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HOME OF SIDNEY KIMMEL MEDICAL COLLEGE

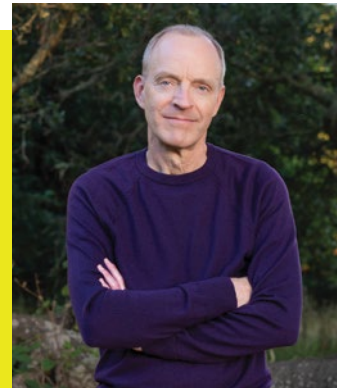
Jefferson's 2025 research as art competition

celebrates all Jefferson faculty, students and staff who have an eye for the beauty in their research or scholarship. Our panel of judges selected a winner from two categories: life under the microscope, reflecting cellular and molecular work; and conceptual art that shows renderings of research observations, experiences and concepts in various media. They judged each piece based on aesthetic quality, meaning and originality.

This year, we had 32 submissions with representation from disciplines including neuroscience, population health, engineering and art therapy. Each work depicts the creative aspects of academic study that often go underappreciated. The images also do something that is rare in research: they invite the novice or uninitiated to interact with the topic, to bring their own experiences to bear in the interpretation and appreciation of research as art. We hope you will enjoy this year's images.

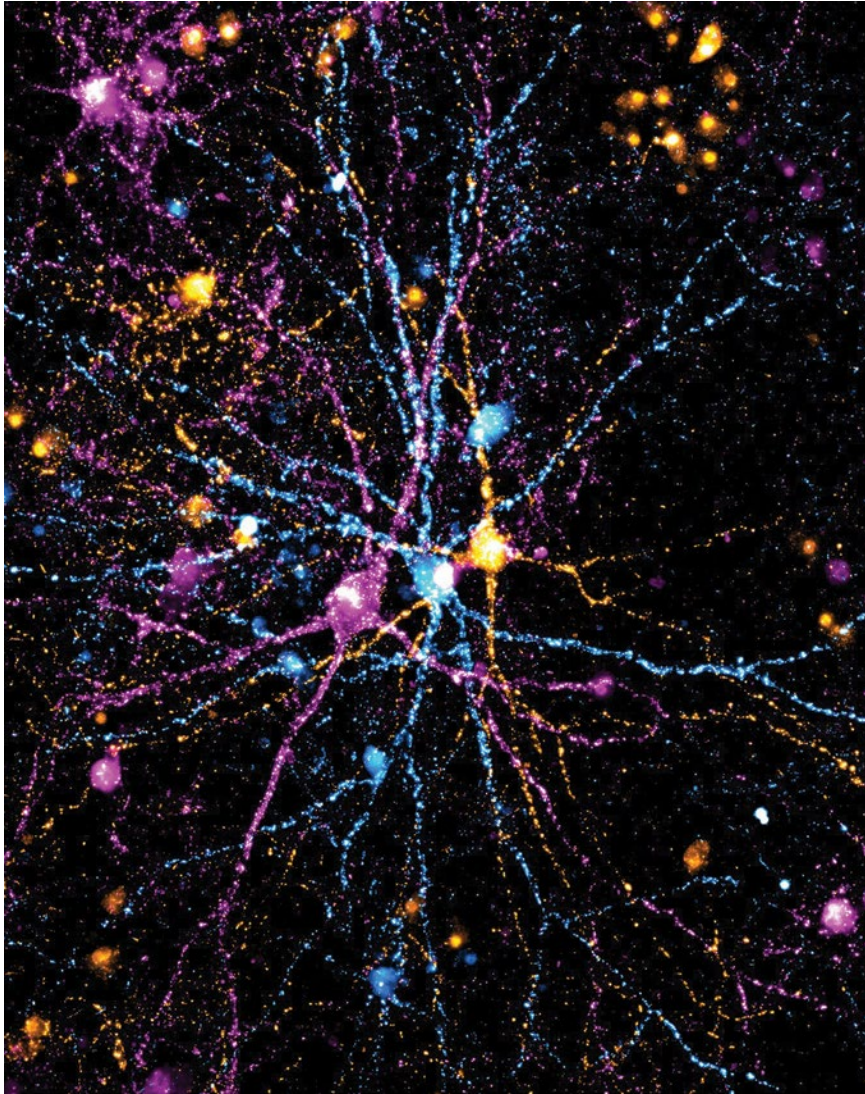


Meghan Kelly (she/her) is the Interim Program Director of the MS Textile Design graduate program at Thomas Jefferson University and primary knitting professor, specializing in advanced knitting techniques with manual and electronic machines. She holds a BFA in Fibers and Art History from Kansas City Art Institute and an MS in Textile Design from Philadelphia University, now Jefferson.



Robert Irion (he/him) teaches science journalism in the UC Santa Cruz Science Communication Master's Program, which he directed from 2006 to 2017. He has covered physical sciences for *Science*, *Smithsonian*, *National Geographic*, and many other publications. In September 2024, he was inducted as a Fellow of the American Association for the Advancement of Science.

