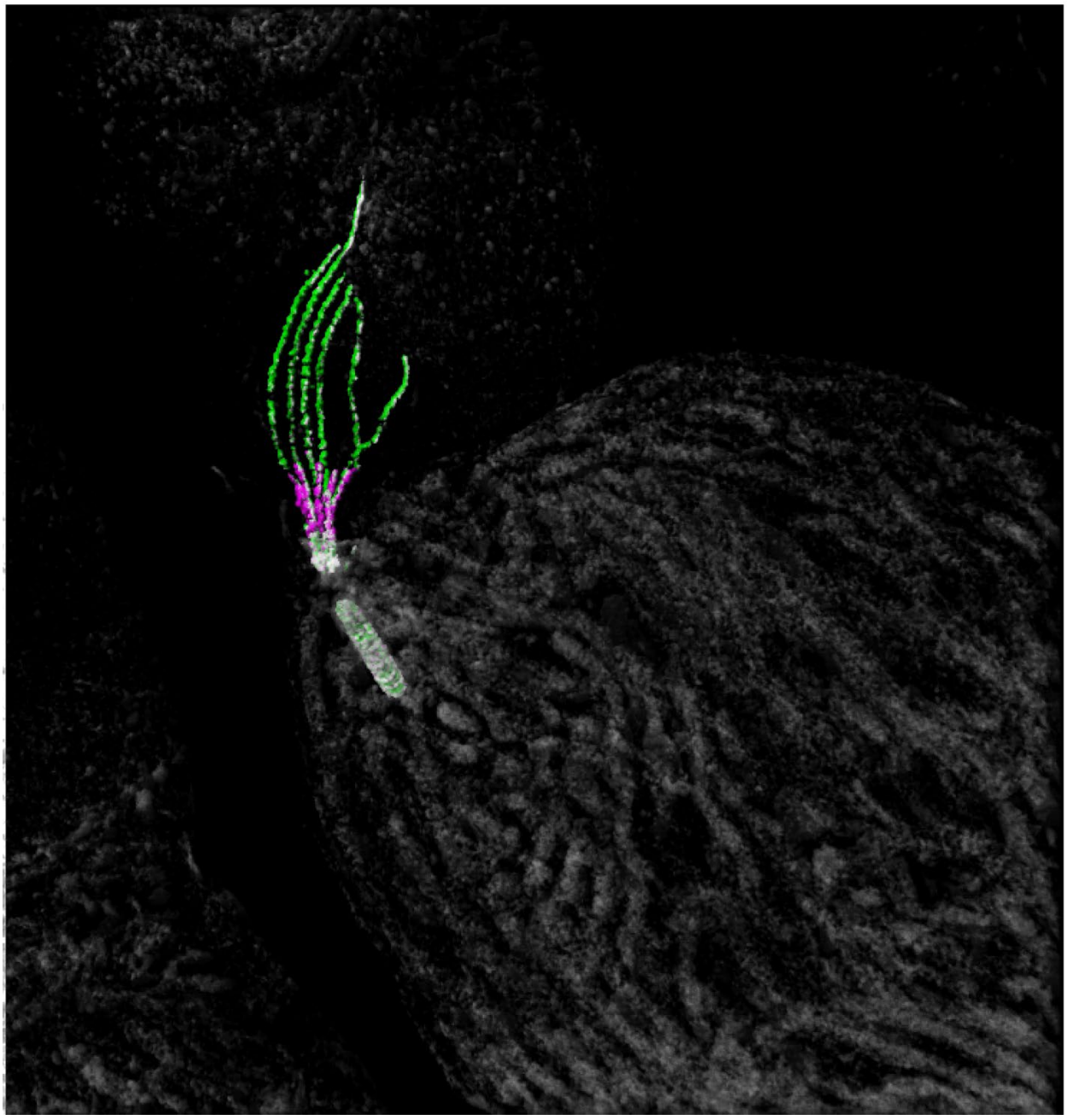
Entrant: Abigail Moye, Ph.D.

Institute of Molecular and Clinical Ophthalmology, Basel (IOB)

Basel, Switzerland



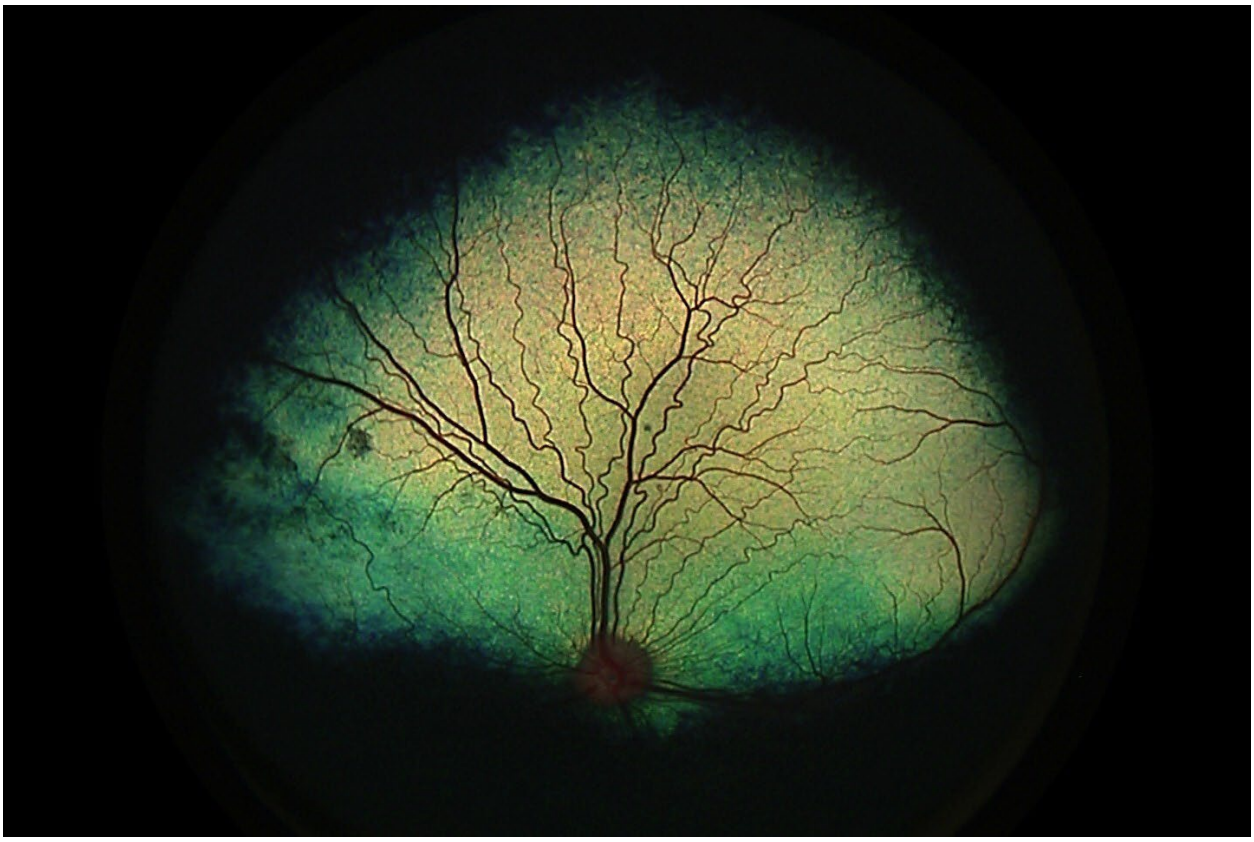
Description: Many inherited retinal diseases (IRDs) are associated with variants in genes coding for ciliary proteins, including Centrosomal Protein of 290 kDa (CEP290). To gain a better understanding of the sub-cellular localization of CEP290 in human photoreceptors, we used iterative ultrastructure expansion microscopy (iU-ExM). This technique allows a detailed view of all the cells in the retina and by staining with a pan-amino fluorescent marker (NHS-ester-ATTO647), we can identify different types of retinal cells and sub-cellular structures. This image depicts CEP290 (magenta) and tubulin (green) in a cone photoreceptor cilium, with CEP290 fluorescence restricted to the connecting cilium.

This image was acquired on a Leica Stellaris 8 confocal microscope, and the source image was included in a recently published manuscript: Abigail R. Moye, Michael A. Robichaux, Melina A. Agosto, Alexandre P. Moulin, Alexandra Graff-Meyer, Carlo Rivolta, Theodore G. Wensel; Sub-ciliary localization of CEP290 and effects of its loss in mouse photoreceptors during development. *J Cell Sci* 15 October 2025; 138 (20): jcs263869. doi: https://doi.org/10.1242/jcs.263869

Entrant: Alexandra Azarkevich, DVM/PhD Graduate Student

Michigan State University College of Veterinary Medicine, East Lansing, MI, USA. Mentored by Dr. Simon Petersen-Jones, DVetMed, PhD, DVOphthal, DECVO, MRCVS.

Image:



Description: This is an *in vivo* image of a canine tapetal fundus acquired using a Natus RetCam Envision. In canine models of inherited retinal degeneration, serial fundus imaging enables detection of early disease manifestations such as vascular attenuation, pigmentary changes, and optic disc pallor, features that closely parallel human retinal dystrophies that aid in translational research. The canine fundus can display a striking range of natural color variation, from shimmering gold and green to red and brown, creating a visually captivating mosaic that reflects both the species' anatomical diversity and inherent beauty.

Accolades: There are no official accolades related to this specific image, though many canine color fundic photographs have been included in publications and abstracts that have come from the Petersen-Jones laboratory. This specific image was featured on the T-shirt for the 2025 Cold Spring Harbor Laboratories *Vision: A Platform for Linking Circuits,*

Behavior & Perception course, facilitated by Drs. Joe Carroll and Kristina Nielsen, in which the entrant participated in June 2025 – see below.

Item#: 64000
Item Name: Gildan Men's Softstyle® T-Shirt
Item Color: Charcoal

CSHL Vision Course 25

3" drop from collar

Imprint Location: Front Left Chest
Imprint Color: Underbase White
Imprint Process: Heat Transfer
Imprint Size: 9" x 2.23"

3" drop from collar

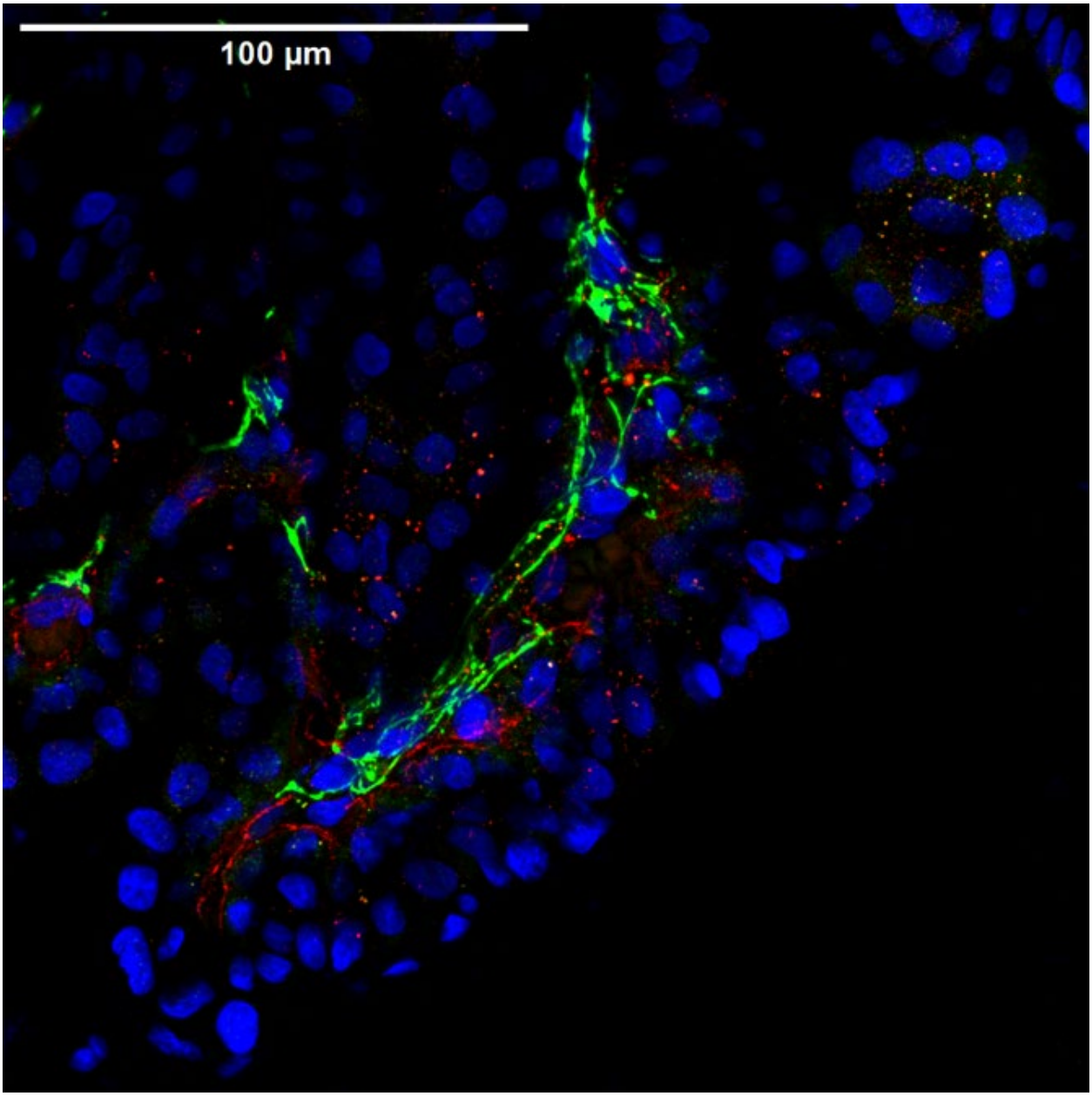
Imprint Location: Back
Imprint Color: Full Color
Imprint Process: Heat Transfer
Imprint Size: 12" x 7.79"

1" above sleeve seam

Imprint Location: Left Sleeve
Imprint Color: Underbase White
Imprint Process: Screen Print
Imprint Size: 3.5" x 2.49"

Entrant names: Alexandra Zamitalo, Christopher Passaglia

Image :

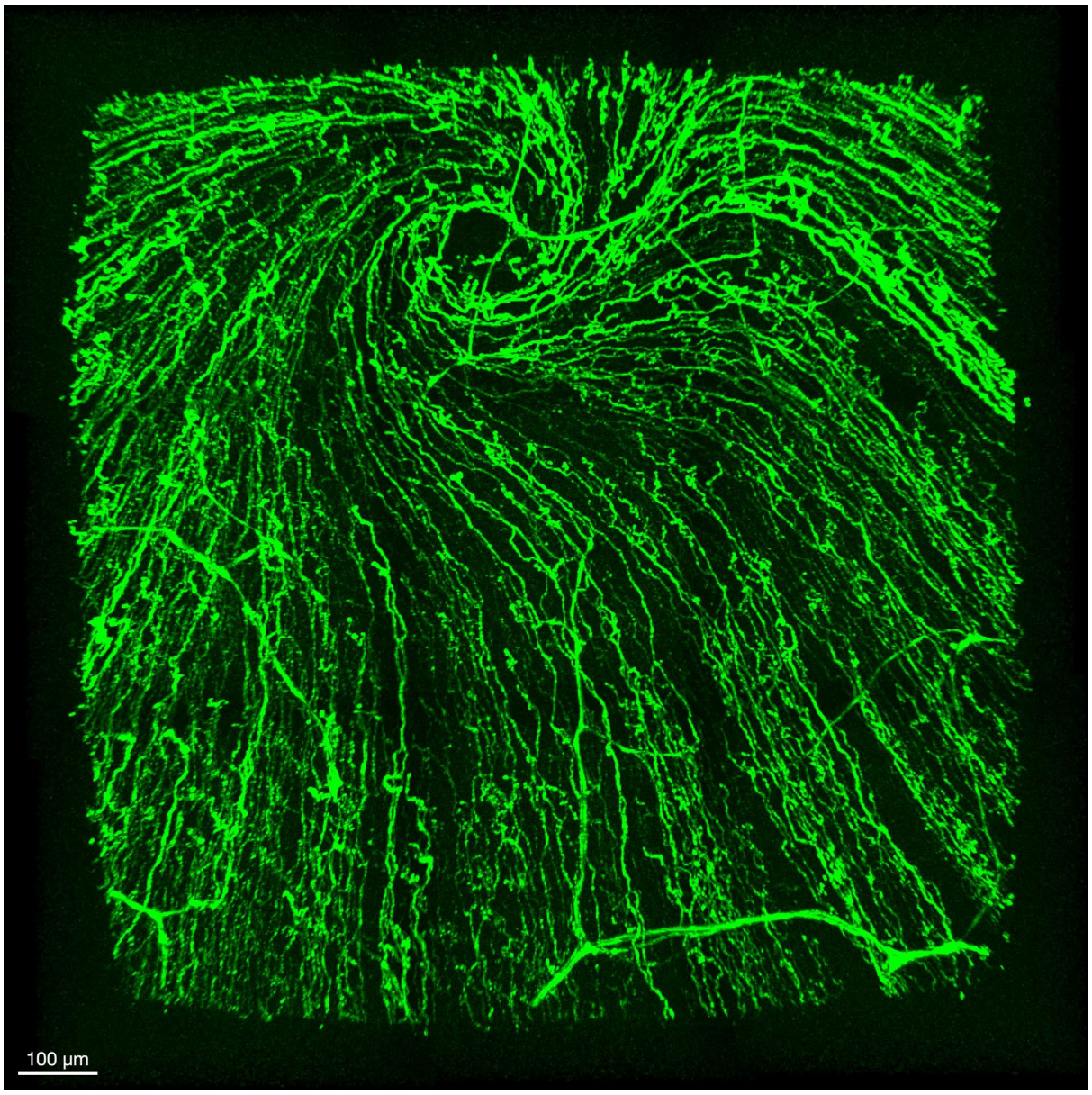


Brief description : This image is an immunostained rat ciliary process where nerves are labelled in green (by labelling tyrosine hydroxylase), endothelial cells in red (by labelling CD31), and nuclei (by labelling with DAPI). This image was taken on a LEICA STELLARIS. This image was presented as part of the following ARVO abstract (https://scholar.google.com/citations?view_op=view_citation&hl=en&user=JFSVdGEAAAAJ&sortby=pubdate&citation_for_view=JFSVdGEAAAAJ:IjCSPb-OGe4C) and again at the ISER/BrightFocus Foundation Glaucoma Symposium

Entrant's Name: Ali Khodor

Institution: Bascom Palmer Eye Institute, University of Miami

City/Country: Miami, Florida, USA



Description:

- In vivo Z-stacked confocal image of the mouse cornea from a transgenic C57BL/6 line expressing EGFP under the CGRP promoter, revealing the mesmerizing architecture of the subbasal nerve plexus as it spirals into the iconic corneal vortex. This image represents a 2D projection of a 3D Z-stack acquisition, capturing the corneal nerves' delicate branching and precise alignment illuminated in vivid green, an intricate neural lattice that underlies

corneal transparency and ocular surface health.
Acquired on a Leica Stellaris 5 laser-scanning confocal microscope.

