July 2025: Volume 2, Issue 3

THE IRF INSIDER

University of South Carolina School of Medicine
Instrumentation Resource Facility
RRID:SCR_024955

In Case You Missed It

- The IRF hosted Lunch & Learns for the Echo Revolution and brand-new Leica Stellaris 8 with FALCON TauSTED. There were both heavily attended and both systems garnered a lot of interest!
- We have officially launched the Leica Stellaris 8 with FALCON TauSTED technology. It delivers sharper images, deeper insights, and exceptional performance for your most demanding applications. If you have questions about feasibility or would like to be trained on the system, contact Anna Harper! Location: Main Campus Microscopy Core until new HSC is completed.
- Drs. Worden and Price hosted the 2025 Meeting of the Southeastern Microscopy Society in May. Even with funding restrictions across the region, this was the most attended meeting since USC hosted the meeting in 2018. This was supported by workshops on the IRF's Zeiss Lightsheet 7 and Stellaris 8. We look forward to hosting the SEMS meeting again in a few years!
- Also in May, the IRF hosted the 1st Annual Undergraduate Microscopy Workshop, giving an in-depth introduction to several high-end pieces of equipment to USC undergraduates. With such positive feedback from the students, we look forward to hosting this workshop again next summer!

Optically cleared mouse brain using the IRF's X-Clarity Clearing System.

Be the First to Know!

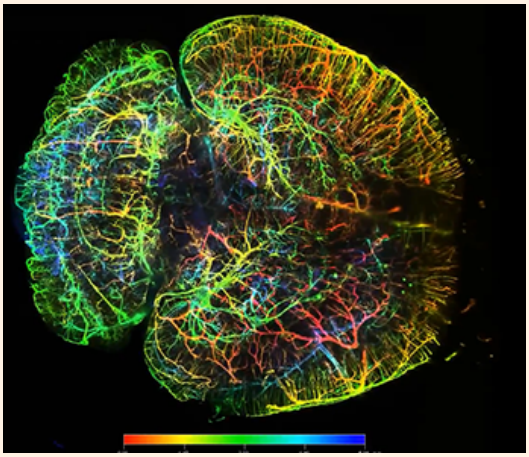
Welcome to the IRF Insider, brought to you by the USC Instrumentation Resource Facility. In this newsletter, we recap what you may have missed, give updates on upcoming events, highlight our state-of-the-art equipment, and give you bits of knowledge. We hope you enjoy!

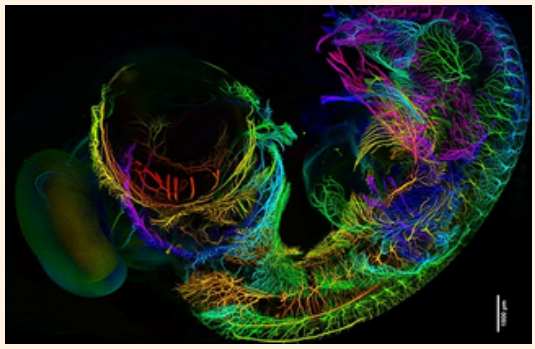
- Join us on Tuesday, August 26th at 12:00pm in the B1 Classroom for a Lunch & Learn seminar presented by **Beckman Coulter Life Sciences**! They will share information about our SPRI magnetic bead-based solutions for DNA, RNA, and total nucleic acid extraction, as well as our purpose-built liquid handling platform, the Biomek NGeniuS System. They will also discuss centrifugation and cell health, highlighting the instrumentation commonly used in these workflows. Lunch will be provided for the first 40 attendees!
- Join us (tentatively) on Tuesday, September 9th at 12:00pm (location TBD) for a **"State of the IRF Address"** Lunch & Learn. We will be having an in-depth conversation about changes in the IRF, funding, and how investigators can be more involved moving forward. While this is not mandatory to attend, we strongly suggest that all users and potential users participate in this Lunch & Learn. Lunch will be provided by the USC VPR Office of Research Cores and Infrastructure.
- We are pleased to announce the **2025 Research Core Fair** is scheduled for Friday, September 19, 2025, in the USC Russell House Ballroom and Theater. This full-day event is dedicated to fostering Collaborative Opportunities for Research Excellence (CORE) across our research community.
  - This event will feature:
    - Introductions to several USC core facilities
    - Opportunities to talk directly with core personnel and company product experts
    - In-depth talks covering new equipment and services offered
    - "Lightning Talks" and an expanded poster session highlighting innovative research by student and postdoctoral scholars
  - Attendees will be provided lunch and are invited to stay for refreshments at the closing awards reception.
  - We welcome the entire research community to join us, share your work, and collaborate in strengthening our CORE network. Registration and call for abstracts will open August 2025, the date to be announced.

Have You Used This Yet?

Right: Developing nervous system of a seven-day old chicken embryo. Image Courtesy of Dr Fabian Voigt from the group of Professor Fritjof Helmchen at the Brain Research Institute, University of Zurich.

Bottom: C57 BL6J mouse perfused with PBS, CellTracker™ CM-DiI Dye, and 4% PFA. Image Courtesy of Zeiss and Erin Diel – Harvard University; Harvard Center for Biological Imaging.

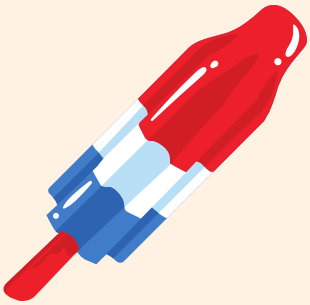




Zeiss Lightsheet 7 + Logos X-Clarity Clearing System
Location: IRF B59

Experience high-resolution 3D imaging with the powerful combination of the ZEISS Lightsheet 7 and the Logos X-CLARITY tissue clearing system. This integrated workflow enables researchers to visualize large, optically cleared tissues with exceptional clarity and minimal photodamage.

