, Hugo A M Fernandes, Daniel B F Saris

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**siRNA-mediated Gene Silencing of PAI-1 Rescues Plasmin and MMP Activity in TGF-beta1 Treated Flexor Tenocytes**

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Kaori L Graybeal, Catherine K Kuo

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Andrew S Quigley, Laurent Kreplak, Samuel P Veres

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Jeffrey R. Jaglowski, Brady T. Williams, Travis L Turnbull, Robert F LaPrade, Coen A Wijdicks

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Kosuke Uehara, Chunfeng Zhao, Anne Gingery, Andrew Thoreson, Kai-Nan An, Peter C. Amadio

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Camila Carballo, Xiangyu Gu, Zoe Album, Scott Rodeo Jr, Michael Mosca, Arielle Hall, Hongsheng Wang, Lilly Ying, Xiang-Hua Deng, Scott Rodeo

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Ra Jeong Kim, Young-Sool Hah, Jae-Ran Kang, Hyung Bin Park

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Mark L Wang, Pedro K Beredjikian, Maulik D Shah, Ryan Hoffman, Andrzej Fertala

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**Apoptotic Bodies from Tenocytes Enhance the Proliferation and Migration of Tenocytes and Bone Marrow Mesenchymal Stem Cells In Vitro Canine Model**

Chenhui Dong, Anne Gingery, Ramona Reisdorf, Kai-Nan An, Peter C. Amadio, Chunfeng Zhao

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Shun-Hao Tsao, Bo-Jiang Lin, Pen-hsiu Grace Chao

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Seung Yeon Lee, Hyang Kim, Hyeyoun Kim, Ji Sun Shin, Won Kee Park, Kang Sup Yoon, Chris Hyunchul Jo

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Seung Yeon Lee, Hyang Kim, Hyeyoun Kim, Ji Sun Shin, Won Kee Park, Kang Sup Yoon, Chris Hyunchul Jo

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Yasuhiro Ueda, Atsuyuki Inui, Takeshi Kokubu, Yutaka Mifune, Tomoyuki Muto, Yoshifumi Harada, Fumiaki Takase, Masahiro Kurosaka

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Franka Klatter-Schulz, Gerry Giese, Karen Ruschke, Regina Puts, Petra Knaus, Britt Wildemann

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Chien An Chen, Pen-hsiu Grace Chao

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Jungjoo Kim, Jillian Cornish, David Musson, Iain Anderson, Vickie Shim

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Jie Jiang, Jaime V Tan, Tien Phan, Nancy Morones, Karen M Lyons

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Parmis Sepanloo, Robert Blomgran, Jan Ernerudh, Per Aspenberg

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**Cell-Cell Junction Proteins and Embryonic Tendon Progenitor Cell Behavior are Influenced by Substrate Elastic Modulus and Protein Composition**

Nathan Robert Schiele, Steven C Bench, Nicole A Danek, Ava M Sanayei, Catherine K Kuo

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**Il-1 $\beta$  Inhibits Tenogenic Differentiation And Accelerates Glycolysis Activity In Injured Tendon-derived Progenitor Cells**

Kairui Zhang, Motomi Enomoto-Iwamoto

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**Bone Marrow Derived Mesenchymal Stem Cells Transduced With SOX-9 Improve Rotator Cuff Healing at an Early Time Point in a Rat Rotator Cuff Model**

Michael Schaer, Richard Ma, Will Gu, Marco Sisto, Ashley Titan, Xiang-Hua Deng, Scott Rodeo

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Lijian Peng, Michael Schenk, Xingyu Chen, Brandon K Zimmerman, Xin Lu, Liyun Wang

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Yasuharu Nagano, Ayako Higashihara, Mitsuaki Edama

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Andrew R Krause, Henry Donahue, Charles Lang, Jennifer Steiner, Toni Speacht, Yue Zhang, Peter M Govey

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Thomas Laumonier, Flavien Bermont, Pierre Hoffmeyer, Jacques Menetrey

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Athanasia Nikolaou, Liangjun Hu, Roger Cornwall

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**VEGF Gene Transfer Enhances Human Myogenic Precursor Cell Survival After Transplantation in Injured Skeletal Muscles**

Thomas Laumonier, Flavien Bermont, Pierre Hoffmeyer, Jacques Menetrey

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Hua Shen, Chanteak Lim, Andrea G Schwartz, Stavros Thomopoulos

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**Muscle Atrophy in Osteosarcoma-Induced Cancer Cachexia**

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Rajeswari Pichika, Rachel Meza, Lucas Smith, Samuel R Ward, Richard L Lieber

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Athanasia Nikolaou, Liangjun Hu, Roger Cornwall

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Koyal Garg, Catherine L Ward, Brady Hurtgen, Jason Wilken, Daniel J. Stinner, Joseph Wenke, Johnny G. Owens, Benjamin T Corona

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Zachary Kendrick, Courtney A Sprouse, Heather Gordish-Dressman, Michael Liu, Elizabeth Hedges, Elizabeth Dominic, Jackie McKesey, Dustin Hittel, Gina M Many, Whitney L Barfield, Eric Hoffman, Laura L. Tosi, Joseph M. Devaney

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Xiaodong Mu, Ying Tang, Bing Wang, Kurt Weiss, Johnny Huard

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Sameer B. Shah, Kenneth M Vaz, Ian Foran, James M Love, Ting-Hsien Chuang

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Elizabeth Dominic, Courtney A Sprouse, Heather Gordish-Dressman, Zachary Kendrick, Michael Liu, Elizabeth Hedges, Jacqueline McKesey, Eric Hoffman, Laura L Tosi, Joseph M. Devaney

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Edward Puzas, Edward M. Schwarz, Tzong-Jen Sheu

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Marco C Mendoza, Kevin Sonn, Sharath S Bellary, Abhishek Kannan, Gurmit Singh, Christian Park, Stuart R Stock, Erin L Hsu, Wellington Hsu

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Corinne Decker, Roberta Faccio

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**Effect Of Repeated Oral Administration Of A Cathepsin k Inhibitor On Bone Turnover And Bone Quality In Healthy Adult Exercising Horses**  
Hayam Hussein, Jennifer Dulin, Lauren Smanik, Alicia L Bertone

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**SubAB Prevent Joint Inflammation And Destruction Via Er Stress In Collagen Induced Arthritis**  
Kensuke Koyama, Tetsuro Ohba, Atsuhito Nakao, Hiroataka Haro

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**Osteocyte-Mediated Remodeling of the Perilacunar Bone Matrix is Repressed by Glucocorticoids**  
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**Osteocytes' Response to Mechanical Loading Supports Breast and Prostate Cancer Cell Growth and Migration**  
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Ashley B Allen, Joshua A Zimmermann, Laura D Cox, Hazel Y Stevens, Todd C McDevitt, Robert E Guldberg

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**Reduced Anabolic Response To Parathyroid Hormone In Periosteal Mesenchymal Stem Cells From Aged Mice**

Li Yue, Alayna Loiselle, Jennifer Jonason, Regis O'Keefe

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**Differential Signaling Through BMP Type 1 Receptors ALK2 and ALK3 in the Formation of Trauma-Induced Heterotopic Ossification**

Jonathan R Peterson, Oluwatobi N Eboda, Agustin H Mohedas, Shawn Loder, Robert C Brownley, Shailesh Agarwal, Kavitha Ranganathan, Steven R Buchman, Paul S Cederna, Yuji Mishina, Stewart C Wang, Paul B Yu, Benjamin Levi

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Marietta Herrmann, Jennifer J Bara, Ursula Menzel, Jagoda M Jalowiec, Rik Osinga, Arnaud Scherberich, Mauro Alini, Sophie Verrier

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David K. Barton, Benjamin P. Sinder, Michael S. Ominsky, Terese Jenks, Joan C. Marini, Michelle S. Caird, Kenneth M Kozloff

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Sarah Kelch, Claudine Seeliger, Marina Unger, Martijn van Griensven

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Kendra E Keenan, Chad S Mears, Tanner D Langston, Colton M Phippen, Scott M Litton, S. Taylor Brady, Roy D Bloebaum, John G Skedros

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Jun Ouyang, Weidong Wu

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Brandon L. Girardi, Tarik Attia, David Backstein, Oleg Safir, Thomas L. Willett, Paul R. T. Kuzyk

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William Runge, Laurence Dahners, Denis Marcellin-Little, Ola Harrysson, David Ruppert, Paul Weinhold

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Max A Hammond, Rafael Pacheco-Costa, Hannah M Davis, Lilian I. Plotkin, Joseph M. Wallace

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Jonathan B Matheny, Ashley M Torres, Matthew G Goff, Clare M Rimnac, Christopher J Hernandez

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Allison R Altman, Carina Lott, Chantal M de Bakker, Wei-Ju Tseng, Ling Qin, X. Sherry Liu

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Michiel Croes, Cumhuri Öner, Moyo C Kruyt, Wouter JA Dhert, Jacqueline Alblas

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**Porous Growth Plate Extracellular Matrix-derived Scaffolds Facilitate Osteogenesis of MSCs In Vitro and Accelerate Host-mediated Bone Healing In Vivo**

Grainne M Cunniffe, Pedro J Diaz-Payno, Emmet Thompson, Fergal J O'Brien, Daniel J Kelly

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**Development of a Novel Self-Organizing, Cell-Based Bone Graft Substitute: Control of Bone Dimension and Structure**

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Rene Olivares-Navarrete, David Haithcock, Christy Wasilewski, Caitlin A Cundiff, Sharon L Hyzy, Zvi Schwartz, Barbara D. Boyan

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**microRNA-activated Scaffolds for Enhancing Bone Formation by Mesenchymal Stem Cells through the Regulation of Osteogenic Genes**

Irene Mencía Castaño, Caroline M Curtin, Georgina Shaw, Mary J Murphy, Garry P Duffy, Fergal J O'Brien

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**An Immediate Source Of Purified Autologous Mesenchymal Stem Cells For Musculoskeletal Regeneration**

Iain R Murray, Christopher West, Winters Hardy, Mirko Corselli, Hamish Simpson, Xinli Zhang, Chia Soo, Bruno Peault

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**Positive Effect Of Platelet-derived Growth Factor Bb On Adipose-derived But Not Marrow-derived Mesenchymal Stem Cells**

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Jong-Min Lee, Eun-Ah Kim, Gun-Il Im

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Mary E Blackmore, Cody W Saylor, Shawn A Hunter

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Celine Heu, Ulf Knothe, Stefan Milz, Melissa Knothe Tate

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Jagoda M Jalowiec, Marietta Herrmann, Ursula Menzel, Matteo D'Este, Jennifer J Bara, Mauro Alini, Sophie Verrier

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**Fibromodulin Reprogrammed Cells for Bone Regeneration**

Zhong Zheng, Pu Yang, Chen-Shuang Li, Elizabeth L Lord, Kambiz Khalilnejad, Juyong Park, Caroline Chung, Tara Aghaloo, Xinli Zhang, Kang Ting, Chia Soo

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Meghan M Moran, Amarjit Viridi, Steven Mazzone, D. Rick Sumner

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**A Semi-automated Method For Defining Cortical Bone Breaks In Cadaveric Finger Joints Using High-resolution Peripheral Quantitative Ct And Microct**

Michiel Peters, Andrea Scharmga, Chris Arts, Astrid van Tubergen, Jeroen Williams, Joop Van den bergh, Bert Rietbergen, Piet Geusens

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Priyanka Srinivasan, Mark A Miller, Nico Verdonshot, Kenneth A. Mann, Dennis Janssen

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**Loading Induced 2nd Messenger and Transcriptional Interactions Mediate Multiple Measures of Bone Adaptation**

Sundar Srinivasan, Edith Gardiner, Brandon J Ausk, Ronald Y Kwon, Ted Gross

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Edward J Tremols, Jennifer S Wayne

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**Rat Cortical and Trabecular Bone: Hierarchical Analysis and Multi-Scale Modeling**

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**Cannabidiol, a Major Non-Psychotropic Cannabis Constituent Enhances Fracture Healing and Stimulates Lysyl Hydroxylase Activity in Osteoblasts**

Eitan Melamed, Natalya M Kogan, Yankel Gabet, Elad Wasserma, Batya Raphael, Aviva Breuer, Kathryn S Stok, Ana Veronica Villarreal Escudero, Rachel Sondergaard, Malka Attar-Namdar, Silvina Friedlander-Barenboim, Raphael Mechoulam, Ralph A Müller, Alon Bajayo, Itai Bab

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**(-)-epigallocatechin-3-gallate (egcg) Enhances Bone Defect Healing**

Chung-Hwan Chen, Yi-Shan Lin, Yin-Chih Fu, Mei-Ling Ho, Je-Ken Chang, Chih-Kuang Wang, Lin Kang

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**Systemically Administered Micelles Containing Simvastatin Improve Fracture Healing in Aged Mice**

Alexia Hernandez-Soria, Yen Hsun Chen, Adam L. Johnson, Yijia Zhang, Dong Wang, Marjolein C.H. van der Meulen, Mathias P.G. Bostrom, Chitra L. Dahia, Ed Purdue, Steven Goldring, Aaron Daluiski

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Adele L Boskey, Eve L. Donnelly, Zhen Xiang Wang, Lyudmilla Spevak, Yan Ma, Wei Zhang, Robert Recker

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Barbara Minkowitz, Tim U. Leier, Joseph T Nguyen, Eileen Poletick, Nicole D Formoso, Barbara Cerame, Sherri L Luxenberg, Joseph M Lane

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**Cartilage To Bone Transformation Through Reactivation Of Pluripotent Stem Cell Programs: A New Paradigm In Endochondral Fracture Repair**

Diane P Hu, Federico Ferro, Aaron J Taylor, Frank Yang, Theodore Miclau, Wenhan Chang, Ralph S Marcucio, Chelsea S Bahney

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Cristal Yee, Liqin Xie, Sarah Hatsell, Deepa Muruges, Aris N Economides, Gabriela Loots, Nicole Collette

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**Mini Fragment Fixation of Clavicle Fractures: A Biomechanical Study**

Ali Alhandi, Jason Lowe, Edward Milne, David Kaimrajh, Jason Albert, Loren Latta

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**Stability of the Glenohumeral Joint with Combined Humeral Head and Glenoid Defects: A Cadaveric Study**

Lionel J Gottschalk, Piyush Walia, Ronak Patel, Matthew Kuklis, Morgan Jones, Stephen D Fening, Anthony Miniaci

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**Loss of Anterior Stability of Shoulder Across a Range of Motion Due to Combined Bony Defects: A Cadaveric Study**

Piyush Walia, Lionel Gottschalk, Ronak Patel, Matthew Kuklis, Morgan Jones, Stephen Fening, Anthony Miniaci

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**The Effects of Latarjet Reconstruction on Glenohumeral Instability in the Presence of Combined Bony Defects**

Piyush Walia, Ronak Patel, Lionel Gottschalk, Matthew Kuklis, Morgan Jones, Stephen Fening, Anthony Miniaci

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Kevin L Ong, Edmund Lau, Steven Kurtz

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Adam Graver, Bin Yang, Sara Merwin, Michael O'Connor, Ariel Goldman

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Mina Aziz, Omar Dessouki, Saeid Samiezadeh, Habiba Bougherara, Radovan Zdero, Emil H Schemitsch

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**The Utility of Taper-wedged Stem for Bipolar Hemiarthroplasty in Patients with Displaced Femoral-neck Fractures: A Morphological and Clinical Study**

Satoshi Ikemura, Taro Mawatari, Takahiro Iguchi, Gen Matsui, Hiroaki Mitsuyasu

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**The Novel Method Of External Fixation In Unstable Pelvic Ring Fracture**

Keisuke Oe, Kouki Nagamune, Takahiro Niikura, Ryosuke Kuroda, Masahiro Kurosaka

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**Experimental Investigations On Three Fixation Methods (CSs, DHS+DS, And PFLP) Of Femoral Neck Fractures In Young Adults**

Shabnam Samsami, Sadegh Saberi, Nima Bagheri, Nazanin Daneshvar H, Mohammad J Ein-Afshar, Golamreza Rouhi

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**A Biomechanical Comparison Of Four Methods Of Treatment For Periprosthetic Distal Femur Fractures**

Tatu J Mäkinen, Gil Fichman, Herman Dhotar, Matthew Gunton, Mitchell Woodside, Oleg Safir, David Backstein, Thomas L Willett, Paul R Kuzyk

