ORS PSRS 6th International Spine Research Symposium

Skytop Lodge, Pennsylvania

Sunday, November 6 – Thursday, November 10, 2022

Agenda

Sunday, November 6, 2022

2:00 PM – 9:00 PM	**Arrival and Check-in**	**Evergreen Ballroom**

5:30 PM – 7:00 PM	**Dinner**	**West Windsor Dining Room**

7:00 PM – 7:10 PM	**Welcome & Introductory Comments by Chair** Makarand Risbud, *Thomas Jefferson University, USA*	**Evergreen Ballroom**

7:10 PM – 9:00 PM	**Topic: Development and Homeostasis 1** Discussion Leaders: Christine Le Maitre, *Sheffield Hallam University, UK* and Devina Purmessur, *Ohio State University, USA*	**Evergreen Ballroom**
7:10 PM – 7:20 PM	**Discussion Leader Lightning Talk by:** Christine Le Maitre and Devina Purmessur	
7:20 PM – 7:50 PM	**Invited Speaker:** Anne Camus, *Université de Nantes, France* **In depth transcriptomic characterization of human induced pluripotent stem cells-derived notochordal cells for intervertebral disc regeneration**	
7:50 PM – 8:20 PM	**Invited Speaker:** Chitra Dahia, *Hospital for Special Surgery, USA* **Role of developmental signaling pathways in intervertebral disc development and aging**	
8:20 PM – 9:00 PM	**Short Talk Podium Presentations** (10 minutes each) **Embryonic Notochord Proliferation Increases in the Intervertebral Expansion and Decreases in the Vertebral Fragment** Rose Long, *Harvard University, USA* **TGF-β Signaling is Required for Sclerotome Resegmentation During Development of the Axial Skeleton** Rosa Serra, *University of Alabama at Birmingham, USA* **Characterising Notochordal and Progenitor Cell Sub-Populations within the Human Nucleus Pulposus** Andra-Maria Ionescu, *University of Manchester, UK* **GLUT1 is Redundant in Hypoxic and Glycolytic Nucleus Pulposus Cells of the Intervertebral Disc** Shira Johnston, *Thomas Jefferson University, USA*	

9:00 PM – 10:00 PM	**Organizing Committee Welcome Reception**	**Hemlock Ballroom**

10:00 PM	**Campfire with s'mores**

Monday, November 7, 2022

7:30 AM – 8:30 AM	**Breakfast**	**West Windsor Dining Room**

8:30 AM – 10:00 AM	**Topic: Development and Homeostasis 2** Discussion Leaders: *Rosa Serra, University of Alabama at Birmingham, USA* and Fackson Mwale, *McGill University, Canada*	**Evergreen Ballroom**
8:30 AM – 8:40 AM	**Discussion Leader Lightning Talk by:** Rosa Serra and Fackson Mwale	
8:40 AM – 9:10 AM	**Invited Speaker:** Ryan Gray, *University of Texas at Austin, USA* **Regulation of CREB Provides a Feedback Loop for the Homeostasis and Mechanics of Connective Tissues Vital for Spine Alignment**	
9:10 AM – 9:40 AM	**Invited Speaker:** *Makarand Risbud, Thomas Jefferson University, USA* **Role of Mitochondria in Intervertebral Disc Health and Disease**	
9:40 AM – 10:00 AM	**Short Talk Podium Presentations** (10 minutes each) **A Role of Biglycan C-terminal Peptide in Regulating Intervertebral Disc Homeostasis** Victor Leung, *The University of Hong Kong, Hong Kong* **Single-cell RNA-Seq of Human Cartilage Endplate Cells Identifies Clusters that Drive Healthy and Diseased Phenotypes** Kyle Kuchynsky, *Ohio State University, USA*	

