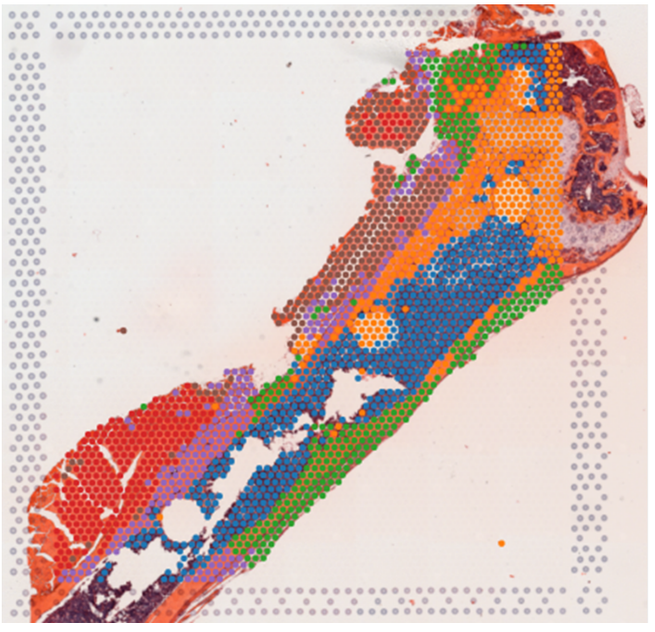
Breakthroughs
ORS ISFR Newsletter

ORS
INTERNATIONAL SECTION
FRACTURE REPAIR
Orthopaedic Research Society

August 2023

The Spatial Transcriptomics Edition
with Drs. Robert Tower, Mimi Sammarco and Esther Wehrle



RNAseq clusters obtained by spatial transcriptomics for a mouse femur with fracture callus and adjacent muscle (Wehrle et al., ORS abstract 2175, 2023).

Inside the August Breakthroughs Issue:

- See our exclusive interview with Drs. Mimi Sammarco, Robert Tower, and Esther Wehrle, field leaders in using spatial transcriptomics in bone development and regeneration
- Hear from the ORS ISFR 3-minute original research competition winner Madhura Nijsure and ORS collaborative exchange grant 2022 awardee Benjamin Osipov
- Finally take a peek at the ISFR's fall research awards lineup and volunteer vacancies

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Hot Topics and Member Spotlights:
Spatial Transcriptomics in Bone Development/ Regeneration

With the advancement of research technologies, results that would have been considered science fiction a decade ago are now possible. The emerging use of Spatial Transcriptomics in musculoskeletal tissue analysis is one example. This technology allows researchers to study the transcriptome in respect to its spatial localization within a tissue by effectively performing RNAseq on histological sections. Spatial Transcriptomics has expanded the capabilities of studying gene expression, putting results similar to scRNAseq into dimensional perspective. Because of the intrinsic complications to bone processing for both molecular and histological analyses, specialized techniques are required to use this new technology in calcified bone tissue.

Meet the Member Spotlights

Robert J. Tower, PhD
Assistant Professor, University of Texas Southwestern Medical Center

"In my experience, good quality RNA going in will mean much better results coming out. Conversely, no amount of slide efficiency and computational know how can overcome poor tissue input. So take the time to make sure you're giving yourself the best chance for success."

Learn more about Dr. Tower here.

Read More

Follow Dr. Tower on Social Media!
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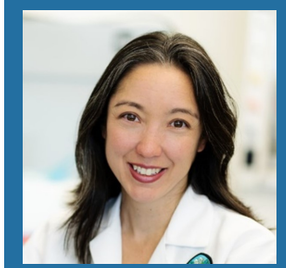

Mimi Sammarco, PhD
Assistant Professor, Tulane School of Medicine

"My research program focuses on the mouse digit amputation model, where the mouse distal digit tip is amputated and subsequently regenerates bone and soft tissue. While spatial transcriptomics was being used in models of development, this was a new model to look at regeneration in bone after injury."