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**Axial and Rotational Mal-Reduction (Golf Club Deformity) in Distal Femur Fractures**

Ali Alhandi, Willard Moore, Jason Lowe, Edward Milne, David Kaimrajh, Loren Latta

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Toshitaka Yoshii, Jeffry S Nyman, Gloria Gutierrez

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**The Effects of the Duration of Transcutaneous CO<sub>2</sub> Application on the Facilitatory Effect in Rat Fracture Healing**

Takashi Iwakura, Takahiro Niikura, Sang Yang Lee, Etsuko Okumachi, Takahiro Waki, Shunsuke Takahara, Michio Arakura, Yoshitada Sakai, Ryosuke Kuroda, Masahiro Kurosaka

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**Histomorphometric Comparison of Graft Efficacy Using a Caprine Chronic Tibial Defect Model**

AlexAnne Weinzierl, Ferenc Toth, Grace Elizabeth Pluhar, George Muschler, Joan Bechtold, Viviane Luangphakdy, Cathy S Carlson

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**Characterization of Composition and Structure of Callus Tissue in Fractures Treated with BMP-7 and Zoledronate in an Osteoporotic Rat Model**

Neashan Mathavan, Mikael Turunen, Martin Bech, Florian Schaff, Ulf Olsson, Magnus Tagil, Hanna Isaksson

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**Osteogenic Potential of Teriparatide Adjuvant Therapy in Surgical Treatment of Femoral Fracture**

Hong Suk Kwak, Soong Joon Lee, Hee Joong Kim, Jeong Joon Yoo

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Julia Kemmler, Ronny Bindl, Florian Wagner, Oscar MacCook, Katja Wagner, Michael Gröger, Enrico Calzia, Peter Radermacher, Anita Ignatius

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**Inhibition Of Microrna-222 Expression Accelerates Bone Fracture Healing With Enhancement Of Angiogenesis And Osteogenesis In Atrophic Non-union Model In Rat**

Masaaki Yoshizuka, Tomoyuki Nakasa, Yoshitaka Kawanishi, Mitsuo Ochi

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**Effect of Plates in Proximity to Empty External Fixation Pin Sites on Long Bone Torsional Strength**

Fred L Speck, Randal P. Morris, Ronald W. Lindsey

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**Biomechanical Comparison of Conventional versus Cable Pin Fixation for Transverse Patellar Fractures**

Aaron D Schrayner, Randal P. Morris, Andrew G. Patton, William L. Buford, Ronald W. Lindsey

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**Cannulated Lag Screw Fixation of Displaced Lateral Humeral Condyle Fractures is Associated with Lower Rates of Open Reduction and Infection than Pin Fixation**

Benjamin E Stein, Alim F Ramji, Hamid Hassanzadeh, Jared M Wohlgemut, Michael C Ain, Paul D Sponseller

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**Human Psuedoarthrosis Tissue Contains Osteoprogenitor Cells in Vitro**

Shunsuke Takahara, Takahiro Niikura, Sang Yang Lee, Takashi Iwakura, Etsuko Okumachi, Takahiro Waki, Michio Arakura, Ryosuke Kuroda, Masahiro Kurosaka

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**Assessment of Methods for Rapid Intraoperative Concentration and Selection of Marrow-Derived Connective Tissue Progenitors for Bone Regeneration using the Canine Femoral Multi-Defect Model**

Viviane Luangphakdy, Cynthia Boehm, Hui Pan, Phil Zaveri, James Herrick, George Muschler

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**Reverse Dynamization Efficiently Heals Large Segmental Bone Defects Using a Reduced Dose of BMP-2**

Vaida Glatt, Nicole Loechel, Nicholas Quirk, Michael Schuetz, Chris Evans

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**Devitalized Cartilage Allografts Promote Improved Vascular Remodeling Compared to Bone Allograft in Murine Tibia Defects**

Aaron J Taylor, Yotvat Marmor, Diane P Hu, Jaselle Perry, Hayley M Britz, Avi D Stricker, Benedikt Hallgrimsson, Theodore Miclau, Ralph S Marcucio, Chelsea S Bahney

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**Local Transplantation Of CD31+ Cells From Peripheral Blood Improves Biologically Impaired Bone Healing By Modulation Of Early Inflammation And Angiogenesis**

Anke Dienelt, Andrea Sass, Katharina Schmidt-Bleek, Sebastian Filter, Agnes Ellinghaus, Georg Duda

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**Electronic Distraction Force Measurements to Optimize Segmental Transport in an Ilizarov Fixator**

Matthias Muench, Klaus DE Seide, Birgitt Kowald, Ulf J Gerlach

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**The Relationship Between Elevated Contact Stress and Clinical Outcome Following Intra-Articular Calcaneal Fractures**

Kevin N Dibbern, Saran Tantavisut, Andrew M Kern, J. L. Marsh, Donald Anderson

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**Osteochondral Allograft Matching by Radius of Curvature**

Craig O'Neil, Jesal Parekh, Derick Bernstein, Hugh L Jones, Philip C Noble, Patrick McCulloch



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**Would A Proximal Tibial Locked Plating System Or Cannulated Screws Allow Postoperative Weight Bearing On A Surgically Stabilized Schatzker I Tibial Plateau Fracture? An In Silico Pre-check**

Gaetan Chary, Ion Carrera, Pablo E Gelber, Joan Carles Monllau, Jerome Noailly

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**Use of Finite Element Analysis to Predict the Fatigue Strength of Cephalomedullary Nail Systems**

Michael Bushelow, Stanley J. Kmiec, Brian Shultzabarger, Roderick McMillan, Dana J Coombs, Michael Blauth

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**Comparison of Statically Locked Proximal Lag Screws in Cephalomedullary Nail Systems**

Brian Shultzabarger, Michael Bushelow, Dana Pappalardo, Robert Harris

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**Dynamic Hip Screw Hole Placement vs Bone Strain**

Dana J Coombs, Michael Bushelow

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**Comparison of Intra-operative Radiation Exposure during Intramedullary Nailing between Free-hand Technique and Electromagnetic Assisted Technique**

Hiroki Kobayashi

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**Time Course of Bone Screw Fixation Following a Local Delivery of Zoledronate in a Rat Femoral Model**

Ulrike Kettenberger, Adeliya Latypova, Alexandre Terrier

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**Development of a Novel Augmentation Pattern of Femoroplasty to Prevent Hip Fracture-Using Finite Element Methods**

Qiang Luo, Frankie Leung

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**A Computational Model of Annulus Fiber Deformation in Cervical Discs During In Vivo Dynamic Flexion/Extension, Rotation and Lateral Bending**

William Anderst, Mara Palmer, Joon Lee, William Donaldson, James D Kang

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**Severity of Adjacent Disc Disease Due to Lower Lumbar Fusion Depends on the Adjacent Segment's Degenerative Grade**

Raghu N Natarajan, Gunnar B Andersson

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**Changes in Adjacent Segment Biomechanics After Laminectomy and Laminotomy in Lumbar Spine**

Shady Elmasry, Shihab Asfour, Joseph Gjolaj, Loren Latta, Francesco Travascio, Frank Eismont

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**Pedicle Subtraction Osteotomy Rods: Surgical Skills Module**

Robin Parrish, William Camisa, Jeremi Leasure

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Jessica Küpper, Gulshan Sharma, Chukwudi Chukwunyeremwa, Adrienne Kline, Jason Howard, Ron El-Hawary, Ali Melia, Tyler Dubetz, Elaine Joughin, James Harder, Janet Ronsky

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Nathaniel R Ordway, Kevin M. Albanese, Stephen A. Albanese, William F Lavelle

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Dai-Soon Kwak, Moon-Kyu Kim

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**Rapamycin Suppresses Microglial Activation and Reduces inflammation after Spinal Cord Injury in Mice**

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Andrew G Patton, Randal P. Morris, Yong-Fang Kuo, Ronald W. Lindsey

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Abbie L A Binch, Ashley A Cole, Lee M Breakwell, Antony LR Michael, Neil Chiverton, Alison K Cross, Christine L Le Maitre

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Kenneth R Nakazawa, Benjamin A Walter, Thomas P Naidich, Kara L Spiller, James C Iatridis

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Sarah Loh, Eric Mahoney, Christopher Wylie, Chitra L Dahia

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**In-vivo Motion Characteristics Of The C5-C6 And C6-C7 Cervical Spine Segments During Dynamic Weight-bearing Flexion-Extension**

Sean J. Driscoll, Shaobai Wang, Weiye Zhong, Guoan Li, Kirkham B Wood, Thomas D Cha

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**Anterior Cervical Decompression and Fusion: Influence of Surgical Levels and Morphological Factors on the Range of Motion and Kinematical Changes**

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**Intervertebral Kinematics Correlate with T2 Relaxation Times in the Lower Human Cervical Spine**

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Alex K Roth, Albert van der Veen, Rob Bogie, Paul Willems, Chris Arts, Lodewijk W van Rhijn

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Sachin A Mali, Aarti A Shenoy, Vaneet Singh, Jeremy L Gilbert

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Robert A Hartman, Robert T Tisherman, Kevin M Bell, Richard E Debski, James D Kang, Gwendolyn Sowa

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Robert A Hartman, Bryan Brown, Richard E Debski, James D Kang, Gwendolyn Sowa

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Yutaka Yabe, Yoshihiro Hagiwara, Akira Ando, Masahiro Tsuchiya, Takashi Minowa, Taro Takemura, Masahito Honda, Kazuaki Sonofuchi, Kenji Kanazawa, Masashi Koide, Takuya Sekiguchi, Nobuyuki Itaya, Eiji Itoi

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**India Hedgehog is correlated to Human Endplate Cartilage Degeneration**

Shaowei Wang, Yaqiong Chang, Lei Wei, Guoqing Du, Shunwu Fan

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**The Hip Internal Rotation is Negatively Correlated to Valgus Knee Motion and Internal Tibial Rotation in the Early Phase during a Landing Task in Drop Jumping**

Tomoya Ishida, Masanori Yamanaka, Shohei Taniguchi, Ryo Ueno, Shigeyuki Minami, Yuta Koshino, Mina Samukawa, Hiroshi Saito, Takumi Kobayashi, Hisashi Matsumoto, Yoshimitsu Aoki, Harukazu Tohyama

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Victoria L Manning, Michela Zanotto, Adeel Aqil, Justin Cobb

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Ata M Kiapour, Samuel C Wordeman, Vijay K Goel, Carmen E Quatman, Timothy E Hewett, Constantine K Demetropoulos

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Ashutosh Khandha, Elizabeth Wellsandt, Kurt Manal, Adam Marmon, Lynn Snyder-Mackler, Thomas Buchanan

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Andrew K. Battenberg, Donohoe Steven, Nicholas Robertson, Thomas P Schmalzried

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Toshifumi Watanabe, Takeshi Muneta, Ichiro Sekiya, Hideyuki Koga, Masafumi Horie, Tomomasa Nakamura, Koji Otabe, Scott A Banks

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**Sex Differences in Knee Valgus Rotation under Unconstrained Single- and Multi-Planar Loading: Implications for Valgus Collapse ACL Injury Mechanism**

Ata M Kiapour, Carmen E Quatman, Samuel C Wordeman, Vijay K Goel, Constantine K Demetropoulos, Timothy E Hewett

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Mackenzie L Pater, Noah J Rosenblatt, Mark D Grabiner

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Adam Seidl, Todd Baldini, Jason Rhodes, James Carollo

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Hidenori Tanikawa, Tomonori Muto, Ryo Ogawa, Kengo Harato, Kazunari Okuma, Takeo Nagura

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Ian M Zeller, William B Kurtz, William R Hamel, Matthew A Young, Mathew R Anderle, Richard D Komistek

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Young-jun Koo, Yoon Kwak, Seungbum Koo

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Yong Feng, Tsung-Yuan Tsai, Jing-Sheng Li, Shaobai Wang, Hai Hu, Changqing Zhang, Harry E Rubash, Guoan Li

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**Preoperative Knee Kinematics Impacts Upon Postoperative Knee Kinematics In Total Knee Arthroplasty**

Naoki Seito, Tomohiro Onodera, Yasuhiko Kasahara, Yusuke Nishio, Eiji Kondo, Norimasa Iwasaki, Tokifumi Majima

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**Correlations Between Knee Anatomy and Joint Laxity Using Principle Component Analysis**

Sami Shalhoub, Lowell M Smoger, Adam J Cyr, Paul J Rullkoetter, Peter J Laz, Lorin P Maletsky

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Sami Shaloub, Adam J Cyr, Fallon Fitzwater, Lorin P Maletsky

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Kanto Nagai, Ryosuke Kuroda, Yuichi Hoshino, Yuichiro Nishizawa, Daisuke Araki, Shinya Oka, Naoki Nakano, Takehiko Matsushita, Tomoyuki Matsumoto, Koji Takayama, Kouki Nagamune, Masahiro Kurosaka

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**Vitamin E Grafted Highly Crosslinked Polyethylene Hip Acetabular Liners Exhibit Stable, Ultra Low Wear after 85 Million-Cycles of In Vitro Wear Testing**

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Aminudin Shamsudin, Karin Peters, Imants Rubenis, Patrick H Lam, George AC Murrell

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**The Effect of Concomitant Glenohumeral Joint Capsule Release During Rotator Cuff Repair: A Comparative Study of 195 Arthroscopic Rotator Cuff Repairs**

Jordan McGrath, Patrick H Lam, Martin TS Tan, George AC Murrell

Poster No. 1019

**Collagen Scaffolds are a Safe Intra-articular Drug Delivery Vehicle in a Novel Rabbit Model of Arthrofibrosis**

Justin A Walker, Timothy Ewald, Mark Morrey, Matthew Philip Abdel, Bernard Morrey, Joaquin Sanchez-Sotelo

Poster No. 1020

**The Secreted Aggrecanases From Synovium In Rotator Cuff Tear Participate In Progression Of Cartilage Degradation In The Shoulder Joint**

Takahiro Iino, Masaya Tsujii, Toru Wakabayashi, Naoki Kokubu, Hirokazu Yokoyama, Takuya Nakanishi, Masahiro Hasegawa, Akihiro Sudo

Poster No. 1021

**Is the Neural Control Different in Complex Shoulder Instability Patients?**

Anthony Howard, Joanne Powell, David Hawkes, Omid Alizadehkhayat, Jo Gibson, Graham Kemp, Simon Frostick

PS1 HAND AND WRIST - INFECTION AND TRUMA

Poster No. 1022

**Are the New Generation of Dorsal Plates still a Greater Risk than Volar Fixed Angle Plating? Results of a Meta-Analysis**

Mitchell S Fourman, Deidre L Bielicka, Robert J Goitz, John R Fowler

Poster No. 1023

**Predictive Factors of Neurovascular and Tendon Injuries Following Dog Bites to the Upper Extremity**

Ram K Alluri, William Pannell, Nathanael Heckmann, Michael Bauschard, Alidad Ghiassi

Poster No. 1024

**Capitate-based Angles Can Better Characterize Carpometacarpal Fracture and Dislocation**

Kaicheng Wu, Vishnu Potini, Virak Tan, Kang Li

PS1 HAND AND WRIST - MECHANICS

Poster No. 1025

**Role of the Interosseous Membrane in Preventing Radial Head Displacement during Forearm Rotation**  
Frederick W Werner, Ashley Anderson, Brian J Harley

Poster No. 1026

**In Vivo Thumb Carpometacarpal (CMC) Motion is Highly-Complex, with Coupled Rotations and Translations**

Joseph J. Crisco, Eni Halilaj, Tarpit Patel, Douglas Moore, Amy L Ladd, Arnold-Peter C Weiss

Poster No. 1027

**A Biomechanical Comparison Of The Thumb-tip Trajectory With/Without Trapeziometacarpal Joint Fusion: A Cadaveric Study**

Yusuke Kawano, Toshiyasu Nakamura, Mitsunori Tada, Yusaku Kamata, Shinjiro Sueda, Dinesh Pai, Takeo Nagura, Yoshiaki Toyama

Poster No. 1028

**Compressive Loading across the Wrist Changes the Morphology and Position of the Carpal Arch and Median Nerve**

Tamara L Marquardt, Joseph N. Gabra, Zong-Ming Li

Poster No. 1029

**High Resolution Motion Analysis for Identification of Primary Trapeziometacarpal Joint Stabilizers During Grip Motion**