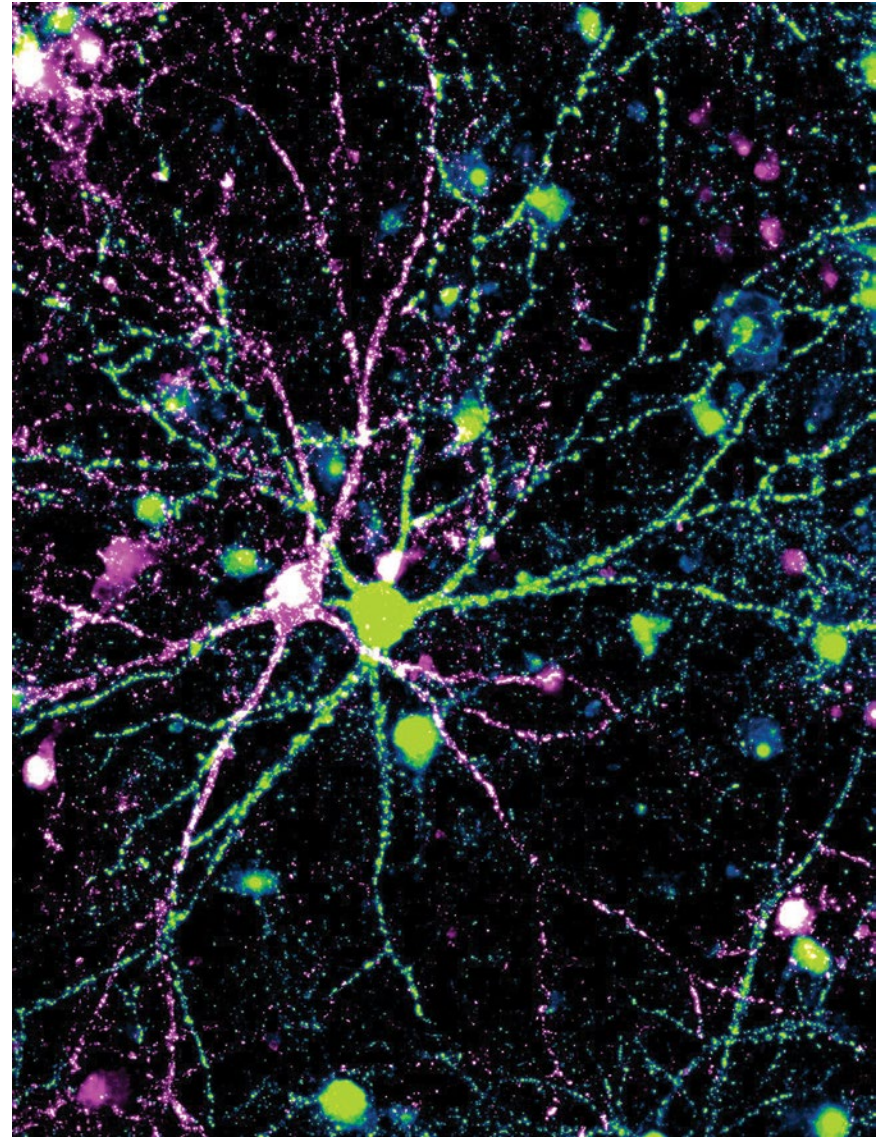
learn about this year's judges



Celestial Memories: Hippocampal Neurons in the Cosmos

Bridget Boyle

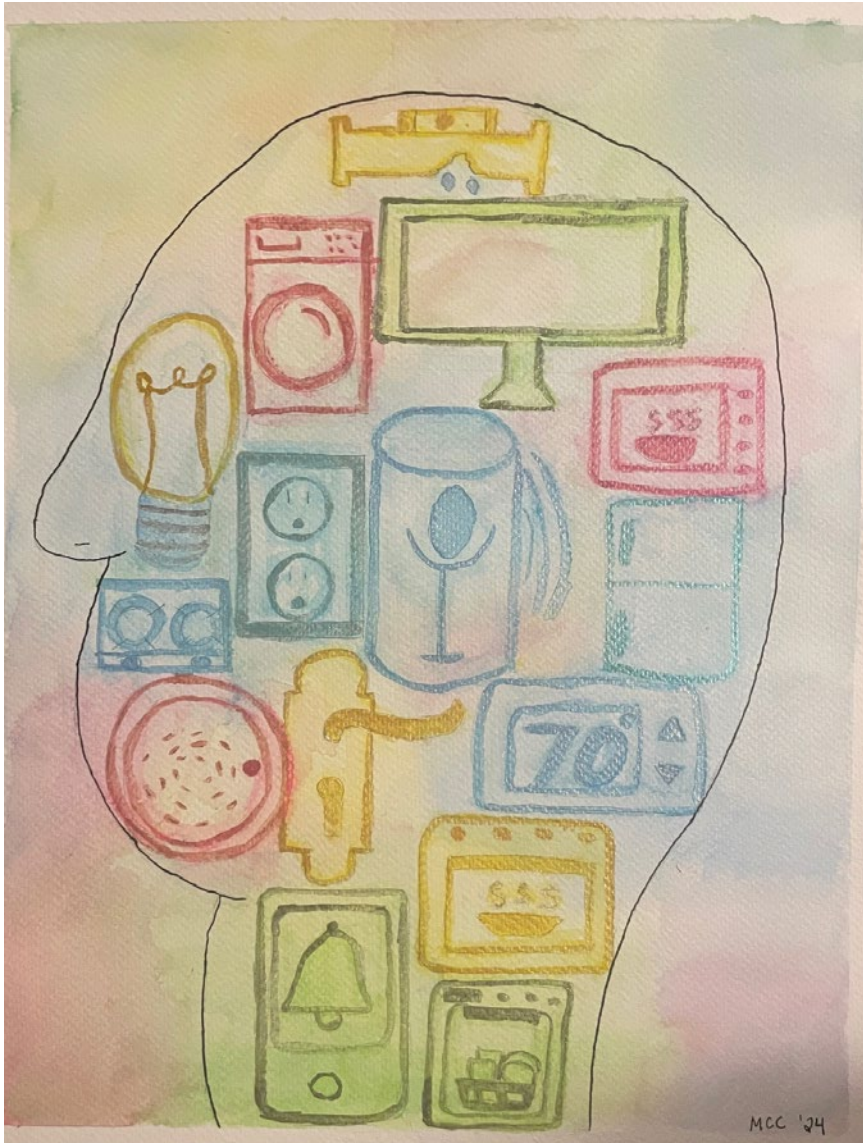
"Celestial Memories" presents three different hippocampal neurons that look like they are floating in a cosmic setting. We used fluorescent markers that show vibrant colors, highlighting the complexity of these neurons, key players in learning and memory. Set against a starry backdrop of fluorescent puncta, the neurons resemble constellations, symbolizing the way our memories connect and shape our understanding of the world. This artwork merges the science of the brain with the vastness of space, reflecting the importance of understanding how these neurons communicate.



Fluorescent Memory: Dual Neurons in Conversation

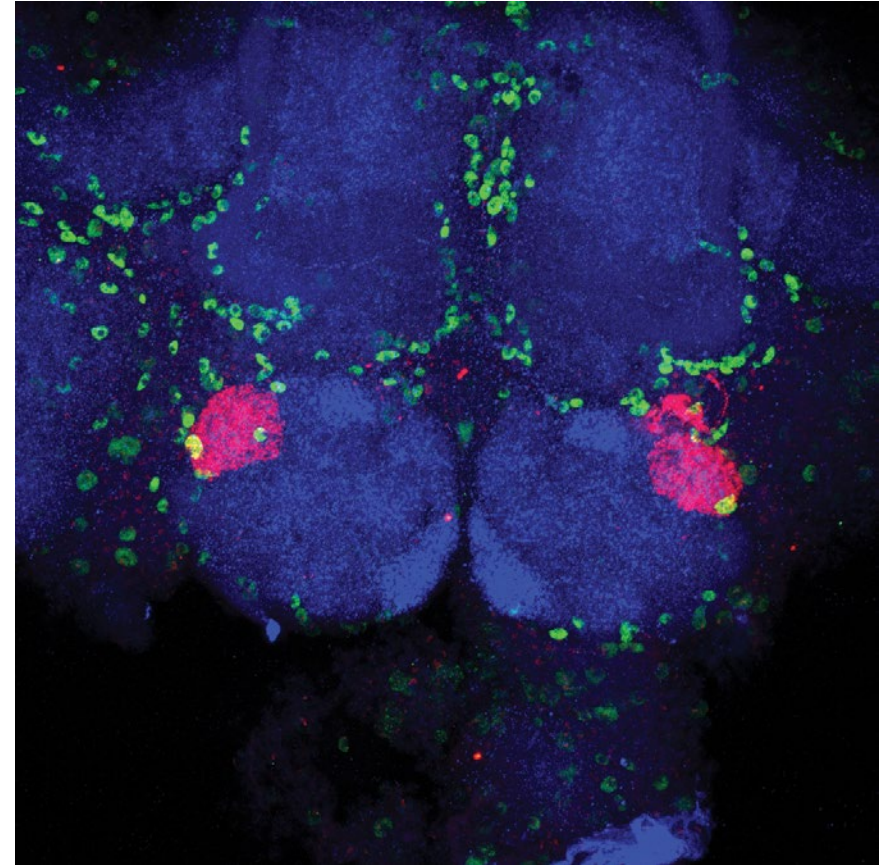
Bridget Boyle

"Fluorescent Memory: Dual Neurons in Conversation" features two brightly labeled fluorescent hippocampal neurons, essential for forming and storing memories. This image captures the dynamic exchange between the neurons as they communicate through synapses, forging connections that help us recall experiences. This artwork highlights the beauty of memory formation and the essential role these neurons play in our everyday lives.



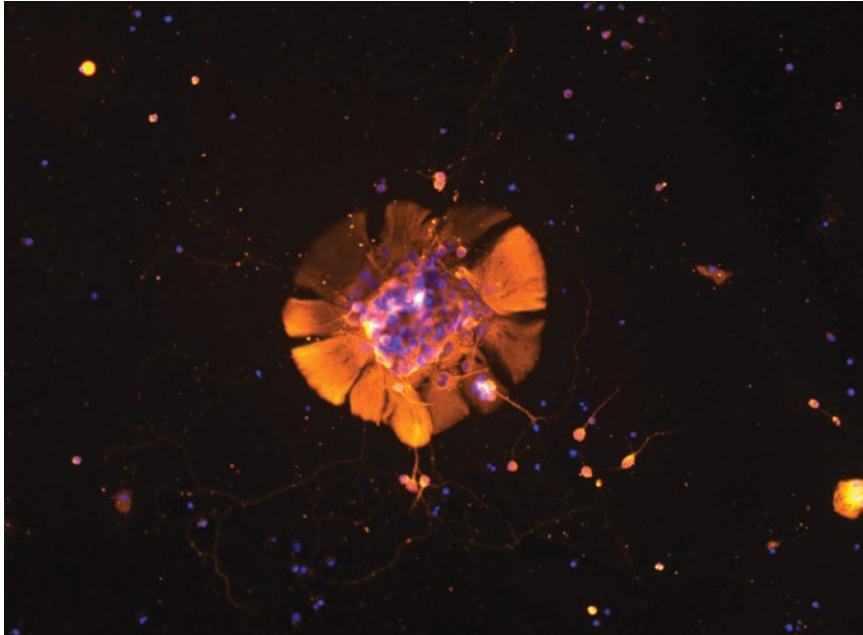
**Embracing Aging for the Next Generations:
A Landscape of Smart Technology**
Monique Chabot

The Baby Boomers and Gen X generations view older adulthood differently than their parents and grandparents, including a different acceptance of smart technology in their lives. However, our understanding of what it means to age in place is based on previous generations. This research challenges previous knowledge by gathering a landscape of current smart technology use by the next generations while also examining the impact of smart technologies on cognition in people looking to age in place. The icons represent the commonly used smart technologies with their sizes approximating their comparative frequency of use as one data set analyzed.



Gl-gl-glia
Kristen Davis

This image shows the connections formed between olfactory sensing neurons (red) with in the fruit fly brain and important support cells called glia (green) with a general neuron stain (blue).