10:00 AM – 10:30 AM	**Break**

10:30 AM – 12:00 PM	**Topic: Pain, Pathobiology and Crosstalk 1** Discussion Leaders: Dino Samartzis, *Rush University, USA* and Robby Bowles, *University of Utah, USA*	**Evergreen Ballroom**
10:30 AM – 10:40 AM	**Discussion Leader Lightning Talk by:** Dino Samartzis and Robby Bowles	
10:40 AM – 11:10 AM	**Invited Speaker:** Francis Williams, *King's College London, UK* **Using 'omics to understand back pain: studies from TwinsUK**	
11:10 AM – 11:40 AM	**Invited Speaker:** Danny Chan, *University of Hong Kong, Hong Kong* **Spatiotemporal proteomics atlas of human intervertebral discs**	
11:40 AM – 12:00 PM	**Short Talk Podium Presentations** (10 minutes each) **Cartilage Endplate Composition and Intervertebral Disc Height: Associations with Disc Degeneration in Patients with Chronic Low Back Pain** Noah Bonnheim, *University of California San Francisco, USA* **Gram Positive Bacteria within the Disc and their Potential Influence on Nucleus Pulposus cells** Andrea Nuesch, *Sheffield Hallam University, UK*	

12:00 PM – 1:00 PM	**Lunch**	**West Windsor Dining Room**

1:00 PM – 4:00 PM	**Free Time**
	Hikes or Other Activities

4:00 PM – 5:30 PM	**Odd Number Poster Viewing**

5:30 PM – 6:30 PM	**Dinner**	**West Windsor Dining Room**

6:30 PM – 7:00 PM	**PSRS Lifetime Achievement Awardee Lecture**	**Evergreen Ballroom**
	Judith Hoyland, University of Manchester, UK	

7:00 PM – 9:00 PM	**Topic: Pain, Pathobiology and Crosstalk 2** Discussion Leaders: Robert Mauck, *University of Pennsylvania, USA* and Conor Buckley, *Trinity College Dublin, Ireland*	**Evergreen Ballroom**
7:00 PM – 7:10 PM	**Discussion Leader Lightning Talk by:** Robert Mauck and Conor Buckley	
7:10 PM – 7:40 PM	**Invited Speaker:** Laura Stone, *University of Minnesota, USA* **Epigenetics and Low Back Pain: What is it and why should I care?**	
7:40 PM – 8:10 PM	**Invited Speaker:** Nam Vo, *University of Pittsburgh, USA* **Roles of Lactate in Disc Metabolism and Epigenetic Regulation**	
8:10 PM – 9:00 PM	**Short Talk Podium Presentations** (10 minutes each) **New Insights into a Cross-Talk between the Muscle and the Intervertebral Disc: the Role of Irisin in Human Nucleopulpocytes In Vitro** Gianluca Vadala, *Campus Bio-Medico University Hospital Foundation of Rome, Italy* **Single Cell RNA-Sequence Analyses Reveal Uniquely Expressed Genes and Heterogeneous Immune Cell Involvement in the Rat Model of Intervertebral Disc Degeneration** Sade Clayton, *Washington University in St. Louis, USA* **Spontaneous Intervertebral Disc Herniation Mouse Model Uncovers the Molecular Profiles within the Disc, Dorsal Root Ganglia, and Spinal Cord in Discogenic Pain** Emanuel Novais, *Thomas Jefferson University, USA* **Global Deletion of SerpinA1a-e Impairs Macrophage Recruitment to the Site of Disc Injury by Enhancing Osteoclast Differentiation** Neharika Bhadouria, *Icahn School of Medicine at Mount Sinai, USA* **Cell Senescence and Facet Joint Osteoarthritis in Adolescent Idiopathic Scoliosis** Kai Sheng, *McGill University, Canada*	

9:00 PM – 10:00 PM	**Networking Reception**	**Hemlock Ballroom**

Tuesday, November 8, 2022

7:30 AM – 8:30 AM	**Breakfast**	**West Windsor Dining Room**

8:30 AM – 10:10 AM	**Topic: Pain, Pathobiology and Crosstalk 3** Discussion Leaders: Ashish Diwan, *University of New South Wales, Australia,* and Jeffrey Lotz, *University of California San Francisco, USA*	**Evergreen Ballroom**
8:30 AM – 8:40 AM	**Discussion Leader Lightning Talk by:** Ashish Diwan and Jeffrey Lotz	
8:40 AM – 9:10 AM	**Invited Speaker:** Cheryle Seguin, *University of Western Ontario, Canada* **Nuclear Receptors as Potential Mediators of Disc Degeneration**	
9:10 AM – 9:40 AM	**Invited Speaker:** Lachlan Smith, *University of Pennsylvania, USA* **Cellular Heterogeneity of the Nucleus Pulposus: Impact of Species, Microenvironment and Treatment**	
9:40 AM – 10:10 AM	**Short Talk Podium Presentations** (10 minutes each) **Targeting TRPC6 for Chronic Discogenic Back Pain** Janitri Babu, *Rochester Institute of Technology, USA* **Increased Glucose Uptake in the Lumbar Discs with Age and the Impact of Spinal Level: a Retrospective 18F-FDG PET Imaging Study** Christine Park, *Duke University, USA* **Use of Shock Waves in a Large Animal Model of Degenerative Disc Disease** Andres Bonilla, *Colorado State University, USA*	