Christina Salas, Deana Mercer

PS1 HAND AND WRIST - SOFT TISSUE AND NERVE

Poster No. 1030

**MicroRNA Profiles Of Diseased Dupuytren'S Fascia Reveal Increased Extracellular Matrix Synthesis Via Downregulation Of Collagen Targeting MicroRNAs**

Scott Riester, Emily Camilleri, Amel Dudakovic, Diren Arsoy, Eric Lewallen, Andre van Wijnen, Sanjeev Kakar

Poster No. 1031

**Involvement Of Bmp7/smad Signale In De-differentiated Schwann Cells During Peripheral Nerve Regeneration After Injury**

Naoki Kokubu, Masaya Tsujii, Takahiro Iino, Hirokazu Yokoyama, Akihiro Sudo

Poster No. 1032

**Bridging A 20mm Rat Sciatic Nerve Gap Using An Undifferentiated Bone Marrow-derived Mesenchymal Stem Cell-laden Conduit Containing Vessels And Decellularized Allogenic Basal Lamina**

Yukitoshi Kaizawa, Ryosuke Kakinoki, Ryosuke Ikeguchi, Souichi Ohta, Takashi Noguchi, Hiroki Oda, Shuichi Matsuda

Poster No. 1033

**Unique Genetic Signature and Therapeutic Targets for Diabetic Carpal Tunnel Patients**

Anne Gingery, Tai-Hua Yang, Sandra Passe, Kai-Nan An, Chunfeng Zhao, Peter C. Amadio

PS1 FOOT AND ANKLE - ADULT

Poster No. 1034

**Model-Based Validation of a Graphics Processing Unit Algorithm to Track Foot Bone Kinematics Using Fluoroscopy**

Matthew Kindig, Grant Marchelli, Joseph M Iaquinto, Duane Storti, David Haynor, Bruce J Sangeorzan, William R Ledoux

Poster No. 1035

**The Effect of Normal Aging on the Biomechanical Properties of Rat Achilles Tendons**

Emily C Vafek, Eric Friedman, Aaron T Scott, Sandeep Mannava, Kerry A Danelson

Poster No. 1036

**Regeneration of Foot Fat Pad with Autologous Adipose Tissue Derived Mesenchymal Stem Cells**

Zijun Zhang, Reed Mitchell, Jeremy Molligan, Lew Schon

Poster No. 1037

**Biomechanical Evaluation of Mini-Open and Percutaneous Achilles Repair Techniques During Simulated Early Progressive Rehabilitation**

Thomas O Clanton, C Thomas Haytmanek, Brady T Williams, David M Civitaresse, Travis L Turnbull, Robert F LaPrade, Coen A Wijdicks

PS1 FOOT AND ANKLE - INFECTION AND TRAUMA

Poster No. 1038

**Characterization of Syndesmotic Behavior During External Rotation Stress Test**

Joshua T Bunch, Benjamin D. Westerhaus, Evan C Glidewell, Terence E McIlff, Michael B Tilley

Poster No. 1039

**Impact of Clamp Placement on Reduction of the Ankle Syndesmosis**

Joshua T Bunch, Benjamin D Westerhaus, Evan C Glidewell, Terence E McIlff, Michael B Tilley

PS1 FOOT AND ANKLE - MECHANICS

Poster No. 1040

**Influence of Patient and Surgical Variability on Loading Across a Cuneiform Osteotomy**

Mehul A Dharia, Jeffrey Bischoff, James Woodburn, Scott Tefler, Amir Al-Munajjed

Poster No. 1041

**Cyclic Loading of Achilles Tendon Repairs Through Forces Simulating Early Functional Rehabilitation**

Heather E. Gotha, Jack Anavian, Todd A Fellars, Sarath C. Koruprolu, Ryan R. Rich, Christopher W DiGiovanni

Poster No. 1042

**Injuries Observed in a Prospective Transition from Traditional to Minimalist Footwear: A Protective Effect of High Impact Transient Forces?**

Matthew J Salzler, Hollie J Kirwan, Donna M Scarborough, James T Walker, Anthony J Guarino, Eric Berkson

Poster No. 1043

**Can Fixation Methods for First MTP Joint Arthrodesis Allow Full Weight-bearing?**

Bradley C Campbell, Stephen F Conti, Mark Carl Miller, Adam Mandel, Sudhir C Belagaje, Pat Schimoler

PS1 INFECTION

Poster No. 1044

**Elucidating The Natural History Of Staphylococcus aureus Biofilm Formation And Maturation During The Establishment Of Chronic Implant-associated Osteomyelitis In A Quantitative Murine Model**

Kohei Nishitani, Karen de Mesy Bentley, Sheila N Bello- Irizarry, John J Varrone, Hiromu Ito, Stephen L Kates, John L Daiss, Edward M. Schwarz

Poster No. 1045

**CERAMENT Bone Void Filler Impregnated with Gentamicin Increases Bone Formation and Decreases the Rate of Detectable Infection After Debridement in a Rat Model of Osteomyelitis**

Aleksey Dvorzhinskiy, Giorgio Perino, Robert Chojnowski, Marjolein C.H. van der Meulen, F. Patrick Ross, Mathias P.G. Bostrom, Xu Yang

Poster No. 1046

**Altering Polymerization Temperature of Antibiotic-Laden Cement Can Increase Porosity and Subsequent Antibiotic Elution**

Jeffrey Sundblad, Jeffrey C. Flynn, Christopher Bergum, Nancy Jackson, David C. Markel

Poster No. 1047

**A Novel Murine Model of Established Staphylococcal Bone Infection in the Presence of a Fracture Fixation Plate to Study Therapies Utilizing Antibiotic-laden Spacers After Revision Surgery**

Jason A Inzana, Edward M. Schwarz, Stephen L Kates, Hani A. Awad

Poster No. 1048

**IL-12 Enhances Bacterial Killing Efficacy of Macrophages against Intracellular Bacteria**

Bingyun Li, Therwa Hamza

Poster No. 1049

**Electrical Stimulation as an Adjunct to Antibiotic Treatment During Periprosthetic Joint Infection**

Scott R Nodzo, Menachem Tobias, Ross Cole, Lisa Hansen, Nicole Luke-Marshall, Anthony Campagnari, Mark Ehrensberger

Poster No. 1050

**Cytokine levels following surgical sepsis: Association with Tumor Necrosis Factor Gene Polymorphisms**

Rajeshwar N Srivastava, Kavita Baghel, Abhijit Chandra, Jyotsna Agrawal, Aditya Bhusan Pant, Saloni Raj

Poster No. 1051

**Dual Rifampin and Vancomycin Delivery from 3D Printed Calcium Phosphate Scaffolds Improves Outcomes of Implant-associated Osteomyelitis**

Jason A. Inzana, Ryan P. Trombetta, Edward M. Schwarz, Stephen L Kates, Hani A. Awad

Poster No. 1052

**A Persister Population of Biofilm Remains on the Surface of TKA Materials after Extended Antibiotic Treatment**

Kenneth Urish, Peter Demuth, Brian Kwan, Hani Haider, David Craft, Thomas Wood, Charles Davis

PS1 TRAUMA - CLINICAL OUTCOMES METHODOLOGIES

Poster No. 1053

**The Effect of Balanceshoes Training on the Knee Kinematics during Athletic Tasks Associated with Anterior Cruciate Ligament Injury**

Satoshi Kubota, Kohei Koresawa, Kazuyoshi Gamada

Poster No. 1054

**Distal Femoral Fracture Fixation: Locking Plates Vs. Retrograde Nails**

Anthony Howard, Alexander Wibberley, Aafreen Rahman, Nick Kanakaris, Peter Giannoudis

Poster No. 1055

**A Technique to Measure Intrarticular Displacement on CT After Fracture of the Calcaneus**

Saran Tantavisut, John Lawrence Marsh, Matthew D Karam, Phinit Phisitkul, Kevin Dibbern, Yubo Gao, Brian O Westerlind

Poster No. 1056

**Radiographic Analysis of Korean Proximal Femur for Lateral Impingement in Pertrochanteric Fracture: PFNA vs PFNA II**

Wonchul Shin, Sangmin Lee, Seunghun Woo, Kuentak Suh

PS1 TRAUMA - PATHOPHYSIOLOGY

Poster No. 1057

**Degeneration of the Cervical Spine Influences the Risk of Sustaining Dens Fractures**

Marcel Betsch, Sabina Blizzard, Jung U Yoo

Poster No. 1058

**Testing the Utility of Engineered Anti-Collagen I Antibody to Limit the Formation of Collagen-Rich Fibrotic Deposits in a Rabbit Model of Posttraumatic Joint Stiffness**

Andrzej Steplewski, Jolanta Fertala, Jonathan Barlow, Pedro Beredjikian, Joseph Abboud, Mark Wang, Surena Namdari, William Arnold, James Kostas, Cheryl Hou, Andrzej Fertala

Poster No. 1059

**The Amplitude of Pulse-Synchronous Oscillations correlates with the Level of Intramuscular Pressure**

Andreas Nilsson, Qiuxia Zhang, Jorma Styf

PS1 CANCER, TUMORS

Poster No. 1060 *ORS Best Tumors Poster*

**The Epigenetic Regulation Of SOX9 By MiR-145 In Human Chondrosarcoma**

Isabella Mak, Shalini Singh, Robert Turcotte, Michelle Ghert

Poster No. 1061

**RANKL Blockade Prevents And Treats Aggressive Osteosarcomas In Mice**

Yan Chen, Rama Khokha

Poster No. 1062

**Development of New Hybrid Treatment for Osteosarcoma Using Sustained-release Tearubicin Conjugated Endothelial Progenitor Cells**

Yohei Kawakami, Masaaki Ii, Tomoyuki Matsumoto, Yasuhiko Tabata, Takayuki Asahara, Ryosuke Kuroda, Masahiro Kurosaka

Poster No. 1063

**Netrin-, RGM- and Slit-Ligands Do Not Increase Proliferation in Ewing's Sarcoma or Osteosarcoma Tumor Cells**

Bryan S Margulies, Connor G Policastro, Benjamin Craxton, Adrienne M Parsons, Judith A Strauss, Timothy A Damron

Poster No. 1064

**Apoptosis And Anti-tumor Effect Induced By Mtor Inhibitor And Autophagy Inhibitor In Human Osteosarcoma Cells**

Ryosuke Horie

Poster No. 1065

**AICAR Induces Apoptosis in Human Osteosarcoma Cells through AMPK-dependent PGC-1 $\alpha$ /TFAM/Mitochondrial Pathway**

Masayuki Morishita, Teruya Kawamoto, Hitomi Hara, Yasuo Onishi, Takeshi Ueha, Masaya Minoda, Etsuko Kamata, Masahiro Kurosaka, Toshihiro Akisue

Poster No. 1066

**CD146 Identifies Tumor Propagating Cells In Soft Tissue and Bone Sarcoma**

Yuning J Tang, Qingxia Wei, David Shih, Veronique Voisin, Makoto Hirata, Shingo Sato, Gary D Bader, Laurie Ailles, Jay Wunder, Benjamin Alman

Poster No. 1067

**Expression of PIM1 Kinase in Osteosarcoma and the Clinical Significance**

Yong Feng, Yan Gao, Jackson Shen, Gregory Cote, Edwin Choy, Henry Mankin, Francis Hornicek, Zhenfeng Duan

Poster No. 1068

**Inhibition Of Gli2 And Smo By Clinical Agents Prevents Osteosarcoma Metastasis**

Masahito Nagata, Takao Setoguchi, Hiroko Nagao-Kitamoto, Shunsuke Nakamura, Satoshi Nagano, Masahiro Yokouchi, Yasuhiro Ishidou, Setsuro Komiya

Poster No. 1069

**Tumor-suppressive MicroRNA-let-7a Inhibits Cell Proliferation Via Targeting Of E2f2 In Osteosarcoma Cells**

Masanori Kawano, Kazuhiro Tanaka, Ichiro Itonaga, Tstsuya Iwasaki, Hiroshi Tsumura

Poster No. 1070

**Antagonistic Pleiotropy and its Effects on Angiogenic Capacity to Promote Osteosarcoma Tumor Progression**

Stephanie N Moore, Tetsuro Oba, Heather Cole, Jonathan Schoenecker

Poster No. 1071

**Identification of Circulating miRNA Signatures in Osteosarcoma Patients**

Koji Uotani, Tomohiro Fujiwara, Aki Yoshida, Kazuhisa Sugiu, Takaaki Uehara, Toshinori Omori, Yasuaki Yamakawa, Ken Takeda, Toshiyuki Kunisada, Akira Kawai, Takahiro Ochiya, Toshifumi Ozaki

Poster No. 1072

**Combined Effect Of Zoledronic Acid And Telomerase-specific Oncolytic Adenovirus For Human Osteosarcoma Cells**

Yasuaki Yamakawa, Joe Hasei, Hiroshi Tazawa, Shuhei Osaki, Toshinori Omori, Kazuhisa Sugiu, Tomohiro Fujiwara, Toshiyuki Kunisada, Aki Yoshida, Yasuo Urata, Toshiyoshi Fujiwara, Toshifumi Ozaki

Poster No. 1073

**Parathyroid Hormone Confers Transient Protection Against Radiotherapy-Induced Bone Fragility and Trabecular Loss**

Megan Elizabeth Oest, Kenneth A. Mann, Nicholas D Zimmerman, Nicholas Allen, Timothy Damron

Poster No. 1074

**A Novel Mouse Model of Enchondromatosis by Cartilage Specific Expression of Mutant Idh1**

Makoto Hirata, Masato Sasaki, Qingxia Wei, Shingo Sato, Yuning J Tang, Jay Wunder, Tak Mak, Benjamin Alman

Poster No. 1075

**Tumor Infiltrating PD1-Positive Lymphocytes and the Expression of PD-L1 Predict Poor Prognosis of Soft Tissue Sarcomas**

Jung Ryul Kim, Kyu Yun Jang

Poster No. 1076

**Increased Insulin mRNA Binding Protein-3 Expression Correlates with Vascular Enhancement of Renal Cell Carcinoma by Dynamic Multidetector-CT and is Associated with Bone Metastasis**

Chao Xie, Yaying Li, Qingqing Li, Yu Chen, Regis J O'Keefe, Edward M. Schwarz, Wakenda Tyler

Poster No. 1077

**Clinicopathologic, Prognostic And In Vitro Evaluation To Assess The Rationale For Mtor Inhibition In Malignant Peripheral Nerve Sheath Tumors**

Makoto Endo, Nokitaka Setsu, Kenichi Kohashi, Hidetaka Yamamoto, Michiyuki Hakozaki, Tomoya Matsunobu, Yoshihiro Matsumoto, Katsumi Harimaya, Yukihide Iwamoto, Yoshinao Oda

Poster No. 1078

**Association Between The MicroRNAs Derived From Round Cell Component And Cancer Malignancy In Myxoid Liposarcoma**

Yutaka Nezu, Kosuke Matsuo, Akira Kawai, Tomoyuki Saito, Takahiro Ochiya

Poster No. 1079

**Programmed Cell Death Ligand 1 Expression in Chordoma**

Yong Feng, Jackson K Shen, Yan Gao, Gregory Cote, Choy Edwin, Henry Mankin, Francis Hornicek, Zhenfeng Duan

Poster No. 1080

**Stromal Cell Proliferation And Recurrence Of Giant Cell Tumor Of Bone Following Neoadjuvant Denosumab Treatment**

Isabella Mak, Nathan Evaniew, Snezana Popovic, Michelle Ghert

Poster No. 1081

**A Grooved Hydroxyapatite Coated Ingrowth Collar Reduces Aseptic Loosening of Cemented Distal Femoral Massive Bone Tumour Prostheses: A Radiographic Pair Matched Study**

Melanie J Coathup, Anish P Sanghrajka, William J Aston, Panagiotis D Gikas, Robin C Pollock, Stephen R Cannon, John A Skinner, Tim WR Briggs, Gordon W Blunn

Poster No. 1082

**Distinct Clinicopathologic Features Of Nab2-stat6 Fusion Gene Variants In Solitary Fibrous Tumor With Emphasis On The Acquisition Of Highly Malignant Potential**

Keisuke Akaike, Aiko Kurisaki-Arakawa, Kieko Hara, Yoshiyuki Suehara, Tatsuya Takagi, Kazuo Kaneko, Takashi Yao, Tsuyoshi Saito