Entrant Information

Full Name & Credentials: Ali Zahraei, PhD
Institution: Cell and Developmental Biology, Vanderbilt University School of Medicine; Mass Spectrometry Research Center (MSRC), Vanderbilt University School of Medicine
City, Country: Nashville, Tennessee, United States

Additional Contributors

1. Thai Pham, PhD

Institution: Cell and Developmental Biology, Vanderbilt University School of Medicine; Mass Spectrometry Research Center (MSRC), Vanderbilt University School of Medicine
City, Country: Nashville, Tennessee, United States

2. Angela Kruse, PhD

Institution: Cell and Developmental Biology, Vanderbilt University School of Medicine; Mass Spectrometry Research Center (MSRC), Vanderbilt University School of Medicine
City, Country: Nashville, Tennessee, United States

3. Jeffrey M. Spraggins, PhD, Lab Leader and Director of MSRC

Institution: Cell and Developmental Biology, Vanderbilt University School of Medicine; Mass Spectrometry Research Center (MSRC), Vanderbilt University School of Medicine
City, Country: Nashville, Tennessee, United States

Submitted Image

Human Eye, Female, 40 years old, fresh frozen tissue.

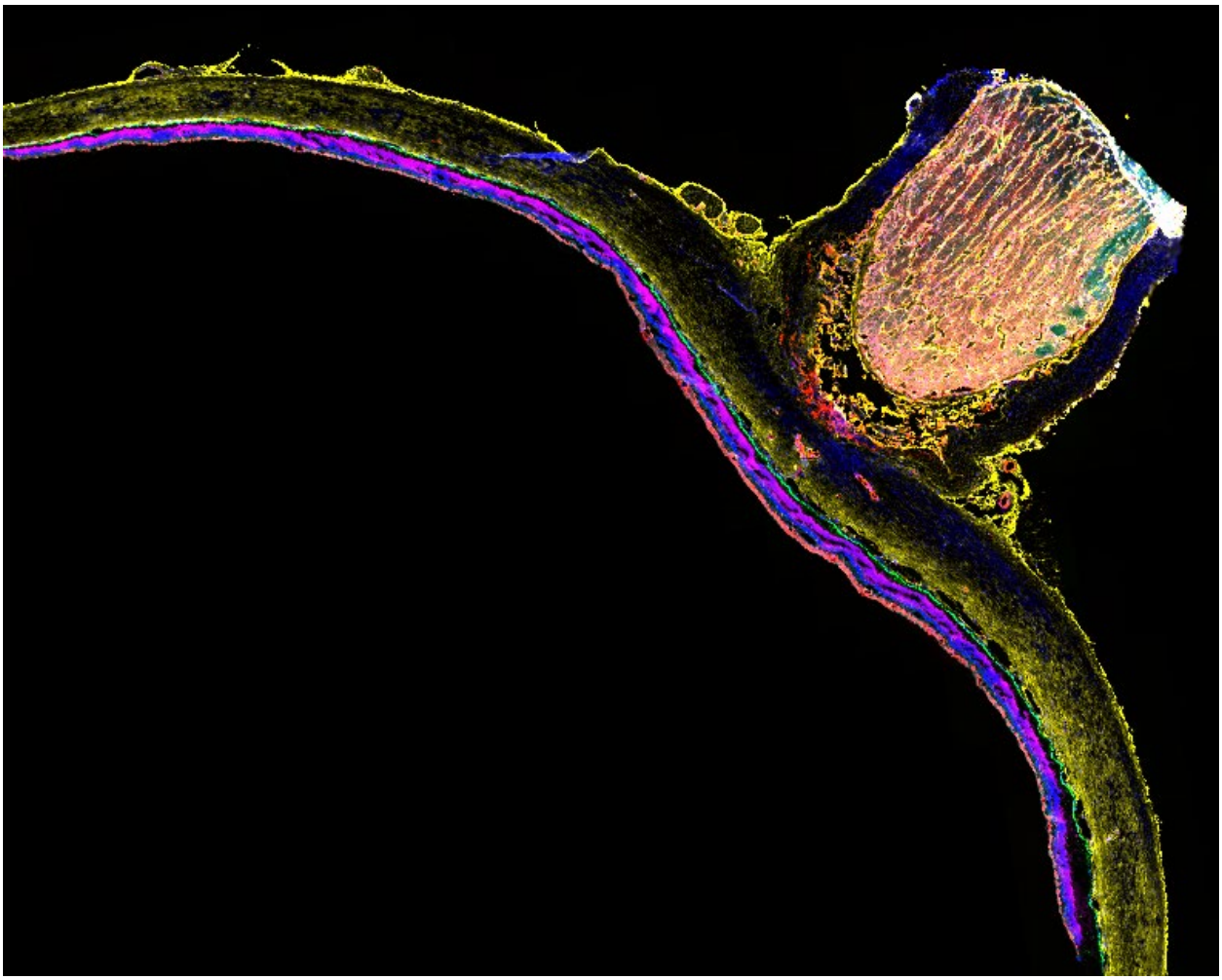


Image Description

This multiplexed CODEX image captures the intricate structural organization of the human retina and optic nerve in a 40-year-old female donor. By overlaying six molecular markers, the image reveals the layered retinal architecture, including photoreceptor elements, glial activation, extracellular matrix, and retinal pigment epithelium. The integration of structural and molecular detail illustrates how high-dimensional imaging can spatially resolve protein distributions within the eye, providing new insights into vision biology and potential disease mechanisms. Furthermore, this approach can be integrated with multimodal imaging workflows that incorporate mass spectrometry modalities and histology to explore multi-omics signatures across anatomical regions of the retina and optic nerve.

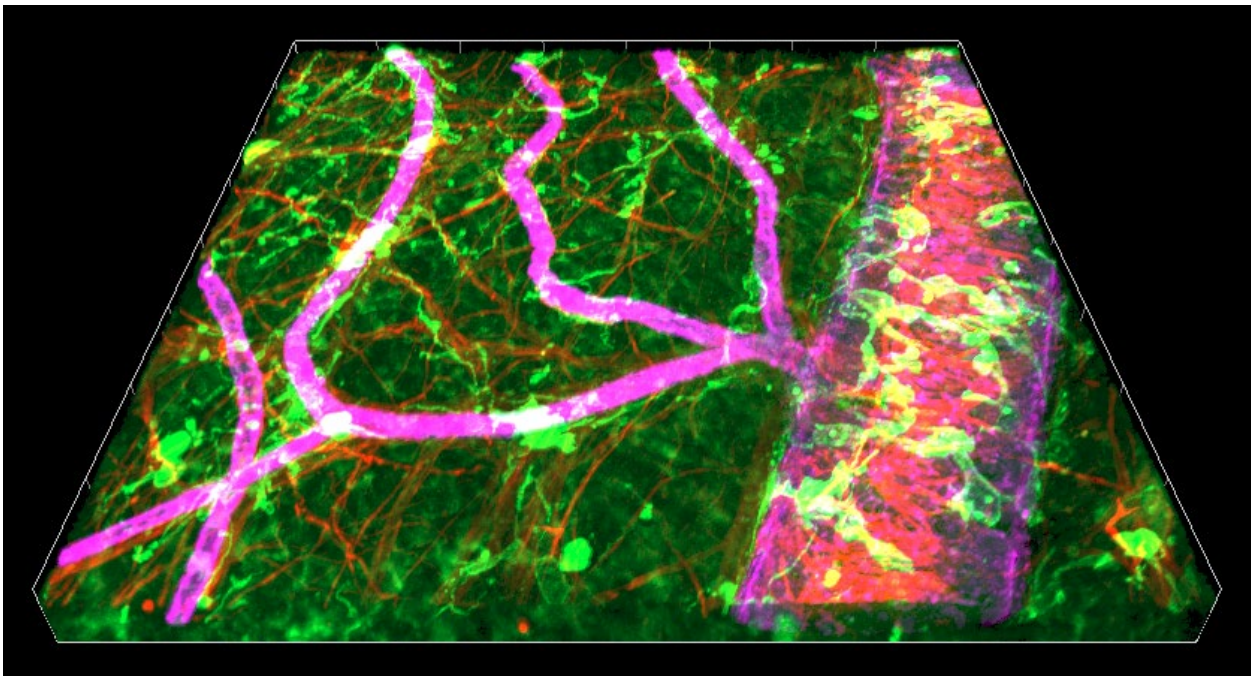
Techniques Used: CODEX (CO-Detection by indEXing) multiplexed imaging with six fluorescent channels overlaid:

- Blue: DAPI (nuclei)
- Magenta: Phosducin (photoreceptor marker)
- Cyan: AQP4 (astrocyte/water channel)
- Yellow: Fibrillin (extracellular matrix)
- Lime: RPE65 (retinal pigment epithelium marker)
- Red: GFAP (glial fibrillary acidic protein, astrocytes/glia)

Entrants: Amir Hosseini – BSc, MSc (c)

Printha Wijesinghe – PhD

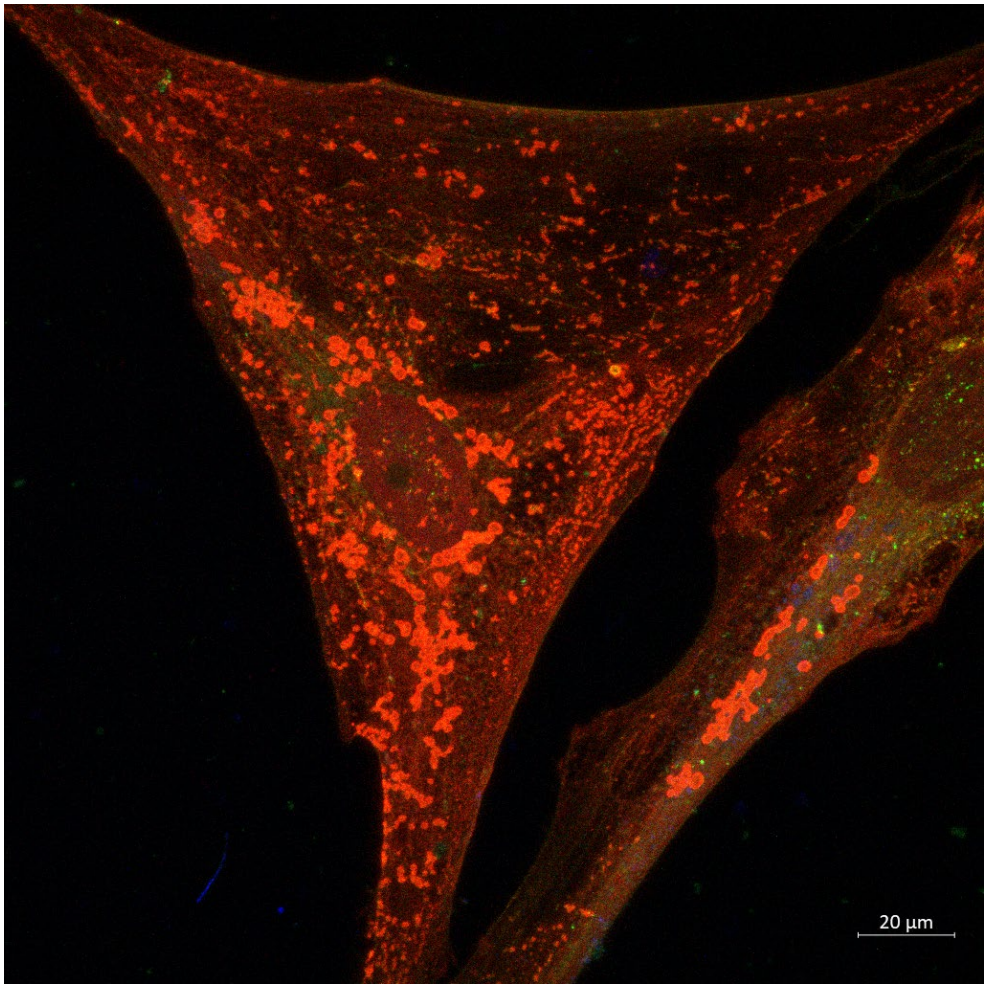
Matsubara Lab, Department of Ophthalmology & Visual Sciences, Faculty of Medicine, The University of British Columbia, Eye Care Centre, Vancouver, BC, Canada



Three-dimensional ex vivo image of the human Alzheimer's retina, revealing the intricate interplay between macroglia—astrocytes and Müller cells (red), microglia (green), and blood vessels (purple).

The image highlights elongated microglia in the Alzheimer's retina, with prominent glial enrichment and attachment along the vascular network, captured by high-resolution confocal microscopy following immunofluorescent labeling.

Entrant: Anusha Shivashankar, Indiana University School of Medicine, Indianapolis, Indiana, USA



From Condensates to Contraction: Tensin3 Signalosomes Stiffen the Trabecular Meshwork

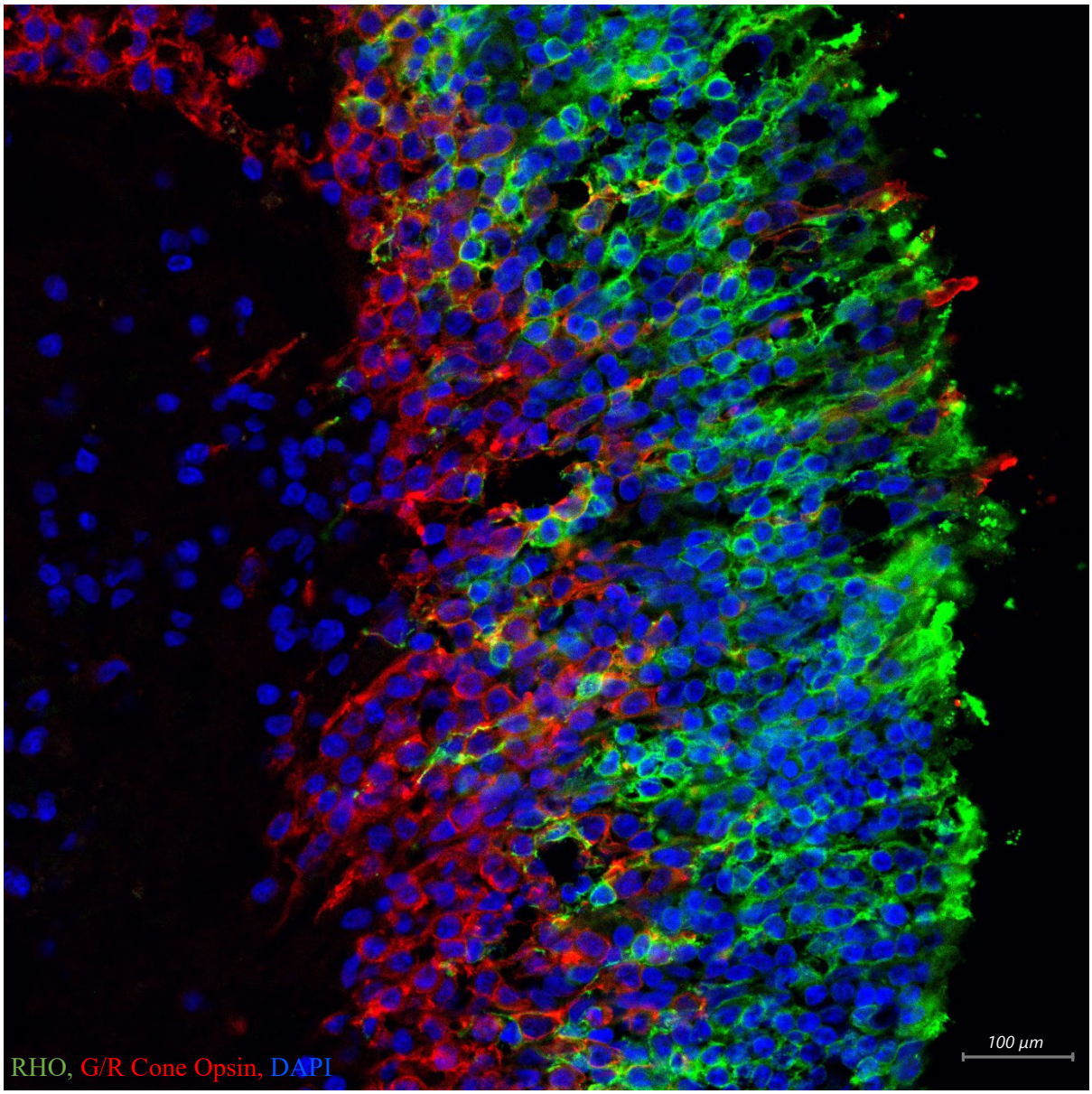
This image reveals human trabecular meshwork cells illuminated by vivid red Tensin3 condensates which are membraneless biomolecular assemblies that function as intracellular signalosomes. Tensin3, a mechanosensing focal adhesion protein, forms these condensates to amplify adhesion and cytoskeletal signaling, driving the cells toward a more contractile and rigid state. The resulting biomechanical stiffening of the trabecular meshwork limits aqueous humor drainage, a key event in glaucoma progression. It is a snapshot of a trabecular meshwork cell turning rogue, embarking on the path toward a glaucomatous fate.

Technique: Primary human trabecular meshwork cells constitutively expressing Tensin3 were subjected to immunofluorescence staining. Tensin3 was labeled in red, and nuclei counterstained with DAPI (blue).