Astrocyte Blossom

Gabriela Daszewska-Smith

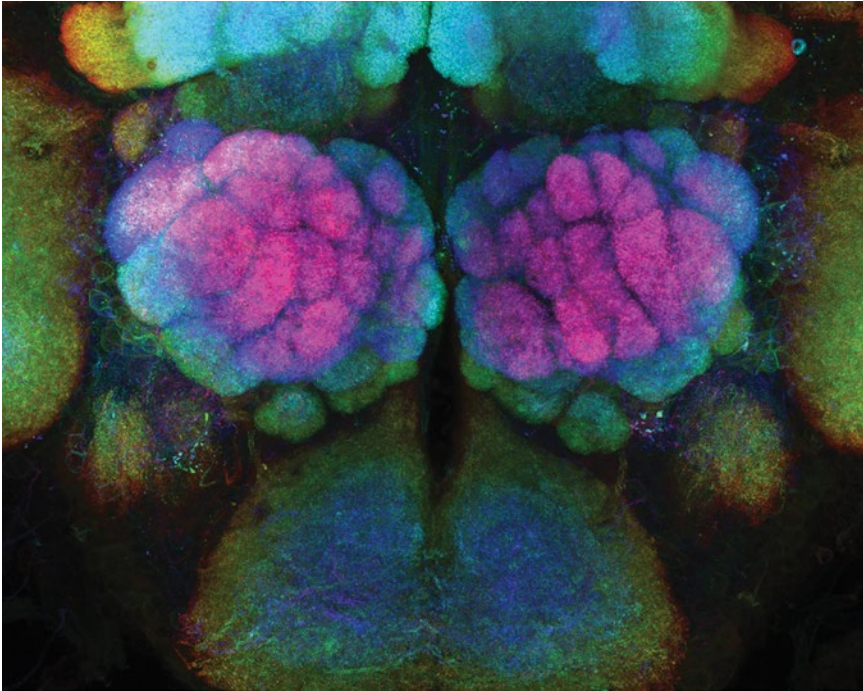
This fluorescence microscopy image showcases astrocytes in culture, with GFAP proteins labeled in yellow and nuclei stained blue. A notable characteristic of astrocytes is their response to injury, where they cluster together and form a reactive aura that appears as an “astrocyte blossom.” This phenomenon highlights the astrocytes’ role in neuroinflammation and tissue repair, emphasizing their significance in both protective and pathological processes within the brain.



Signs of Humanity

Rosemary Frasso

Unhoused: Personal Stories and Public Health is a researcher-artist collaboration at the Mütter Museum. Artists Willie Baronet and Leah den Bok with researcher Rosie Frasso share the exhibit space where data, signs purchased from people who are unhoused, and powerful photographs of people struggling with poverty line the walls. This exhibition is designed to foster a conversation about empathy. Additionally, the researchers are exploring the exhibit’s impact on visitors. “Researchers can shed light on an issue, measure it, weigh it — while artists can bring an issue into the light, setting the stage for broader conversation. When researchers and artists work together, they expand their individual capacities to bring about change,” says Dr. Frasso.



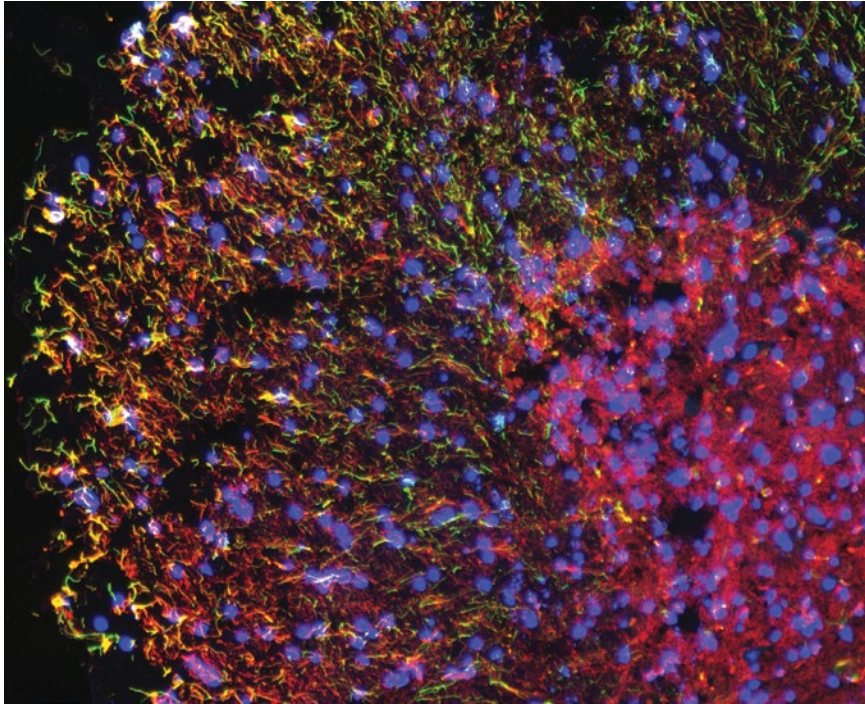
Flying Colors
Alison DePew

The fruit fly brain, though tiny, contains over 100,000 neurons which communicate with each other at 50 million synaptic connections. The process by which these synapses form is both extremely complex and also remarkably similar to the development of our own brains. This depth-coded image of the fly brain highlights the 3D structure of the antennal lobes, which the fly uses to sense its environment. By studying how connections form in these structures, we can better understand how our own brains develop.



Silhouette
Alison DePew

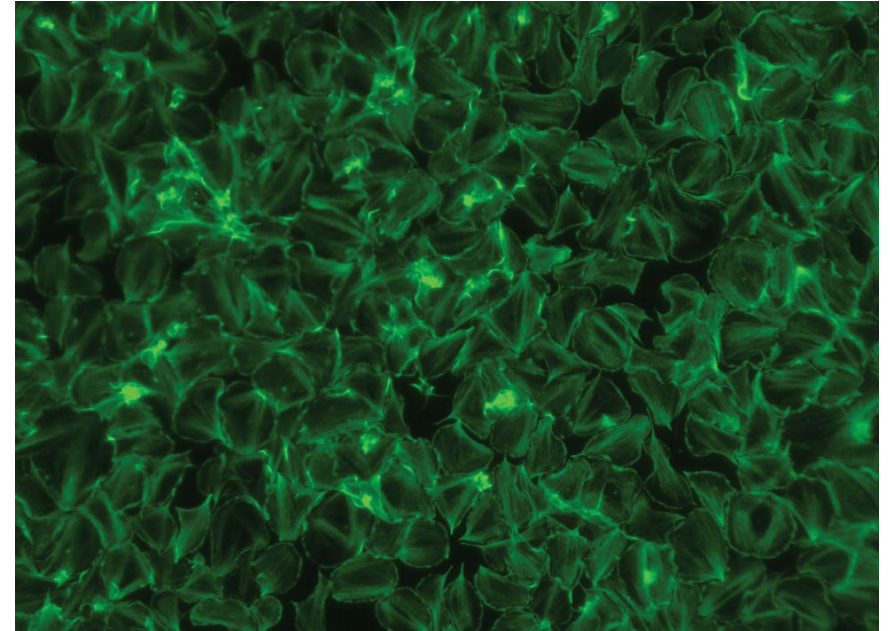
As our brains develop, neurons form specialized connections to communicate, called synapses. Here, a neuron of a fruit fly stretches its branches to form a synapse with a muscle fiber. Although it appears simple, the formation of this connection is a feat achieved through an elaborate series of molecular events. The striking simplicity of this connection allows us to study the complex molecular processes that occur during development across organisms — from fruit fly to human.



**Fractured Connections:
An Invisible Battle and Cellular Struggles in ALS**

Mandeep Kaur

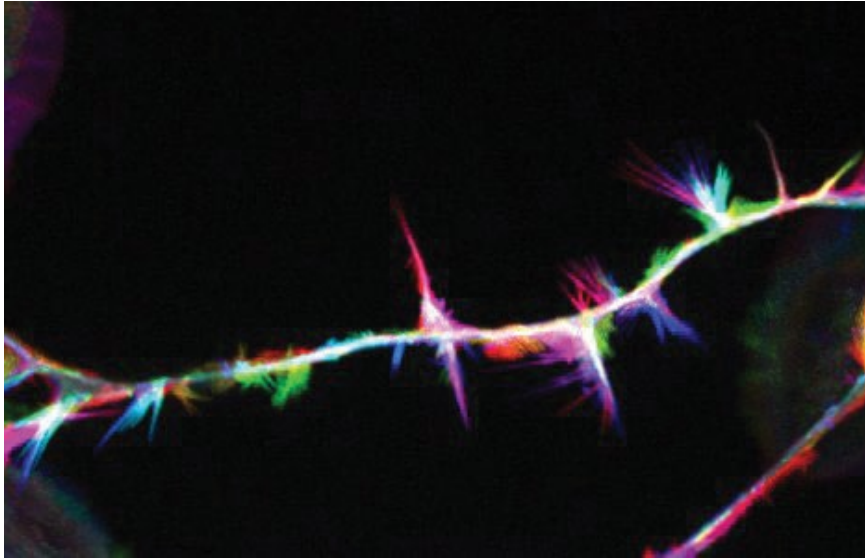
This depiction vividly illustrates the lumbar region (L5) in the spinal cord of the ALS mouse, emphasizing critical roles of astrocytes and microglia. The vibrant colors and intricate patterns reflect the underlying chaos of this condition and cellular battles within the nervous system, urging a deeper understanding of ALS and the vital need for research and support. Astrocytes (green) are showing reactive state, illustrating their struggle to manage the damage caused by motor neuron loss. Microglial activation (red) is indicating immune response to injury. Together, these cellular markers highlight the pathological features of ALS that severely impact muscle control and strength.



