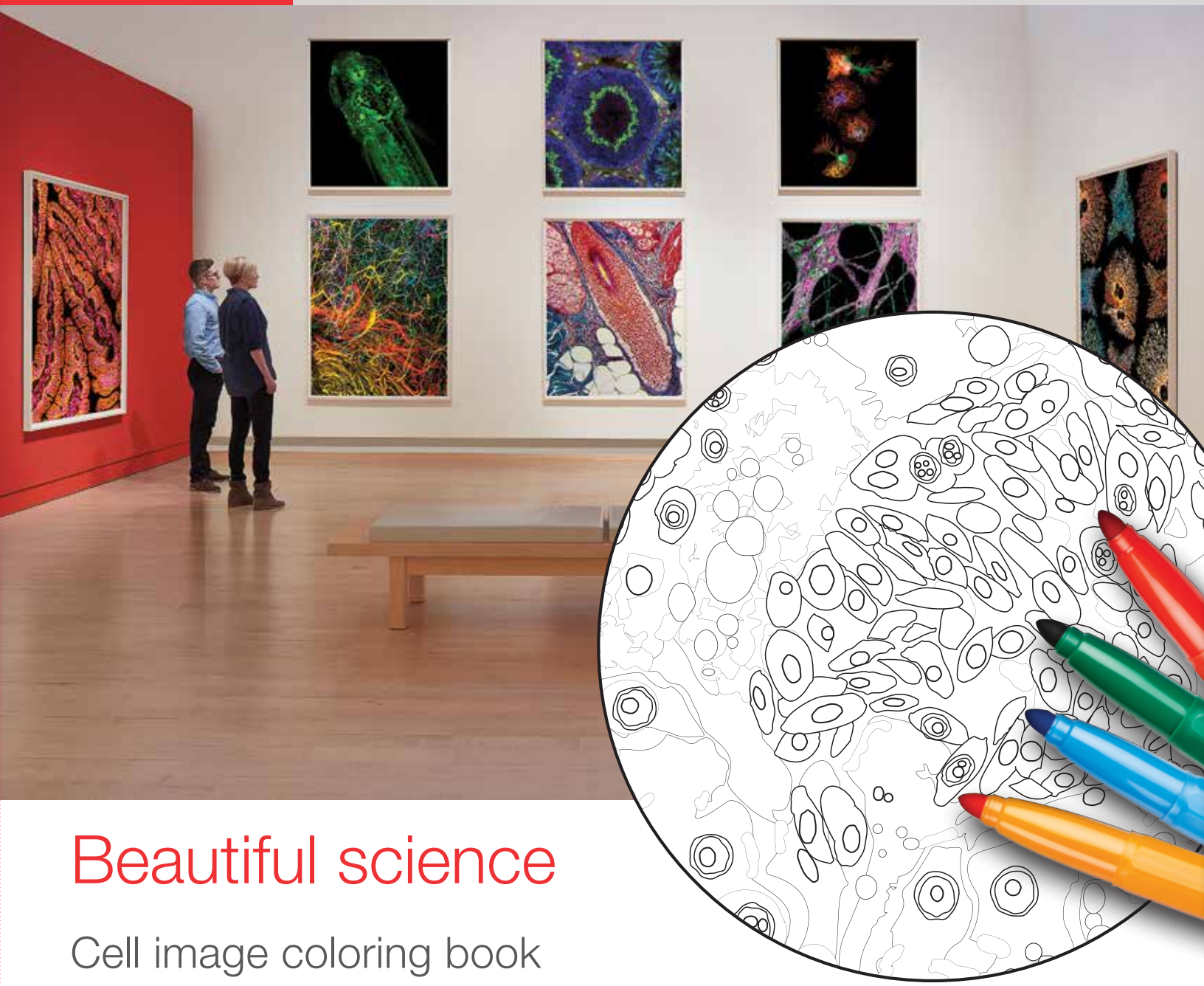
cell analysis

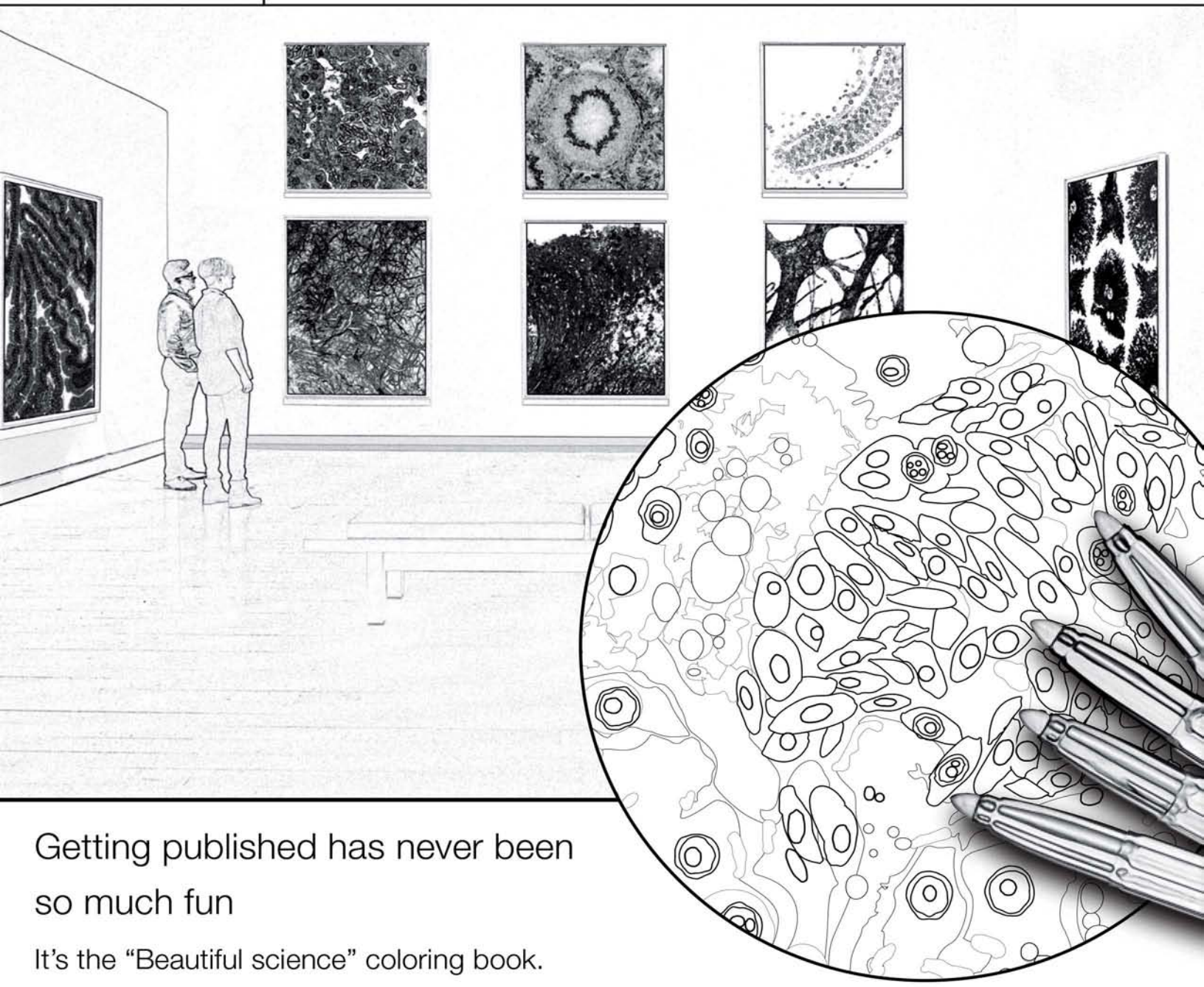
thermo scientific invitrogen



Beautiful science

Cell image coloring book

ThermoFisher SCIENTIFIC



Getting published has never been so much fun

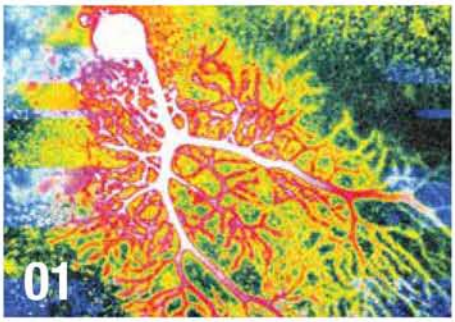
It's the "Beautiful science" coloring book.