Poster No. 1083

**Does Simulating Activities of Daily Living Improve Fracture Prediction for Patients with Metastatic Femoral Lesions?**

Jacklyn Goodheart, Timothy Damron, Ara Nazarian, Brian Snyder, Kenneth A. Mann

Poster No. 1084

**Targeting Skeletal Metastases Using HPMA Copolymer Nanoparticle Delivery and Retention**

Alexander B Christ, Chloe Horowitz, Yen H Chen, Dong Wang, Ed Purdue, Steven Goldring, John H Healey

Poster No. 1085

**The Combined Effect Of Tumor-specific Oncolytic Adenovirus And Radiation On Bone And Soft Tissue Sarcoma Cells**

Toshinori Omori, Yasuaki Yamakawa, Joe Hasei, Hiroshi Tazawa, Shuhei Osaki, Tsuyoshi Sasaki, Kazuhisa Sugiu, Aki Yoshida, Toshiyuki Kunisada, Yasuo Urata, Toshiyoshi Fujiwara, Toshifumi Ozaki

Poster No. 1086

**YM155, A Novel Small Molecule Survivin Suppressant, Reduces Tumor Progression of Human Musculoskeletal Malignancies**

Masaya Minoda, Teruya Kawamoto, Toshihiro Akisue, Hitomi Hara, Yasuo Onishi, Masayuki Morishita, Etsuko Kamata, Masahiro Kurosaka

PS1 DIAGNOSTIC IMAGING - TENDONS, LIGAMENTS

Poster No. 1087

**Quantitative Evaluation of Elasticity in the Posteroinferior Shoulder Joint Capsules of Collegiate Baseball Players Using Shear-Wave Ultrasound Elastography**

Tetsuya Takenaga, Hideyuki Goto, Katsumasa Sugimoto, Masahiro Nozaki, Masahito Yoshida, Atsunori Murase, Hiroto Mitsui, Masaaki Kobayashi, Yuko Nagaya, Hirotaka Iguchi, Takanobu Otsuka

Poster No. 1088

**Ultrasound Based Tendon Micromorphology Predicts Mechanical Characteristics of Degenerated Tendons**

Yu-Jen Chang, Gregory R Bashford, Kornelia Kulig

Poster No. 1089

**The Effect of Freeze-Thawing on Magnetic Resonance Imaging T2\* of Freshly Harvested Bovine Patellar Tendon**

Sarah L. Pownder, Parina H. Shah, Hollis G. Potter, Matthew F Koff

PS1 DIAGNOSTIC IMAGING - BIOMARKERS

Poster No. 1090

**18F-NaF Pet-CT Is A Good Early Clinical Marker For High Bone Stress In The Lower Lumbar Spine**

Justin Fernandez, Shasha Yeung, Andi Liu, Amanjeet Toor, Ju Zhang, Vickie Shim, Thor Besier, Jacob Munro, Peter Robertson, Gerard Deib

Poster No. 1091

**Heterogeneity in the Mechanical Response of Differentiating Adipose-Derived Stem Cells**

Nicholas R Labriola, Eric M Darling

Poster No. 1092

**Distribution Of Podoplanin In Synovial Tissues Of Rheumatoid Arthritis And Osteoarthritis**

Yuya Takakubo, Hiroharu Oki, Tomoyuki Hirayama, Yasunobu Tamaki, Yasushi Naganuma, Suran Yang, Akiko Sasaki, Kan Sasaki, Michiaki Takagi

PS1 DIAGNOSTIC IMAGING - BONE

Poster No. 1093

**Mineral Density Of Subchondral Bone May Be Quantitatively Evaluated Using A Clinical Cone Beam Computed Tomography Scanner**

Mikael J Turunen, Juha Töyräs, Harri Kokkonen, Jukka S Jurvelin

Poster No. 1094

**Increased Posterior Tibial Slope Is a Risk Factor for Anterior Cruciate Ligament Injuries: A Quantitative Three Dimensional Study**

Takayuki Murayama, Takashi Sato, Hiroshi Yamagiwa, Satoshi Watanabe, Osamu Tanifuji, Tomoharu Mochizuki, Go Omori, Yoshio Koga, John D Blaha, Naoto Endo

Poster No. 1095

**Evaluation of Bone Mineral Density of the Necrotic Area in Osteonecrosis of the Femoral Head Using Quantitative Computed Tomography**

So Kubota, Yutaka Inaba, Naomi Kobayashi, Hiroyuki Ike, Taro Tezuka, Masaki Kawamura, Tomoyuki Saito

Poster No. 1096

**Dual Ultrasound Can Measure Kinematic Motion and Intervertebral Disc Deformation of Cervical Spine**

Mingxin Zheng, Aidin Masoudi, Sagar Umale, Daniel Buckland, Narayan Yoganandan, Brian Stemper, Thomas Szabo, Brian Snyder

Poster No. 1097

**Visualization of Experimental Bone Defects by Computed Tomography at Reduced Radiation Doses**

Jamie J Alexander, Zbigniew Gugala, Ronald Lindsey, John A. Hipp, Nathan K. Priddy, Jay S. Croley

Poster No. 1098

WITHDRAWN

Poster No. 1099

**Quantitative Analysis of Bone Texture Using Digital Tomosynthesis in Spontaneous Osteonecrosis of the Knee (SONK)**

Yener N Yeni, Omaila Bokhari, Daniel Oravec, Woong Kim, Michael J Flynn, Catherine Lumley, Fred Nelson

Poster No. 1100

**Analysis Of Postoperative Intertrochanteric Fracture Based On 3d-mpr Images Of The Cortical Bone Contact Site In The Fractured Area**

Tomohiro Yasuda

PS1 DIAGNOSTIC IMAGING - CARTILAGE (ARTICULAR AND MENISCAL)

Poster No. 1101

**Posterolateral Tibia Cartilage Condition, Age and Gender as Predictors of Patient-Reported Outcomes at 1 Year Following ACL Reconstruction**

Brian C Lau, Favian Su, Richard Souza, Christina R Allen, Brian T Feeley, Xiaojuan Li, C Benjamin Ma

Poster No. 1102

**Functional Imaging of Biomechanics and Relaxivity Following Articular Cartilage Injury In Vitro**

Kateri Gilliland, Logan Worke, Nancy Emery, Corey Neu

Poster No. 1103

**Contrast-Enhanced Computed Tomography Correlates with the Equilibrium Modulus of Tibial Plateau Cartilage in a Destabilized Medial Meniscus Mouse Model of Osteoarthritis**

Benjamin Lakin, Joshua Shelofsky, Michele Sidler, Gisela Kuhn, Daniel Ellis, Brian Snyder, Kathryn S Stok, Mark Grinstaff

Poster No. 1104

**Use of the Human Metacarpophalangeal Joint as an Ideal Model of a Discreet Synovial Joint that Develops OA and is Appropriate for High Resolution Imaging, Mechanical Testing and Biochemical Analysis**

Benjamin Lakin, Joshua Shelofsky, Daniel Ellis, Mark Grinstaff, Brian Snyder

Poster No. 1105

**Contrast-enhanced Computed Tomography Distinguishes Osteoarthritic Disease State in an Equine Patellofemoral Joint**

Rachel C Stewart, Brad Nelson, Chris Kawcak, Brian Snyder, Laurie R Goodrich, Mark Grinstaff

Poster No. 1106

**Evaluation of the Acetabular Labrum in Patients with Acetabular Dysplasia Using T2 Mapping with Arthroscopic Verification**

Tomonobu Hagio, Masatoshi Naito, Yoshinari Nakamura, Koichi Kinoshita, Tetsuya Sakamoto, Kunihide Muraoka, Norihito Watanabe, So Minokawa, Tomohiko Minamikawa, Hajime Seo, Tetsuro Ishimatsu

Poster No. 1107

**Predicting Early Osteoarthritis in the Human Knee: Pattern Recognition and Machine Learning Classification of Magnetic Resonance Images**

Beth G. Ashinsky, Mustapha Bouhrara, Kenneth L. Urish, Christopher E. Coletta, Ilya G. Goldberg, Richard G. Spencer

Poster No. 1108

**Determining the Composition of Human Meniscus using Near Infrared Spectroscopy**

Isaac O Afara, Juuso T Honkanen, Elvis K Danso, Rami K. Korhonen, Jukka S Jurvelin, Juha Töyräs

Poster No. 1109

**Cartilage MR T1 $\rho$  And T2 Quantifications: Longitudinal Reproducibility And Variations Using Different Coils And Scanners At Single And Multi-sites**

Xiaojuan Li, Valentina Padoia, Deepak Kumar, Drew Lansdown, Cory Wyatt, Julien Rivorie, Narihiro Okazaki, Dragana Savic, Matthew F Koff, Joel Felmlee, Steven Williams, Sharmila Majumdar

Poster No. 1110

**Effects of Articular Cartilage Constituents on Phosphotungstic Acid Enhanced Micro-CT Imaging**

Sakari Karhula, Mikko Finnilä, Sami Kauppinen, Heikki J Nieminen, Simo Saarakkala

Poster No. 1111

**Quantification of Glycosaminoglycans (GAG) Concentration in Articular Cartilage by micro Computed Tomography ( $\mu$ CT)**

Daniel J Mittelstaedt, David J Kahn, Yang Xia

Poster No. 1112

**True Four Dimensional Imaging Technology With Advanced Tissue Geometry Fusion Methods For Musculoskeletal Diagnosis**

George Papaioannou, Christos Mitrogiannis

Poster No. 1113

**MRI Detection of Early Lesions of Surgically-induced Osteochondrosis in Goats**

Ferenc Toth, Mikko J. Nissi, Luning Wang, Jutta M Ellermann, Cathy S Carlson



PS1 DIAGNOSTIC IMAGING - MUSCLE, NERVE, VASCULATURE

Poster No. 1114

**Automating the Diagnosis of Peripheral Nerve Injury via Second Harmonic Generation Imaging**

Surabhi Vijayaraghavan, Nikki M Verberne, Asad Ashraf, Michael R Hausman

Poster No. 1115

**Changes In Central Nervous System Activity After Peripheral Nerve Injury: A Functional MRI Study**

Tetsuro Yamasaki, Kazuya Ikoma, Ryo Oda, Masateru Nagae, Takumi Ikeda, Yasuo Mikami, Hiroyoshi Fujiwara, Toshikazu Kubo

Poster No. 1116

**Change In ADC and FA Values of the Normal Lumbar Spinal Root as a Function of Distance From the Junction of the Dura Mater**

Ryo Miyagi, Toshinori Sakai, Eiko Yamabe, Hiroshi Yoshioka

PS1 DIAGNOSTIC IMAGING - NOVEL AND FUNCTIONAL IMAGING, ARTIFACTS

Poster No. 1117 *ORS Best Hand and Wrist Poster*

**Multidimensional Ultrasound Imaging of the Wrist: Changes of Shape and Displacement of the Median Nerve and Tendons in Carpal Tunnel Syndrome**

Anika Filius, Peter C. Amadio, Marjan Scheltens, Hans G. Bosch, Pieter A. van Doorn, Henk J. Stam, Steven E.R. Hovius, Ruud W. Selles

Poster No. 1118

**Quantitating the Effect of Prosthesis Design on Femoral Remodeling Using High-Resolution Region-Free Densitometric Analysis (DXA-RFA)**

Richard M Morris, Jeannette O Penny, Lang Yang, Miguel A Martin-Fernandez, Jose M Pozo, Soren Overgaard, Alejandro Frangi, J Mark Wilkinson

Poster No. 1119

**A New MRI-Based 3D Bone-marrow Model for In Vivo Spine Kinematics**

Sayuri Kitahata, Kresten Rickers, Alejandro A Espinoza Orias, Steffen Ringgaard, Gunnar BJ Andersson, Cody E Büngrer, Jenna Peterson, Bruce Robie, Nozomu Inoue

Poster No. 1120

**A Novel Approach to Determine Accuracy of Radiographic Measurements Utilizing Three-Dimensional Hip Implant Models**

Chris Nocera, Paul Lichstein, Thies Wuestemann, Adam Bastian, Javad Parvizi, Richard Rothman

Poster No. 1121

**Rapid Throughput, Seamless Imaging of Human Hip Joint Tissue Across Length Scales to Elucidate Emergent Structure-Function Relationships**

Ulf Knothe, Dirk Zeidler, Anna-Lena Keller, Melissa Knothe Tate

Poster No. 1122

**Measuring Internal Deformation of the In Vivo Rat Spinal Cord During Traumatic Spinal Cord Injury**

Tim Bhatnagar, Jie Liu, Andrew Yung, Peter Crompton, Piotr Kozłowski, Wolfram Tetzlaff, Thomas Oxland

PS1 POLICIES/GUIDELINES/LEADERSHIP

Poster No. 1123

**Revisions to Federal Guidelines for Human Experimentation and the Public Response**

Jennifer Racine, Roy Aaron

Poster No. 1124

**The Role of Chairman and Research Director in Influencing Scholarly Productivity and Research Funding in Academic Orthopaedic Surgery**

Alexandra Stavrakis, Ankur Patel, Zachary Burke, Amanda Loftin, Erik Dworsky, Mauricio Silva, Anthony Scaduto, Nicholas Bernthal

## POSTER SESSION 2

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*Posters Will Be Displayed Monday And Tuesday*

PS2 BIOMATERIALS - OTHER

Poster No. 1125

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**Importance of Structural Alignment in Myogenic Cell Delivery for Regeneration of Skeletal Muscle**  
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Daisuke Chiba, Eiichi Tsuda, Yuji Yamamoto, Shugo Maeda, Eiji Sasaki, Ippei Takahashi, Shigeyuki Nakaji, Yasuyuki Ishibashi

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Tristan Maerz, Michael Kurdziel, Abigail Davidson, Kevin Baker, Kyle Anderson, Howard Matthew

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Koji Takayama, Yohei Kawakami, Makoto Kobayashi, Takehiko Matsushita, Ryosuke Kuroda, Masahiro Kurosaka, Freddie H Fu, Johnny Huard

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Giuliana E. Salazar-Noratto, Nick Willett, Hazel Y Stevens, Angela Lin, Greg Gibson, Robert E Guldberg

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Olufunmilayo O Adebayo, Frank C Ko, Steven R Goldring, Mary B Goldring, Timothy M Wright, Marjolein C.H. van der Meulen

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**A Confocal Microscope-Based Method for Mapping Compressive Strains in Murine Cartilage**

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**Effect of Binding Peptide Length and Concentration on Augmentation of IGF-I Gene Therapy for Chondrocytes**

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**Effects Of Static Versus Dynamic Culture Conditions Upon The Chondrogenic Differentiation Potentialof Human Bone Marrow Aspirates Following rAAV-mediated Overexpression Of sox9**

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Ana Rey Rico, Alvarez-Lorenzo Carmen, Angel Concheiro, Henning Madry, Magali Cucchiari

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**Early Changes in Synovial Protease Gene Expression after Surgical Induction of Post-Traumatic Osteoarthritis in a Porcine Large Animal Model**

Jakob T Sieker, Ugur M Ayturk, Benedikt L Proffen, Braden C Fleming, Martha M Murray

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**Magnetic Resonance-Guided Focused Ultrasound for Treatment of Arthritic Pain in a Sheep Model**

Adam Wilson, Xuejun Du, Chunxi Yang, Arik Hananel, Xinlin Yang, Jourdan Cancienne, Richard Price, Abhijit Dighe, Quanjun Cui

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**Wisp1 Aggravates Osteoarthritis By Modulation Of TGF- $\beta$  Signaling And Positive Regulation Of Canonical Wnt Signaling**

Martijn H van den Bosch, Arjen B Blom, Azusa Maeda, Tina M Kilts, Esmeralda N Blaney Davidson, Wim B van den Berg, Floris P Lafeber, Peter L van Lent, Marian F Young, Peter M van der Kraan

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Athanassios Fragoulis, Rainer Beckmann, Claudius Conrads, Mersedeh Tohidnezhad, Thomas Pufe, Christoph J Wruck, Mary B Goldring, Holger Jahr

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Natasha Topoluk, Renae Keeley, Jeremy Mercuri

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Monideepa Chatterjee, Miri Park, Brandon K Zimmerman, X. Lucas Lu

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**Cell-Cell Interactions Enhance Cartilage Formation in Gradient Hydrogels that Mimic Tissue Zonal Organization**

Danqing Zhu, Pavin Trinh, Fan Yang

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**Overexpression of hsa-miR-7 Enhances Cartilage Regeneration by Osteoarthritic Chondrocytes**

