ORS Spine Section
Orthopaedic Research Society
Monthly Newsletter

Spinal Column

January 2024

Dr. Peter Roughley Award

The ORS Spine Section established the ***Dr. Peter Roughley Award,*** named after the late Dr. Roughley, who was well known for his seminal contributions to proteoglycan research and their role in intervertebral disc and cartilage structure and function. Peter was particularly gifted in teaching and mentoring individuals and was always willing to instruct and advise his fellow scientists.

This award will preserve his legacy in training future generations of scientists by sponsoring a trainee and mentor exchange to enhance a trainee's knowledge in spine, disc, and cartilage biology. The award will recognize a team (mentor and trainee) and provide $2,000 to support the travel of the trainee.

Our 2024 Winner

The 2024 Peter Roughley Award winner is **Janitri Venkatachala Babu** (**Dr. Karin Wuertz-Kozak**'s Lab, Rochester Institute of Technology, Rochester, NY, USA) and her mentor-host **Dr. Laura Stone** (University of Minnesota, Minneapolis, MN, USA).

Congratulations **Janitri Venkatachala Babu**!

2024 Spine Section Travel Fellowship Winner

The ORS Spine Section leadership has continued to develop ideas for initiatives that bring value to its Section members, particularly junior investigators. This fellowship promotes research collaboration and the acceleration of the spine field. It is designed to advance an ongoing study or establish new collaborations by providing a mechanism to promote the exchange of research methodologies and/or the development of pilot data to support larger-scale funding.

The 2024 Spine Section Travel Fellowship winner is **Emma Coltoff** (**Dr. Philip Jayson Brown**, Wake Forest University School of Medicine, Winston-Salem, NC, USA) and will be host-mentored by **Dr. Mark Driscoll** (McGill University, Montreal, QC, Canada).

Congratulations **Emma Coltoff**!

Member Spotlight

Christian Gonzalez, BS

Current Title and Department: Ph.D. Candidate in the Tang Lab, Biomedical Engineering, Washington University, St Louis

Undergraduate Degree: Biomedical Engineering, Johns Hopkins University

Who do you consider your mentors?
My mentor in my academic endeavors is definitely Dr. Simon Tang. As my advisor, he keeps me focused on my research while challenging me to engage thoughtfully with the trials and tribulations of science. In my personal life, my mom is the leader I aspire to be. Despite being disabled, she is by far the most perseverant and bravest person I know.

What is your specific area of interest in research?
My specific area of interest in research is the degenerative and proinflammatory effects of Type II Diabetes on the intervertebral disc.

What are you currently working on?
I am currently working on characterizing the microenvironment, tissue structure, and mechanical properties of the intervertebral disc in the Streptozotocin-High-Fat-Diet mouse model of Type II Diabetes.

What has been the biggest challenge for you lately in your research?
My biggest challenge as of late in my research is minimizing the effects of lot-to-lot variability in the multiplex cytokine panels we run on organ culture media samples.

What projects are you looking forward to?
I am looking forward to expanding my STZHFD project to examine the effects of injury and age on inflammation and degeneration.

What do you like to do outside of your work?
I love cooking and posting pictures of my food on my Instagram page. I also love video games!

What is the last book you read?
Bad Feminist by Roxane Gay

What is the most unusual/unexpected item sitting on your desk right now?
A foam stress-ball shaped like a brain!

Paper Review

Intervertebral Disc Human Nucleus Pulposus Cells Associated with Back Pain Trigger Neurite Outgrowth in Vitro and Pain Behaviors in Rats

Science Translational Medicine. 2023;15(725)
https://doi.org/10.1126/scitranslmed.adg7020

Wensen Jiang, Juliane D. Glaeser, Giselle Kaneda, Julia Sheyn, Jacob T. Wechsler, Stephen Stephan, Khosrowdad Salehi, Julie L. Chan, Wafa Tawackoli, Pablo Avalos, Christopher Johnson, Chloe Castaneda, Linda E.A. Kanim, Teerachat Tanasansomboon, Joshua E. Burda, Oksana Shelest, Haneen Yameen, Tiffany G. Perry, Michael Kropf, Jason M. Cuellar, Dror Seliktar, Hyun W. Bae, Laura S. Stone, Dmitriy Sheyn

In the quest to understand discogenic low back pain (LBP), a recent study from the Sheyn Lab at the Cedars-Sinai Medical Center identified a specific subtype of nucleus pulposus cells (NPCs) associated with pain onset in degenerating intervertebral discs (IVDs). Further analysis showed these NPCs, conditioned by a degenerative microenvironment, exhibit a pain-associated phenotype. This novel insight could pave the way for targeted therapeutic strategies to address discogenic low back pain.

The study investigated the role of NPC subtypes in LBP through multiple stages. Human IVD tissues, obtained from surgery or autopsy, were categorized based on patient history of LBP. Single-cell RNA sequencing (scRNA-seq) was performed on these tissues to identify NPC subtypes associated with back pain. For in vitro experiments, authors induced a pain-associated NPC phenotype by harvesting cells from asymptomatic IVDs and subsequently aggravating them with a combination of physical and chemical stimuli. Stimulated and asymptomatic cells were compared with scRNA-seq data from asymptomatic and LBP IVDs. In vitro experiments also assessed neurite outgrowth, and in vivo experiments in rats evaluated the role of recreated pain subtypes through behavioral assays and histological analysis. Overall, the authors employed rigorous study design to ensure robust and reliable results.