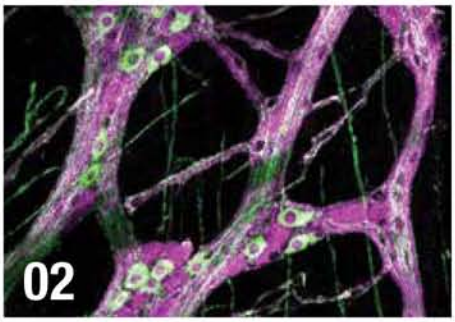
Celebrate the amazing submissions by colleagues from around the world that we artfully rendered into coloring pages to create this book.

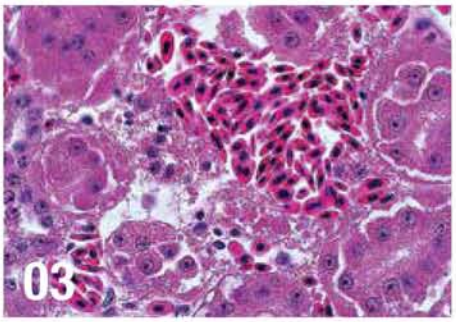
Enjoy putting bright color to nuclei, membranes, centrioles, and all other components in a cell. You'll find a frame in the back to make your colored page a true work of art.

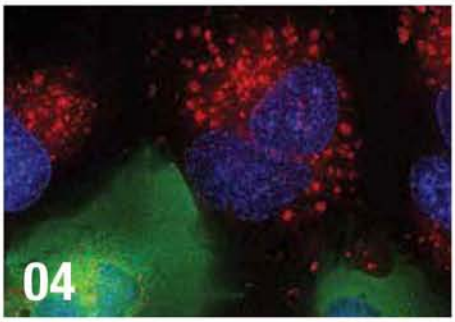
Share your colored images on social media:
facebook.com/molecularprobes
twitter.com/MolProbes