Entrant: Arman Firoz, PhD

Department of Ophthalmology,
Casey Eye Institute,
Oregon Health & Science University,
Portland, OR, USA - 97239

Abnormal Green/Red Cone Opsin Trafficking in D300 Patient Derived Human Retinal Organoid

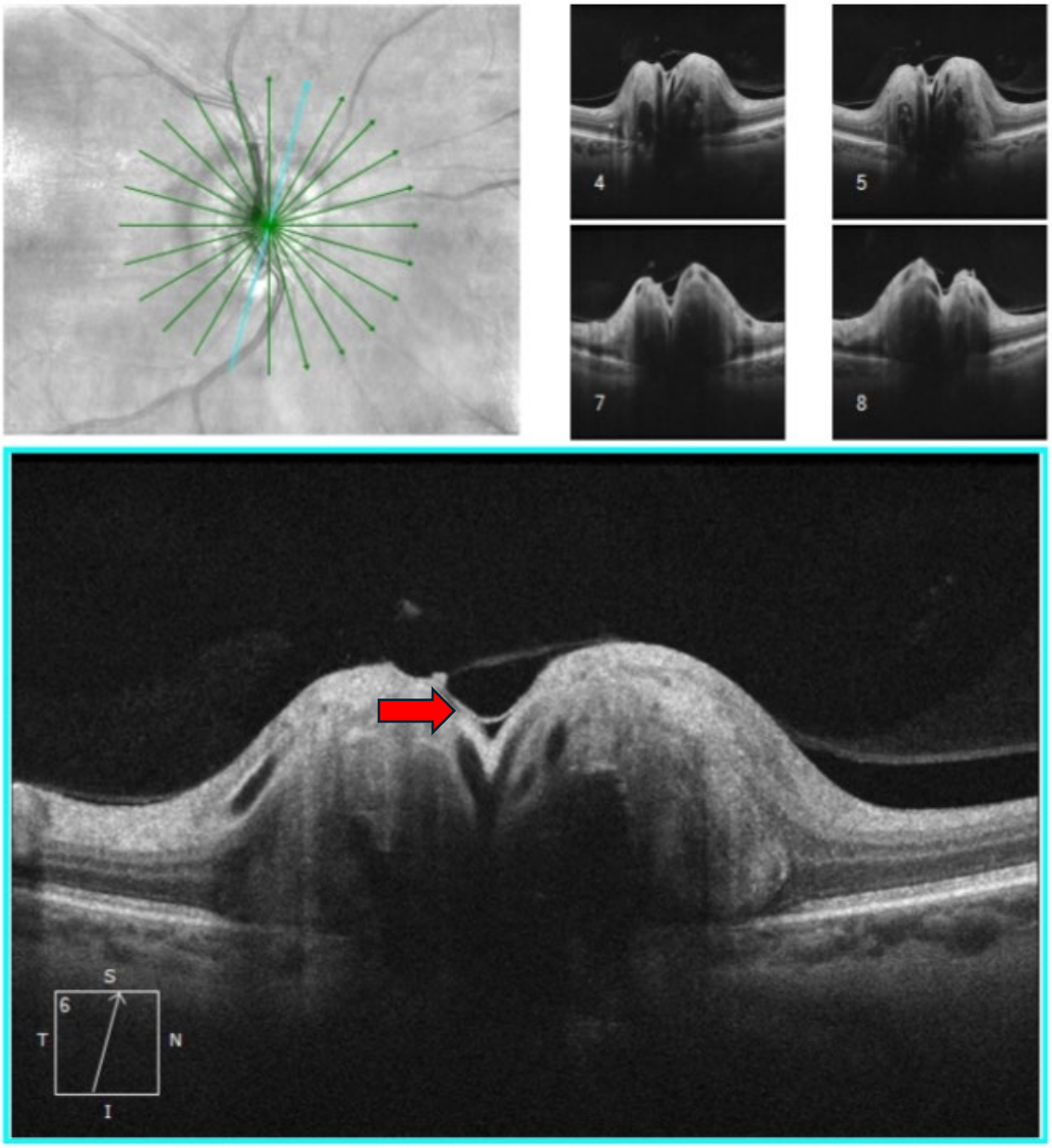


This image shows a D300 human retinal organoid stained with Rhodopsin (green), green/red cone opsin (red), and DAPI (blue) as a nuclear marker. The scale bar represents 100 µm. In this patient-derived organoid, green/red cone opsin does not reach the outer segment, indicating disrupted cone opsin trafficking or maturation. This

disruption could impact cone photoreceptor function, providing insights into disease mechanisms affecting vision.

Entrants: Ashley Zhou, MD, Colby E. Lesniak, Sabrina Poonja, MD, John J. Chen, MD, PhD

Mayo Clinic Department of Ophthalmology, Rochester, Minnesota, USA



A Disc Full of Love (and Drusen)

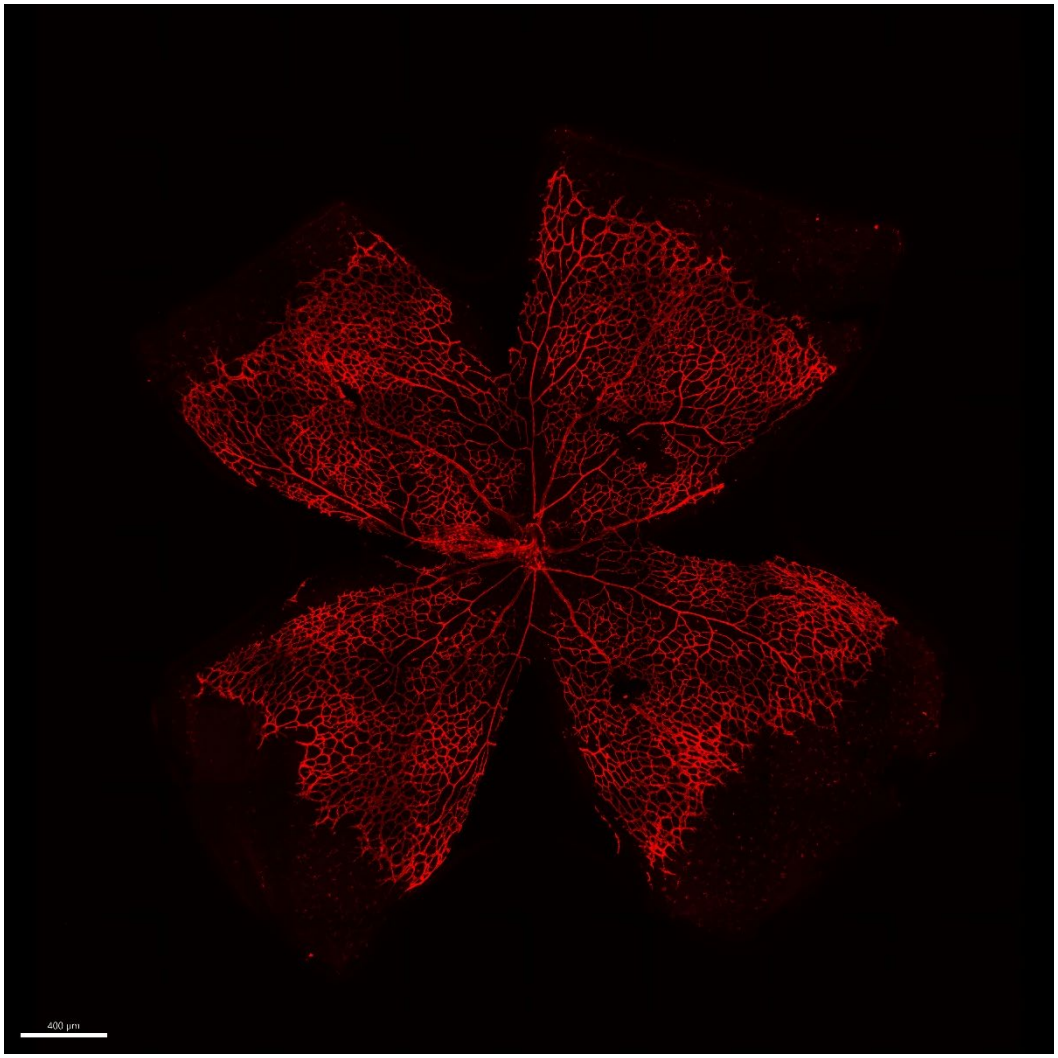
In this ocular coherence tomography (OCT) image of the optic disc, the blood vessels come together to resemble a cartoon heart (red arrow). This 59-year-old patient underwent OCT because elevated optic nerves were incidentally noted on her exam. OCT, a non-

invasive technique utilizing near-infrared light to generate in vivo cross-sectional images of the retina and retinal nerve fiber layer, revealed extensive optic disc drusen confirming a diagnosis of pseudopapilledema.

Entrant: Carolina Moreira dos Santos

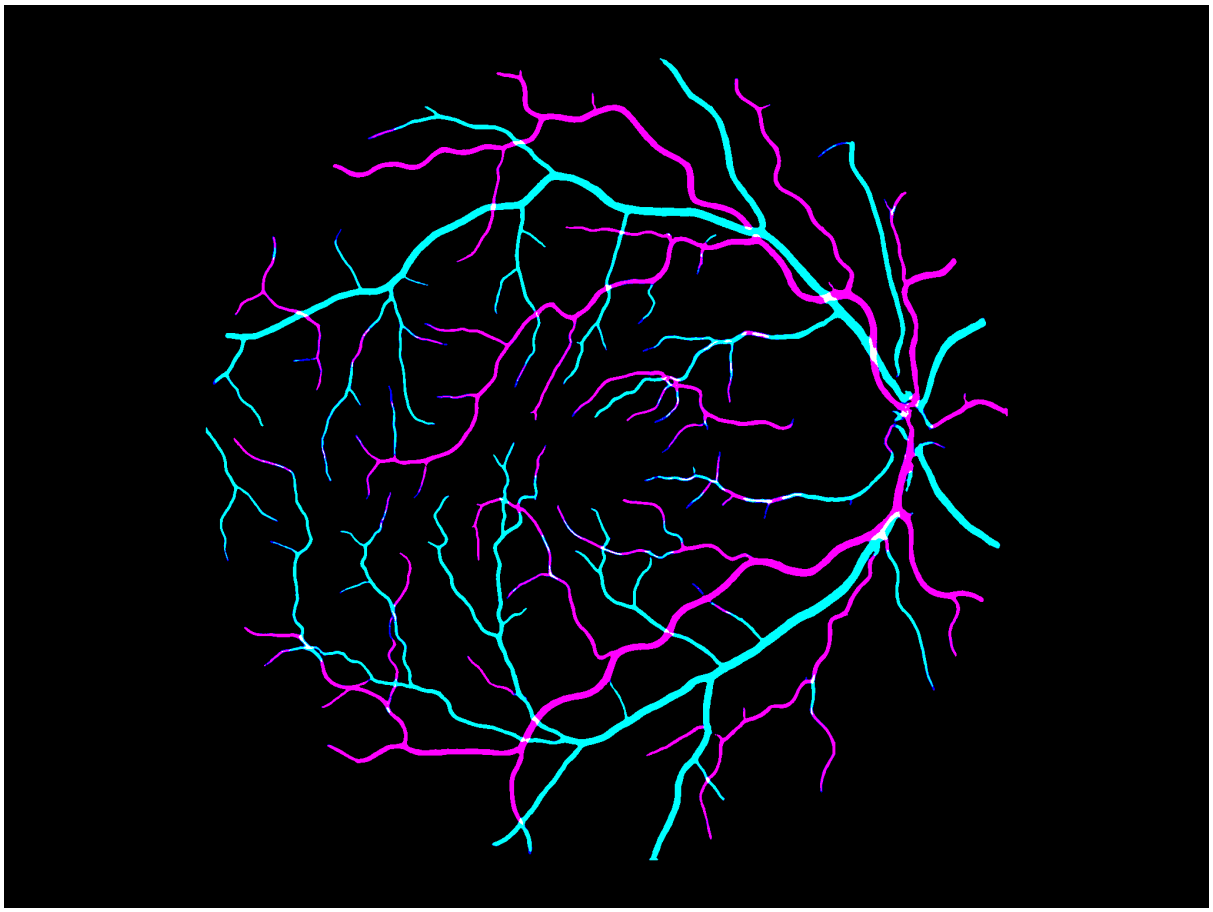
Description: Flat-mounted retina from congenitally infected mice with *Toxoplasma gondii* on day 5 post-partum.

Oswaldo Cruz Foundation (FIOCRUZ), Rio de Janeiro, Brazil.



Entrant: Professor Christopher G Owen, City St George's, London, UK

Output generated by a freely available online AI tool (QUARTZ - Quantitative Analysis of Retinal vessel Topology and siZe), which automatically extracts retinal vessels (arterioles and venules) and measures their morphological features from a retinal image.



Entrant's Full Name: Daniel M.W. Lee

Institution: University of Pittsburgh | Swanson School of Engineering

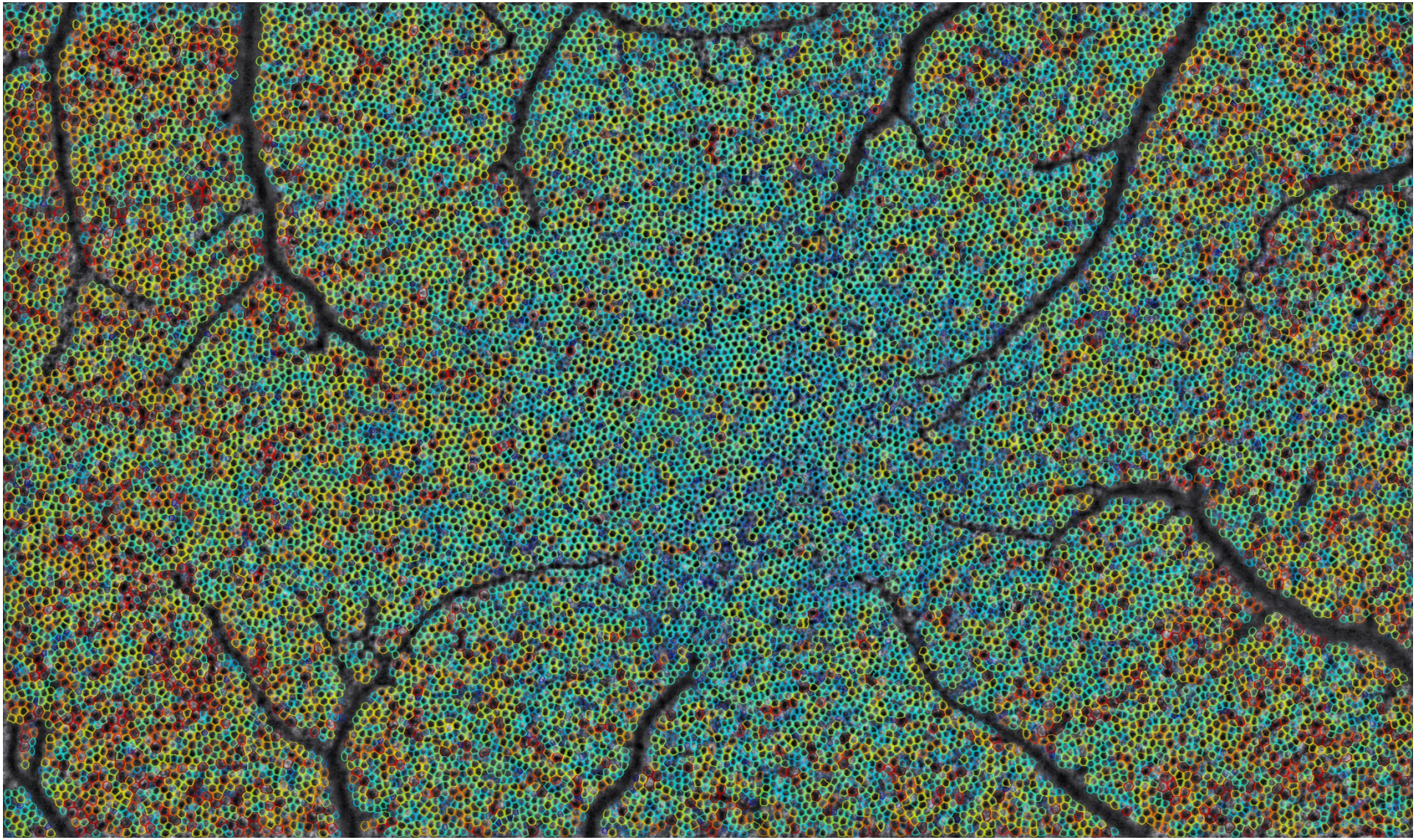
City: Pittsburgh, PA

Country: USA

Brief Description of the Image: Healthy retinal pigmented epithelial (RPE) cells imaged *in vivo* from a human eye using an adaptive optics scanning laser ophthalmoscope. 45 images were montaged to acquire a 10x6° field of view centered at the fovea. RPE cells were segmented and color coded by cell area with cooler and warmer colors representing smaller and larger cells respectively.

Relevant Accolades: A variation of this image was awarded a Top 12 finish for the UPMC Mercy Vision Institute Image Contest in 2024 (https://ophthalmology.pitt.edu/mercy-vision-institute-scientific-image-contest) and was also presented during the ARVO 2025 Annual Meeting by Dr. Ethan A. Rossi at the "Clinical Applications of Adaptive Optics Imaging" Minisymposium.

Image:



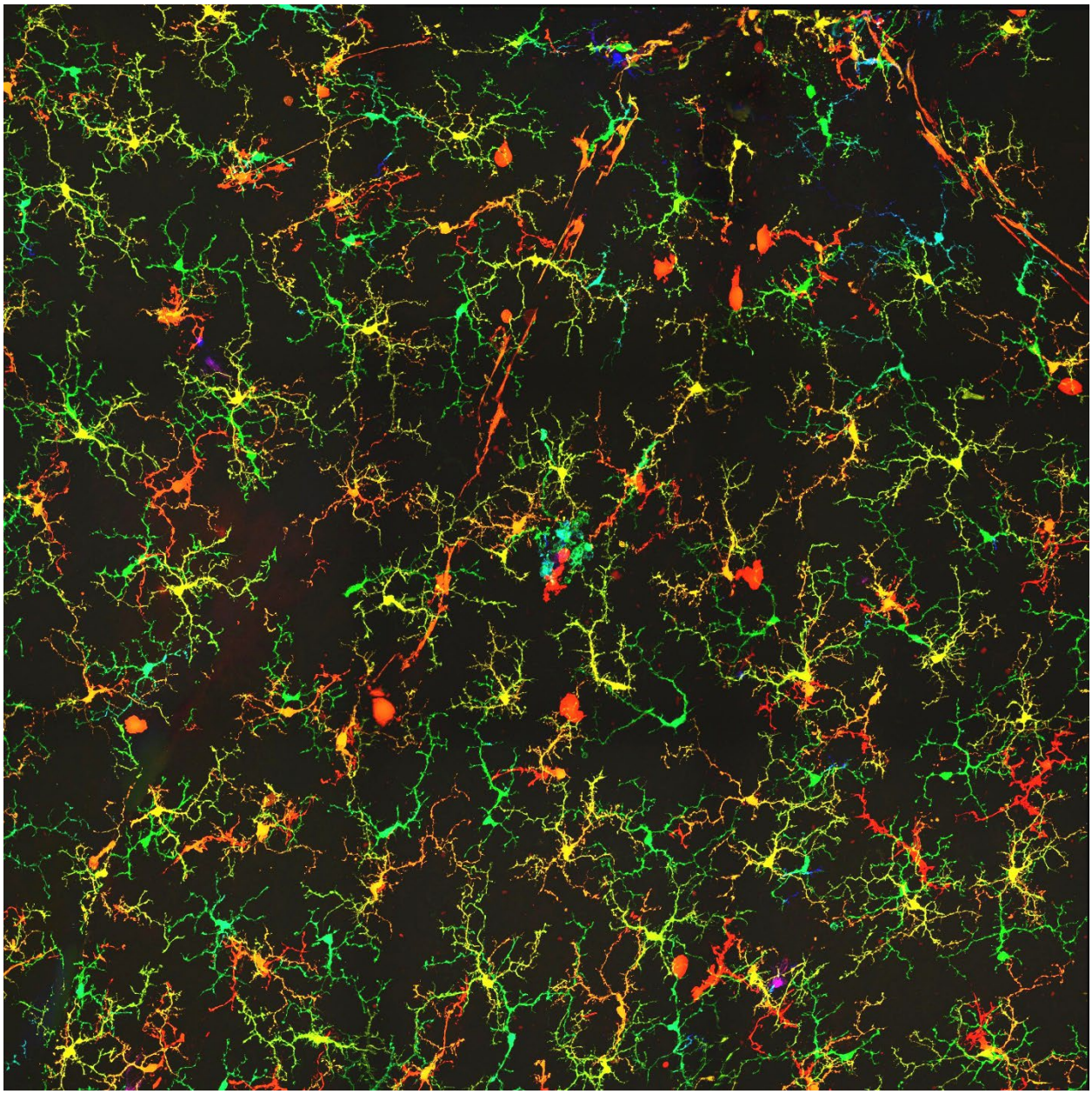
Entrant Names: Derek Power (acquisition), Jesse Schallek (post-processing)

Credentials: M.S. Biology

Institution: University of Rochester

City and Country: Rochester, NY, U.S.A.