10:10 AM – 10:30 AM	**Break**

10:30 AM – 12:10 PM	**Topic: Pathobiology, Imaging and Biomechanics** Discussion Leaders: Aaron Fields, *University of California San Francisco, USA* and Larry Bonassar, *Cornell University, USA*	**Evergreen Ballroom**
10:30 AM – 10:40 AM	**Discussion Leader Lightning Talk by:** Aaron Fields and Larry Bonassar	
10:40 AM – 11:10 AM	**Invited Speaker:** Simon Tang, *Washington University in St Louis, USA* **Intervertebral Disc Inflammation: Befriending a Foe**	
11:10 AM – 11:40 AM	**Invited Speaker:** Nadeen Chahine, *Columbia University, USA* **Intervertebral Disc Inflammatory Activation Induces Severe Degeneration In Vivo**	
11:40 AM – 12:10 PM	**Short Talk Podium Presentations** (10 minutes each) **Diffusion Tensor Imaging visualizes the Effect of Aging on the Spatial Variation in Annulus Fiber and Lamellar Structure In Intact Human Discs** Ron Alkalay, *Beth Israel Deaconess Medical Center, USA* **Cartilage Endplate Permeability: From In Vitro to In Silico** Ahmad Alminnawi, *University of Liege, Belgium* **In Vitro Coupled Motions of the Human Thoracic and Lumbar Spine with Rib Cage** Mattan Orbach, *Drexel University, USA*	

12:10 PM – 1:00 PM	**Lunch**	**West Windsor Dining Room**

1:00 PM – 4:00 PM	**Free Time**
	Volleyball and Lawn games (corn hole/bags, ladder ball, and Kan jam)

1:00 PM – 3:30 PM	**Optional Scientific Program**	**Evergreen Ballroom**
	BACPAC Workshop: Knowledge organizing technologies to advance transdisciplinary back pain research. Organized by Jeffrey Lotz and Jeannie Bailey, University of California San Francisco, in collaboration with the ORS Spine Section.	

4:00 PM – 4:45 PM	**Odd Number Poster Viewing**	**Hemlock Ballroom**
4:45 PM – 5:30 PM	**Even Number Poster Viewing**	

5:30 PM – 6:45 PM	**Dinner**	**West Windsor Dining Room**

7:00 PM – 9:00 PM	**Topic: Biomechanics** Discussion Leaders: Elise Morgan, *Boston University, USA* and Sriram Balasubramaniam, *Drexel University, USA*	**Evergreen Ballroom**
7:00 PM – 7:10 PM	**Discussion Leader Lightning Talk by:** Elise Morgan and Sriram Balasubramanian	
7:10 PM – 7:40 PM	**Invited Speaker:** Dawn Elliott, *University of Delaware, USA* **In Vivo Mechanics of the Intervertebral Disc**	
7:40 PM – 8:10 PM	**Invited Speaker:** Theo Smit, *Amsterdam University Medical Center, Netherlands* **On Growth and Scoliosis**	
8:10 PM – 8:40 PM	**Invited Speaker:** Jerome Noailly, *Universitat Pompeu Fabra, Spain* **Systems mechanobiology in intervertebral disc modelling: multifactorial cell regulation in an organ context**	
8:40 PM – 9:10 PM	**Short Talk Podium Presentations** (10 minutes each) **Geometric Determinants of the Mechanical Behavior of Intervertebral Disc Models** Ingmar Fleps, *Boston University, USA* **Modeling the Effects of Hydration on Viscoelastic Properties of Nucleus Pulposus Tissue in Shear and Compression using the Fractional Zener Model** Megan Co, *The Ohio State University, USA* **The Development of Complex Physiological Loading Profiles for the Study of the Intervertebral Disc** Daniela Lazaro-Pacheco, *University of Exeter, UK*	