Learn more about Dr. Sammarco here.

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Esther Wehrle, Dr. med. vet., Dr. rer. nat.
Focus Area Leader Bone Biology, AO Research Institute Davos and Senior Researcher, AO Research Institute and ETH Zurich, Switzerland

"Spatial transcriptomics allows us to capture the intersection and crosstalk between multiple tissues using histological sections. In the context of bone healing, spatial transcriptomics analyses have the potential to elucidate the local molecular mechanisms underlying impaired healing with optimization of treatments."

Learn more about Dr. Wehrle here.

Read More

Follow Dr. Wehrle on Social Media!
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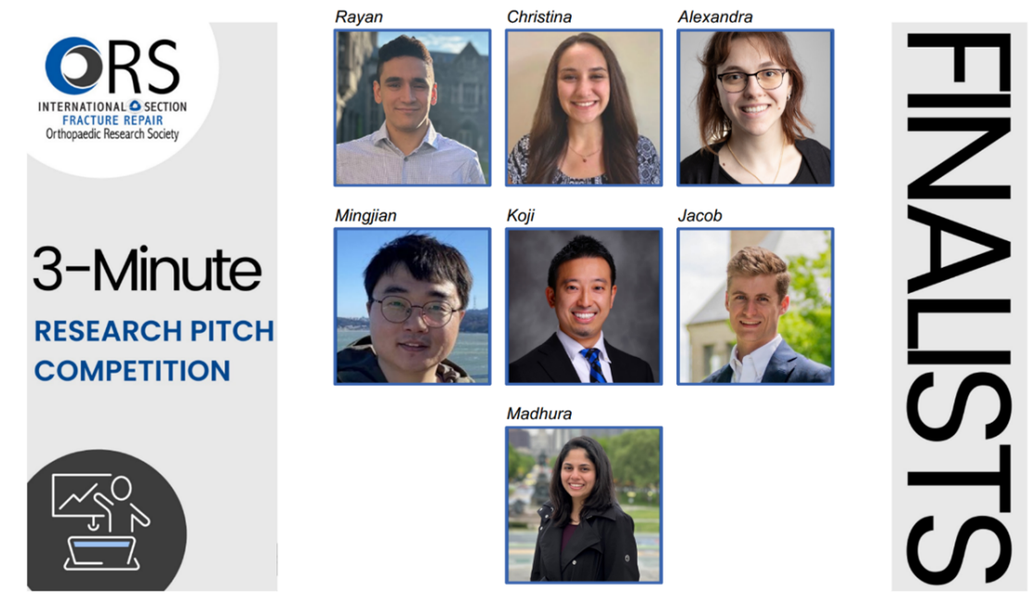
ORS Original Research Pitch Competition



Pictured: ***Rayan Ben Letaifa*** *(McGill University),* ***Christina Capobianco*** *(University of Michigan),* ***Alexandra Ciuciu*** *(Thomas Jefferson University),* ***Mingjian Huang*** *(Duke),* ***Koji Ishakawa*** *(Duke),* ***Jacob Moore*** *(Hospital for Special Surgery),* ***Madhura Nijsure*** *(University of Pennsylvania)*

The ISFR 3-Minute Research Pitch Competition took place on June 21, 12:00 - 2:00pm CST on Zoom. The session was introduced and moderated by Michael Hast (University of Pennsylvania) and Woojin Han (Mount Sinai), who did a wonderful job keeping all 40 attendees engaged and our seven finalists at time. The event, organized by the ISFR Research Section Education Committee, showcased the fracture related work of seven trainees.

Each finalist had 3 minutes to present a single, static slide and had to field 1 minute of questions from the audience. Finalists were judged not just on content, but on how well they relayed the importance and impact of their research in an engaging and accessible way. The judges agreed that all the talks were stellar and that competition was closer!

The Winner!