Image:



Description of image: “Microglial response to focal photoreceptor damage”. This is an image of the microglia that tile the mouse retina 1 day after a small lesion was placed in the center of the field. The entire depth of a flat-mount retina was imaged using confocal microscopy. Fluorescent microglia of the Cx3CR1-GFP mouse were collapsed onto a single 2D plane and depth was encoded by color. Inner retina = red, outer retina = blue/violet. The major finding from this work is that despite the focal microglial response to laser lesion, neutrophils do not respond to this insult. This indicates that under some inflammatory conditions, microglia may protect the retina from infiltration of damaging systemic immune cells. This work was presented at Optical Fall Vision Meeting and ARVO 2023 and was recently published in eLife.

Accolades:

Optica Fall Vision Meeting: https://doi.org/10.1167/jov.23.11.65

ARVO 2023: https://iovs.arvojournals.org/article.aspx?articleid=2790455

eLife publication: https://doi.org/10.7554/eLife.98662.4

Entrant Name: Ebenezer J. Quainoo, OD. PhD Candidate
Institution: Augusta University Medical College of Georgia
City: Augusta, Georgia
Country: USA

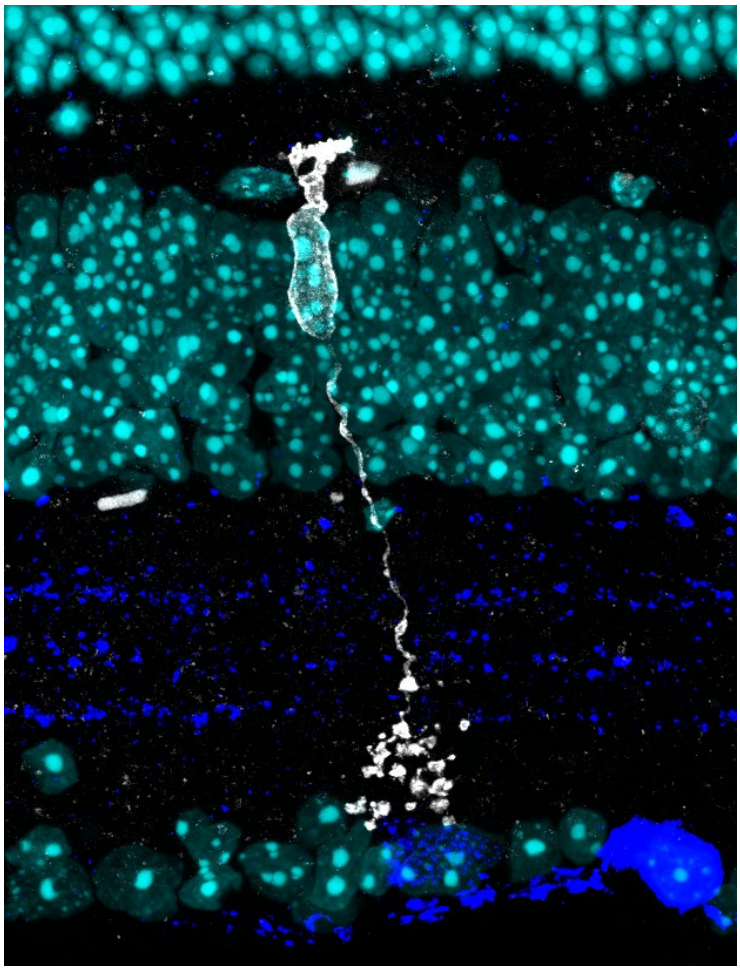
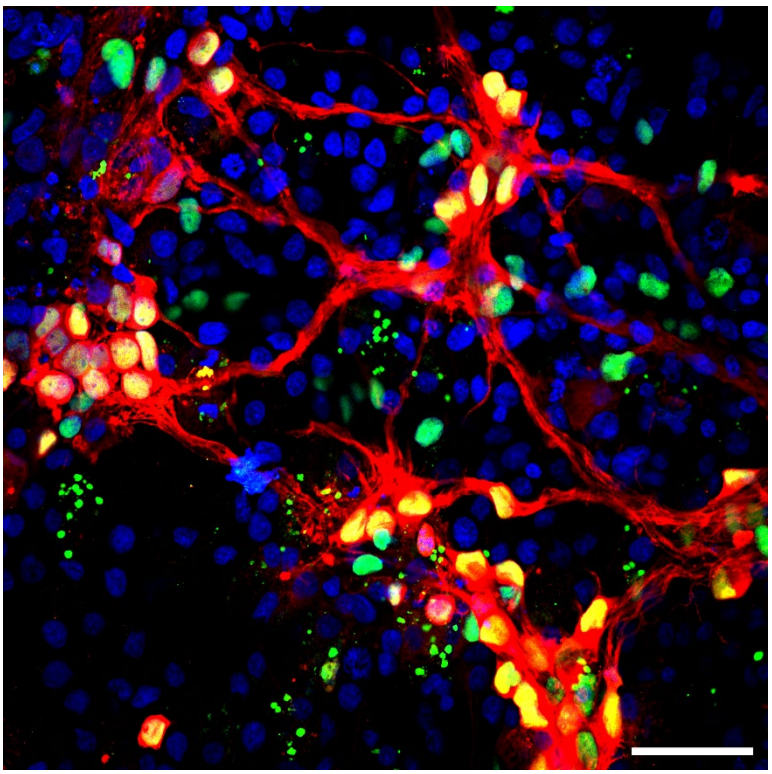


Image Description: Image shows an ON-bipolar cell contacting a calretinin-expressing cell in the ganglion cell layer in an adult mouse retina. Bipolar cells are interneurons in the retina that bridge, process, and transmit visual information from photoreceptors to ganglion cells. ON-bipolar cells specifically depolarize in the presence of light to mediate transmission of visual signals in the retina. Image was generated through immunohistochemical staining of ChR2EYFP (grey/white) and calretinin (blue) with DAPI (cyan) as counterstain, and was acquired at high resolution using a confocal microscope. Image was shown as part of an oral presentation at the 2024 ARVO conference in Seattle. https://iovs.arvojournals.org/article.aspx?articleid=2796232

Entrant: Emma De Coster
Lab. General Biochemistry and Physical Pharmacy
Ghent University, Ottergemsesteenweg 460, 9000 Gent, Belgium



Laymen's short explanation of the image:

This image shows human lab-grown nerve cells that were transplanted into a cow's retina. The human transplanted cells are colored in red, with their nuclei marked in yellow. All the blue nuclei originate from the cow's retina.

Short scientific explanation of the image:

Confocal image shows hiPSC-derived RGCs expressing TdTomato, 7 days after transplantation into a bovine retinal explant. Bovine flatmounts were stained with Human Nuclei (green) to identify the donor RGCs and Hoechst (blue) to visualize all nuclei. Scale bar: 50 µm.

Confocal microscope: Nikon A1R with a 40x air objective (plan apo λ 40X, NA 0.9, WD 250 µm)

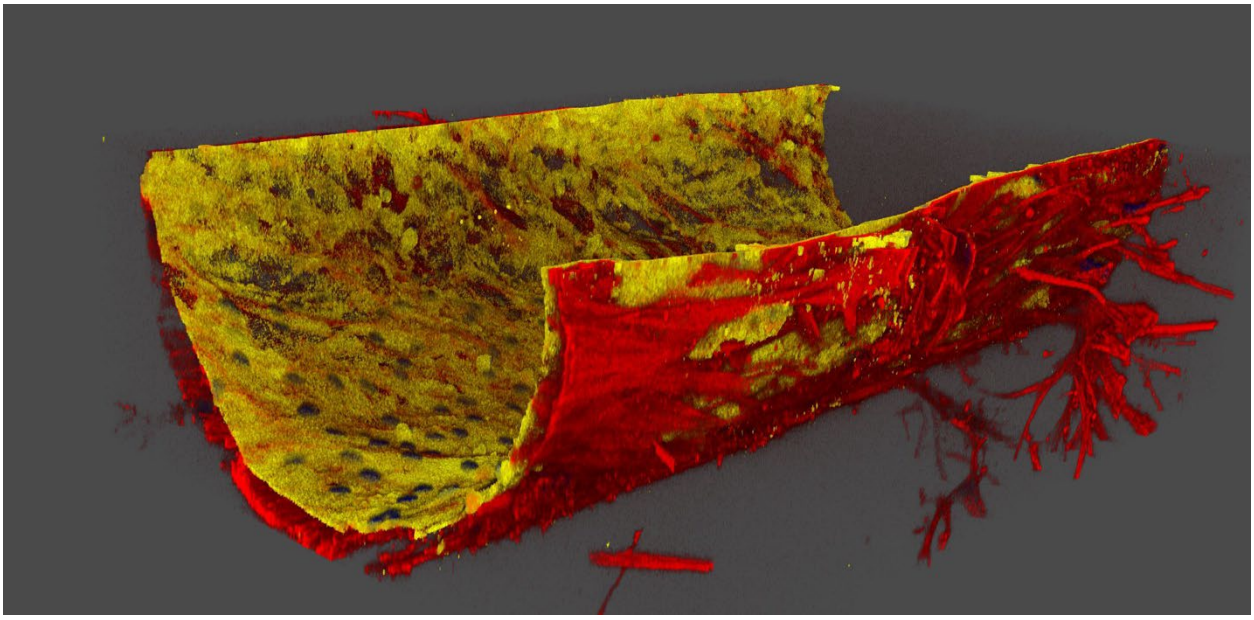
ARVO 2025 abstract: https://iovs.arvojournals.org/article.aspx?articleid=2803668

BioRxiV link: https://www.biorxiv.org/content/10.1101/2025.04.14.648093v1

Entrant: Esak (Isaac) Lee, Assistant Professor

Institution/organization: Cornell University Biomedical Engineering

City/Country: Ithaca, NY, USA



Title: *Human ocular fluid outflow on-chip reveals trabecular meshwork-mediated Schlemm's canal endothelial dysfunction in steroid-induced glaucoma*

Description of the image: Immunofluorescence staining of human fluid ocular outflow on-chip with phalloidin and anti-CD31 antibodies to visualize actin-rich trabecular meshwork cells (red) and CD31-positive Schlemm's canal (SC) endothelium (yellow), revealing that the trabecular meshwork nicely covered the underlying SC endothelium in 3D.

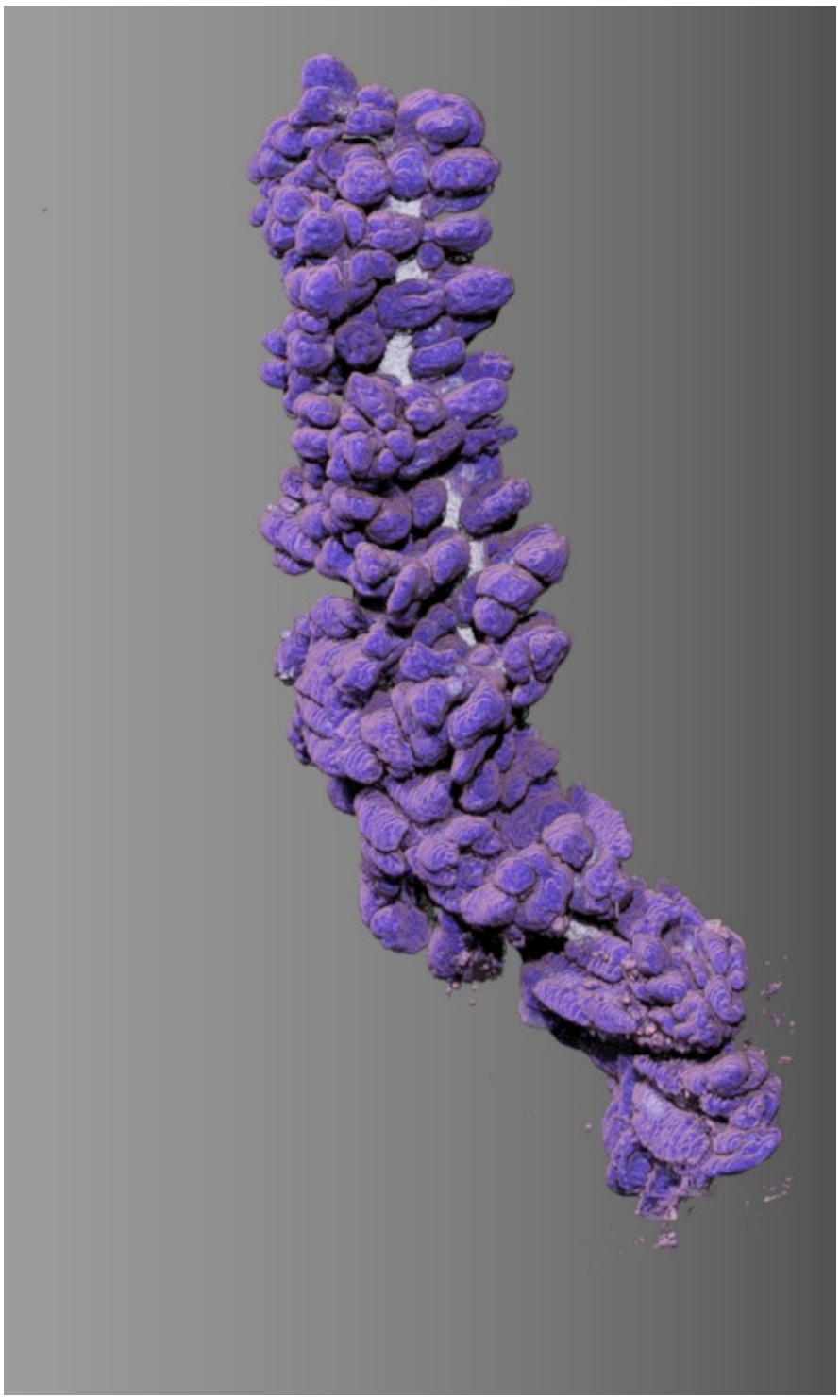
Citation related to the Image:
Nature Cardiovascular Research (2025), https://doi.org/10.1038/s44161-025-00704-3

Authors: Renhao Lu[1], Anna M. Kolarzyk[1], W. Daniel Stamer[2], and Esak Lee[1,*]
1. Nancy E. and Peter C. Meinig School of Biomedical Engineering, Cornell University, Ithaca, NY 14853, United States.
2. Department of Ophthalmology, Duke University School of Medicine, Durham, NC 27710, United States.

Entrant: Friedrich Paulsen

Prof. Dr. med. Dr. h.c. Friedrich Paulsen, HonFAS I Head Institute of Functional and Clinical Anatomy I FAU Erlangen
Friedrich Alexander University Erlangen-Nürnberg
Immediate Past President European Federation of Experimental Morphology
Universitätsstr. 19 I 91054 Erlangen I Germany

Image:



Three-dimensionally reconstructed meibomian gland.
The glandular acini are colored purple. The excretory duct shimmers white. This is the meibomian gland of an upper eyelid; the gland is oriented as it is embedded in the eyelid.

Description: Tissue blocks containing Meibomian glands from cadavers were cut out en bloc after fixation in 4% paraformaldehyde solution and embedded in paraffin wax. Serial sagittal sections were stained with haematoxylin and eosin. These sections were then scanned using a digital slide scanner. All digitised images were transferred and processed using the HiD 3D application (Chimaera GmbH, Erlangen, Germany) to reconstruct and visualise the gland's morphology. This was followed by extensive processing to create a three-dimensional model of a Meibomian gland that is free of non-linear tissue deformations, heterogeneous intensities and low contrast.