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Ron N Alkalay, Carl-Fredrik Westin, David Hackney



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Robert Kang, Ying Tang, Qing Dong, Kara Imbrogno, Qing Yang, James Kang, Bing Wang

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**Teriparatide Improves Trabecular Osteoporosis but Simultaneously Promotes Spinal Ankylosis in the twy Mice Model for Diffuse Idiopathic Skeletal Hyperostosis**

Hiroki Hamano, Masahiko Takahata, Masahiro Ota, Shigeto Hiratsuka, Tomohiro Shimizu, Yusuke Kameda, Norimasa Iwasaki

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Carl Lauryssen, Gary S Fanton, EJ Ehrhart, Dana Ruehlman, Howard Seim, Jeremiah T Easley

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**Nell-1 Promotes Spinal Fusion In Non-human Primates**

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Elisabeth Rok, Marc Grynepas, J Paul Santerre, Rita Kandel

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**Visualization of Collagen Crimp in Multilayer Annulus Fibrosus using Ultra-High Field 9.4T MRI**

Scott Moorman, Jeff Dunn, John Matyas, Neil Duncan

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Alon Lai, Andrew Moon, Devina Purmessur, Branko Skovrlj, Beth Winkelstein, Samuel Cho, Andrew C Hecht, James C Iatridis

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**Fibrin-Genipin Annulus Fibrosus Sealant as a Delivery System for Anti-TNF $\alpha$  Drug**

Morakot Likhitpanichkul, Yesul Kim, Eugene See, Olivia M Torre, Zepur Kazezian, Abhay Pandit, Andrew C Hecht, James C Iatridis

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**Effect Of A Selective Inhibitor Of c-Fos/activator Protein-1 On Intervertebral Disc Degeneration Induced By Needle Puncture In Rats**

Hiroto Makino, Shoji Seki, Hiraku Motomura, Yasuhiro Yahara, Makiko Nogami, Shunichi Shiozawa, Tomoatsu Kimura

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**Dynamic Loading Improves Intervertebral Disc Metabolic Activity And Nutrient Exchange Under Low Glucose Conditions**

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**The Ability Of Ultrasound To Determine Rotator Cuff Tear Reparability**

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**Can Rotator Cuff Repair Prevent The Progression Of The Osteoarthritis?**

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**Bone Morphogenetic Proteins Signaling in Rotator Cuff Muscles Following Massive Tendon Tears**

Xuhui Liu, Bharat Ravishankar, Dominique Laron, Sunil Kumar Joshi, Tammy Luan, Hubert Kim, Brian T Feeley

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**Side-specific Differences In The Supraspinatus Muscle And Tendon Morphological Properties In Collegiate Baseball Players With And Without Shoulder Injuries**

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**Muscular Fatty Infiltration Is Mediated By Mmp-13 In A Mouse Model Of Rotator Cuff Tears**

Bharat Ravishankar, Tammy Luan, Dominique Laron, Hubert Kim, Brian T Feeley, Xuhui Liu

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**Mast Cell Tryptase Modifies The Contraction Of Human Joint Capsule Cells In Vitro**

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**A Prospective, Quantitative MRI-Based Assessment on the Progression of Fatty Infiltration after Rotator Cuff Repair**

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**Side-to-side Versus Pulvertaft Extensor Tendon Repair - Biomechanical Study**

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**Looped versus Single Stranded Flexor Tendon Repairs: A Cadaveric Mechanical Study**

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**Stepwise Releases of the Flexor Retinaculum Affect Carpal Tunnel Structural Properties**

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**Characterization of the Hyperelastic Material Properties of Subsynovial Connective Tissue**

Yusuke Matsuura, Andrew Thoreson, Chunfeng Zhao, Peter C. Amadio, Kai-Nan An

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**Biomechanical Evaluation of Isolated Scapholunate Ligament Disruption on Dynamic Scapholunate Instability**

Matthew E. Hiro, Muturi Muriuki, Corey J. Schiffman, Julia Graham, Robert M Havey, Leonard I. Voronov, Avinash G. Patwardhan, Randipsingh Bindra

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Matthew J Thompson, John R Owen, Jennifer S Wayne, Charles M McDowell

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**Biomechanical Analysis of Internal Fixation Methods for Distal Interphalangeal Joint Arthrodesis**

Stephanie Rigot, Rafael Diaz-Garcia, Richard E Debski, John Fowler

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**Force in the Scapholunate Interosseous Ligament during Physiological Wrist Loading**

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**Secondary And Tertiary Axial Stabilization Of The Forearm, A Biomechanical Study Of The Interosseous Membrane And Triangular Fibrocartilage Complex**

Daniel R Bachman, Kai-Nan An, Shawn W O'Driscoll

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**Fixation for Metacarpal Neck Fracture: A Biomechanical Study**

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**Electrophysiological Changes of Median Nerve Induced by An Intraoperative Phalen's Test on Carpal Tunnel Syndrome**

Shigeru Kobayashi, Takafumi Yayama, Kousuke Awara, Adam Meir, Katsuhiko Hayakawa

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**Cell-Seeded Contraction Gel Model to Assess TGF- $\beta$  and Fibroblast Biomechanics in an Established Rabbit Model of Carpal Tunnel Syndrome**

Tai-Hua Yang, Andrew Thoreson, Anne Gingery, Dirk Larson, Sandra Passe, Kai-Nan An, Chunfeng Zhao, Peter C. Amadio

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**Light Activated Sealing of Nerve Graft Coaptation Sites Improves Outcome Following Large Gap Nerve Injury**

Neil G Fairbairn, Joanna H Ng-Glazier, Amanda M Meppelink, Mark A Randolph, Jonathan M Winograd, Ian L Valerio, Mark E Fleming, Robert W Redmond

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**Examinations In Relation To Intra-articular Pressure Force Of Talocrural Joint By The Use Of Miniature Pressure Sensor: Comparison Of Three Types Of Screws On Arthroscopic Ankle Arthrodesis**

Satoshi Kamijo, Tsukasa Kumai, Shogo Tanaka, Tuyoshi Mano, Yasuhito Tanaka

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**Posterior Tibial Dysfunction: Imaging Diagnosis When No MRI Detectable Tendon Pathology Is Present**

Elie Harmouche, Douglas D Robertson, Jr., Aparna Kakarala, Seth Means, Minzhi Ming, Michael Terk

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**Tarsal Navicular Bone Collapse in Diabetics**

Douglas D Robertson, Jr, Elie Harmouche, Geza Kogler, Minzhi Xing, Michael Terk

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**Reconstruction of the Superior Aspect of the Midfoot Provides Greater Correction than an Anatomic Reconstruction of the Spring Ligament in a Simulated Flatfoot Deformity**

Josh R Baxter, Jeremy M LaMothe, Raymond J Walls, Marcelo P Prado, Susannah Gilbert, Jonathan T Deland

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**Statistical Assessment Of Load Variations Across Osteotomies In The Foot**

Jeffrey Bischoff, Mehul A Dharia, Jim Woodburn, Scott Telfer, Amir Al-Munajjed

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**Changes in Energy Recovery Following Total Ankle Replacement**

Robin M Queen, Tawnee Sparling, Abigail L Carpenter, Daniel Schmitt

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**Predicting Tibial Stress Fields Around Total Ankle Replacements**

Matthew A Hamilton, Phong Diep, James Nunley, James DeOrio, Mark Easley, Victor Valderrabano

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**Effect of a Supramalleolar Osteotomy in a Novel Asymmetric Ankle Arthritis Model**

Jack Anavian, Todd A Fellars, Heather E. Gotha, Sarath C. Koruprolu, Ryan R. Rich, David Paller, Christopher W DiGiovanni

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**Effect of a Calcaneal Osteotomy in a Novel Asymmetric Ankle Arthritis Model**

Jack Anavian, Todd A Fellars, Heather E. Gotha, Sarath C. Koruprolu, Ryan R. Rich, David J. Paller, Christopher W DiGiovanni

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**The Impact of Nitinol Staples on the Compressive Forces, Contact Area and Mechanical Properties in Comparison to a Claw Plate for the Lapidus Arthrodesis**

Amiethab A Aiyer, Nicholas A Russell, Matthew H Pelletier, Mark S Myerson, William Robert Walsh

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**Next Generation type Silver-containing Hydroxyapatite Coating**

Iwao Noda, Hiroshi Miyamoto, Masaya Ueno, Shuichi Eto, Masatsugu Tsukamoto, Shunsuke Kawano, Motoki Sonohata, Masaaki Mawatari

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**IDR-1018: An Immunodulatory Host Defense Peptide that Decreases Bacterial Burden and Preserves Osseointegration in a Murine Model of Orthopaedic Implant Infection**

Hyonmin Choe, Arvind S Narayanan, David J Corn, Bryan S Hausman, Sona Haku, Hani A Essber, Steve H Marshall, Zhenghong Lee, Robert A Bonomo, Edward M Greenfield

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**Bacterial Suture Adherence and Biofilm Formation in an In-vivo Contaminated Wound Model**

Michael R Morris, Christopher Bergum, Nancy Jackson, David Markel

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**Comparison of Gown Contamination in Simulated Total Joint Surgery**

Jamie Fraser, Simon Young, Kimberly Valentine, Nicholas Probst, Mark Spangehl

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**Impact of Silver Deposition on Staphylococcus aureus Colonization in a Rat Fracture Osteomyelitis Model**

Duane A. Robinson, Anne Nicholson, Zach Quanback, Joan E Bechtold, Lewis G Zirkle, Cathy S Carlson, Dean Tsukayama, Andrew Schmidt

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**Antimicrobial Surface By Thin Coating With Ag-silicate Platelet Nanohybrids And Waterborne Polyurethane on Metal plate**

Chih-Hao Chang, Yi-Hsiu Huang, Mark Hung-Chih Chen

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**Development of a Hematogenous Implant-Related Osteomyelitis Model**

Stefanie M Shiels, Katherine M Bedigrew, Joseph C Wenke

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**The Effect of Postmortem Interval on Human Cadaveric Tissue Seropositivity: A retrospective donor chart review**

Amir H. Qureshi, Mark D Barton, Anita Vijapura, H. Thomas Temple

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**False Positive Rate of Serological Screening of Cadaveric Tissue Donors for Human T-cell Lymphotropic Virus**

Anita Vijapura, Amir H. Qureshi, Mark D Barton, H. Thomas Temple

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**The Amplitude of Pulse-Synchronous Intramuscular Pressure Oscillations ascertains the Diagnosis of Chronic Compartment Syndrome of the Leg**

Andreas Nilsson, Qiuxia Zhang, Jorma Styf

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**Correlation Of NIRS And Histological Muscle Damage In A Prolonged Trauma/infusion Model Of Extremity Compartment Syndrome (ECS) - Assessing NIRS Ability To Detect The Clinical Consequence Of Delayed ECS**

Steven Budsberg, Michael Shuler, Mellisa Roskosky, Elizabeth Uhl, Megan Hansen, Brett Freedman

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**Biomechanical Evaluation of the Risk of Secondary Fracture around Short vs. Long Femoral Intramedullary Nails**

William E Daner, John R Owen, Jennifer S Wayne, Ryan B Graves, Mark C Willis

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**Pressure Characteristics of Pelvic Circumferential Compression Devices: A Cadaveric Study**

Brandon T Bucker, John R Owen, Marc A Tremblay, Jennifer S Wayne, Mark C Willis

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**Delayed Treatment of Critically-sized Femoral Defects in a Rat Model of Chronic Non-union**

Albert Cheng, Laxminarayanan Krishnan, Robert E Goldberg

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**The Effects of Ketorolac Tromethamine on Tendons - An In Vitro and In Vivo Study**

Ting Yuan, Jianying Zhang, Guangyi Zhao, Binghua Zhou, James Wang

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**Is It Only Athletes That Tear Their Hamstrings? A Systematic Review**

David F Hamilton, Barbara Kuske, Sam Pattle, Hamish Simpson

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**Sex-Related Differences in Sports Performance and Injury**

Marcia Newby-Goodman, Zbigniew Gugala

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**Hypoxia-induced Transmembrane Carbonic Anhydrase 9 Enzyme Inhibitor Suppresses Cell Proliferation, Migration And Invasion Of Osteosarcoma**

Kazuma Okuno, Takao Matsubara, Akihiko Matsumine, Kunihiro Asanuma, Tomoki Nakamura, Takahiro Iino, Akihiro Sudo

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**Isocitrate Dehydrogenase 2 Mutation In Giant Cell Tumor Of Bone**

Masato Sugawara, Xing Liu, Hiroharu Oki, Takashi Tsuchiya, Mika Kaneko Kato, Yukinari Kato, Michiaki Takagi

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**The Tyrosine Kinase Inhibitor, R428, Reduces Progression of In Vitro Models of Osteosarcoma Micrometastasis**

William Z Morris, Christopher T. Manuszak, Ashley N Rettew, Hani A Essber, Christopher Collier, Patrick J. Getty, Edward M Greenfield

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**Microrna Mir-326 Promotes Tumor Growth Of Human Synovial Sarcoma**

Yusuke Minami, Masumi Tsuda, Shinji Kohsaka, Akio MInami, Shinya Tanaka, Norimasa Iwasaki

Poster No. 1927

**Isocitrate Dehydrogenase 2 Mutation Is Frequently Observed In Osteosarcoma**

Masato Sugawara, Xing Liu, Yasushi Naganuma, Takashi Tsuchiya, Mika Kaneko Kato, Yukinari Kato, Michiaki Takagi

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**Cadherin-11 Has Interactions With Osteoblasts And Enhances Bone Metastases In Ewing's Sarcoma Family Of Tumors**

Mihoko Hatano, Yoshihiro Matsumoto, Jun-ich Fukushi, Tomoya Matsunobu, Kunio Iura, Yoshinao Oda, Akira Nabeshima, Nobuhiko Yokoyama, Suguru Fukushima, Yukihide Iwamoto

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**The Overexpression Of Bone Morphogenetic Protein And Activin Membrane-bound Inhibitor In Human Osteosarcoma Cells**

Jung Ryul Kim, Kyu Yun Jang

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**Proteomic Approaches For Defining The Protein Profiles Of EWS/FlI1 In Ewing's Sarcomas**

Yoshiyuki Suehara, Shinji Kohsaka, Kenta Mukaihara, Keisuke Akaike, Midori Ishii, Daisuke Kubota, Saiko Kazuno, Reiko Mineki, Tsutomu Fujimura, Kazuo Kaneko, Marc Ladanyi, Tsuyoshi Saito

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**Effect of Recombinant Human Bone Morphogenetic Protein-2 on Lung Cancer Spine Metastasis in Rodents**

Kevin A Sonn, Sharath S Bellary, Chawon Yun, Sohaib Z Hashmi, John Nelson, Michael S Nickoli, Jason H Ghodasra, Abhishek Kannan, Amruta Ashtekar, Christian Park, Anjan Ghosh, Stuart Stock, Erin L Hsu, Wellington K Hsu

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**Myc Target 1 (MYCT1) Gene is a Novel Target of TGF- $\beta$  Signaling to Promote Differentiation of Chondrosarcoma Cells**

Yuhei Yahiro, Shingo Maeda, Naohiro Shinohara, Kanehiro Matsuyama, Ichiro Kawamura, Takao Setoguchi, Satoshi Nagano, Masahiro Yokouchi, Yasuhiro Ishidou, Setsuro Komiya

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**Bone Morphogenetic Protein (BMP) Signaling Induces the Imprinted Paternally Expressed Gene 10 (PEG10) to Regulate Expression of Matrix Metalloproteinase (MMP)-1 and -13 in Chondrosarcoma Cells**

Naohiro Shinohara, Shingo Maeda, Kanehiro Matsuyama, Yuhei Yahiro, Katsuyuki Imamura, Ichiro Kawamura, Takao Setoguchi, Satoshi Nagano, Masahiro Yokouchi, Yasuhiro Ishidou, Setsuro Komiya

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**Microarray and RNA Sequencing Analysis of Pericyte-derived Sarcomas in a Novel Sarcoma Mouse Model**

Shingo Sato, Qingxia Wei, Makoto Hirata, Yuning Tang, Shu Takeda, Jay Wunder, Benjamin Alman

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**Differentiate Human Ovarian Cancer Cell Line with Different Metastasis Characteristics by Cell Mechanical Properties**