Healing Threads: Platelet Dynamics in Action

Mandeep Kaur

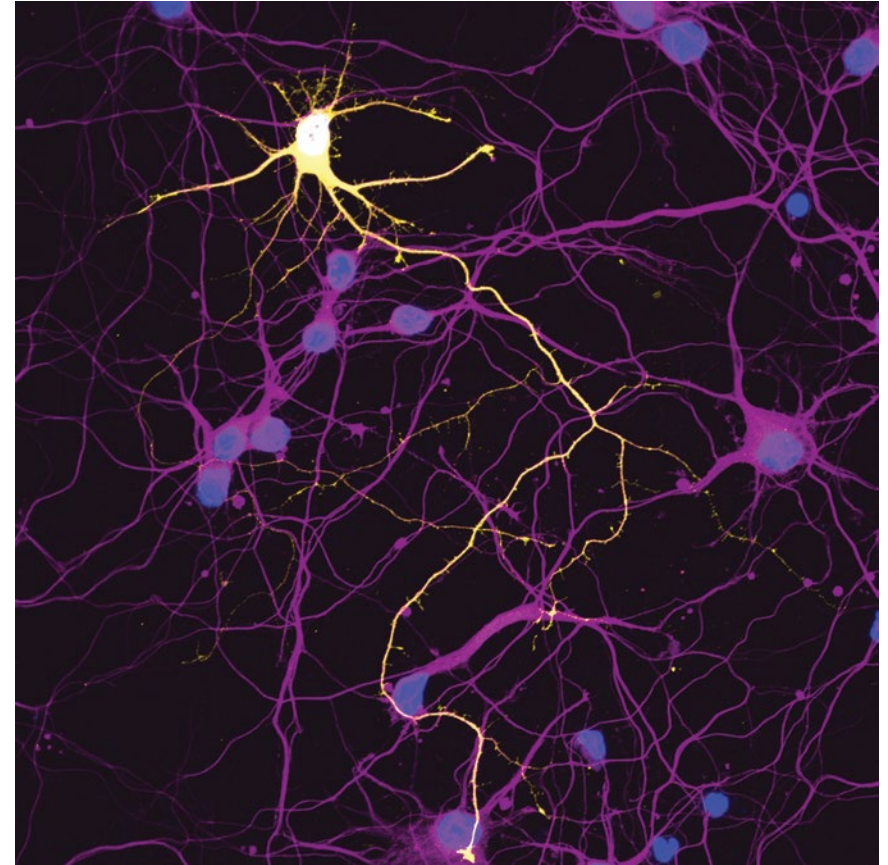
This illustration captures the dynamic choreography of platelets in healthy conditions. Often overlooked, these tiny blood cells are vital for healing and defense. The visual representation highlights their dynamic role in both prevention and recovery, showcasing the elegance of cellular teamwork in ensuring our bodies heal efficiently and effectively. When injury strikes, platelets swiftly converge at the site, spreading out and forming a protective barrier.



Prismatic Protrusions: Sprouting Color With Color

Siddharth Karthikeyan

Neurons extend projections called axons, which can branch out to help the cell connect to multiple targets. Here, we recorded a living axon and color-coded each frame so all timepoints can be seen in a single image. The axon is shown sprouting new branches, which will go on to become mature branches and help the neuron create complex circuits. Remarkably, these new branches were grown using light! By using novel signaling proteins that promote growth following blue light exposure, we can control when and where these structures form along the axon and study how neurons grow during development.



Streaks of Lightning Cutting Through a Purple Midnight

Siddharth Karthikeyan

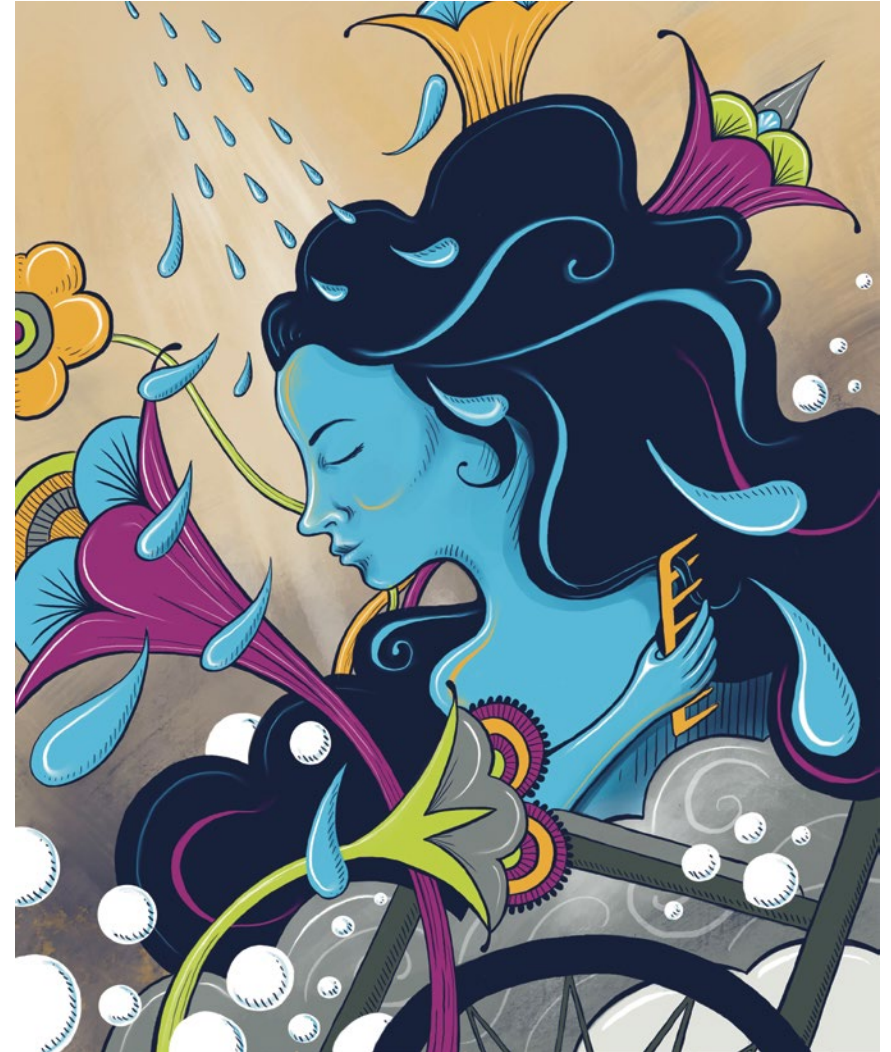
A young cortical neuron labelled with a fluorescent protein (yellow) is shown growing amongst a network of unlabeled neurons stained for the neuron marker β -Tubulin (purple). This approach, known as "sparse labelling," allows us to examine a single neuron's morphology in great detail and study how its dendrites (top of image) and its axon (descending towards bottom of image) grow and integrate into a larger network of neurons. Additional proteins (not shown) can be labelled to study the mediators of neuron development, elucidating how these cells become electrically mature, able to detect and integrate signals and send impulses streaking across the brain.



Spinal Cord Injury Care Team

Maribeth Kradel-Weitzel

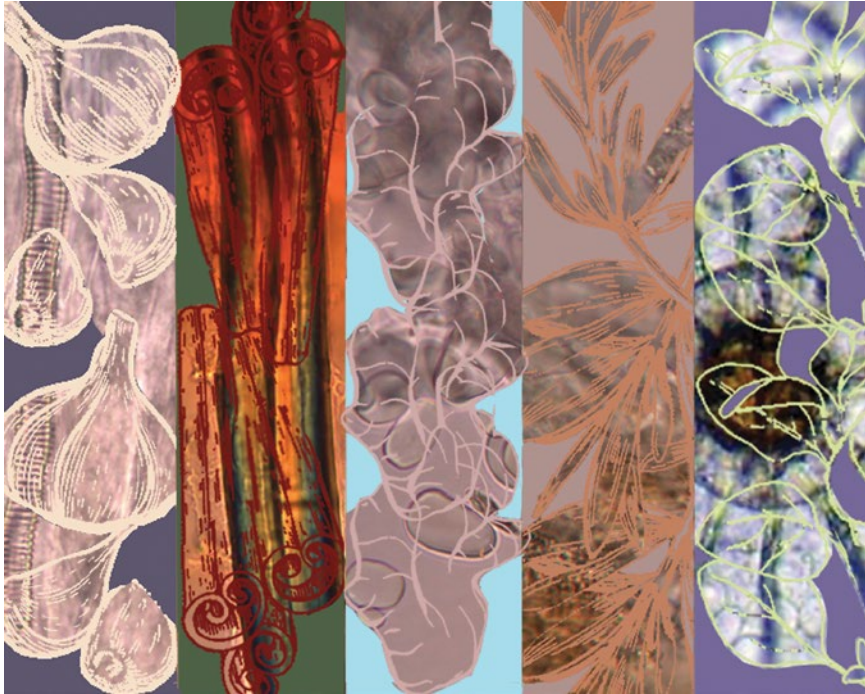
This image was created to introduce the “Your Care Team and Resources” section of a patient-facing informational binder for the Jefferson Moss-Magee Rehabilitation Hospital’s Spinal Cord Injury Program. The concept demonstrates multiple care providers with different specialties collaborating to support a patient in their journey to grow and flourish in the aftermath of a spinal cord injury. This hopeful image demonstrates that it is possible to find a place of joy after such a traumatic life event, and the spinal cord injury team makes sure no patient is alone in that pursuit. *Illustration: Maribeth Kradel-Weitzel; Spinal Cord Injury Program team collaborators: Ben Ayzenberg, Erin Freimuth*