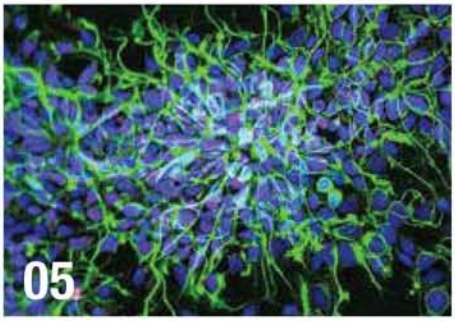
Table of contents

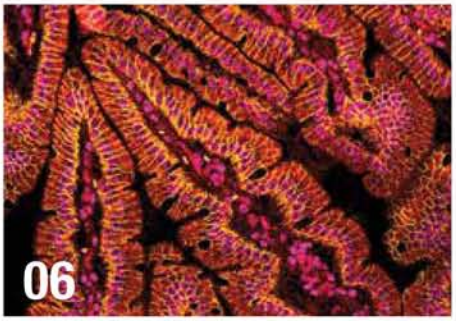

01

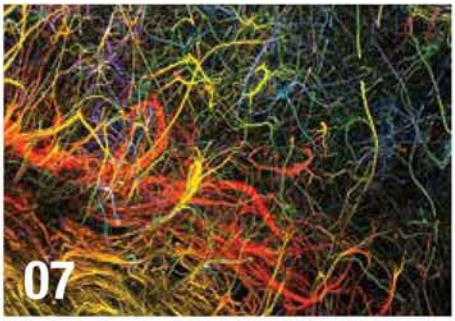

02

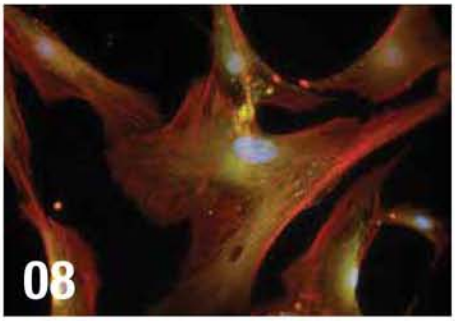

03

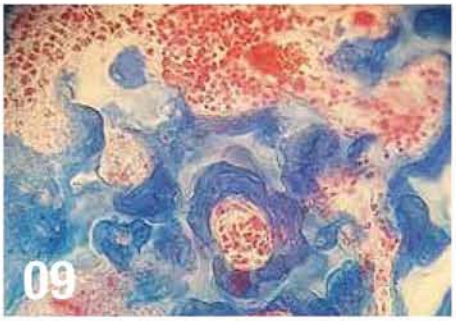

04

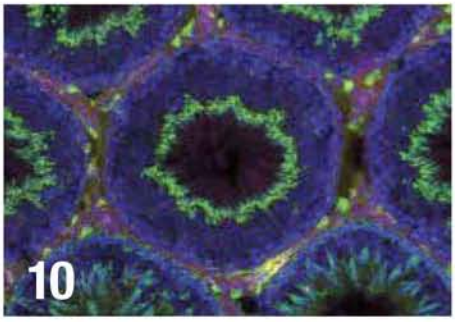

05

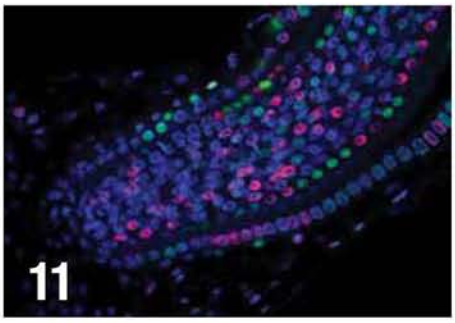

06

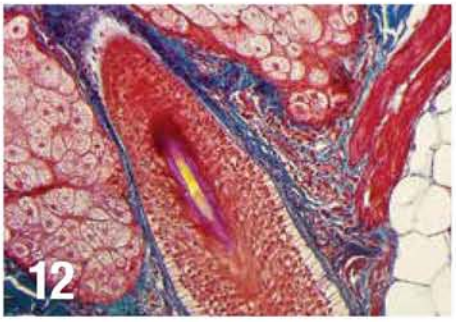

07

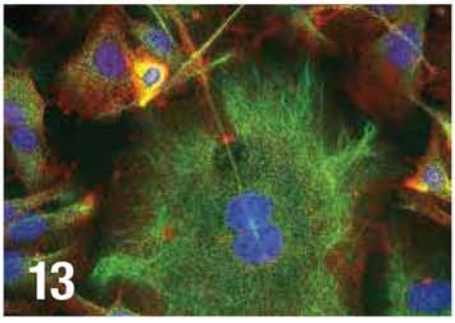