Chih-Chan Lin, Tzu-Hsiang Lin, Tsung-Hsien Wu, Hsueh-Chun Wang, Meng-Chian Wu, Ho-kai Huang, Yu-Chen Liu, Horng-Chaung Hsu, Ming-Long Yeh

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**A Novel Intraoperative Laser Ablation System for Treatment of Residual Sarcoma**

Alexander L Lazarides, Melodi Whitley, David Strasfeld, Diana Cardona, David Kirsch, Brian Brigman, Jorge Ferrer, Suzanne Bartholf DeWitt, William Eward

Poster No. 1937

**microRNA-based Therapy For Osteosarcoma**

Hani A. Essber, Eldra W. Daniels, Christopher T. Manuszak, Michael P. Perisa, Xin Chen, Ashley N. Rettew, Patrick J. Getty, Edward M. Greenfield

Poster No. 1938

**The Correlation of Malignant Potential with NELL-1 Expression in Benign and Malignant Bone Tumors**

Gregory Y LaChaud, Jia Shen, Kevork Khadarian, Greg Asatrian, Xinli Zhang, Sarah Dry, Kang Ting, Chia Soo, Aaron W James

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**The Influence of Physical and Physiological Cues on Atomic Force Microscopy-Based Cell Stiffness Assessment**

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**Hsp90 Inhibitor Induced Autophagy And Apoptosis In Osteosarcoma Cells**

Masaki Mori

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**Oncolytic Measles Virus (MV) expressing Sodium Iodine Symporter Gene as a Therapy for Neurofibromatosis Type I Associated Tumors**

David Deyle, Scott Riestter, Kah-Whye Peng, Dusica Babovic--Vuksanovic

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**Epigenetic Regulation of Metastatic Osteosarcoma Cells with HDAC Inhibitor**

Xiaodong Mu, Daniel Brynien, Johnny Huard, Kurt Weiss

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**Preclinical Activity Of KPT-330, An Inhibitor Of Crm1/xpo1, In Several Models Of Sarcoma Subtypes**

Robert Nakayama, Yi-Xiang Zhang, Ewa Sicinska, George D Demetri, Andrew J Wagner

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**GSK-3 Inhibitor Inhibits Cell Proliferation And Induces Apoptosis In Human Osteosarcoma Cells**

Hideki Nishimura

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**A Platelet Aggregation-inducing Factor Podoplanin Is Highly Expressed In Metastatic Legions Of Osteosarcoma**

Hiroharu Oki, Mika Kato Kaneko, Satoshi Ogasawara, Yuta Tsujimoto, Xing Liu, Masato Sugawara, Yuya Takakubo, Takashi Tsuchiya, Michiaki Takagi, Yukinari Kato

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**Targeting Cancer Stem Cell Marker miR302C in Human Chondrosarcoma Determines the Antiproliferative Activity of Proline Rich Polypeptide 1**

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Nobuhiko Yokoyama, Tomoya Matsunobu, Akira Nabeshima, Mihoko Hatano, Yuko Fujiwara, Keiichiro Iida, Yoshihiro Matsumoto, Jun-ichi Fukushi, Katsumi Harimaya, Yukihide Iwamoto

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**The Emerging Role of p38 for expression of Sclerostin in Giant Cell Tumor**

Jocelyn Compton, Dawn Maldonado, Hyunwoo Kang, Jungho Back, Lee Song, Heon Goo Lee, Francis Y Lee

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**A Potential Biomarker Predicting Sensitivities of Synovial Sarcoma Cells to a Selective c-MET Inhibitor, INC280**

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**MRI Derived Parameters Of Volume And Signal Intensity Predict Clinical, Functional And Patient-oriented Outcome Measures Following ACL Reconstruction**

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**Shear Wave Elastography \_ A Promising Diagnostic Tool For Evaluating Tendon Regeneration In Chronic Tendinopathy**

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Koichi Okamura, Yukio Yonemoto, Takahito Sudo, Chisa Okura, Kenji Takagishi

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**In Vivo Evaluation Of Arthritis By Mmp Activatable Probe In A Rat Mia-induced Model**

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**Correlation of T1ρ and T2 Relaxation Times Values with Glycosaminoglycan and Water Content of Articular Cartilage**

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**Comparison Of Gd-DTPA-BMA Vesus Gd-DOTA Gadolinium Retention In Human Bone Tissue**

Toshihiro Akisue, Hitomi Hara, Teruya Kawamoto, Takaki Maeda, Hajimu Goto, Yasuo Onishi, Kazuro Sugimura, Masahiro Kurosaka

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**Variability in Fluoroscopic Image Acquisition during Operative Fixation of Ankle Fractures at an Academic Institution**

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**The Role of Bone Marrow Edema in the Prognosis for Subchondral Insufficiency Fracture of the Hip Joint**

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**Femoral Geometry and BMD in Patients With Hip Osteoarthritis and Those With Hip Fracture During a Six-year Follow-up**

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**In-vitro and In-vivo Imaging of Mmp Activity in Cartilage and Joint Injury**

Tomoaki Fukui, Elizabeth Tenborg, Jasper H. N. Yik, Dominik R Haudenschild

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**Reliability of Radial MRI with Biochemical and Morphological MR Sequences in Painful Hips: Comparison to Arthroscopic Findings**

Hidetoshi Hamada, Takashi Nishii, Masaki Takao, Takashi Sakai, Hideki Yoshikawa, Nobuhiko Sugano

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**Diffusion Rate And Equilibrium Partition Of An Anionic Contrast Agent Are Different In Cartilage And Meniscus**

Juuso T Honkanen, Mikael Turunen, Virpi Tiitu, Jukka S Jurvelin, Juha Töyräs

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**Is Worms A Suitable Analysis To Quantify The Status Of Osteoarthritis?**

Heide Boeth, Felix Eckstein, Benedetta Rigoni, Gerd Diederichs, Arne Schlausch, Wolfgang Wirth, Tobias Jung, Georg Duda

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**Effect Of Soft Tissue On Ultrasound Characterization Of Articular Cartilage Degeneration: Experimental Study With Clinical Ultrasound Device**

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**Multivariate Analysis of OCT Signal Enhances Prediction of Articular Cartilage Health**

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**Analysis Of Mechanical Strength In Talus Using CT-osteoaabsorptiometry; In Vivo Study**

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**A Trial To Detect Early Degenerative Changes Of Rabbit Knee Cartilage In Vivo Using MR Imaging With A Double-contrast Agent**

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**Development Of A New Tool To Predict Outcome Of Hip Arthroscopy: Worms- Whole Organ Magnetic Resonance Score**

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**T2 Quantitative Magnetic Resonance Imaging Identifying Femoral Head Cartilage Degeneration As A Result Of Corticosteroid Treatment And Osteoporosis**

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**A Biphasic Apatite/ Sulphate Bone Substitute and Osteoblast Cell Factory Harvested Bone Active Proteins Induce Transdifferentiation Of Skeletal Muscle Cells**

Deepak Raina, Ankur Gupta, Werner Hettwer, Michael Petersen, Martin Mc Nally, Magnus Tagil, Ming Hao Zheng, Ashok Kumar, Lars Lidgren

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**A Biphasic Apatite/Sulphate Injectable Bone Substitute As a Carrier for Bone Morphogenic Protein-2 and Zoledronic Acid: In- Vitro and In-Vivo Analysis**

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**In Vivo Drug Release Behavior And Bone Biocompatibility Of Doxorubicin-loaded Tissue-engineered Scaffold**

Ming Sun, Muwan Chen, Miao Wang, Jakob Hansen, Dang Q.S. Le, Anette Bastrup, Frederik Dagnaes-Hansen, Jan Rölfing, Jonas Jensen, Helle Lysdahl, Mogens Johannsen, Jørgen Kjems, Cody E. Bünger

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**Decellularized Tendon Slices With An Inductive Microenvironment For Enhancing Rat Tendon-derived Stem Cells Proliferation And Tenogenic Differentiation**

Liangju Ning, Yajing Zhang, Yi Zhang, Quan Qing, Yanlin Jiang, Jieliang Yang, Jingcong Luo, Tingwu Qin

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**The Acute and Chronic Biologic Response following Noninvasive Anterior Cruciate Ligament Rupture compared to Surgical Transection as Models for Post-Traumatic Osteoarthritis (PTOA)**

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**Cholesterol Homeostasis mediates Hedgehog Signaling in Osteoarthritis**

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**Diet Induced Obesity Leads to Increased Expression of Adipokines by Intraarticular tissues and Osteoarthritis-like changes in the Rat Knee**

Kelsey H Collins, David A Hart, Raylene A Reimer, Walter Herzog

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**Epigenetic Analysis of Adipose Stem Cells in Obesity Identifies Dysregulation of Critical Pathways in Musculoskeletal Regeneration and Disease**

Dianne Little, Chia-Lung Wu, Reid D'Amico, David Corcoran, Simon Gregory, Farshid Guilak

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**Biomechanical Analysis of Tibiofemoral Contact Pressures After Novel Repair of Meniscus Horizontal Cleavage Tears**

Brandon Beamer, Kempland C. Walley, Stephen Okajima, Ohan Manoukian, Miguel Perez-Viloria, Joseph P DeAngelis, Arun J Ramappa, Ara Nazarian

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**Crosstalk between Sensory Neuropeptides Regulating Heterotopic Ossification in Tendon**

Ceren Tuzmen, Lee Weiss, Phil G Campbell

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**Biaxially Aligned Tendon-derived Matrix-Poly(E-caprolactone) (PCL) Electrospun Scaffolds For Rotator Cuff Tendon Tissue Engineering**

Tiffany Tseng, Sean Meehan, Abby Chainani, Steven B. Orr, Christopher L. Gilchrist, Dianne Little

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**Delivery of Recombinant Indian Hedgehog Protein to the Healing Patellar Tendon Entesis Does Not Improve Biomechanical Outcomes in a Murine Model**

Steven D Gilday, E. Chris Casstevens, Heather M Powell, Keith Kenter, David L Butler, Jason T Shearn

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**Costamere Remodeling And Interstitial Reactions In An Experimental Model Of Tendon Release In Sheep**

Martin Flück, Severin Ruoss, Christoph Möhl, Brigitte von Rechenberg, Mario C Benn, Karl Wieser, Dominik C Meyer, Christian Gerber

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**Wnt-beta-Catenin Controls The Chondrocyte To Osteoblast Lineage Transition In Endochondral Bone Formation**

Kathryn S Cheah, Horace SW Tsang, Kwok Yeung Tsang, Danny Chan, Yingzi Yang

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**Controlling for Tissue Age During Raman Spectroscopy and Nanoindentation to Assess Changes with Scl-Ab Therapy, Mouse Aging, and Osteogenesis Imperfecta**

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**Pge2 Receptor Subtype 1 (ep1) Down Regulation Enhances Periosteal-derived Mesenchymal Stem Cell (pdmscs) Differentiation And Accelerates Fracture Healing**

Marina E Feigenson, Jennifer Jonason, Hani E Awad, Alayna Loiselle, Regis J O'Keefe

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**Chemokine Receptor Mutated In All Affected Members of a Large Multigeneration Family with DDH Affects Acetabular Morphology In the CX3CR1 Knockout Mouse**

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**A Genome-Wide Association Study of Osteolysis Following Total Hip Arthroplasty**

Scott J MacInnes, Anne-Marie Fenstad, Kallia Panoutsopoulou, Lorraine Southam, Geir Hallan, Havard Dale, Ove Furnes, Eleftheria Zeggini, J. Mark Wilkinson

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**A Whole Genome Association Study of Susceptibility to Heterotopic Ossification After Total Hip Arthroplasty**

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Woong Kim, Luyao Cai, David McMillan, Gregory Tamer, Corey Neu

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**Functionalized Polyethylene Glycol (PEG) and Poly(trimethylene carbonate) (PTMC) Block Copolymers Demonstrate High Adhesion Strength for Intervertebral Disc Repair**

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**The Effect of Dosing and Cryopreservation on Efficacy and Safety of a Novel Cell Therapy for Degenerative Disc Disease Using a Porcine Model: Sub-Acute and Chronic Timepoints**

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**Analyzing The Cellular Contribution Of Periosteum To Fracture Healing Using A Membrane-targeted Tdtomato Transgenic Mouse Model**

Tao Wang, Daniel D Bikle, Xudong J Li, Alicia Menendez

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**Does Taper Size Have an Effect on Taper Damage in Retrieved Total Hip Devices?**

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**The Effect of Simulated Inflammatory Conditions on the Corrosion and Fretting Corrosion of CoCrMo alloy**

Yangping Liu, Jeremy L Gilbert



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**Patient Outcomes Following Revision Total Knee Arthroplasty With Total Stabiliser Prostheses Are Similar To Those Achieved Following Primary Knee Arthroplasty: A Longitudinal Cohort Study**

David F Hamilton, Philip Simpson, James T Patton, Colin R Howie, Hamish RW Simpson, Richard Burnett

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**Defining the Role of Fibro-Adipogenic Progenitor Cells in Fibrosis and Fatty Infiltration of Muscle After Rotator Cuff Tears**

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Jessica Amber Jennings, Jegdish Babu, Diego Velasquez, Daniel Carpenter, Sanjay Mishra, Joel D Bumgardner

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Brad M Isaacson, Thomas Swanson, Benjamin K Potter, Richard T Epperson, Roy D Bloebaum, Paul F Pasquina

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**MRI Assessment of Oral CSF1-Receptor Inhibition with PLX3397 for Tenosynovial Giant Cell Tumor/Pigmented Villonodular Synovitis using Novel Modified RECIST, Tumor Volume Scoring, and Tissue Damage Scoring Methods**

Charles Peterfy, William D. Tap, Julie DiCarlo, Zev A. Wainberg, Chao Zhang, Arthur P. Staddon, Allen Lee Cohn, Geoffrey Shapiro, Igor Puzanov, Eunice L. Kwak, Henry H. Hsu, Paul S. Lin, Sandra Tong, John H Healey

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**Doxorubicin Induced Oxidative Stress is a Double Edged Sword for Life and Death of Cancers Regulated by p53- Dependent Dual Function of SRC kinase**

SungWook Seo, Dami Shim, YunSun Lee, YoungJoon Choi

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CellScale manufactures biomaterial and mechanobiology test systems. Our mechanical test systems are specifically designed for biomaterials testing and incorporate temperature-controlled media baths, image capture and analysis software, and a range of gripping mechanisms. Our cell culture systems enable mechanically active environments in 2D or 3D.

**Cleveland Clinic BioRobotics Core**

9500 Euclid Ave., ND-20  
Cleveland, OH 44195  
Phone (216)399-6743  
<http://mds.clevelandclinic.org/services/biorobotics.aspx>

The Cleveland Clinic BioRobotics Core is a center of excellence for biomechanical testing of biological structures and biomaterials. We provide robotic testing capabilities for tissues, joints, and multi-articular units, such as knees, hips, shoulders, foot/ankle complexes, and spines. We also develop and sell robotic testing systems using our simVITRO software.

**Collagen Solutions US Inc.**

5941 Optical Court  
San Jose, CA 95138  
Phone (408)960-2205  
Fax (866)935-9288  
www.collagensolutions.com

Collagen Solutions US Inc. provides a highly skilled team offering both standard and customized collagen raw material supply of ultra-purified soluble collagen, powders, and dispersions in addition to expert development services. Contract manufacturing is done under BSI certified ISO 13485 and produces product used in FDA and CE approved devices worldwide.

**Delsys, Inc.**

23 Strathmore Road  
Natick, MA 01760  
Phone (508)545-8200  
Fax (508)975-4551  
www.delsys.com

Delsys is a world leader in the design, manufacture and marketing of a broad portfolio of high-performance Electromyography, physiological/ biomechanical sensors used in movement measurement research and education. Our wired and wireless sensors and software solutions are designed to meet the needs of our broad customer base in over 85 countries.

**Elsevier BV**

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ELSEVIER is a leading publisher of health science publications, advancing medicine by delivering superior reference information and decision support tools to doctors, nurses, health practitioners and students. With an extensive media spectrum — print, online and handheld, we are able to supply the information you need in the most convenient format.

**Faxitron**

3440 E. Britannia Drive, Suite 150  
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Phone (520)399-8180  
Fax (520)399-8182  
www.faxitron.com

As the world's only fully vertically integrated and dedicated cabinet X-ray company, Faxitron is the industry standard. Faxitron offers compact, fully-shielded digital imaging systems with the highest resolution (up to 100 lp/mm) and the largest field of view in the market.