Madhura Nijsure

*"**Brewing Skele-gro**" on using YAP overexpressing periosteal stem cells to regrow bones.'*

Tell us more about why you decided to participate in the 3-minute original research pitch this year?
"My research focuses on the role of Yes Associated Protein (YAP) in transcriptional regulation of periosteal cells, with potential
implications for therapeutics. It is difficult to convey complicated science and the significance of our work to both

scientists and non-scientists. However, when presented as a compelling narrative, it engages more people. One of my favorite parts of doing science is getting other people excited about it!"

University of Pennsylvania

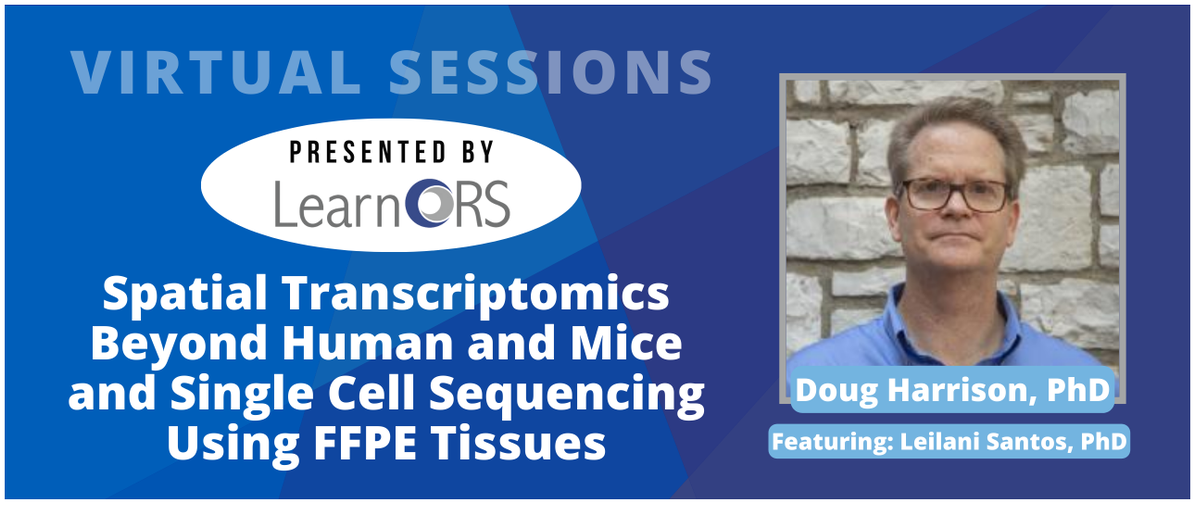
How did you come up with your unique idea to draw on inspiration from the Harry Potter series?

"The Harry Potter series is a great example of a story that engages a wide audience, despite having an intricate plot. At an outreach event a couple years ago, I used the Skele-gro reference when presenting my research to college freshmen and sophomores, and since then, I've been eager to link this story to my work in fracture repair. Sharing this idea with the ISFR community was particularly exciting, as we all aspire to develop something like Skele-gro. The ISFR 3MT thesis pitch competition offered an excellent opportunity to deliver this concept as a concise talk."

Click the link below to view the recorded session.

ISFR 3-Minute Research Pitch Competition

Recent ORS Webinar on Spatial Transcriptomics



In case missed it, check out this recent LearnORS Virtual Session: "Spatial Transcriptomics – Beyond Human and Mice and Single Cell Sequencing Using FFPE Tissues", with speakers Doug Harrison, PhD and Leilani Santos, PhD.

Sponsored by the Preclinical Model Section

View Session

ISFR 2023 Interdisciplinary Academic Exchange Grant Now Open

This grant will fund an ORS ISFR member to visit a research lab for the purpose of collaboration and knowledge exchange in the areas of fracture repair and/or bone regeneration research and to facilitate the exchange of new research methodologies and techniques.

$5,000 for one ORS ISFR (Section) member to visit a research lab for the purpose of collaboration and knowledge exchange.