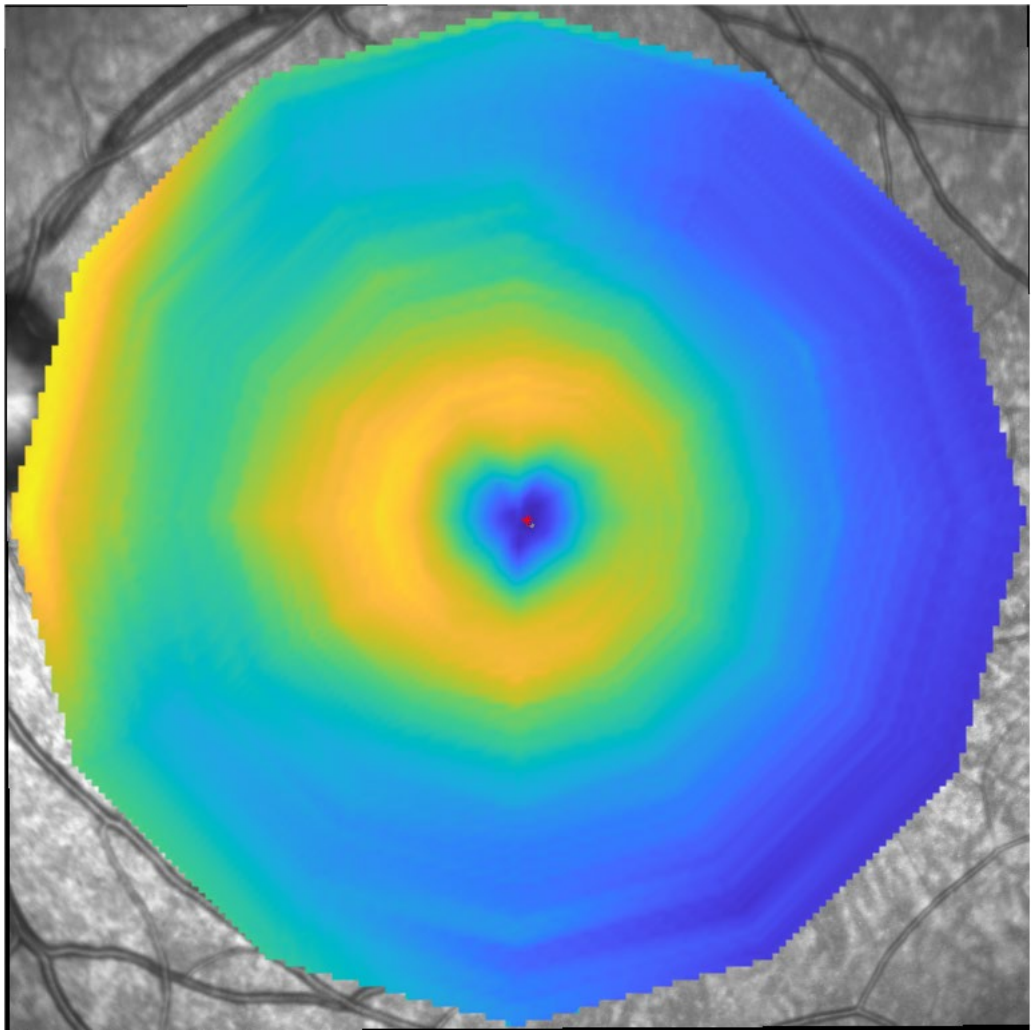
Publication: https://pubmed.ncbi.nlm.nih.gov/38542083/

ARVO Abstract:
https://iovs.arvojournals.org/article.aspx?articleid=2786237&resultClick=1

Entrant: Jacinth Priscilla Jacob Jayakumar, PhD Candidate

University of Houston, College of Optometry, Houston, Texas

Heart Shaped Retinal Thickness Map

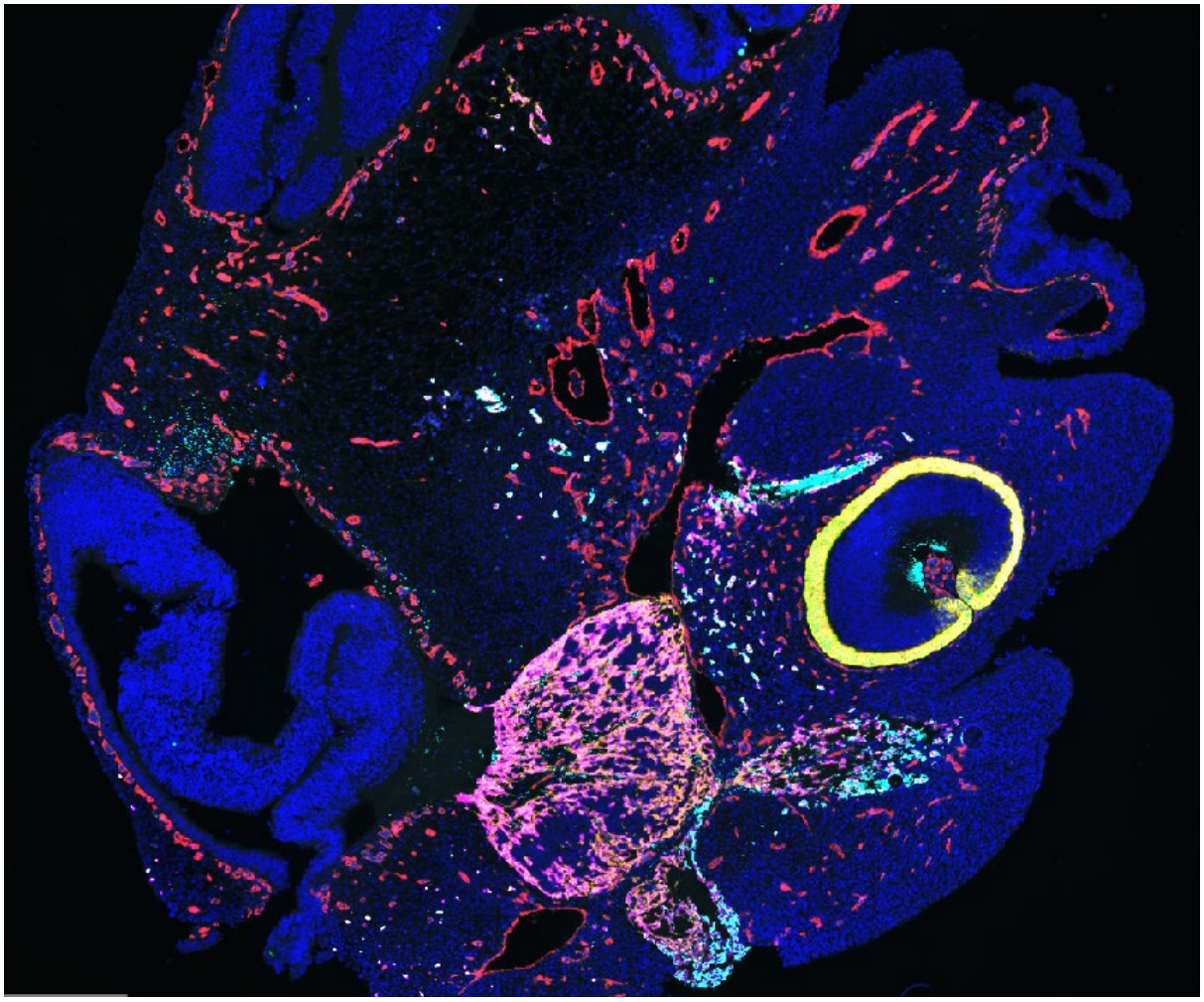


This stunning color map of retinal thickness was derived from an Optical Coherence Tomography (OCT) image using MATLAB image analysis. In this map, cooler blue hues represent thinner retinal regions while warmer yellow tones indicate thicker areas. Typically, the fovea presents as a circular blue region marking the thinnest part of the macula, but interestingly, this participant exhibited a rare heart-shaped foveal thickness pattern. Despite this unusual anatomical presentation, the participant maintained perfect 20/20 vision. This unique visualization highlights the remarkable diversity of human ocular anatomy.

Entrant: James Draper

Department of Eye and Vision Science, University of Liverpool

Liverpool, United Kingdom



FFPE Multiplex immunofluorescence stain using Akoya OPAL kit, imaged on Akoya Phenocycler of 36 day post-conception human embryonic eye. This 6-plex panel was designed to assess the melanocyte development in the uveal tract as they migrate from the neural crest, and study the possible interplay of melanocyte migration with nerve and vascular development in the eye. Panel was applied to embryonic eyes between 4 and 8 weeks of development.

This 6-Plex panel includes:

- SOX10 (Pink) neural crest marker
- MITF (Green) master regulator of melanocytic processes

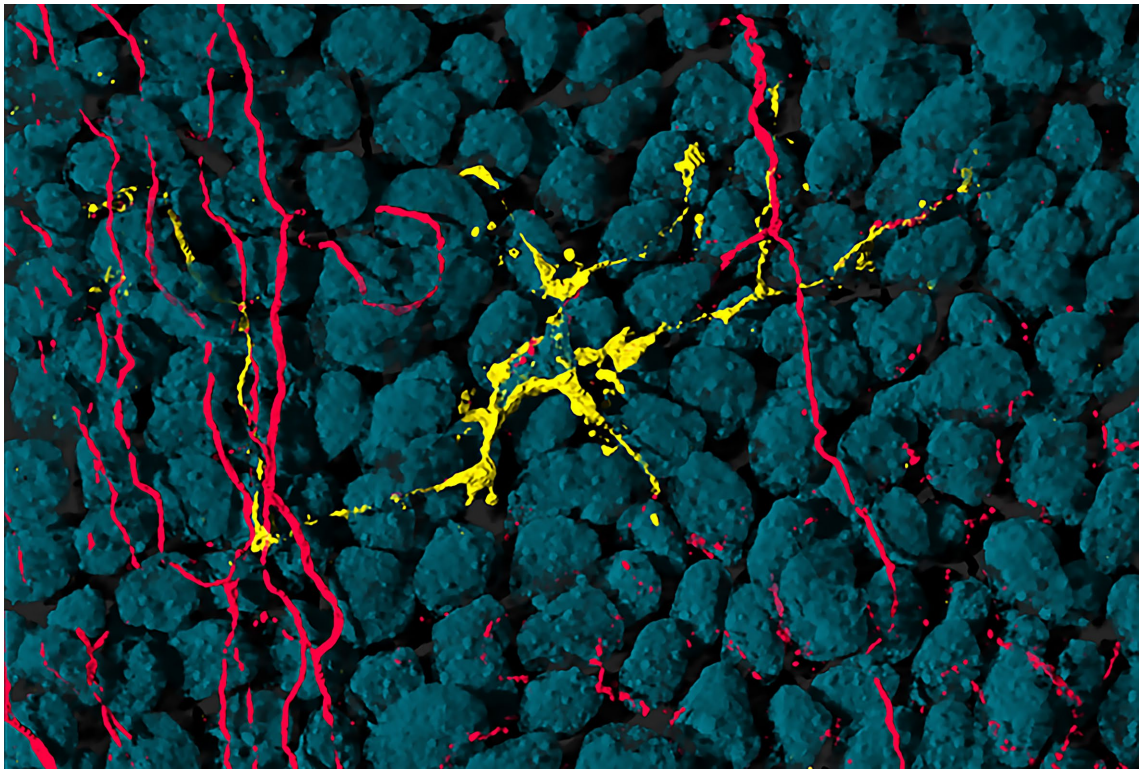
- Dopachrome tautomerase / DCT (Yellow) – regulated by MITF, required for melanin biosynthesis (marker of melanoblast progressive differentiation)
- Myelin Protein Zero / MPZ (Orange) – Schwann cell & Schwann cell precursor marker (Schwann cells may have shared lineage with melanocytes in the eye)
- Nerve growth factor receptor / NGFR (Blue) – Marks peripheral neurons with neural crest lineage (to differentiate from melanoblasts as well as highlight structure)
- CD31 (Red) – Vascular marker

In this image, the early eye can be visualised by the yellow ring of DCT expression, which highlights the retinal pigment epithelium. CD31-expressing cells immediately adjacent to the RPE show an early precursor to choriocapillaris formation. The large orange/pink structure is the dorsal root ganglion; nerve fibre offshoots (blue/pink structures) contain co-expressing SOX10/NGFR/MITF cells.

The significance of this study is to explore the yet undescribed mechanism of how ocular melanocytes migrate/differentiate and arrange themselves as they enter the uveal tract, as it establishes. Formation of the choriocapillaris is the initial formation point of the choroid, which makes up the largest uveal tract tissue.

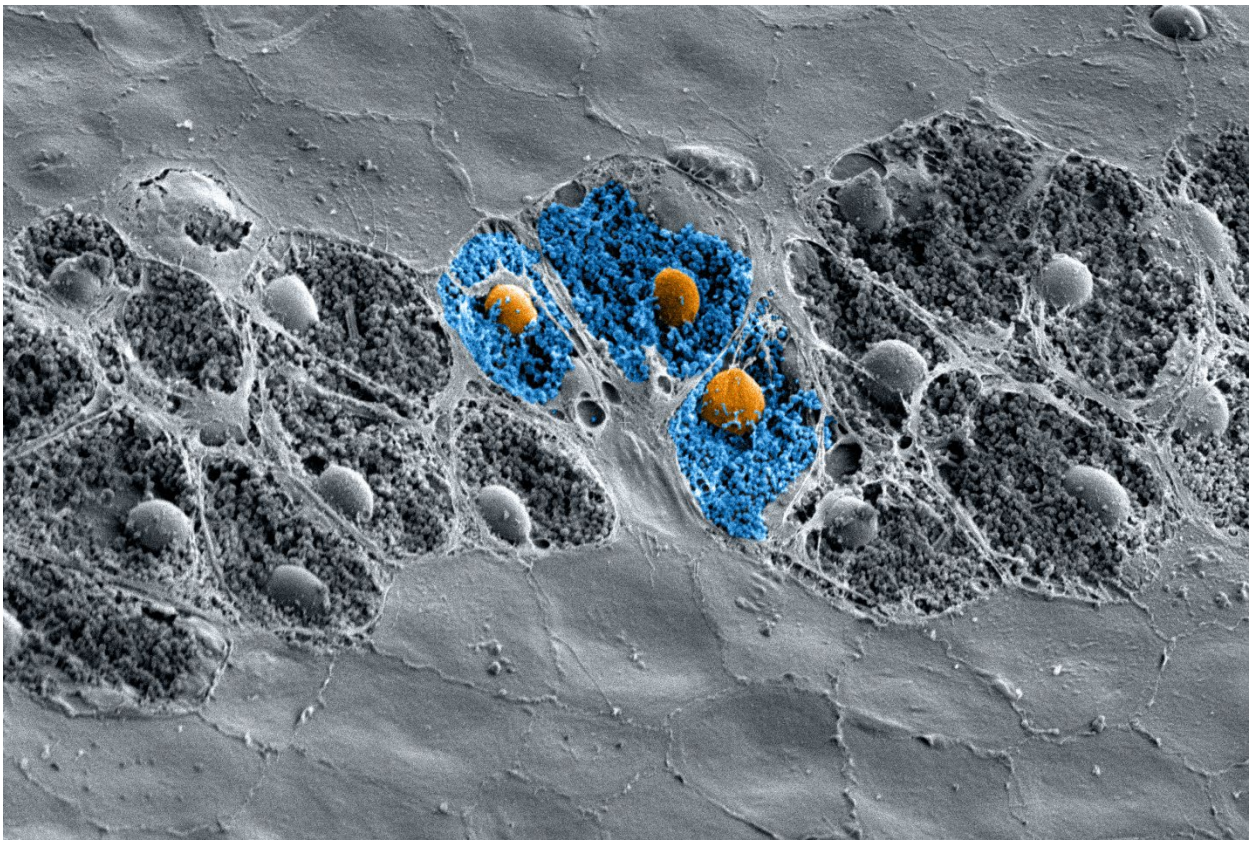
Entrants: Prof. Juana Gallar, Instituto de Neurociencias (UMH-CSIC), San Juan de Alicante, Spain.

Dr. Almudena Íñigo-Portugués, Instituto de Neurociencias (UMH-CSIC), San Juan de Alicante, Spain.



Blue, Pink, and Yellow: A Confocal Portrait of Neuroimmune Interactions in the Cornea. The micrograph, captured using a Zeiss LSM 880 laser scanning confocal microscope, shows a corneal dendritic cell (colored yellow; immunostained with anti-Iba1) located between the basal epithelial cells (nuclei shown in blue, counterstained with Hoechst 33342) of a C57BL/6J mouse cornea. This image illustrates the close interaction between the immune cell and the adjacent corneal sensory nerves (colored pink; labeled with anti-β-tubulin III antibody).

Entrant: Khoa D. Tran, PhD
VisionGift, Portland, OR. 97214



Scanning electron micrograph of human corneal endothelial cells. The cells in the center show ruptured membranes caused by mechanical stress during tissue procurement and have been false-colored to highlight the nuclei in orange and the internal organelles and cytoplasmic contents in light blue. 3,500X magnification.

Image credits: Dr. Claudia Lopez, Dr. Megan Straiko, Dr. Khoa Tran

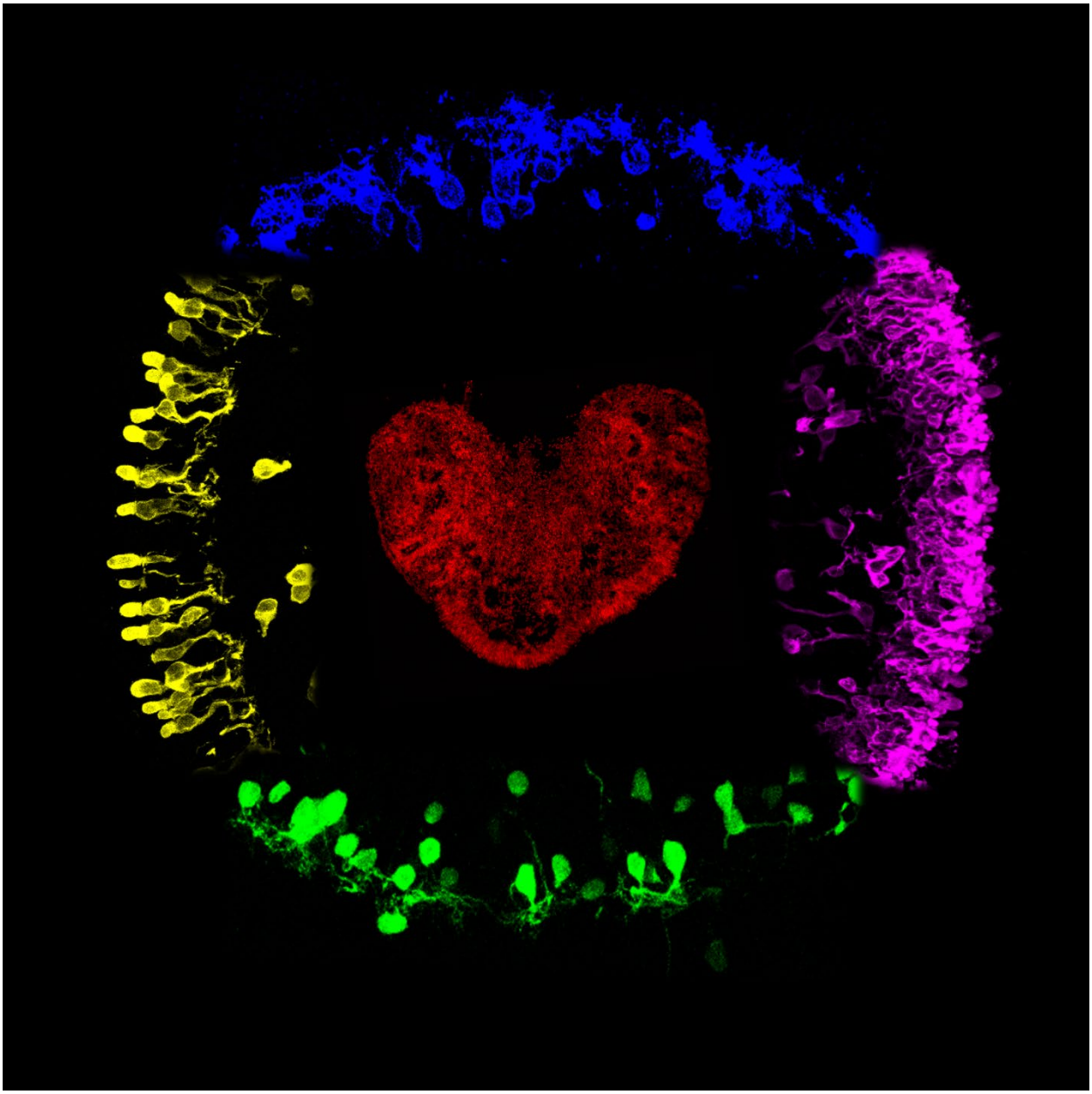
Entrant: Leila Bahmani, Postdoctoral Research Fellow

PI: Aaron Nagiel, The vision center, Department of surgery.