Beauty of Everyday Functions

Maribeth Kradel-Weitzel

A spinal cord injury is a life-changing event, and it can change many aspects of a patient’s daily existence and sense of self. This image was created to introduce the “Everyday Functions” section of a patient-facing informational binder for the Jefferson Moss-Magee Rehabilitation Hospital’s Spinal Cord Injury Program. The concept focuses on the patient’s ability to thrive and feel beautiful in the act of everyday self-care while their self-image may now include assistive devices such as a wheelchair. *Illustration: Maribeth Kradel-Weitzel; Spinal Cord Injury Program team collaborators: Ben Ayzenberg, Erin Freimuth*



Herbs Under the Microscope

Grace McCaughey

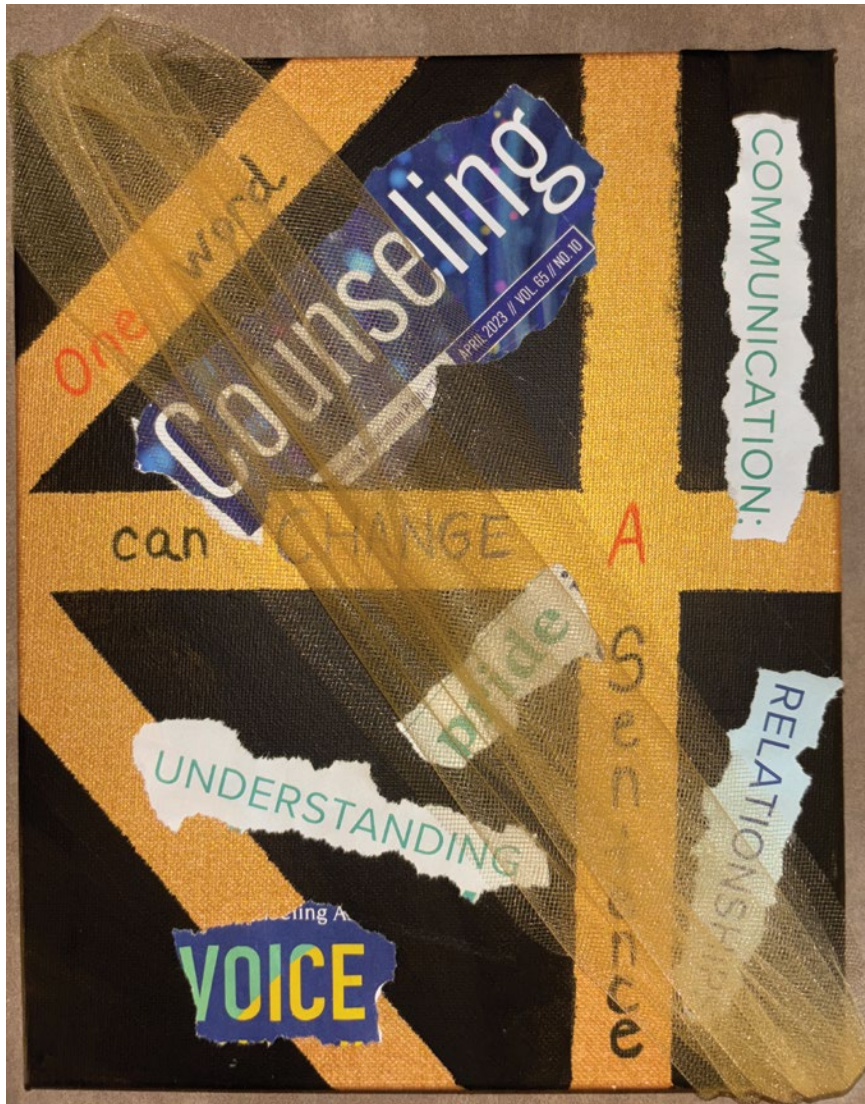
Inspired by *The Herbal Kitchen*, this display blends holistic and Western medicine through herbs. Each column showcases an herb's cellular structure, with an overlaid sketch of the plant. The benefits of each herb are highlighted: Garlic (far left) lowers blood pressure and fights infections. Cinnamon (middle left) regulates menstrual cycles and supports menopause. Ginger (middle) aids digestion, relieves nausea and reduces pain. Rosemary (middle right) promotes liver health and stress relief. Oregano (far right) soothes coughs and supports digestion.



Microbiome: Global Perspective

Grace McCaughey

This display explores the human microbiome, the collection of microorganisms like bacteria, viruses and fungi living in and on our bodies. These organisms are specific to each environment, making the holistic health of each person different from region to region. Playing a role in the protection of pathogens, immune system development, digestion and others. Formed during early life, the microbiome can shift over time. Foods like whole grains, beans, fruits, vegetables and fermented items such as yogurt and kimchi can promote a healthy microbiome, highlighting its importance in maintaining balance and wellness.



One Word.

Makeiah Milbourne

One word can change a sentence. That's exactly what one of my clients mentioned during a session with me. I held on to that sentence because it made me think about relationships we have with people and how the meaning of something can hold so much weight.



Can You See Us?

Makeiah Milbourne

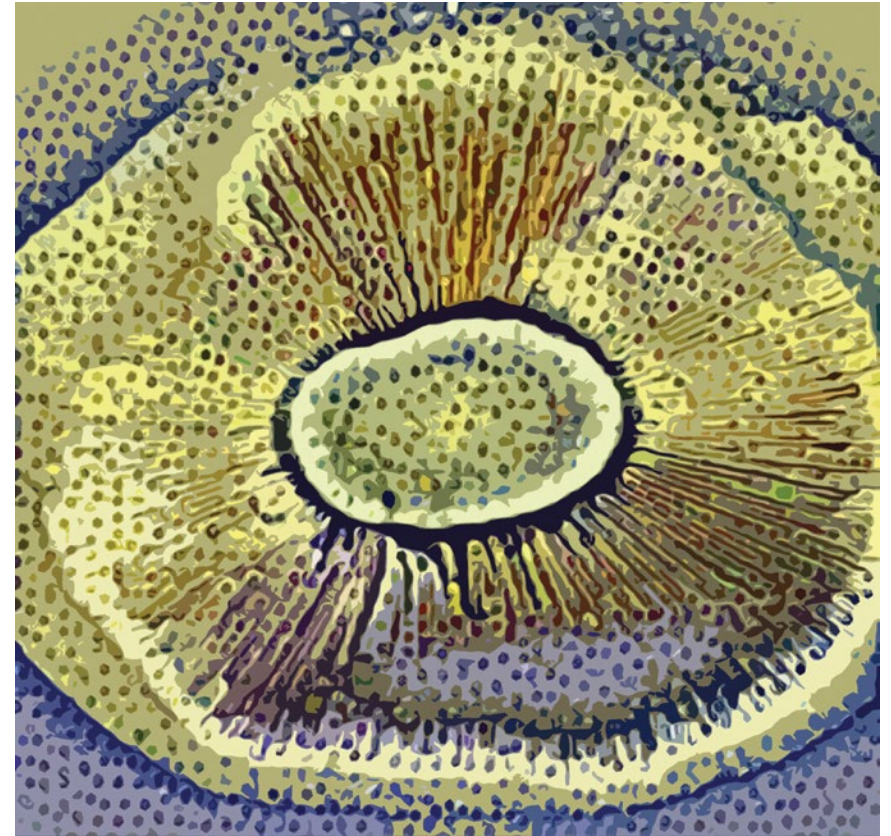
An interpretation of African-Americans being overlooked in any environment. Maybe we would be more noticeable if a brown paper bag was worn over our heads? For me, it happens daily and this is how I have started to interpret those feelings.