Eligibility & Criteria

- Applicant must be an ORS **and** ORS ISFR member in good standing
- Members living outside of the US are encouraged to apply.
- Applications will be accepted from applicants at all career stages.
- The period of exchange is expected to be a minimum of 2 weeks and may spread over more than 1 visit. Support for longer periods of exchange are also welcomed.
- Multidisciplinary exchanges will be given priority.

Deadline: September 15th, 2023

Learn more

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ic Exchange Grant Winner

Benjamin Osipov, PhD

Current Title and Department:
Researcher and Data Analyst, Department of Orthopedic Surgery
Current Employer:
University of California-Davis
Undergraduate Degree, University:
University of California-Berkeley
Graduate Degree, University:
University of Alberta, Edmonton, AB, Canada
Post-doctoral Position:
University of California-Davis
Who have been your mentors?
Blaine Christensen

What laboratory did you visit as part of the collaborative academic exchange grant?
Virginia Ferguson Lab, University of Colorado, Boulder

What research knowledge and methodologies did you gain as part of the collaborative exchange?
For my colloborative exchange project, we examined the systemic response of osteocytes to a femur fracture.
I gained a great deal of theoretical knowledge on osteocyte biology, and their role in orchestrating bone remodeling following fracture. Working with Dr. Ferguson, I learned a new technique for x-ray microscopy that allowed me to visualize changes in osteocyte size, morphology and function in 3D.

How has this research knowledge and or new methodologies impacted your own research?
My research examines how a fracture at one skeletal site induces bone loss and increases fracture risk throughout the skeleton. The ability to image thousands of osteocytes in 3D has allowed me to gain new perspectives on the cellular mechanisms by which these key cells directly resorb bone and contribute to its material properties. I proposed to use this technique for my new NIH K99/R00 grant, and this collaboration contributed to me receiving this award.

What is your greatest memory from the exchange?
My greatest memory was the welcoming nature and eagerness to help displayed by all the members of the Ferguson lab. They went above what was required to ensure I could succeed and showed me the best spots in Boulder for food and hiking.

What advice would you give to applicants applying this year for the academic exchange?
I would advise future applicants to be open to unexpected opportunities. Often, working in a different lab, you will come across an unexpected piece of knowledge or way of doing things that can greatly improve your own science.

Submit Your 2024 Abstracts and Qualify for Section Awards

Abstract submissions are open for the 2024 ORS Annual Meeting. This is your opportunity to be a part of history when ORS celebrates 70 Years of musculoskeletal research, February 2-6 in Long Beach, CA. For more information, guidelines on submission, and a list of topics, click the link below. Abstract submissions will be open until Monday, August 28.

Be sure to join the ISFR membership at the time of your annual meeting abstract submission to be:

- Automatically eligible for section member awards and grants including ***10 ORS ISFR Podium and Poster Awards*** at the ORS Annual Meeting
- Get your research highlighted in our newsletter and via ORS social media and ORS ISFR Twitter
- Networking and collaborating at Section Scientific Meetings, social sessions, virtual scientific sessions and more
- Diverse programming designed by our members, with our members' research in mind

- Opportunities to gain leadership experience by volunteering with our Section

Submit Your Abstracts

ORS ISFR is Seeking Volunteers

Interested in volunteering? ISFR anticipates the need for the following volunteer positions for a two year duration, 2024-2025.

- Membership Committee (2 volunteers)
- Communications Committee (1 volunteer)
- Education Committee (3 volunteers)

Stay tuned for the upcoming ISFR call for volunteers via email and on the ORS ISFR Twitter!

Learn more about various committees and positions

Growing Our Network

The ORS ISFR brings the strengths of the ORS and the ISFR together to combine their collective resources and move forward together to ensure the growth in the field of Fracture Repair.

If you know someone who might be interested in representing the ORS ISFR, spread the word! Your personal endorsement and enthusiasm can inspire potential members to be part of this community.

Section Membership

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