Children's Hospital Los Angeles (CHLA) and University of Southern California (USC), Los Angeles, USA

Imaging technique: Confocal microscopy on a Leica STELLARIS 5

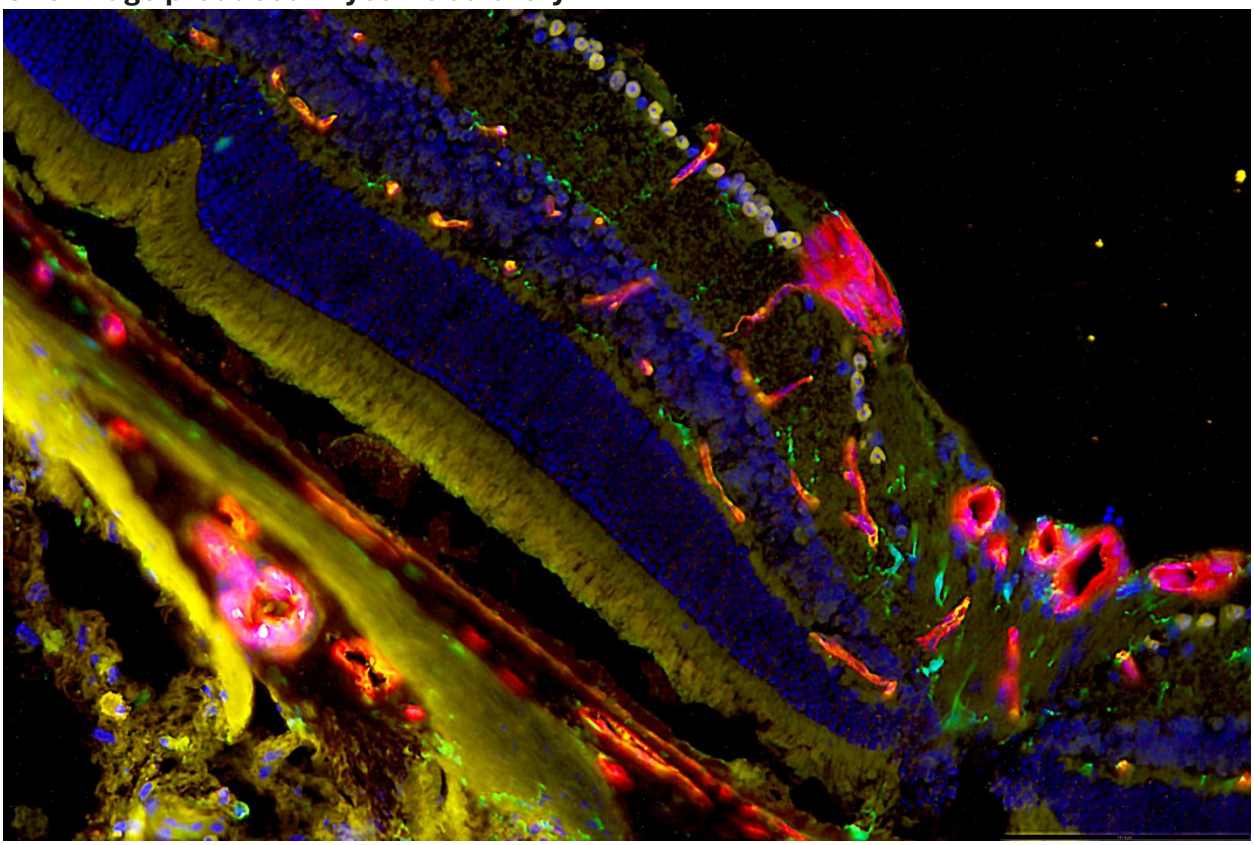
Description: A symphony of light and structure, this confocal image captures the layered elegance of human retinal organoids, revealing the intricate choreography of retinal cell types in vivid detail.



***Entrant: Lu Huang*[1,2,3]**

1. Department of Plastic and Reconstructive Surgery, Shanghai Ninth People's Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, China
2. Schepens Eye Research Institute of Massachusetts Eye and Ear, Boston, MA, 02114, USA
3. Department of Ophthalmology, Harvard Medical School, Boston, MA, USA

One image produced in your laboratory



< Lollipop Heart-Retinal Microvascular Response to Laser-Induced Injury>- RedBrn3a-GreenIBA1-YellowCD31

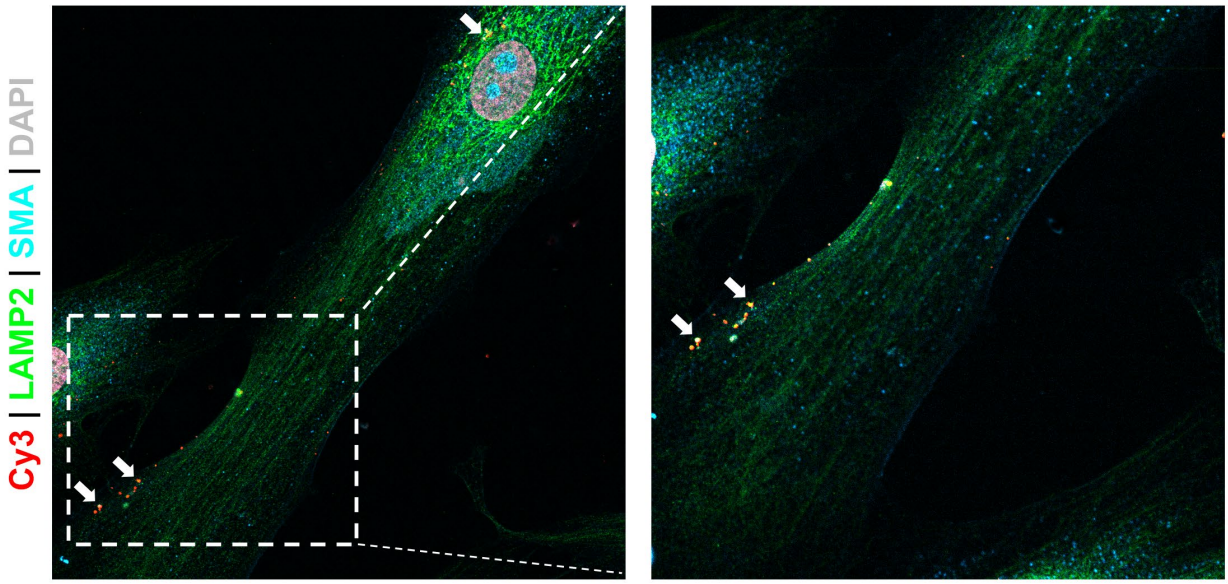
Brief description of the image

< Lollipop Heart-Retinal Microvascular Response to Laser-Induced Injury >
This image, taken in Chen lab at the Schepens Eye Research Institute, captures a section of mouse retina following a low-energy laser application designed to model focal vascular injury. The vessels exhibit distinct remodeling at the lesion border — one vessel, shaped like a "heart-tipped lollipop," symbolizes the intricate and often unpredictable nature of microvascular response. The image highlights the beauty within the repair attempts of retinal tissue under stress, revealing the delicate balance between injury, inflammation, and repair.

Entrant: Matias Alvarez-Saavedra, PhD

NanoNeurosciences, Inc.

Alachua, Florida 32615



Human trabecular meshwork cells were treated with Cy3-labeled glaucoma-targeting nanostructures for 4 hours. The cells were fixed and immunostained for the lysosomal marker LAMP2 (green) and the actin-associated protein Smooth Muscle Actin (SMA; cyan). Nuclei were counterstained with DAPI, shown in gray (pseudocolor). Note the internalization of our nanostructures within the cellular body (arrows).

Entrant Full name: Mohit Parekh

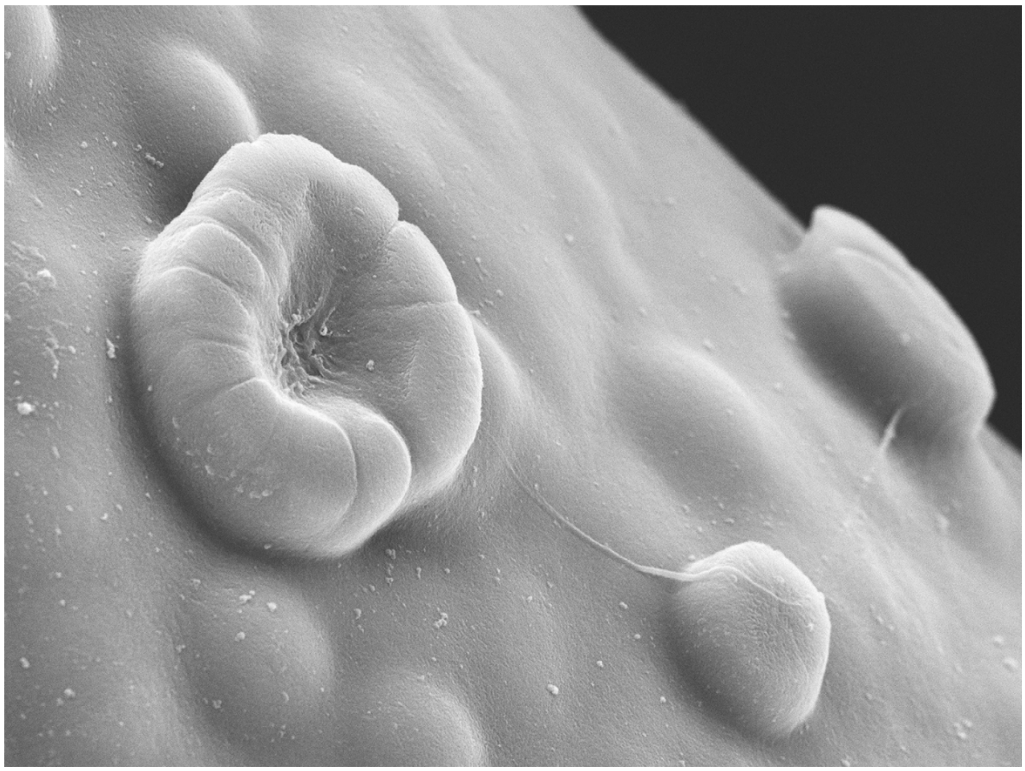
Credentials: PhD

Institution: Schepens Eye Research Institute, Massachusetts Eye and Ear, Department of Ophthalmology, Harvard Medical School

City: Boston, MA

Country: USA

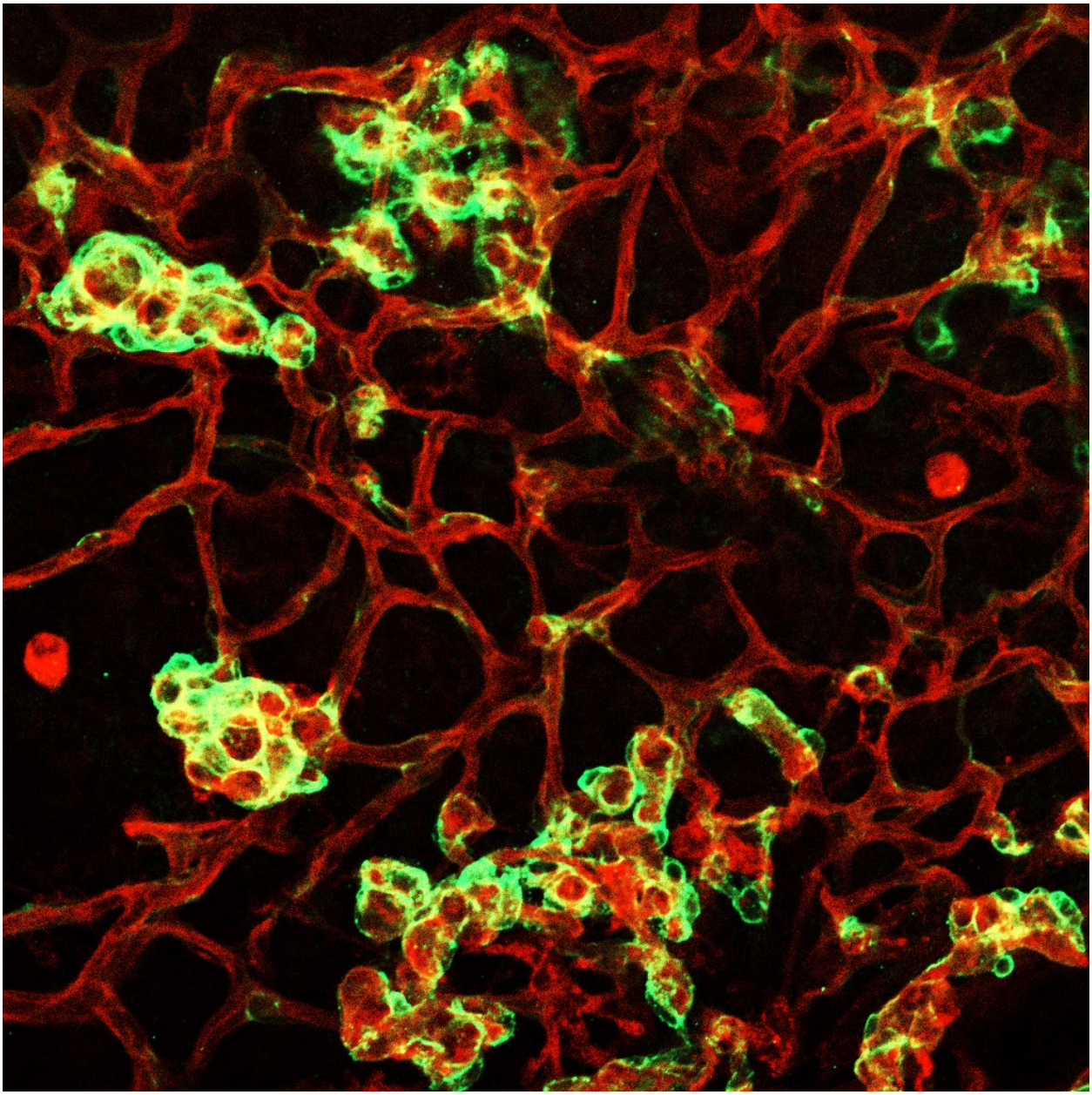
Accolades: The image was selected as the winner of the SERI/MEE Imaging Contest and has been accepted as the cover image for the November 2025 issue of *Investigative Ophthalmology & Visual Science (IOVS)* journal.



Description: The scanning electron microscopy (SEM) image captures guttae, the small, abnormal extracellular deposits secreted by corneal endothelial cells, prominently displayed on the Descemet's membrane of a cornea affected by Fuchs endothelial corneal dystrophy (FECD). Some guttae exhibit a unique flower-like shape, serving as a visual hallmark of this condition. FECD is characterized by the excessive accumulation of extracellular matrix, leading to progressive vision loss and, in severe cases, corneal blindness.

Entrant: Dr. Nikhlesh Kumar Singh, Associate Professor
Dept. Of Ophthalmology, Visual and Anatomical Sciences, Wayne State University School of Medicine, Detroit, MI 48202

Image Caption: The image shows the localization of pericytes around neovascular tufts in the ischemic retina of a mouse. Blood vessels (Isolection-IB4, red) and pericytes (NG2, green). These mice pups were exposed to Oxygen-induced Retinopathy (OIR), and at P17, the eyes were enucleated, retinas isolated, fixed and stained with (Isolection-IB4, red) and (NG2, green).



Entrants: Randolph Jeffrey Kwaw, OD, and Zainab

Zehra, PhD

University of Houston, College of Optometry

Houston, Texas, United States

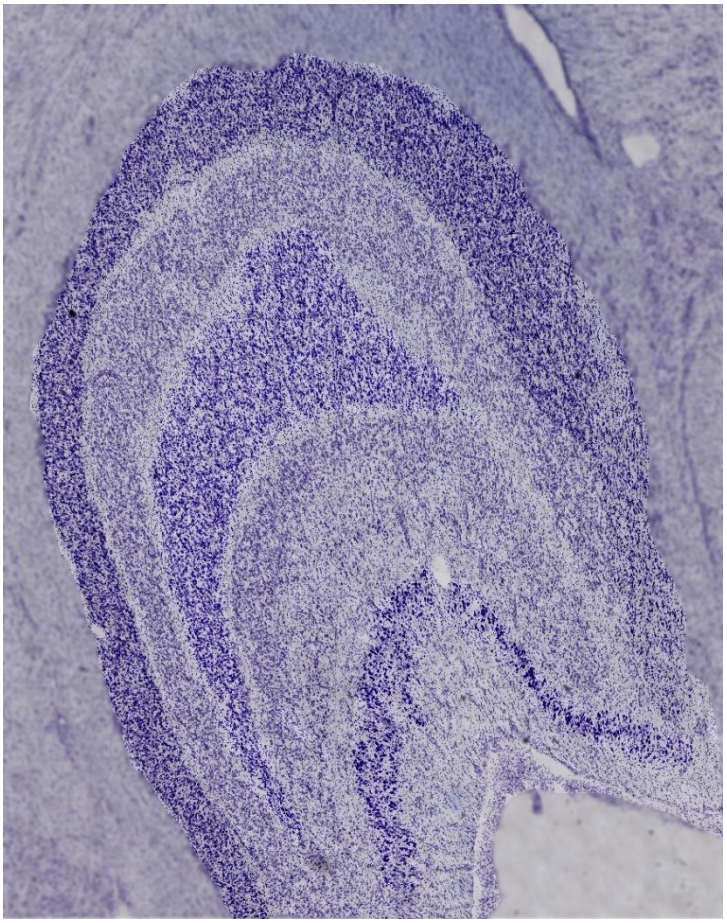


Image Description

This Nissl-stained coronal section of the lateral geniculate nucleus (LGN) reveals laminar differences in cell body density following amblyopia induced via monocular deprivation in a rhesus macaque. Layers 6, 4, and 1 (top to bottom) are visibly darker, representing the fellow eye (non-amblyopic eye) while layers 5, 3, and 2 are lighter and show reduced soma size, reflecting deprivation from the amblyopic eye.

Significance

This image illustrates the structural consequences of early visual deprivation, with distinct interlaminar differences in cell morphology confirming reduced input from the deprived eye. Such changes offer critical insights into the neuroanatomical basis of amblyopia.