MRI of Okra

William Morrison

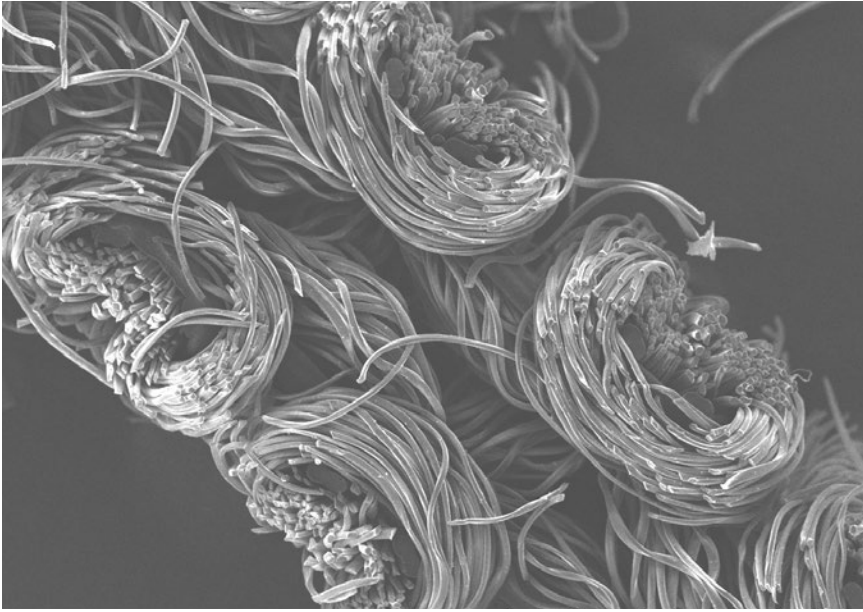
I teach fellows how to perform MR Imaging (MRI). A great way to teach people is to have our trainees perform an actual scan. Normally MRI is used on people to diagnose a variety of conditions from cancer to knee injuries. MRI uses magnetic fields and radio frequency energy to look inside the body with high resolution. It is an essential tool in modern medical care. During our training sessions we scan fruits and vegetables in order to practice skills that will later be applied to diagnosing disease in our patients. I colorize the images using Photoshop and a variety of filters. This is okra.



MRI of a Portobello Mushroom

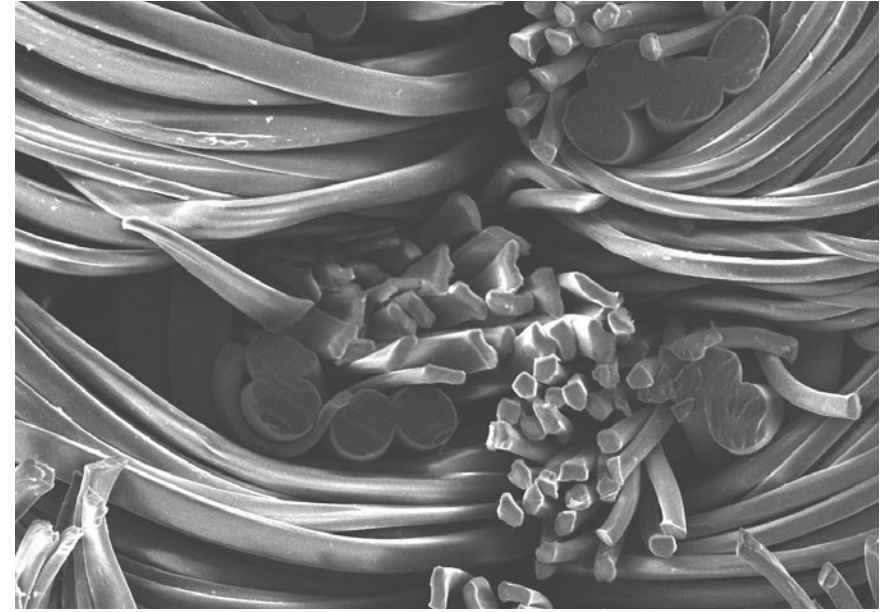
William Morrison

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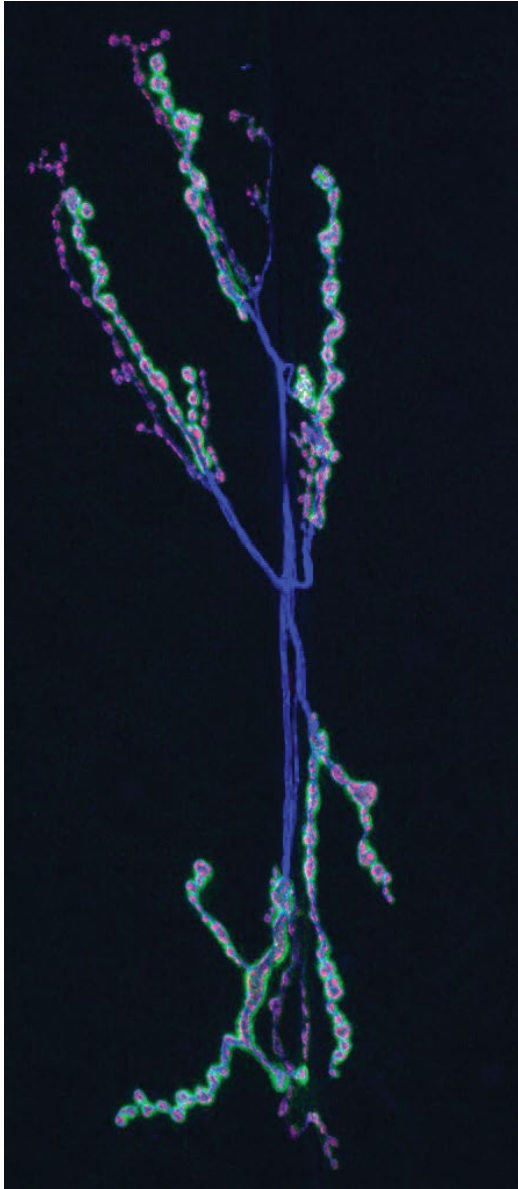
Double Knit
Chris Pastore

The structure of a double knit fabric can be seen here with loops forming on both sides. This is a cross-sectional cut of the fabric to show the interior structure.



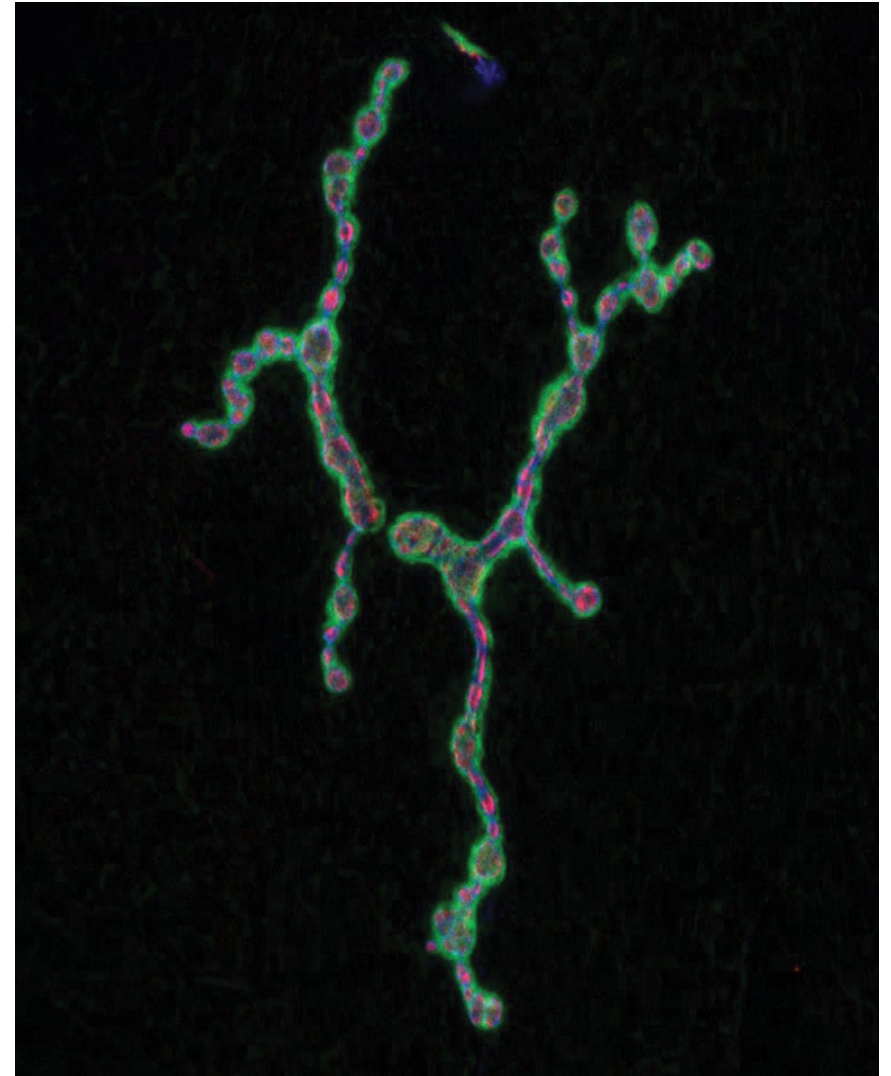
Knitted Fabric
Chris Pastore

The interplay of different fiber types can be seen in a cross-section of this knitted fabric. Circular fibers, rectangular and racetrack shaped filaments can be seen interlooping with each other.