**Flexcell International Corporation**

2730 Tucker Street, Suite 200  
Burlington, NC 27215  
Phone (800)728-3714  
Fax (919)732-5196  
www.flexcellint.com

Flexcell International Corporation specializes in designing and manufacturing products to apply mechanical loads, including tension, compression, and fluid shear, to cells in monolayer and 3D culture. Flexcell has high-throughput culture plates, equipment for making 3D cell-seeded constructs, software for analyzing 3D gel compaction, microscope devices for viewing real-time response to mechanical load, and a state of the art microfluidic pump.

### **Histon**

2615 W. Casino Road  
Everett, WA 98204  
Phone (425)347-0439  
Fax (425)353-3604  
www.histon.com

Histon specializes in evaluation of medical devices (including drug/device and biologic/device combinations) with a proven track record of success providing data to support regulatory submissions. Services include consulting, design and execution of preclinical studies, soft and hard tissue histology, precision cutting/grinding, immunohistochemistry, histopathology, histomorphometry, micro-CT analysis and mechanical testing.

### **Instron**

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Norwood, MA 02062  
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Fax (781)575-5725  
www.instron.com

Instron® TGT instruments are uniquely designed for all aspects of tissue engineering & regenerative medicine. Test applications range from condition & engineer developing tissues to providing an in vitro testbed for drugs and cell therapy development. Instron TGT provides customers with comprehensive solutions for all their research, quality and testing requirements.

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### **iovera® health**

1600 Seaport Blvd., Suite 450  
Redwood City, CA 94063  
Phone (650)465-9709  
www.ioverahealth.com

### **ISIS Services**

1031 Bing Street  
San Carlos, CA 94070  
Phone (510)704-0140  
www.isisservices.com

With over 25 years of experience in experimental surgery, ISIS Services is a leader in preclinical medical device contract research. ISIS is fully equipped to handle all of your needs from research and development to non-GLP and GLP studies. Our state-of-the-art facility consists of four surgical suites with imaging systems including a cath lab, c-arms, ultrasound, endo and lap towers.

### **The Japanese Orthopaedic Association**

2-40-8 Hongo, Bunkyo-ku  
Tokyo 113-8418  
Japan  
Phone +81-3-3816-3671  
Fax +81-3-3818-2337  
www.joa.or.jp

The Japanese Orthopaedic Association was founded in 1926 (Year 15 of the Taisho era) in order to promote studies of orthopaedics, presentation of study results, and to strengthen contact and cooperation among organizations and individuals specializing in this discipline. Our goal is to facilitate the maintenance and improvement of bone and joint function. To achieve this, it will be necessary to produce medical specialists who are adept at diagnosis and treatment, including conservative treatments such as therapeutic exercise, as well as pharmacotherapeutics and surgery.

### **Kubtec Digital X-ray**

270 Rowe Avenue, Unit E  
Milford, CT 06461  
Phone (203)364-8544  
Fax (203)255-7494  
www.kubtec.com

Kubtec's DIGIMUS digital X-ray system offers high-resolution small animal imaging with BMD measurements available in seconds. Rapid acquisition, automatic calibration, a 12x15 cm detector and 5X geometric magnification, and ports for anesthesia and monitoring devices makes DIGIMUS the ideal tool for animal research. Available as compact bench-top or portable system.

### **Lifecore Biomedical**

3515 Lyman Blvd  
Chaska, MN 55318  
Phone (952)368-6321  
Fax (952)368-4278  
www.lifecore.com

Lifecore Biomedical, LLC, specializes in aseptic filling and manufacturing of hyaluronan by fermentation and recently introduced Corgel™ BioHydrogel kits to the research community. Hyaluronan is used and Corgel is being evaluated in applications that range from ophthalmology and tissue engineering to orthopedics, wound healing and aesthetics, along with several others.

### **Materialise**

44650 Helm Court  
Plymouth, MI 48170  
Phone (734)259-6445  
Fax (734)259-6441  
<http://biomedical.materialise.com/>

Materialise has extensive experience in medical imaging processing with the Mimics Innovation Suite, which provides surgeons, researchers and engineers with the most detailed and precise anatomical models available. The MIS is a powerful, user-friendly image processing software that translates medical images to CAD models, STL files or FEA meshes within minutes.

**Micro Photonics, Inc.**

4972 Medical Center Circle  
 Allentown, PA 18106  
 Phone (610)366-7103  
 Fax (610)366-7105  
[www.microphotonics.com](http://www.microphotonics.com)

Micro Photonics, and partner Bruker MicroCT are leading the advancement in high resolution micro-CT solutions for bone, biomaterials, orthopedics, and other life science research with a focus on bone morphology and BMD. The SkyScan product line meets the high-resolution and versatility required for any demanding research laboratory.

**The MotionMonitor**

3711 North Ravenswood, Suite 150  
 Chicago, IL 60613  
 Phone (773)244-6470  
 Fax (773)244-6473  
[www.themotionmonitor.com](http://www.themotionmonitor.com)

Innovative Sports Training, Inc is proud to provide The MotionMonitor®, a fully-integrated 3D motion analysis system for use in biomechanical, orthopaedic, and clinical applications. Data from various kinematic tracking systems, EMG, force plates, video, and other analog devices are collected through one platform, synchronized, and presented in real-time. CT/MRI registration capabilities offer subject-specific models and tracking of internal landmarks.

**MPI Research**

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MPI Research is a full-service preclinical CRO. Our experienced staff offers Sponsors extensive cardiovascular, orthopedic, neurologic, gastroenterological, urologic, wound healing, drug delivery, and medical device capabilities, within industry leading surgical facilities. Learn more about how we can exceed your expectations at [www.mpiresearch.com](http://www.mpiresearch.com).

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 Fax (952)937-4515  
[www.mts.com](http://www.mts.com)

Orthopaedic researchers and manufacturers worldwide depend on MTS to provide test systems that offer precision control for testing and simulation. MTS delivers innovative solutions for kinematics research, trauma studies, biomaterial testing and more. By choosing MTS, you gain a partner who understands how to optimize test design and speed development.

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[www.n2bio.com](http://www.n2bio.com)

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**National Disease Research Interchange (NDRI)**

1628 John F. Kennedy Blvd,  
 8 Penn Center, 15th Floor  
 Philadelphia, PA 19103  
 Phone (215)557-7361  
[www.ndriresource.org](http://www.ndriresource.org)

The National Disease Research Interchange (NDRI) is a 501(c)(3) not-for-profit, NIH-funded organization that provides project-driven human biospecimen service to academic and corporate scientists. NDRI has over 30 years of experience globally distributing human biospecimens for research. Our extensive recovery network has the expertise to provide anatomical structures, organs, and tissues with annotated data.

**National Institute of Arthritis and Musculoskeletal and Skin Diseases**

1 AMS Circle  
 Bethesda, MD 20892-3675  
 Phone (301)495-4484  
 Fax (301)718-6366  
[www.niams.nih.gov](http://www.niams.nih.gov)

The mission of the National Institute of Arthritis and Musculoskeletal and Skin Diseases is to support research into the causes, treatment, and prevention of arthritis and musculoskeletal and skin diseases; the training of basic and clinical scientists to carry out this research; and the dissemination of information on research progress in these diseases.

**Northern Digital Inc. (NDI)**

103 Randall Drive  
 Waterloo, Ontario N2V 1C5  
 Canada  
 Phone (877)634-6340  
 Fax (519)884-5184  
[www.ndigital.com/lifesciences](http://www.ndigital.com/lifesciences)

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 St. Paul, MN 55105  
 Phone (651)221-0505  
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Novel is quality in pressure distribution measurement and manufactures pressure measurement systems that are accurate and reliable for all testing requirements. Novel offers three different systems; the emed platform, the pedar in-shoe, and the pliance system, which measures intraarticular pressure at the patella and tibia, hand/gripping pressures, and much more. Please visit [www.novelusa.com](http://www.novelusa.com) for more detailed information.

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www.osteometrics.com

OsteoMetrics, Inc., with 300 OsteoMeasure systems worldwide, has been redefining Bone Histomorphometry since 1989. OsteoMeasure is now available with outstanding live digital camera support, on-screen pen measurement, thresholding, a complete set of Cortical Bone measurements, a greatly expanded set of non-specific measurements, and a comprehensive GLP validation package. OsteoMetrics is proud that OsteoMeasure is the system of choice of most of the pioneers, the most prominent and the most published scientists in bone research today.

**PharmaLegacy Laboratories (Shanghai) Co., Ltd**

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China  
Phone +86-21-61002280 \*2621  
Fax +86-21-61002270  
www.pharmalegacy.com

PharmaLegacy is a preclinical specialty CRO that has strong track records in services to worldwide companies committing R & D in therapeutics for Bone Metabolism/Orthopaedics and Tissue Engineering, besides Immune Diseases/Inflammation and Tumor. We provide quality, timely and cost saving execution for experiments under GLP operation and AAALAC certification.

**Pre-Clinical Research Services, Inc.**

1512 Webster Court  
Fort Collins, CO 80524  
Phone (970)232-1122  
Fax (970)232-1126  
www.preclinicalresearch.com

Pre-Clinical Research Services, Inc., located in Ft. Collins, Colorado, provides pre-clinical services including: osteoarthritis models, antigen-induced arthritis, experimental surgery (surgical/ medical device development, biomaterial implants, orthopedics, selective catheterization and angiography), medical imaging: MRI, ultrasound/echo, and intra-operative fluoroscopy, toxicology and pharmacokinetics. Species include swine, small ruminants, rodents, rabbits, dogs, cats.

**Preclinical Surgical Research Laboratory (PSRL)**

Colorado State University  
300 W. Drake Road  
Fort Collins, CO 80523  
Phone (970)682-0079  
<http://csu-cvmb.colostate.edu/academics/clinsci/surgical-research-laboratory/Pages/default.aspx>

The Preclinical Surgical Research Laboratory (PSRL) at Colorado State University conducts pilot and pre-clinical research studies with sheep, goats, rodents, and rabbits as validated animal models. The laboratory collaborates with industry and academic institutional partners to evaluate a wide variety of medical devices for treatment of spinal, orthopaedic, sports medicine and soft tissue conditions. Metabolic disorders such as osteoporosis are also commonly studied at the PSRL.

**Qualisys Motion Capture System**

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Highland Park, IL 60035  
Phone (847)945-1411  
Fax (224)636-9832  
www.qualisys.com

Qualisys Motion System is the leading mocap company that can manufacture and supply high quality (12mg / 300 Hz, 3mg / 1100 Hz ...) digital-optical and video cameras that operate: outdoors, in a video mode, has passive and active markers and traditionally indoors. Qualisys technology can be found in most clinical labs where accuracy and precision are equal to outcome performance and ease of use. Visit us at ORS and at [www.qualisys.com](http://www.qualisys.com).

**RISystem AG**

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www.risystem.com

RISystem AG provides high standard implant technology for research purpose. RISystem implants are exclusively made out of medical grade materials to ensure biocompatibility. The small dimensions are demanding but with the innovative design, the surgical technique is simple and easy to learn. To address your study requirements, the available RISystem kits can be customized. If you need a new implant system, we can give you advice and/or develop and produce them for you.

**RoosterBio, Inc.**

4539 Metropolitan Court  
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Phone (301)678-9497  
www.roosterbio.com

RoosterBio is focused on building a robust and sustainable Regenerative Medicine industry. Our products are high quality, affordable, standardized cells and media, manufactured and delivered in formats that simplify research and product development efforts and accelerate clinical translation and shorten time to market of cell therapies and tissue engineering technologies.

**Sawbones Worldwide**

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 Phone (206)463-5551  
[www.sawbones.com](http://www.sawbones.com)

SAWBONES WORLDWIDE offers a complete range of biomechanical composite analogue bones and blocks for mechanical testing. Designed to simulate the physical properties of human bone; these materials offer a more reliable test bed for biomechanical studies than cadaveric specimens.

**Scanco Medical**

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 Southeastern, PA 19399  
 Phone (610)688-1440  
 Fax (610)688-4976  
[www.microCT.com](http://www.microCT.com)

Scanco Medical ([www.microCT.com](http://www.microCT.com)) is the leading global provider of high-resolution micro-CT systems from mouse to man. Scanco also provides contract based scanning services for non-destructive scanning applications at locations in the USA and Switzerland. GPU-based reconstruction, 3D image analyses, 3D visualization, Finite Element Analysis, Image/Data archiving solutions and mechanical loading stage are available for all systems.

**Simi Reality Motion Systems GmbH**

Max-Planck-Strasse 11  
 Unterschleissheim 85716  
 Germany  
 Phone +49-89-321459-0  
 Fax +49-89-321459-16  
[www.simi.com/en/](http://www.simi.com/en/)

SIMI® manufactures high-end image-based Motion Capture and Analysis Systems for movement and behavior analysis. SIMI® systems are high-speed camera based systems using state of the art industrial image processing technology. Our mission is to develop high end image based movement analysis technology with a clear focus on the user friendliness. Our products and applications range from top research facilities to practical applications in daily activities. Our solutions are tailored to our customer's needs and we foster a very close cooperation with our customers.

**Simpleware Ltd.**

Bradninch Hall, Castle Street  
 Exeter EX4 3PL  
 United Kingdom  
 Phone +44 1392 428750  
 Fax +44 1392 428769  
[www.simpleware.com](http://www.simpleware.com)

Simpleware develops world-leading software solutions for processing and converting 3D image data (MRI, CT, Micro-CT...) into high-quality models suitable for CAD, CAE and 3D Printing. The software is used in fields such as the Life Sciences, Materials Science, Industrial RE and NDE, to name a few. Easy-to-learn and use, the software offers a robust bridge between the latest imaging technologies and multiple design and simulation applications.

**Tekscan, Inc.**

307 West First Street  
 South Boston, MA 02127  
 Phone (617)464-4500  
 Fax (617)464-4266  
[www.tekscan.com](http://www.tekscan.com)

Tekscan manufactures a broad range of tools for better pressure offloading and enhanced gait analysis. Our systems use paper-thin, high-resolution sensors to measure plantar pressure distribution, timing and Center of Force (CoF) trajectory in dynamic evaluations. The unique information these systems provide helps you objectively validate treatments and improve outcomes.

**Test Resources Inc.**

701 Canterbury Road  
 Shakopee, MN 55379  
 Phone (952)944-6534  
 Fax (952)233-3682  
[www.testresources.net](http://www.testresources.net)

TestResources is a manufacturer of smart design electrodynamic and static test systems for biomedical/orthopedic testing applications. New products include our electrodynamical planar biaxial and axial/torsion testing system for orthopedic research, a micro-force test system for tissue research, and a variety of new specimen grips, fixtures and accessories for biomaterials engineering.

**Thekin AG**

Technoparkstrasse 2  
 Winterthur 8406  
 Switzerland  
 Phone +41-79-8435596  
[www.thelkin.com](http://www.thelkin.com)

THELKIN offers the next generation of test systems for the mechanical characterization of orthopedic implants and their materials. Our technology provides great precision and flexibility, together with significant savings in time and costs, helping researchers and implant manufacturers in the development of safe, effective and successful products.

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47320 Mission Falls Court  
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[www.thinksurgical.com](http://www.thinksurgical.com)

Think Surgical, Inc. develops, manufactures, and markets the TSolution One™ Surgical System which includes: TPLAN - a 3D planning workstation for pre-surgical planning and TCAT - an active robotic, computer-assisted tool for precise cavity and surface preparation for joint replacement surgeries, supporting surgeon selected implants. Visit [www.thinksurgical.com](http://www.thinksurgical.com) for more information.

**Veterinary Transplant Services, Inc.**

215 East Titus Street  
 Kent, WA 98032  
 Phone (253)520-0771  
 Fax (253)856-1830  
[www.vtsonline.com](http://www.vtsonline.com)

VTS provides animal-sourced DBM and other bone graft materials for product development and pre-clinical studies. We offer customizable processing & packaging of graft materials for a wide variety of animal models. Researchers can rely on VTS to produce animal tissues processed to their unique product development or pre-clinical project specifications.

**ViTRAK Systems Inc.**

91 Water Street, 3rd Floor  
Charlottetown, Prince Edward Island  
C1A 1A5 Canada  
Phone (902)626-4248  
Fax (902)626-3781  
<http://stepscan.com/>

ViTRAK Systems Inc. has developed a pressure sensitive flooring system with sophisticated footprint analytic software for gait research/analysis. Branded Stepscan™ the technology measures under foot pressure distribution and other movement parameters (stride and speed of movement) other applications include security/sports training, medicine, clinical drug trials and various forms of research.