Techniques Used

Amblyopia was induced via monocular form deprivation applied from 2 weeks of age for five months, followed by binocular vision. At the time of histological processing, animals were first perfused and fixed with PBS followed by 4% paraformaldehyde (PFA). After perfusion fixation, the brains were immediately removed, and post-fixation was performed by immersing the brains in 4% PFA for at least 48 hours. Subsequently, brains were cryoprotected through a sucrose gradient, first 10%, then 20%, and finally 30% sucrose, each step lasting roughly 24 hours, to prevent freezing artifacts during tissue sectioning. For the LGN preparation, a tissue block was dissected from the central part of the brain containing the LGN. The tissue was embedded in OCT compound on a microtome plate cooled with crushed dry ice to maintain a temperature between -20°C and -25°C, ensuring optimal cutting conditions. Sections were sliced at 40–50µm thickness using a Leica Jung Histoslide 2000 microtome. Each tissue section was carefully transferred into PBS for subsequent Nissl staining of neuronal cell bodies in the LGN. Sections were hydrated, dehydrated through graded ethanol steps, stained in Nissl solution for five minutes, rinsed, dehydrated again, cleared in xylene, and then cover slipped with Permount mounting medium to preserve the samples for microscope imaging. Finally, the acquired 20X image underwent digital enhancement using GIMP software to improve contrast and clarity, facilitating better visualization of the LGN structure and for evaluating the effect of amblyopia.

Entrants:

Remi J. Shittu[1], Susana da Silva[1,2], Jonathan P. Vande Geest[1,2]

[1]Bioengineering, University of Pittsburgh Swanson School of Engineering, Pittsburgh, Pennsylvania, United States

[2]Ophthalmology, University of Pittsburgh School of Medicine, Pittsburgh, Pennsylvania, United States

Image:

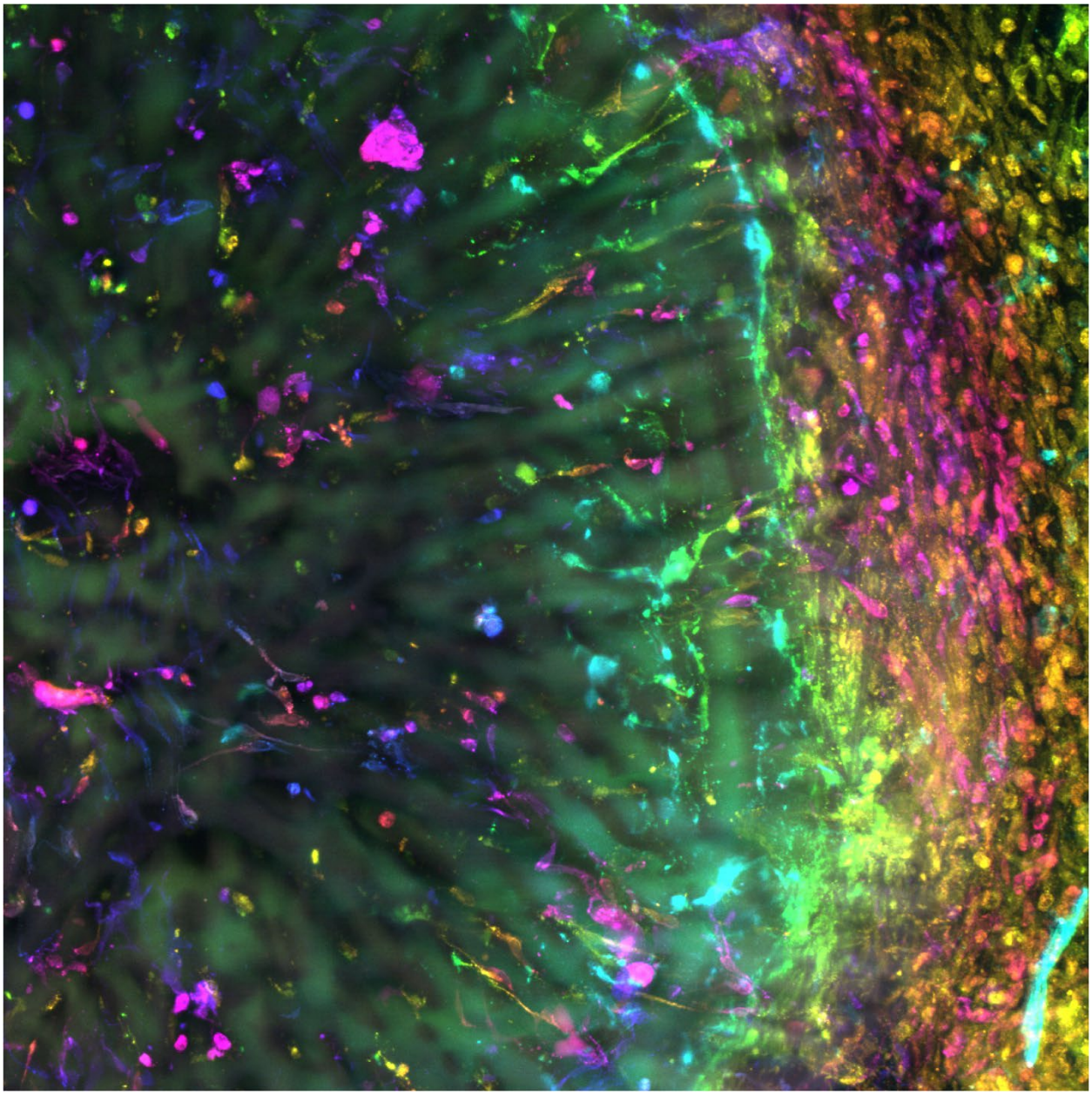


Image Description:

Human-induced pluripotent stem cell-derived astrocytes cultured in 3D on a gelatin-based fabricated model lamina cribrosa. Max intensity projection of the biofabricated model of a human lamina cribrosa based on methods described in (Shittu, RJ et al. 2025). The 3D culture was imaged using live cell multiphoton imaging. The cells are color-coded by depth in the sample.

Significance:

Using the model LC to create 3D cultures of the human optic nerve head at the lamina cribrosa marks the first step toward a biomimetic approach to understanding the mechanobiology of the optic nerve head in glaucoma. The ability to use this method in understand glaucoma can enable researchers to address critical questions that remain unanswered in the context of glaucomatous neurodegeneration.

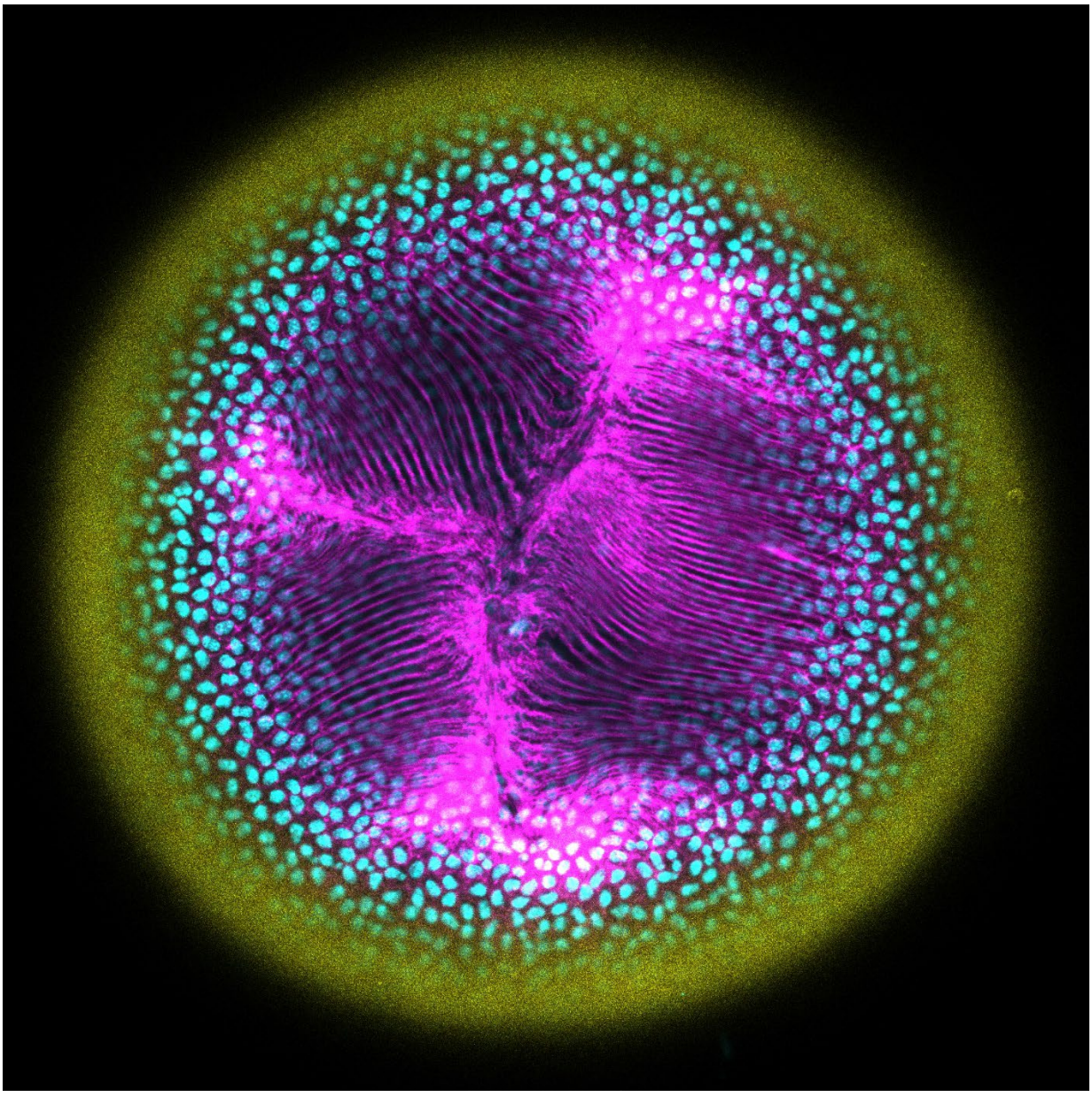
Relevant Conference and Journal Publications

- Shittu, R.J., Pemberton, B., Boettcher, M., Vande Geest, J.P. (2025). Two-Photon Fabrication of Donor-Specific Human Lamina Cribrosa Models., **In Press** in Translational Vision Science & Technology
- Shittu, R.J., Flohr, K., Pemberton, B., da Silva, S., Vande Geest, J.P. (2025). Investigating the Role of Paracrine signaling between astrocytes and retinal ganglion cells in a hiPSC-derived model of the optic nerve head. Investigative Ophthalmology & Visual Science, 66(8),1175.
- Shittu, R.J., Pemberton, B., da Silva, S., Vande Geest, J.P. (2023). Two Photon Biofabrication of the Human Lamina Cribrosa for the 3D culture of optic nerve head cells. Investigative Ophthalmology & Visual Science, 64(8),4359.

Entrant: Sepideh Cheheltani, MS, Ph.D. Candidate

University of Delaware, Department of Biological Sciences

Newark, Delaware, USA



This confocal image was generated in the Dr. Velia Fowler Laboratory at the University of Delaware.

Significance:

This confocal microscopic image depicts the anterior suture of the 8-week-old mouse ocular lens, where elongating fiber cells converge at the anterior pole. Proper alignment and organization at these sutures are critical for maintaining lens transparency and biomechanical flexibility. The image illustrates the cytoskeletal framework underlying this architecture, providing insight into how actin-based structures contribute to lens optical quality and stiffness.

Techniques used to generate it:

Whole-mount staining of the mouse lens with rhodamine–phalloidin for actin (magenta), wheat germ agglutinin (WGA) for cell membrane and capsule (yellow), and Hoechst for nuclei (cyan). The image was acquired using a Zeiss LSM 880 laser scanning confocal microscope with a 20x objective, NA 0.8.

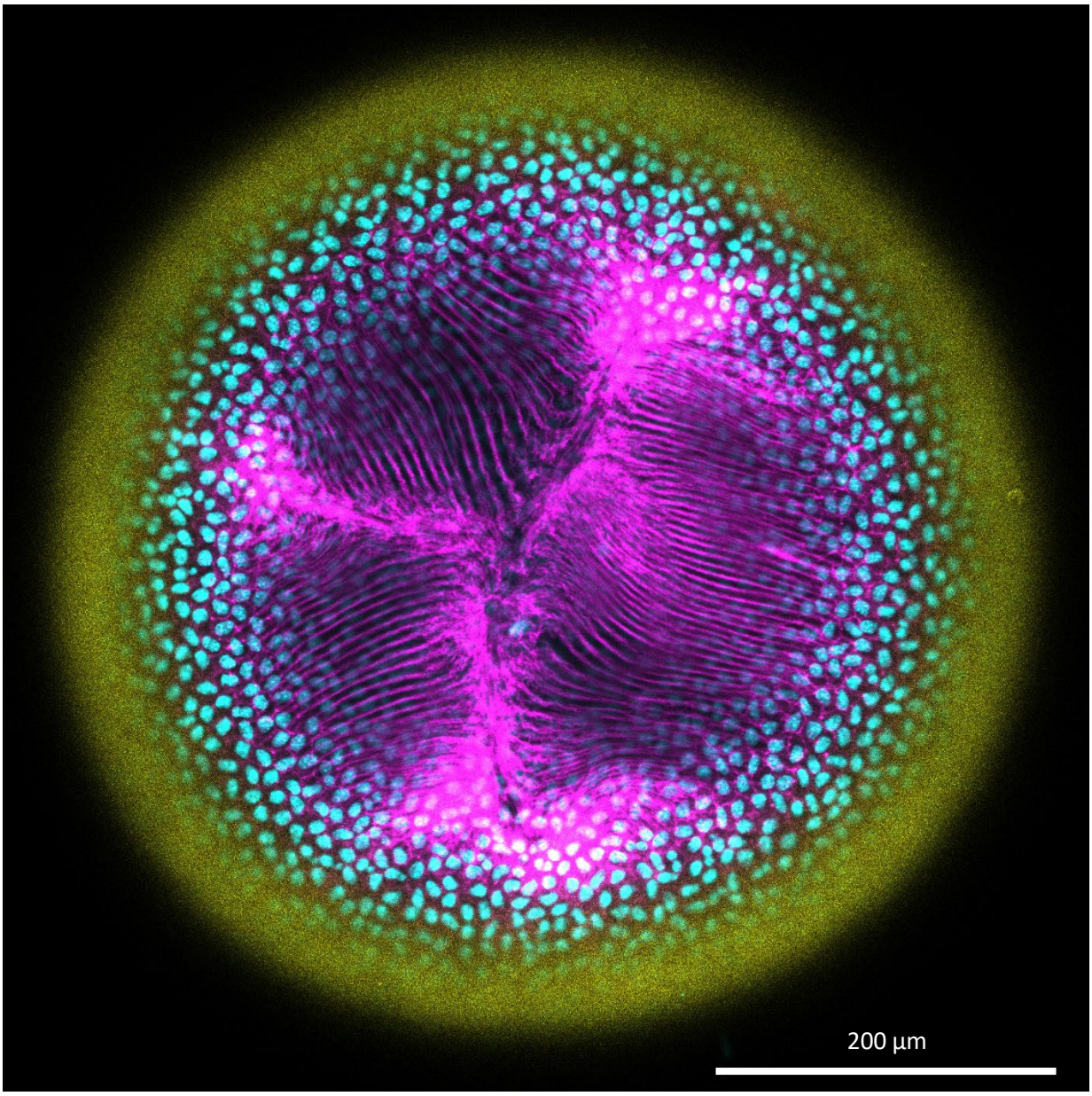
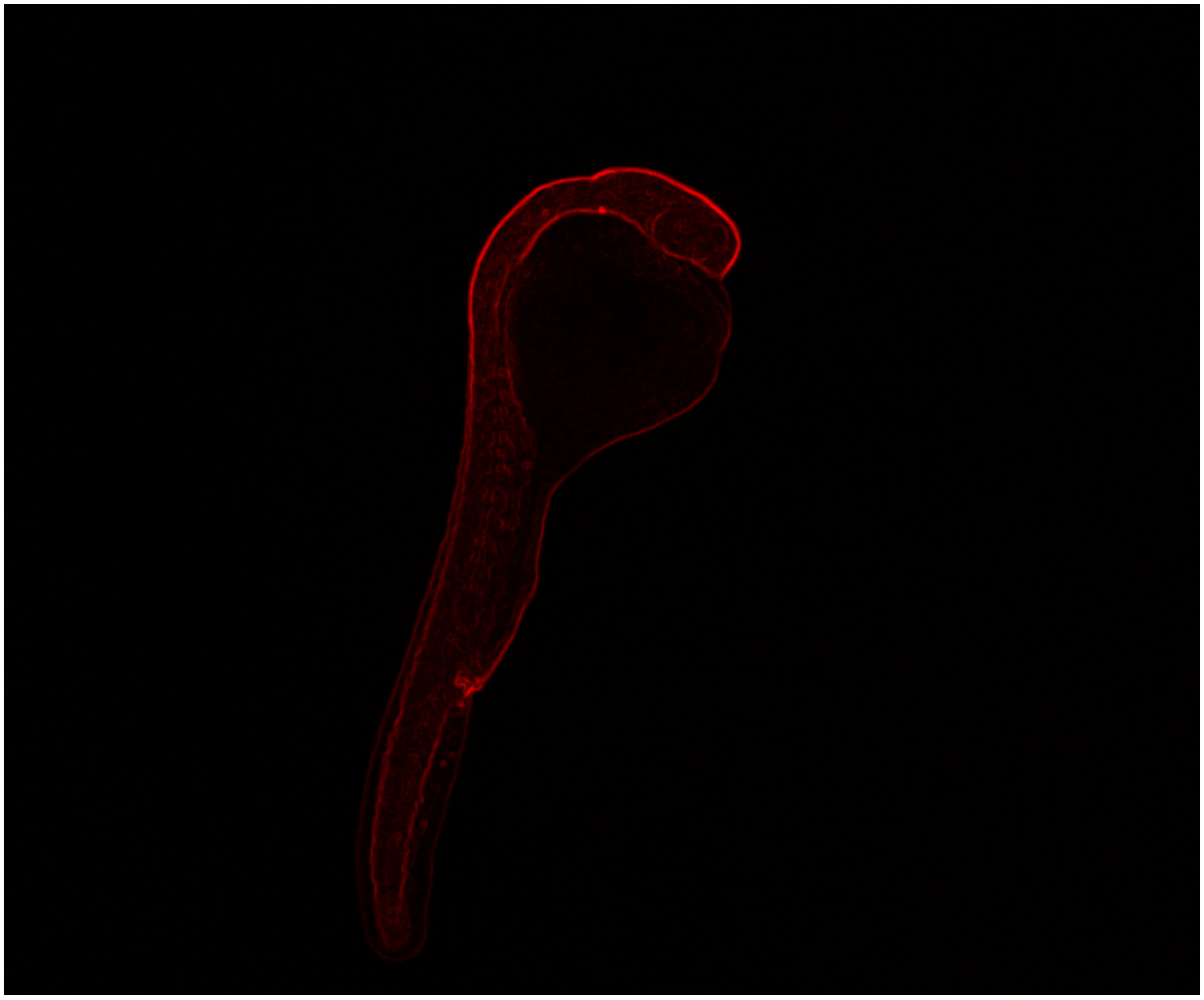