- *ZEISS Lightsheet 7*
  - Designed for gentle, high-speed imaging of live or cleared samples up to 2 cm
  - Adaptive optics and Pivot Scan technology for artifact-free 3D datasets
  - Environmental control for extended time-lapse imaging
- *Logos X-CLARITY System*
  - Rapid, automated tissue clearing using electrophoretic or passive protocols
  - Preserves fluorescent proteins and fine structural details
  - Optimized for whole organs and large tissue sections



Together, these systems provide a robust and reproducible pipeline for deep-tissue imaging—ideal for neurobiology, developmental biology, and organ-level mapping.

Read This Today!

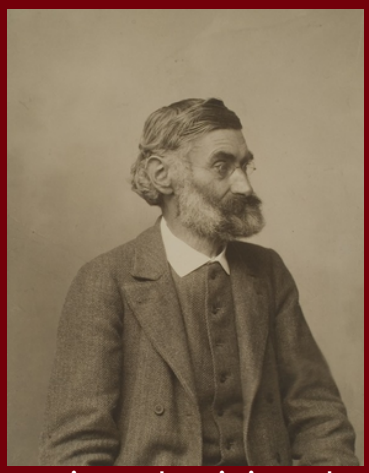
Since the advent of confocal microscopy, advances in tissue clearing have allowed researchers to push the limits of imaging depth and dive deeper into the precise 3D structures of biological specimens. As clearing methods are discovered, refined, and retired, it behooves the prudent microscopist to consider the pros and cons of various tissue clearing methods and systematically evaluate whether tissue clearing is beneficial to answer their research questions. Herein, I will briefly discuss the evolution of tissue clearing, pros and cons of more popular methods and techniques related to fluorescence microscopy, and key considerations for selecting a method most likely to yield experimental success.

Caleb A Padgett, Tissue Clearing: An Overview of Methods, Considerations, and Applications, *Microscopy Today*, Volume 31, Issue 6, November 2023, Pages 31–35, https://doi.org/10.1093/mictod/qaad086.

Science MEME Quarterly

Quote Corner

Learn from yesterday, live for today, hope for tomorrow. The important thing is not to stop questioning.
-Albert Einstein



Microscopy History

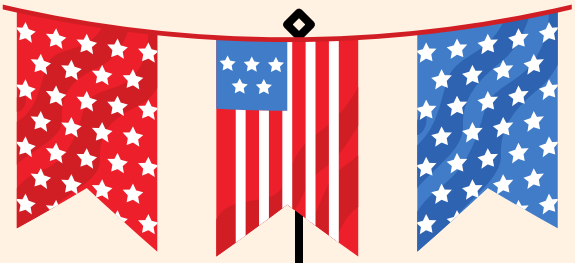
Ernst Abbe (1840-1905) was a pioneering physicist whose theoretical and technical innovations transformed the field of optical microscopy. In 1870, he introduced the use of a condenser to provide strong, even illumination, greatly enhancing image contrast and clarity. His work brought scientific rigor to microscope design, culminating in two major breakthroughs in 1873: the formulation of the Abbe sine condition, which defines a key optical requirement for producing sharp, distortion-free images, and the establishment of the Abbe diffraction limit, which set the fundamental boundary for resolution in light microscopy based on the wavelength of light and the numerical aperture of the objective. As head of the Zeiss company, Abbe applied these principles to revolutionize lens manufacturing and reorganized the company to support both scientific advancement and social responsibility. He founded the Carl Zeiss Foundation and introduced forward-thinking worker benefits, including profit sharing, paid vacations, and shorter working hours. Abbe's legacy lives on in the optical precision of modern microscopes and in the ethical model of scientific enterprise he helped pioneer.

Microscope by Carl Zeiss (1879) with optics by Abbe

In Other News

- **Cryo-EM Capabilities on the Hitachi 7800 TEM:** Thanks to a generous offer from Hitachi, the Hitachi 7800 transmission electron microscope in USC's EM Center has received a temporary field upgrade—at no cost—to include a new camera and cryo-EM capabilities for the months of May, June, and July. This is an exciting opportunity to explore advanced cryo-electron microscopy workflows on-site. Throughout the trial period, Hitachi applications expert Heather Berensmann will be available to provide hands-on support and training. This is a unique opportunity to expand our core imaging capabilities—contact Dr. Bob Price if you're interested in doing work on the system while it's here.
- **Reminder: Select Core Facilities in USCeRA Grant Submissions:** When submitting a grant through USCeRA, don't forget to select the IRF (Instrumentation Resource Facility)—and any other core facilities involved in your work—within the submission portal. This simple step is crucial for tracking how many proposals utilize each core, helping us demonstrate impact, justify resources, and improve support for your research. Your selection ensures that core facilities are accurately credited and can continue to grow alongside your needs.
- **Reminder: Acknowledge the IRF in your Publications!** Tracking publications that utilize core facility resources is increasingly important for demonstrating their impact and securing ongoing support. At the IRF, we've made it simple for investigators to acknowledge our contributions. Just visit the Acknowledgement section on the IRF website (QR Code Below) and copy the pre-written statement that best fits your work. Each statement includes our unique RRID, which allows us to automatically track and credit the publication once it's released. A quick copy-and-paste is all it takes!

Want more information? Scan or Click the QR Code!



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IRF Resources

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