**VOLMO**

45 Stoney Lane  
Newbury RG14 2NG  
United Kingdom  
Phone +91 0755 4064049  
<http://volmopl.com>

VOLMO is a medical image processing and modelling software company committed to application and utilization of advanced image processing techniques and open source libraries to develop an innovative software platform for converting 3D scan data (CT/MRI/US) into surface (STL) and volume meshes for finite element (FE)/computational fluid dynamics (CFD) analysis.

**Wake Forest Innovations**

575 Patterson Avenue, Suite 550  
Winston-Salem, NC 27101  
Phone (336) 713-1111  
[www.wakepreclinical.com/](http://www.wakepreclinical.com/)

Wake Forest Innovations commercializes the great ideas, discoveries and capabilities of Wake Forest Baptist Medical Center. It helps to accelerate research & development through quality preclinical testing of medical devices, surgical procedures and therapeutics, taking advantage of the extensive experience of its internationally renowned scientists, veterinarians and surgeons.

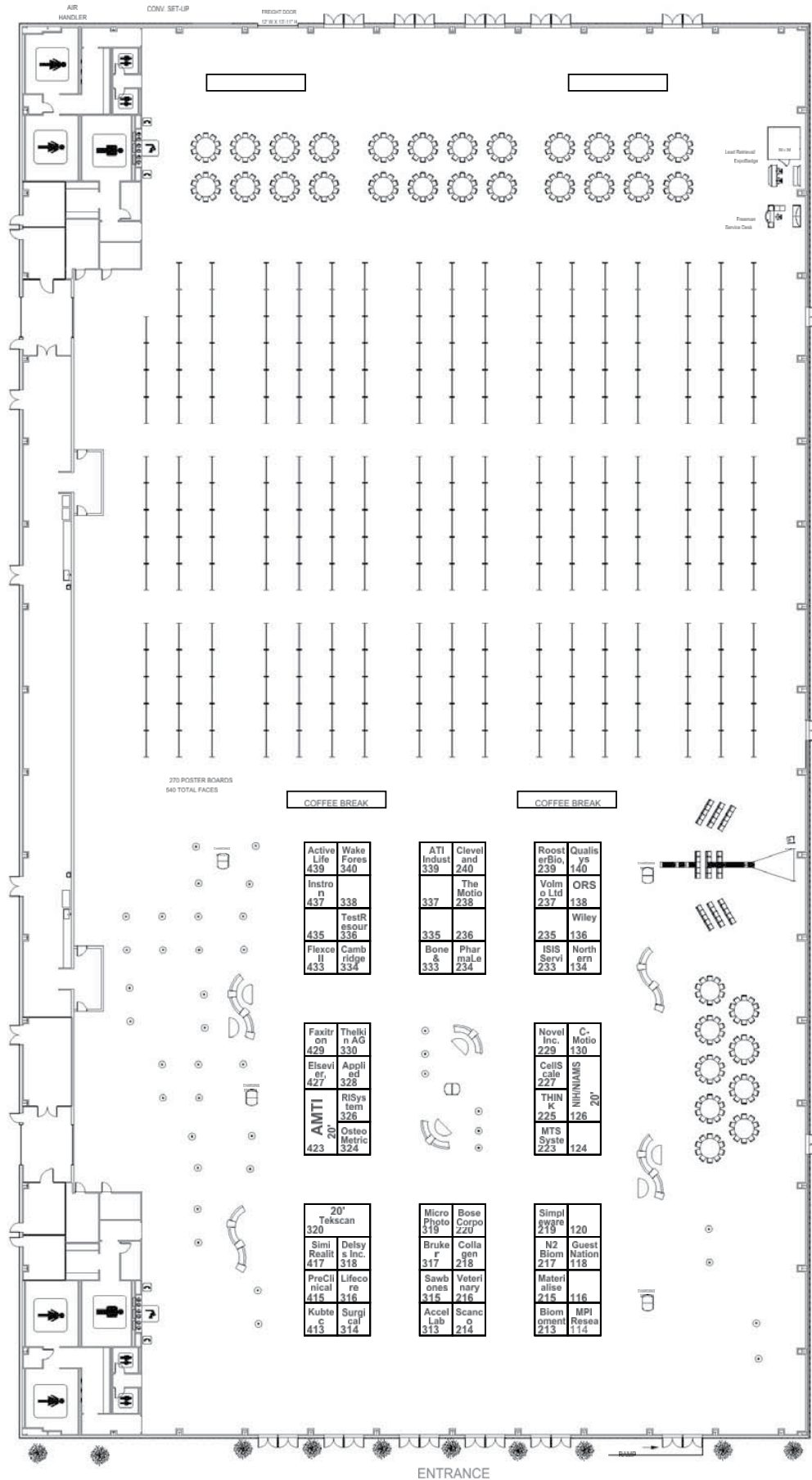
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# EXHIBIT HALL MAP



GENERAL INFORMATION

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or

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## SUNDAY, MARCH 29, 2015 CONT.

**Professional Advancement  
Session: Finding a Partner  
in Research**  
Room 121 - 122

### 3:45PM-4:45PM

**Diagnostic Imaging:  
From Spine to Cartilage**  
Room 111 - 112

**Total Hip & Knee Replacement:  
Clinical Perspectives and  
Biomechanics**  
Room 113 - 114

**PTOA: Studies  
in Preclinical Models**  
*Spotlight Session*  
Room 118 - 120

**Spine Therapeutics**  
Room 121 - 122

### 4:45PM-6:00PM

**Poster Reception I  
(authors present)**  
Innovation Central/  
Marquee Ballroom

### 7:00PM-10:00PM

**ORS Awards Gala Reception  
and Dinner\***  
Vista Ballroom

## MONDAY, MARCH 30, 2015

### 6:30AM-7:45AM

**Research Interest Group (RIG):  
Good and Bad Animal Models**  
Room 106 - 107

### 7:00AM-9:45AM

**Present Your Science:  
Transforming Technical Talks with  
Melissa Marshall**  
Room 117

### 8:00AM-9:00AM

**Mediators of Joint Repair**  
Room 118-120

**Osteocytes and Mechanobiology**  
Room 111-112

**Shoulder and Elbow Arthroplasty**  
Room 113-114

**Tendon/Ligaments - Mechanics**  
Room 121-122

**Biglycan in Bone Healing**  
*Spotlight Session*  
Room 116

### 9:00AM-5:30PM

**Poster and Exhibit Hall Open**  
Innovation Central/  
Marquee Ballroom

### 9:15AM-9:45AM

**Refreshment Break**  
Innovation Central/  
Marquee Ballroom

### 10:00AM-11:00AM

**General Session: Shands Lecture,  
Presidential Address, 1st Vice  
Presidential Address, and ORS  
Business Meeting**  
Room 118 - 120

### 11:15AM-12:45AM

**Aging & OA**  
Room 118-120

**Genetics: Bone Development,  
Bone Aging**  
Room 111-112

**Shoulder and Elbow - Disease  
Process**  
Room 113-114

**Spine Disc Biology and Repair**  
Room 121-122

**Muscle/Tendon Biology and  
Repair**  
Room 116

### 12:30PM-1:30PM

**Poster Walking Tours**  
Innovation Central/  
Marquee Ballroom

**New Investigator Networking  
Session: Position Yourself for  
a Successful Career: Setting  
Foundational Early Career Goals**  
Room 121-122

**Industry Connect**  
Room 115

### 1:45PM-3:15PM

**ORS/POSNA Key Concepts of  
Musculoskeletal Infection**  
Room 113 - 114

**Animal Welfare in Orthopaedic  
Research: Focus on Refinement  
and Reduction**  
Room 116

**The Realities of Commercializing  
Orthopaedic Technologies:  
Business Strategies, Funding,  
Partnerships, and Juggling  
Academic & Corporate Roles**  
Room 111-112

**ORS/MSTS The Osteoclast  
and Bone Diseases**  
Room 118 - 120

**JOR Workshop**  
Room 117

**Professional Advancement  
Session: Rising to the Top:  
Leadership Success  
in Academics**  
Room 121-122

### 3:30PM-4:15PM

**General Session: Urist Lecture,  
NIRA Awards, Video Outreach  
Competition Awards, Harris  
Award, WLF Award, ORS/OREF  
Collaborative Exchange Award,  
Distinguished Investigator  
Award, ORS Outstanding  
Achievement in Mentoring Award**  
Room 118 - 120

### 4:15PM-5:30PM

**Poster Reception II  
(authors present)**  
Innovation Central/  
Marquee Ballroom

### 7:30PM-10:00PM

**Women's Leadership Forum  
Reception**  
Vista Ballroom

## TUESDAY, MARCH 31, 2015

### 6:00AM-3:30PM

**Poster Hall Open (no exhibits)**  
Innovation Central/  
Marquee Ballroom

### 8:00AM-9:00AM

**Tendon/Ligament -  
Collagen Structure - Function**  
*Spotlight Session*  
Room 111-112

**Bone Tissue Engineering**  
Room 113-114

**Biomolecular Approaches  
to Bone Fragility**  
*Spotlight Session*  
Room 116

**Cartilage Matrix Biology**  
*Spotlight Session*  
Room 118-120

**Spine Mechanics**  
Room 121-122

### 9:15AM-9:45AM

**Refreshment Break**  
Innovation Central/  
Marquee Ballroom

### 9:45AM-11:15AM

**The Intervertebral Disc: From  
Development to Regeneration**  
Room 121 - 122

**Functional Imaging of  
Articular Cartilage by MRI**  
Room 113 - 114

**Hip Evo Devo: Adaptation of the  
Hip in Phylogeny and Ontogeny**  
Room 116

**Acute Cartilage Injury: AO  
Foundation Collaborative  
Research Project**  
Room 111 - 112

### 11:30AM-12:30PM

**Poster Walking Tours**  
Innovation Central/  
Marquee Ballroom

### 12:45PM-1:45PM

**Ankle Arthritis, Arthroplasty,  
and Arthrodesis**  
Room 111-112

**Title To Be Determined  
Late Breaking Session**  
Room 113-114

**Repair of Bone Fractures**  
*Spotlight Session*  
Room 116

**Chondro-Progenitors and  
Chondrogenesis**  
Room 118-120

**Tissue Engineering: Models of  
Bone Injury**  
Room 121-122

### 2:00PM-2:30PM

**Posters**  
Innovation Central/  
Marquee Ballroom

### 2:30PM-3:30PM

**Knee - Mechanics and Modeling**  
Room 111-112

**Bone Mechanics and  
Finite Element Analysis**  
Room 113-114

**Knee Ligaments and Meniscus**  
Room 116

**Cartilage Mechanobiology**  
Room 118-120

**Biomaterials for Cartilage Repair**  
Room 121-122

# DAILY MEETING HIGHLIGHTS

FRIDAY, MARCH 27, 2015

7:00AM-6:00PM

AAOS 2015 Annual Meeting  
Venetian/Sands EXPO

6:00PM-8:00PM

Research Interest Group:  
Bone Regeneration  
Room 106 - 107

## SATURDAY, MARCH 28, 2015

8:00AM-10:30AM

Research Interest Group: Growth Factors  
Room 106 - 107

Research Interest Group: Mechanobiology  
Room 115

Research Interest Group: Orthopaedic Evidence  
Room 117

Research Interest Group: Tendon  
Room 121 - 122

Research Interest Group: Spine Research Community  
Room 116 (concludes at 10am)

ORS Advocacy Roundtable  
Room 111 - 112

11:00AM-12:00PM

New Investigator Networking Session: Strategic Lab and Time Management  
Room 117

Mentor Connect  
Room 115

12:00PM-8:00PM

Poster and Exhibit Hall Open  
Innovation Central/  
Marquee Ballroom

12:00PM-1:00PM

Bone Disease  
Room 111 - 112

Knee Kinematics and Gait  
Room 113-114

Hip Disease, Kinematics, FAI  
Room 116

Advanced Articular Cartilage Imaging Techniques  
Spotlight Session  
Room 118 - 120

Intervertebral Disc: Degeneration, Pain and Treatment  
Spotlight Session  
Room 121 - 122

1:15PM-2:15PM

NIRA PRESENTATIONS:

Bone Biology & Repair  
Room 111 - 112

Joint Physiology & Mechanics  
Room 113 - 114

Cell Differentiation Fibrosis & Cancer  
Room 116

OA & Cartilage  
Room 118 - 120

Stem Cells & Tissue Repair  
Room 121 - 122

2:00PM-6:00PM

ORS/OREF Basic Science Course: Part I \*  
Room 117

2:30PM-3:00PM

Refreshment Break  
Innovation Central/  
Marquee Ballroom

2:45PM-3:00PM

Innovation Theater Presentation: THINK Surgical TCAT™ as a Research Tool  
Innovation Central/  
Marquee Ballroom

3:00PM-4:30PM

Hot Topics in Regulatory Challenges within Orthopaedics  
Room 111 - 112

ORS/The HIP Society - Biological Aspects of Modular Implant Tribocorrosion  
New Horizon Workshop  
Room 113 - 114

Trials, Tribulations and Triumphs of Conducting Prospective Clinical Research Studies: The How and Why  
Room 116

Quantitative MR Imaging: Research Applications and Clinical Translation  
Room 118 - 120

Professional Advancement Session-Career Advancement: Winning the Uphill Battle for Research Funding  
Room 121 - 122

4:45PM-5:45PM

Welcome Session - Guest Nation, Patient Story, Presidential Guest Speaker  
Room 118 - 120

6:00PM-8:00PM

President's Welcome Reception  
Innovation Central/  
Marquee Ballroom

## SUNDAY, MARCH 29, 2015

8:00AM-11:15AM

ORS/OREF Basic Science Course: Part II\*  
Room 117

8:00AM-9:00AM

Biomaterials for Bone Repair  
Room 111-112

Knee - Mechanics  
Room 113-114

Bone Necrosis  
Spotlight Session  
Room 116

Pain Pathways and Therapies in Experimental OA  
Spotlight Session  
Room 118 - 120

Tendon/Ligament Cell Biology  
Room 121-122

9:00AM-6:00PM

Poster and Exhibit Hall Open  
Innovation Central/  
Marquee Ballroom

9:15AM-10:15PM

Osteoblasts/Progenitor Cells  
Room 111 - 112

Total Hip Replacement Metal Wear Reactions  
Room 113 - 114

Imaging and Bone Healing  
Spotlight Session  
Room 116

Knee OA Repair  
Spotlight Session  
Room 118-120

Tendon/Ligament - Repair and Tissue Engineering  
Room 121 - 122

10:30AM-11:00AM

Refreshment Break  
Innovation Central/  
Marquee Ballroom

10:45AM-11:00AM

Innovation Theater Presentation: Micro Photonics Advancements in Nano-Computed Tomography for Orthopedic Applications  
Innovation Central/  
Marquee Ballroom

11:15AM-12:30PM

Kappa Delta, OREF, CORR® ORS Award Paper Presentations  
Room 118 - 120

12:45PM-1:45PM

Poster Walking Tours  
Innovation Central/  
Marquee Ballroom

New Investigator Networking Session: An Inside Look at Research Funding Opportunities with the National Institutes of Health (NIH)  
Room 115

ORS Translational Research Symposium: Cartilage Repair: Is it Possible?  
Room 121-122

1:00PM-1:15PM

Innovation Theater Presentation: National Disease Research Interchange (NDRI) Project-driven Human Biospecimen Service for Biomedical Research  
Innovation Central/  
Marquee Ballroom

1:30PM-1:45PM

Innovation Theater Presentation: AMTI Refining Simulation in a Bio-fidelic Testing Environment  
Innovation Central/  
Marquee Ballroom

12:45PM-5:00PM

Clinical Research Forum-The Basis for Clinical Decision Making in Orthopaedics  
Room 116

2:00PM-3:30PM

ORS/OTA - Systemic Inflammation and Organ Dysfunction in Multiply Injured Patients  
New Horizon Workshop  
Room 113 - 114

ORS/SOMOS - How an Integrated Orthosis and Rehabilitation Initiative has Improved Outcomes for Lower Extremity Limb Salvage Patients  
Room 111 - 112

Improving the Translational Success of Cell-Based Therapies  
Room 118 - 120