9:10 PM – 10:00 PM	**Networking Reception**	**Hemlock Ballroom**

Wednesday, November 9, 2022

7:30 AM – 8:30 AM	**Breakfast**	**West Windsor Dining Room**

8:30 AM – 12:00 PM	**Topic: Next Generation Treatments 1** Discussion Leaders: Gianluca Vadala, *Campus Bio-Medico University Hospital, Italy* and Sibylle Grad, *AO Foundation, Switzerland*	**Evergreen Ballroom**
8:30 AM – 8:40 AM	**Discussion Leader Lightning Talk by:** Gianluca Vadala	
8:40 AM – 9:10 AM	**Invited Speaker:** Abhay Pandit, *University of Galway, Ireland* **Understanding the Regenerative Response Induced by Biomaterial Systems: Insights into the Role of Glycosylation**	
9:10 AM – 9:40 AM	**Invited Speaker:** James Iatridis, *Icahn School of Medicine at Mount Sinai* **What needs repairing following annulus fibrosus injury, and can we repair it**	
9:40 AM – 10:00 AM	**Short Talk Podium Presentations** (10 minutes each) **Mitochondrial Transfer from Mesenchymal stromal cells to intervertebral disc cells** Megan Fahey, *Cornell University, USA* **Secretome of Mechanically Loaded Intervertebral Discs Influences Stem Cell Immunomodulatory Response** Hagar Kenawy, *Columbia University, USA*	

10:00 AM – 10:30 AM	**Break**

10:30 AM – 10:40 AM	**Discussion Leader Lightning Talk by:** Sibylle Grad, AO Research Institute Davos, Switzerland
10:40 AM – 11:10 AM	**Invited Speaker:** Svenja Illien-Junger, *Emory University, USA* **PHLPP Inhibition to Promote IVD Health**
11:10 AM – 12:00 PM	**Short Talk Podium Presentations** (10 minutes each) **CRISPR Epigenome Editing of TNFR1 Expression in IVD Cells Prevents Disc Degeneration in In Vivo Rat Models of Degenerative Disc Disease** Robby Bowles, *University of Utah, USA* **Anti-Inflammatory Tension-Activated Repair Patches Promote Intervertebral Disc Repair after Herniation** Harvey Smith, *University of Pennsylvania, USA* **Spatial N-glycan Characterisation of a Dog Model of Intervertebral Disc Degeneration for the Evaluation of Glyco-Functionalised Biomaterials** Kieran Joyce, *University of Galway, Ireland* **Bone Tissue Engineering via Application of 4D-printed Biomimetic Scaffold for Spinal Fusion** Inbo Han, *CHA University, South Korea*

	MicroRNA Modulation of Regenerative Factors in Nucleus Pulposus Cells in the Intervertebral Disc Tara Ni Neill, *Trinity College Dublin, Ireland*	

12:00 PM – 1:00 PM	**Lunch**	**West Windsor Dining Room**

1:00 PM – 4:00 PM	**Free Time**	**South Lawn**
	Kickball/soccer and lawn games (corn hole/bags, ladder ball, and Kan jam)	

4:00 PM – 5:30 PM	**Even Number Poster Viewing**	**Hemlock Ballroom**

5:30 PM – 6:45 PM	**Dinner**	**West Windsor Dining Room**

7:00 PM – 8:20 PM	**Topic: Next Generation Treatments 2** Discussion Leaders: Benjamin Gantenbein, *University of Bern, Switzerland*, and Catherine LeVisage, *Nantes Université, France*	**Evergreen Ballroom**
7:00 PM – 7:10 PM	**Discussion Leader Lightning Talk by:** Benjamin Gantenbein and Catherine LeVisage	
7:10 PM – 7:40 PM	**Invited Speaker:** Raquel Goncalves, *Universidade do Porto, Portugal* **Is there a future for MSC-based IVD therapies?**	
7:40 PM – 8:10 PM	**Invited Speaker:** Stephen Richardson, *University of Manchester, UK* **Understanding human intervertebral disc development: from multi-omic characterisation to bioprinted tissue analogues**	
8:10 PM – 8:30 PM	**ORS PSRS Awards Ceremony and Closing Remarks**	**Evergreen Ballroom**

8:40 PM – 10:10 PM	**Trivia Night** Organized by the ORS Spine Section Membership Committee	**Evergreen Ballroom**

Thursday, November 10, 2022

8:00 AM – 10:00 AM	**Breakfast**	**West Windsor Dining Room**

11:00 AM	**Check-out**