08

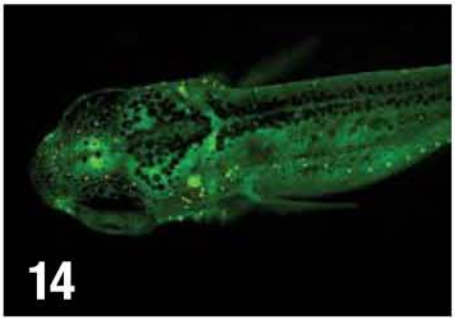

09

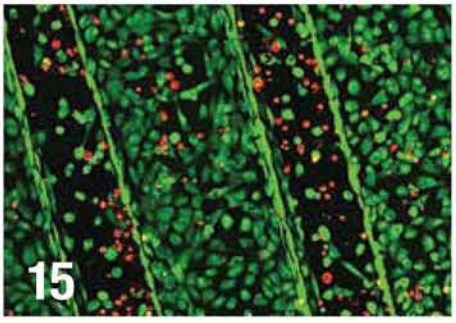

10


11


12

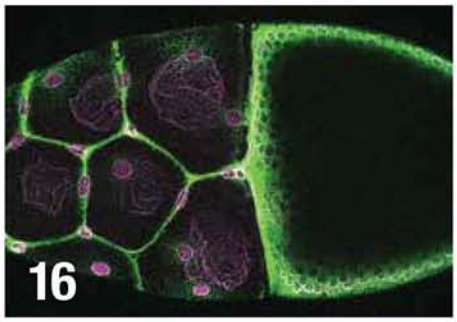

13

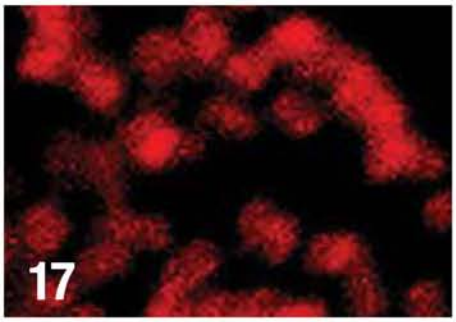

14

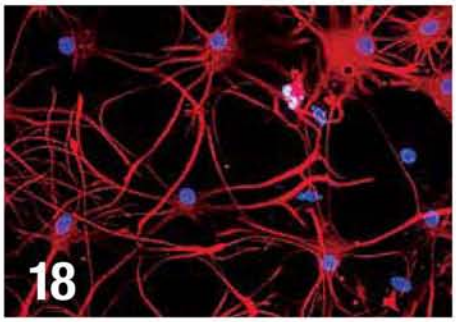

15

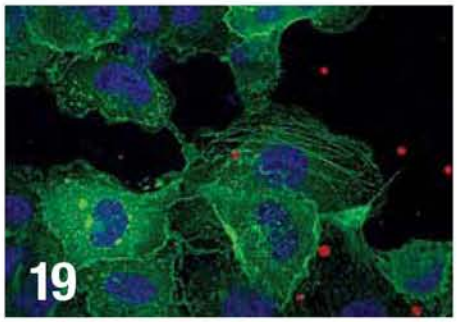
Continued on inside back cover

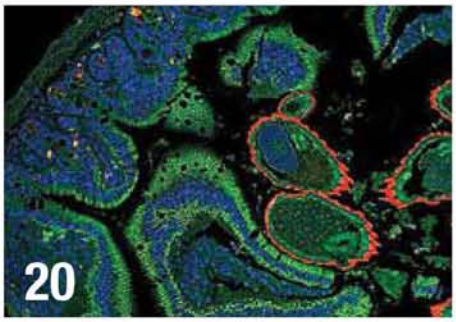
Table of contents, cont.