Image with scalebar

Entrant: Sudipta Chakraborty, PhD
Post Doctoral Research Associate II
The Centre for High Impact Neuroscience and Translational Applications (CHINTA), TCG Centres for Research and Education in Science and Technology (TCG CREST)
Kolkata 700091, INDIA
Previously associated with BRIC-National Institute of Biomedical Genomics, Kalyani, India



Brief description of the image: Representative whole-mount confocal images showing cleaved caspase-3 immunofluorescence in zebrafish embryo (32 hpf). Embryo injected with cntnap5 morpholino display increased cleaved caspase-3 expression, indicating enhanced apoptosis at the system level in their developmental stages. Images were acquired using confocal microscopy (Nikon Ti2 Eclipse)

Relevant publication: Chakraborty S, Sarma J, Roy SS, Mitra S, Bagchi S, et al. (2024) Functional investigation suggests *CNTNAP5* involvement in glaucomatous neurodegeneration obtained from a GWAS in primary angle closure glaucoma. PLOS Genetics 20(12): e1011502. https://doi.org/10.1371/journal.pgen.1011502

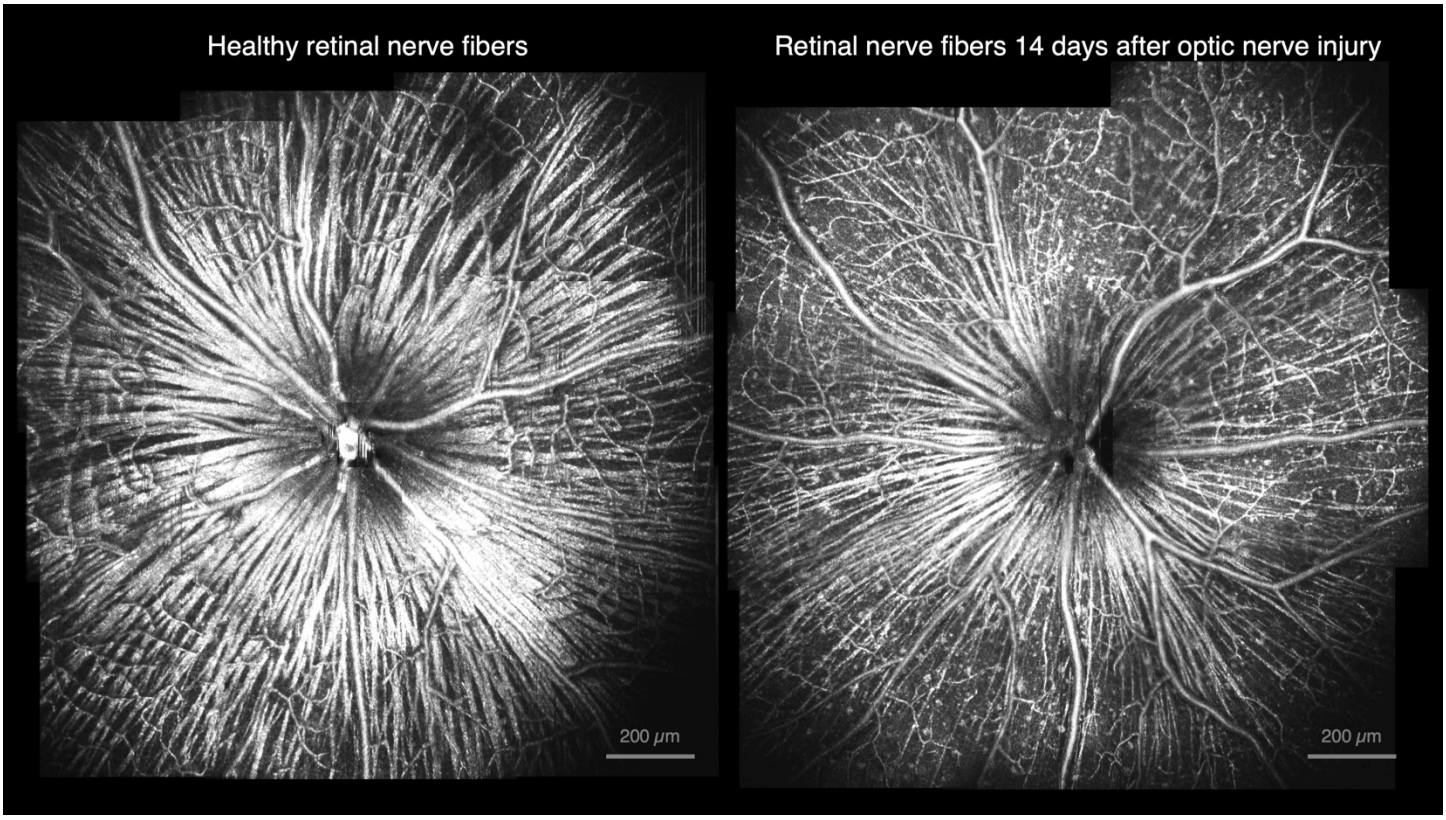
Entrant Name: Taehoon Kim, PhD, MS
Institution/Organization: Department of Translational Imaging, Genentech, Inc.
City/Country: South San Francisco, USA, 94080

Image Description

This submission presents a striking comparison of the mouse retinal nerve fiber layer (RNFL) before and after optic nerve injury, captured in living animals using Adaptive-Optics Optical Coherence Tomography (AO-OCT).

The image on the left displays a healthy retina, characterized by a dense, well-organized network of nerve fibers radiating from the optic nerve head. The image on the right reveals the area 14 days after an optic nerve crush injury. It demonstrates the dramatic and widespread degeneration of these nerve fibers.

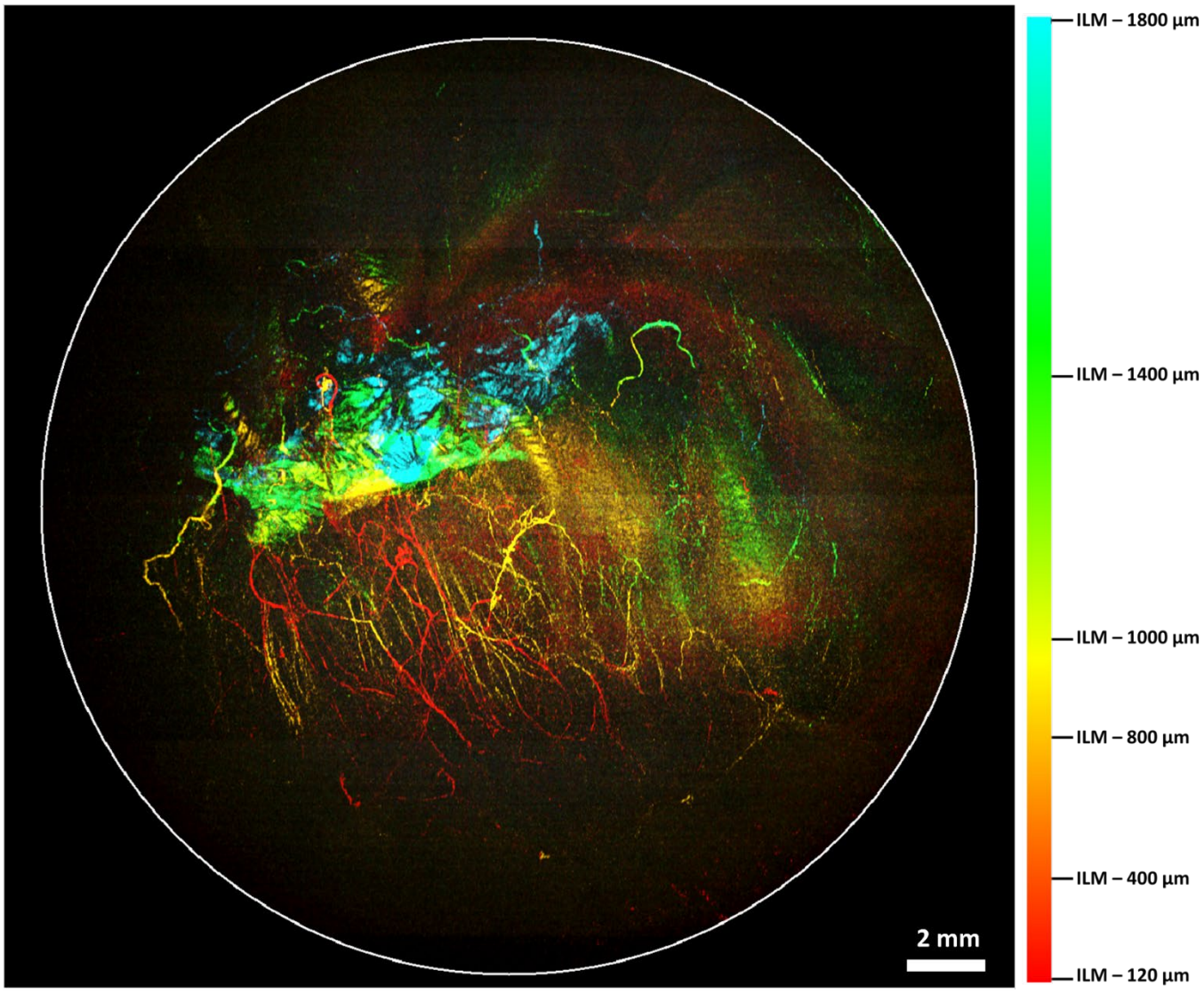
This powerful visualization is a flattened, wide-field view created by stitching nine individual OCT volume scans. The ability to capture such detailed structural changes non-invasively in a living subject highlights a significant technological advance for studying retinal neurodegeneration and potential therapeutic interventions in real-time.



Entrant's full name: Viet-Hoan Le

Institution: Department of Bioengineering, University of Washington, Seattle, Washington, USA

Brief description of the image: Color-coded-by-depth projection of a ultrawide field Swept Source Optical Coherence Tomography volumetric image of vitreous from 1800 µm above Internal Limiting Membrane (ILM) to 120 µm above ILM. The image clearly showed structures in vitreous such as floaters, opacity, and collagen bundles with high resolution and depth information.



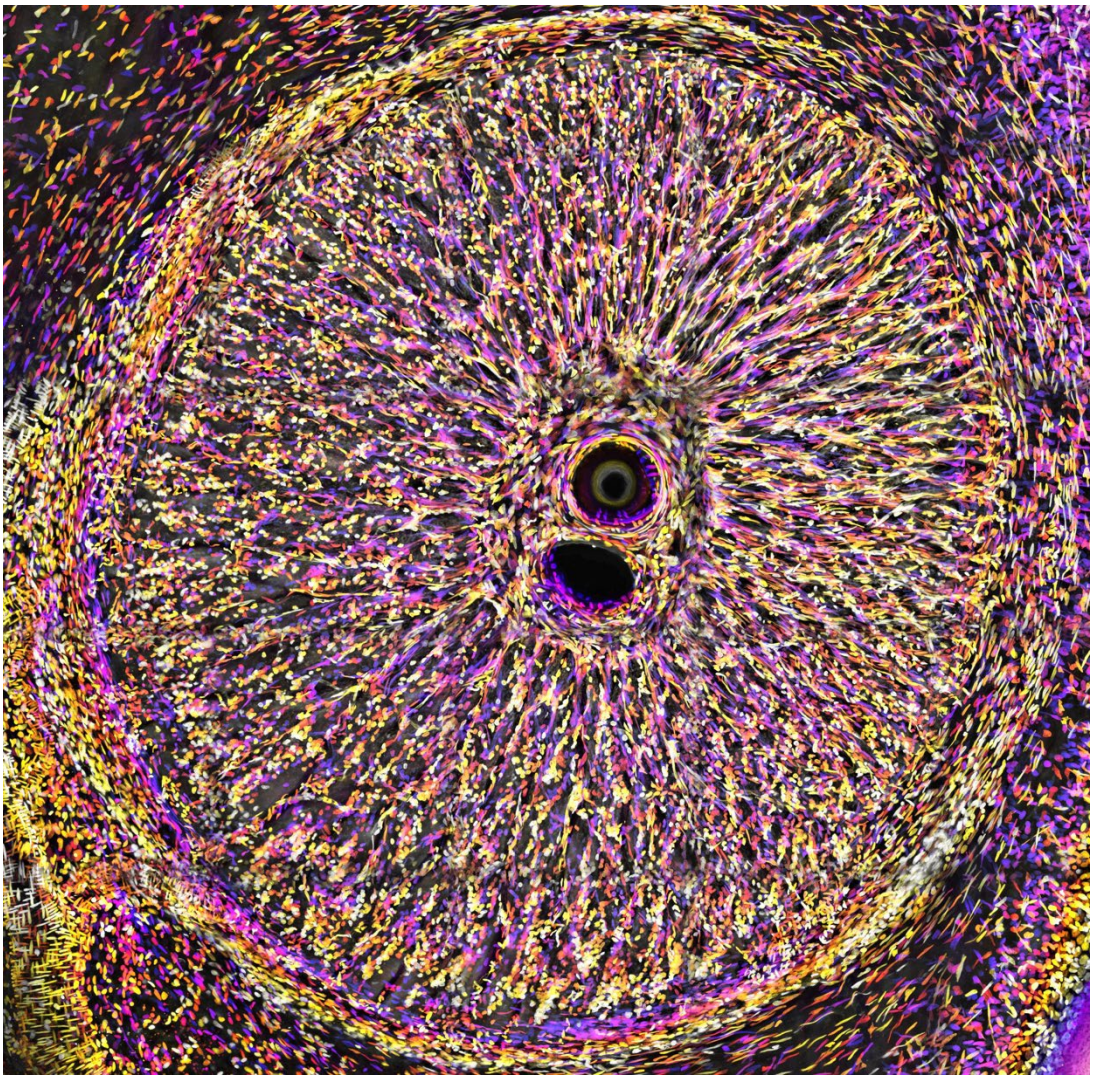
Entrant Names: Xinyue Wang and Ian A. Sigal, PhD, FARVO

Institution: University of Pittsburgh

City: Pittsburgh

Contry: United States

Introduction: This image shows the cell nuclei within the lamina cribrosa of a tree shrew, acquired using multiphoton microscopy. The color scale represents tissue depth, transitioning from yellow in the anterior region to purple in the posterior region.



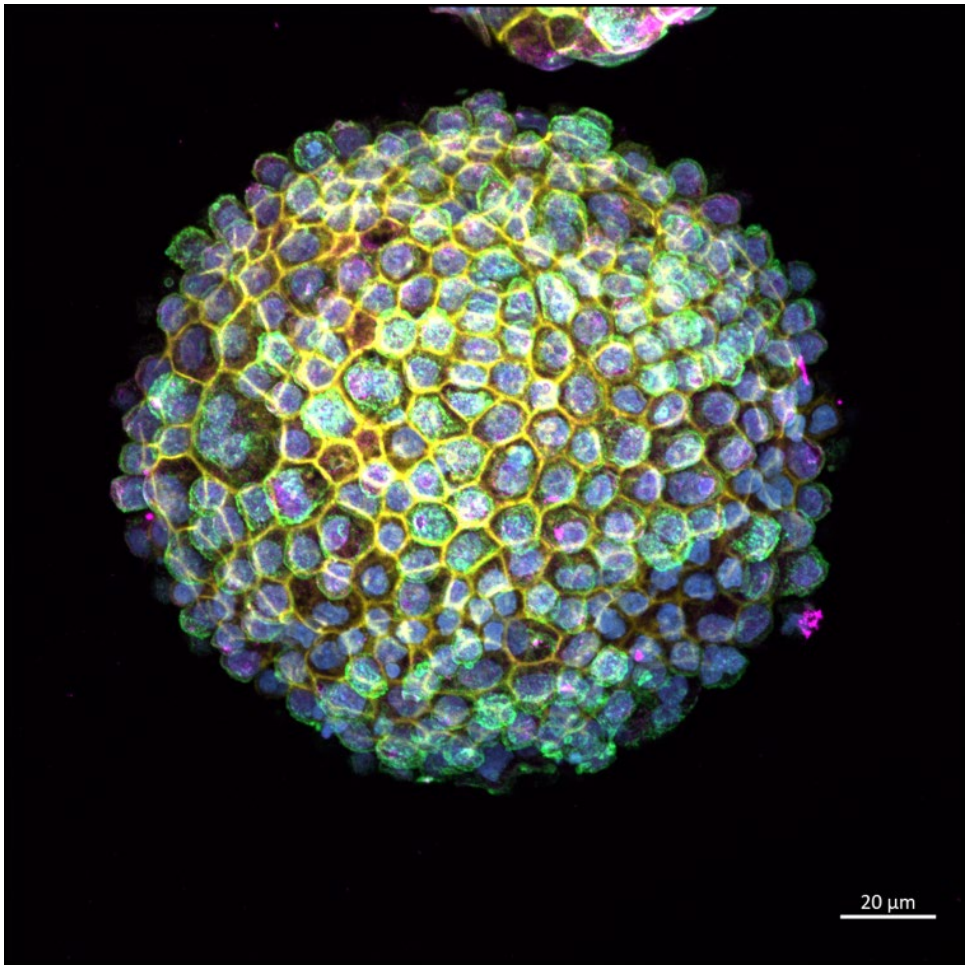
Entrants's full name, credentials, institution, city and country

1. **Dr. Zengping Liu, Assistant Professor**
   a) Department of Ophthalmology, Yong Loo Lin School of Medicine, National University of Singapore, Singapore, Singapore
   b) Institute of Molecular and Cell Biology, Agency for Science, Technology and Research (A*STAR), Singapore, Singapore
   c) Singapore Eye Research Institute, Singapore, Singapore
   d) Centre for Innovation and Precision Eye Health, Yong Loo Lin School of Medicine, National University of Singapore, Singapore, Singapore

2. **Daniel Soo Lin Wong, Research Associate**
   a) Department of Ophthalmology, Yong Loo Lin School of Medicine, National University of Singapore, Singapore, Singapore

3. **Abdurrahmaan Al-Mubaarak, Research Assistant**
   a) Department of Ophthalmology, Yong Loo Lin School of Medicine, National University of Singapore, Singapore, Singapore

One image produced in our laboratory



Brief description:
Preservation of skin-iPSC-derived RPE characteristics after cryopreservation at week 2. Matured RPE cells on microcarriers were cryopreserved directly on microcarriers (without passage), subsequently thawed, recovered, and stained for RPE-specific markers after another 2 weeks.

Immunofluorescence staining with antibodies: Ezrin RPE65 F-actin Hoechst 33342

Liu, Z., Wong, D. S. L., Parikh, B. H., Li, J., Al-Mubaarak, A., Liu, H., Yang, B., Bhargava, M., Li, Z., Loh, X. J., & Su, X. (2025). Development of a biodegradable smooth-surface microcarrier for retinal pigment epithelial cell expansion and maturation. Biomaterials, 123742. https://doi.org/10.1016/j.biomaterials.2025.123742