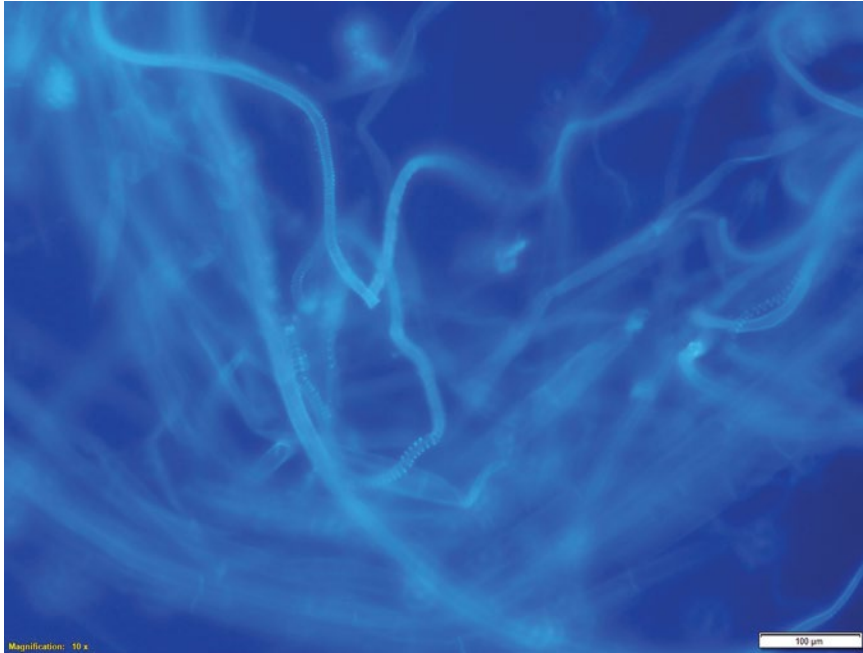
Neon Lights of a Fly Child
Benjamin Seitz

The developing synapse allows us to witness events of synapse formation, and may hold the key for understanding proper and aberrant nervous system development. Here, we see a glimpse of differentiated structures at a larval neuromuscular junction that can inform us of the fundamental genetics that govern how synapses form.



NMJ 4 You
Benjamin Seitz

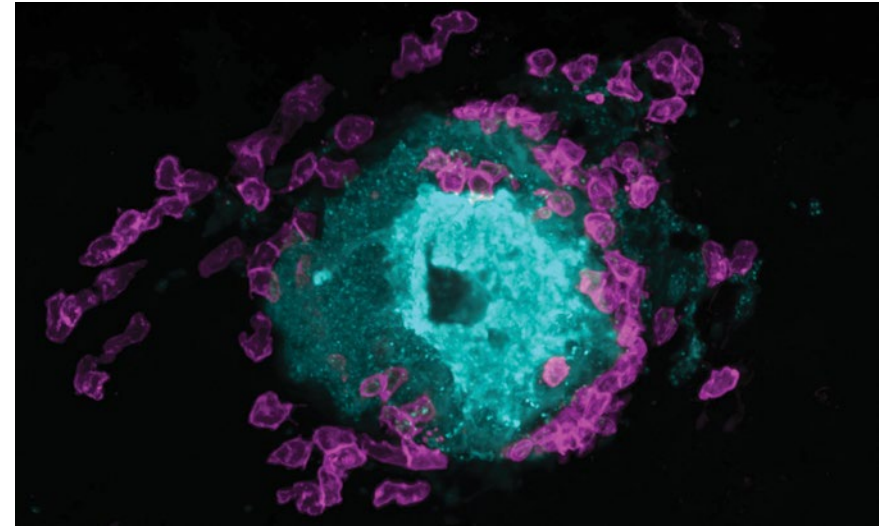
We study the developing neuromuscular junction to elucidate how biology appropriately forms a nervous system. Close observations of the developing synapse, as seen here, allow us to study changes in the molecular machinery that comprises proper synapse construction.



The Meat Leaf

Bryn Mallon

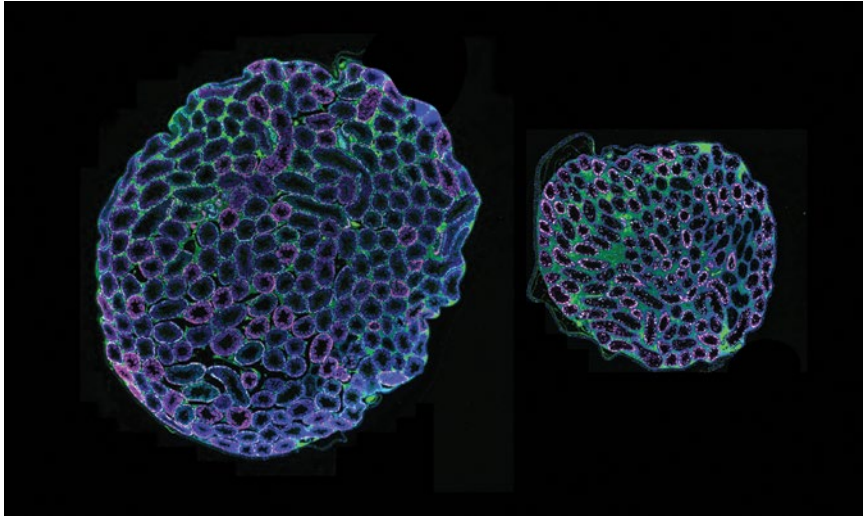
The image was stained with Hoechst fluorescence to look at the structure of the plant and examine whether human fibroblast cells attached to the structure of the plant. The image shows the linear cellulose structure of the plant and some circular fibroblast cells, showing the layout of how it will attach and grow to cover the leaf.



Swarming the Injury

Jenna Severa

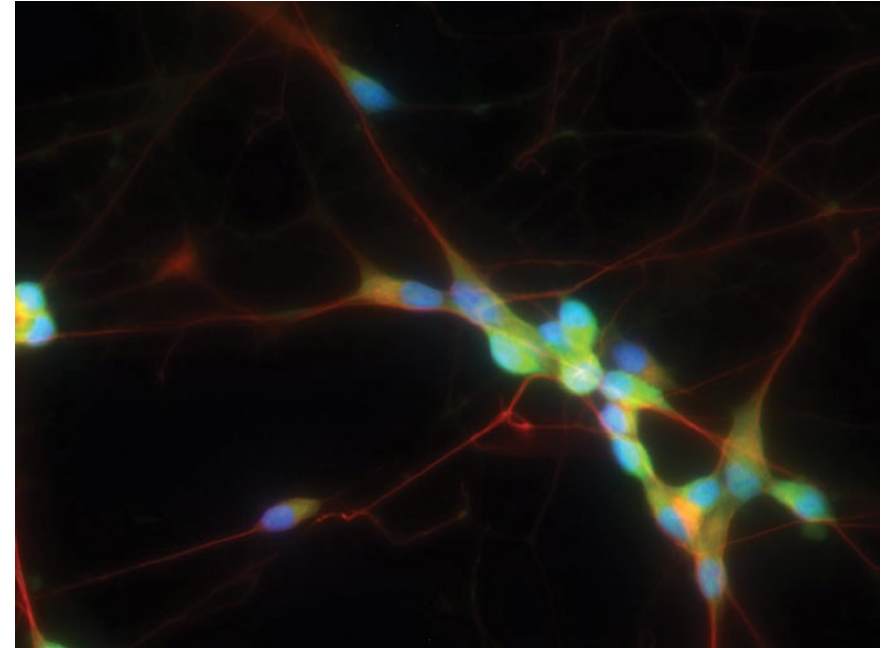
Have you ever wondered how we avoid infection after everyday injuries? "Swarming the Injury" captures immune cells, specifically neutrophils (magenta), gathering at a recently formed blood clot (cyan) after injury in a blood vessel. Neutrophils play an important role in protecting the body against bacterial invasion, which is critically important after a cut, scrape or other injury exposes us to a germ-filled environment.



The Power of Intercellular Connection

Julia Sorkin

Cell to cell connections between germ cells, otherwise known as intercellular bridges, have puzzled cell biologists since they were first described over 50 years ago. This fluorescence microscopy image of testes from control (left) and mutant (right) mice illustrates the dramatic changes that occur when these intercellular connections are disrupted between male germ cells. Our groundbreaking findings highlight the essential role of intercellular bridges in preserving male fertility, setting the stage for future advancements in infertility treatments.