This study revealed a specific NPC subtype, termed bpNPC1, associated with degenerating human IVDs and LBP. bpNPC1 demonstrates an increased expression of pain-related markers, involvement in nociceptive and neurogenic pathways, and the ability to stimulate cell stress and reactive oxygen species (ROS) production. Experiments showed that a degenerative in vitro environment induces healthy NPCs to acquire a bpNPC1-like phenotype, linking this NPC subtype to the onset of early discogenic LBP. The study also introduced a novel method to generate stress-stimulated NPCs comparable to bpNPC1. In vivo experiments using a rat model further support the pain-inducing potential of bpNPC1, indicating its role in neuronal ingrowth and subsequent pain behavior. The findings propose a unique NPC-mediated pain cascade, independent of immune cells, shedding light on potential therapeutic strategies to alleviate discogenic LBP by targeting specific NPC subtypes.

The study contributes valuable insights to the understanding of disc biology and pain, offering potential alternatives for treating discogenic LBP with cell-based therapies.

Meet your 2024 ORS Spine Section Leadership and Section Officers

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Simon Tang, PhD, MSCI

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Karin Wuertz-Kozak, PhD
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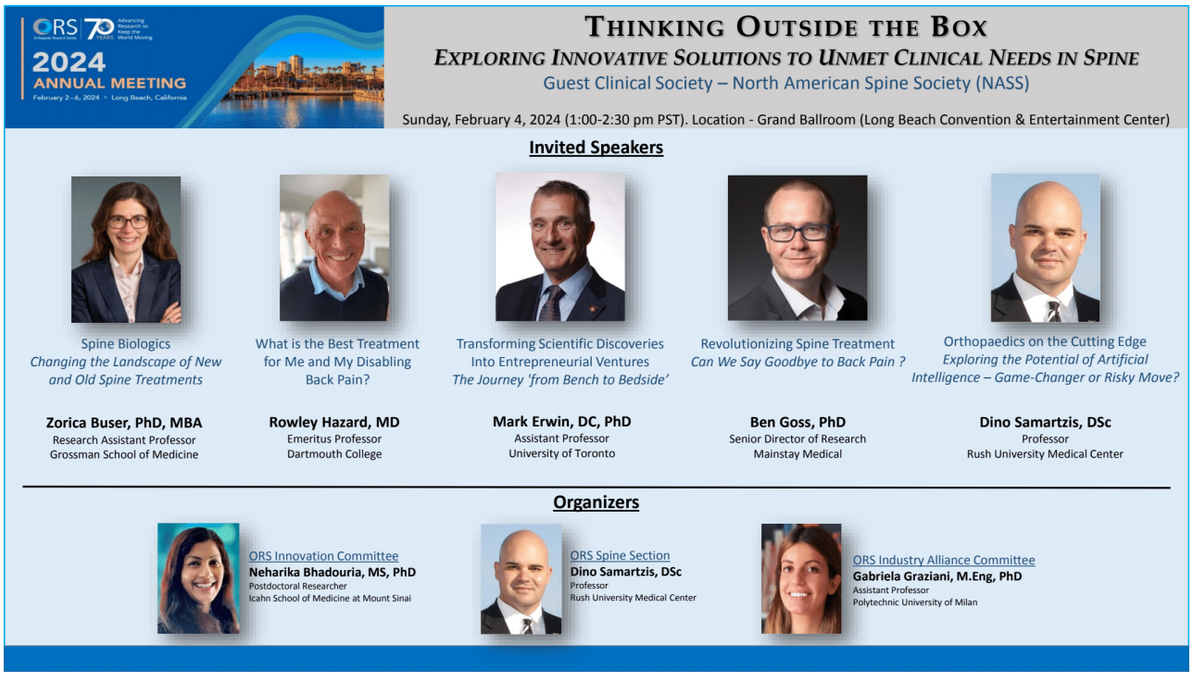
Dmitriy Sheyn, PhD

Membership Committee
Luca Ambrosio, MD
Neharika Bhadouria, MS, PhD
Nina Tang, PhD
Daniele Zuncheddu, MS
Andres Bonilla, DVM

Click the link below to view your 2024 Leadership and Section Officers with headshots.

2024 Leadership and Section Officers

Take Part in this Interactive Symposium Survey



The symposium-related survey is comprised of five multiple choice questions, each tailored to the speaker's presentation topic. The intention is to showcase the survey results before each presentation, fostering interactivity and stimulating discussion towards the unmet needs in the spine field.

The deadline to complete the survey is **January 31, 2024**.

Take Survey

Diversity Award Stipend

This year, the Spine Section offered the 2024 Spine Section Diversity Stipend Awards. The goal of these awards is to increase diversity and equitable access to spine research. Congratulations to the following winners:

Tarek Klaylat, McGill University
Duby Okonkwo, Vanderbilt University
Daniel Garcia, Rutgers University
Mikkael Jozsef Lamoca, Rochester Institute of Technology
Zakiy Alfikri, University of Pittsburgh
Christian Gonzalez, Washington University at St. Louis
Shea Middleton, Duke University
David Barreto, University of Pennsylvania
Leonardo Campos, Columbia University
Maria Astudillo Potes, Mayo Clinic

Andy Ton, University of Southern California

2024 ORS Spine Section Research Symposium

The 2024 ORS Spine Section Research Symposium, '**Promoting Cross Talk and Inclusiveness in Spine Research**,' will take place on February 2, 2024, from 2:00 pm to 7:00 pm. Join us for a panel discussion, speed posters, award presentations, and more.

Learn More

Networking Event

This will be followed by Spine Section networking event at Cafe Sevilla in Long Beach, California, from 7:30 pm onward. The venue transforms into a vibrant Latin-themed nightclub at 9:30 pm.

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