Glow With the Flow

Gauthami Vachalam

Parkinson's disease involves the loss of dopaminergic neurons in the substantia nigra. SH-SY5Y neuroblastoma cells are a common in vitro model for studying neurodegeneration. After plating on Poly-L-Lysine for 48 hours, the cells were treated with retinoic acid and brain-derived neurotrophic factor for seven days, resulting in longer neurites. Double immunofluorescence using antibodies against Neurofilament (high), beta-tubulin and DJ-1 was performed. DJ-1, a Parkinson's disease biomarker, co-localized with beta-tubulin in the cytoplasm and neurites but not the nucleus, confirming SH-SY5Y as an appropriate model for further study.



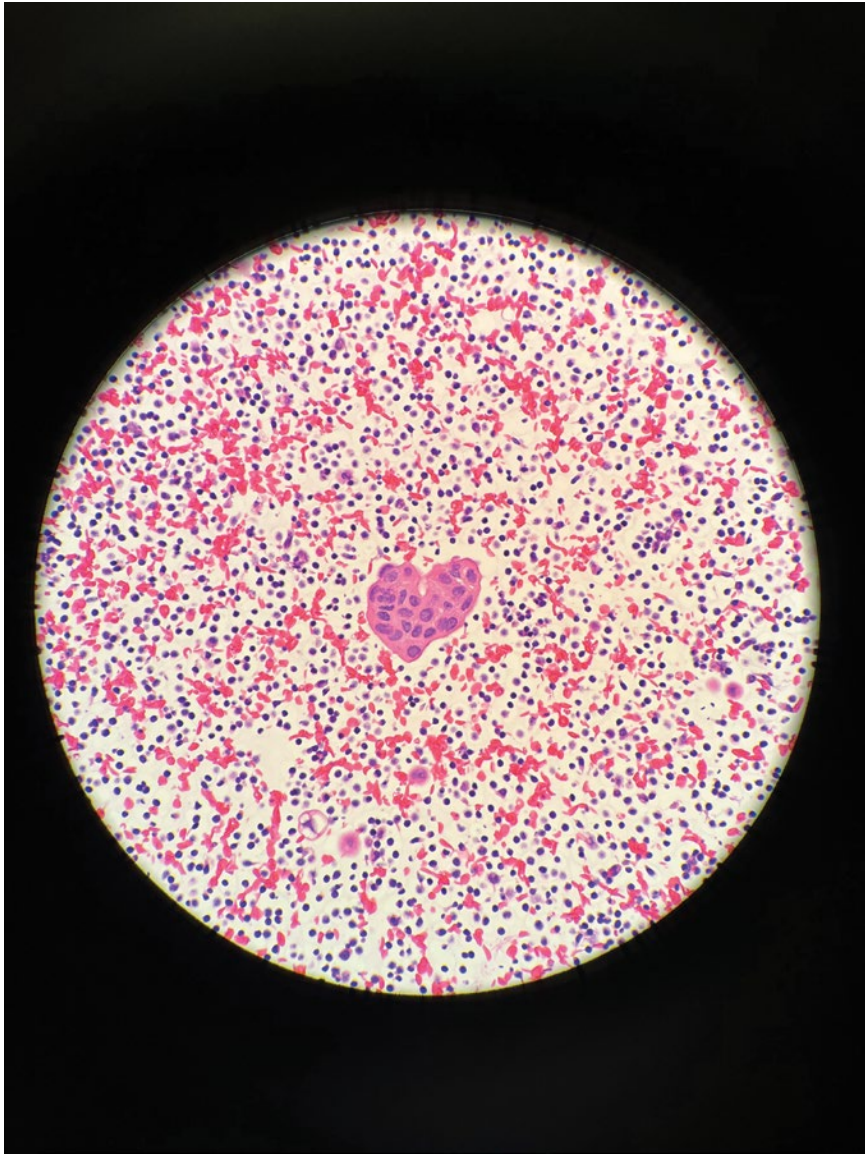
Worth of a Man *Spencer Talbot*

Pictured are some of the integral pieces of firefighting personal protective equipment, used by the author during his volunteer service. A helmet, a coat, an SCBA tank and a mask are stacked, with a halligan tool included in the background. These pieces of equipment took the brunt of exposure damage, stopping harmful substances and flames in their tracks. The author's research and advocacy towards cardiovascular health in firefighters is due to his experiences in service. The safety equipment displayed showcases both the advancement in technology and the futility of the inevitable health complications that come with firefighting.



Out of Service *Spencer Talbot*

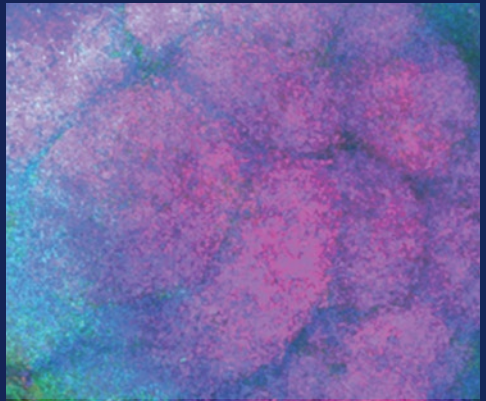
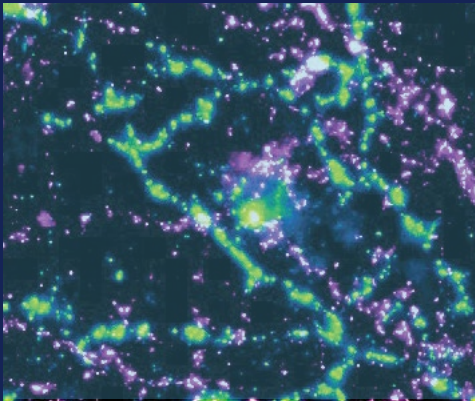
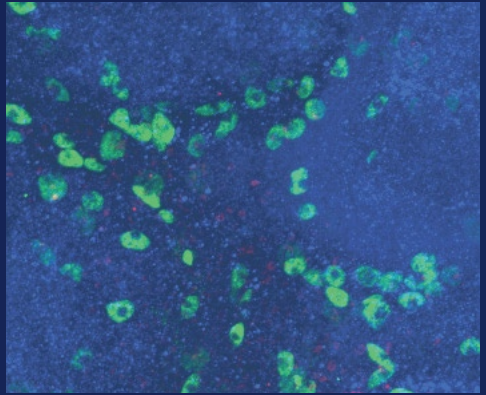
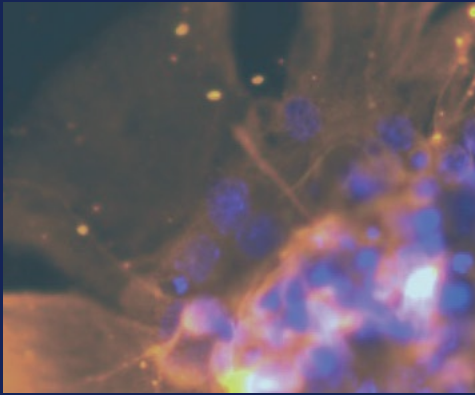
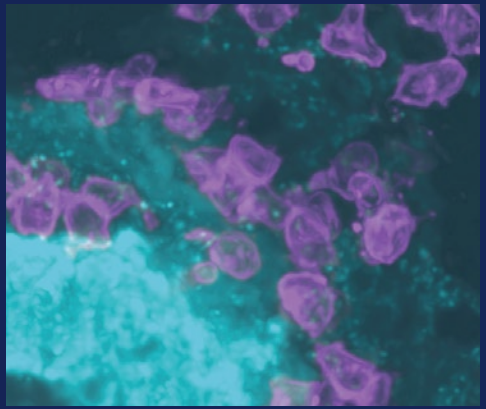
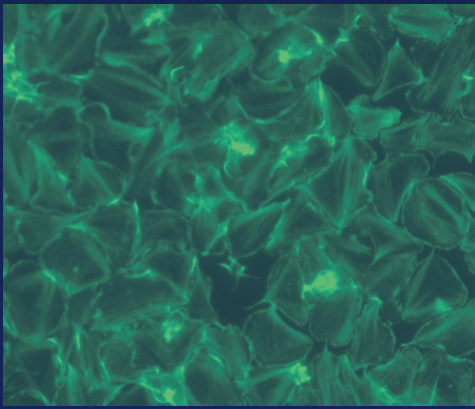
The lights, sirens and driver's seat in a fire truck are pictured, with no driver present. The truck belongs to the author's past department, in which he spent his service responding. The empty seat is symbolic of the decreased life expectancy of firefighters, which is the pivotal point of the author's cardiac epidemiology research. With the rates of cardiac disease claiming many lives, the empty seats and lockers seen in a firehouse are a consistent reminder to those in service of what awaits, with sacrifices both in the present and future.



Heart of Resilience

Ashley Zucker

The field of view reveals a heart-shaped representation of metastatic breast cancer, symbolizing the strength and resilience of women facing this disease.



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