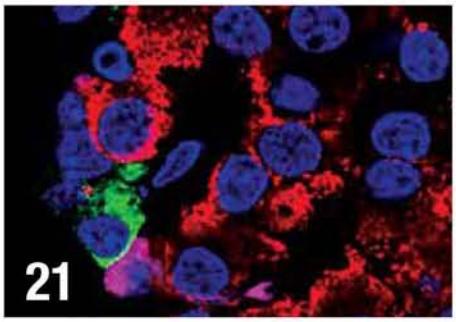

16

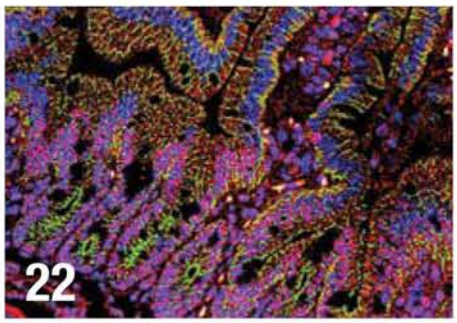

17

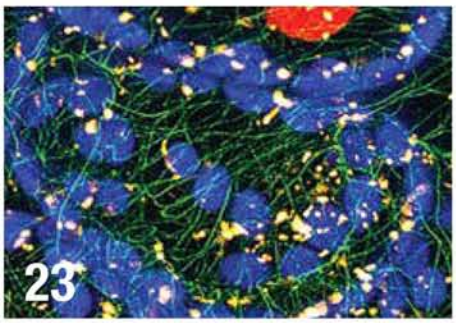

18

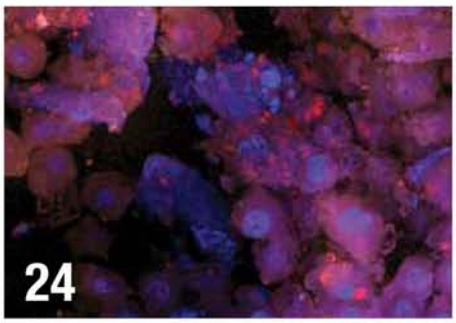

19

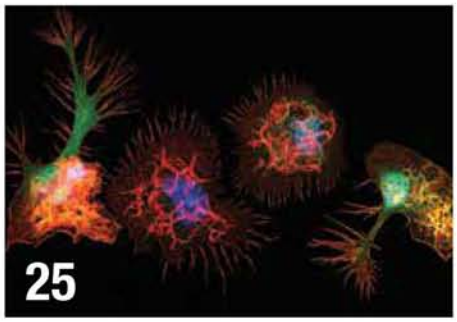

20

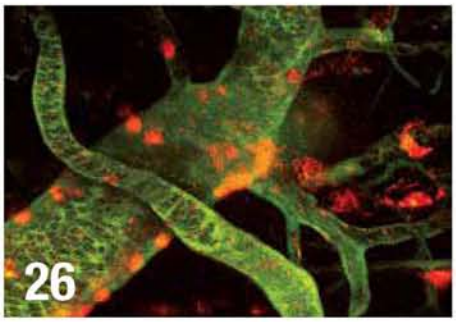

21

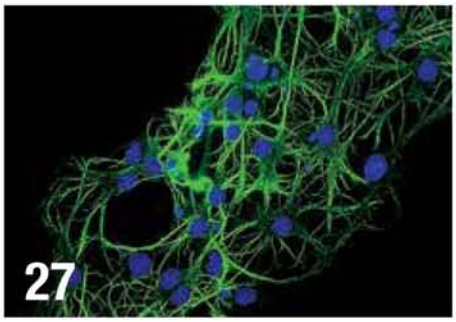

22

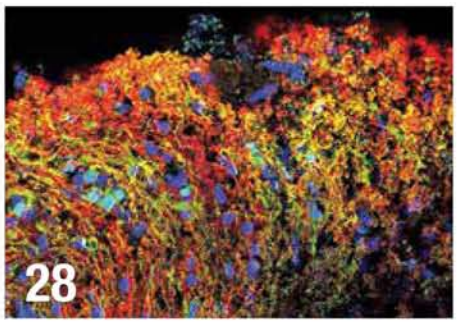

23

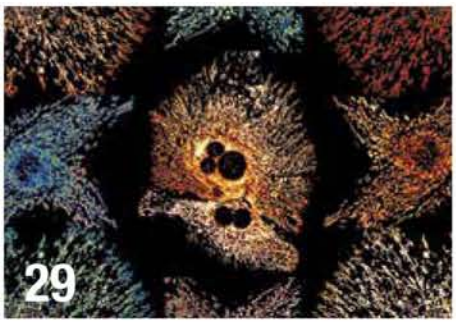

24

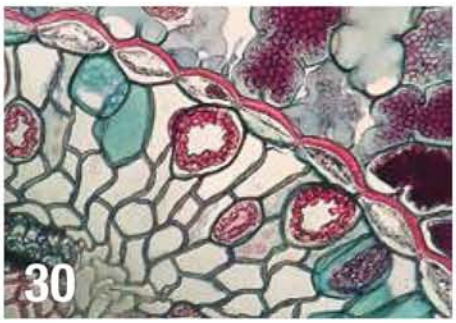

25

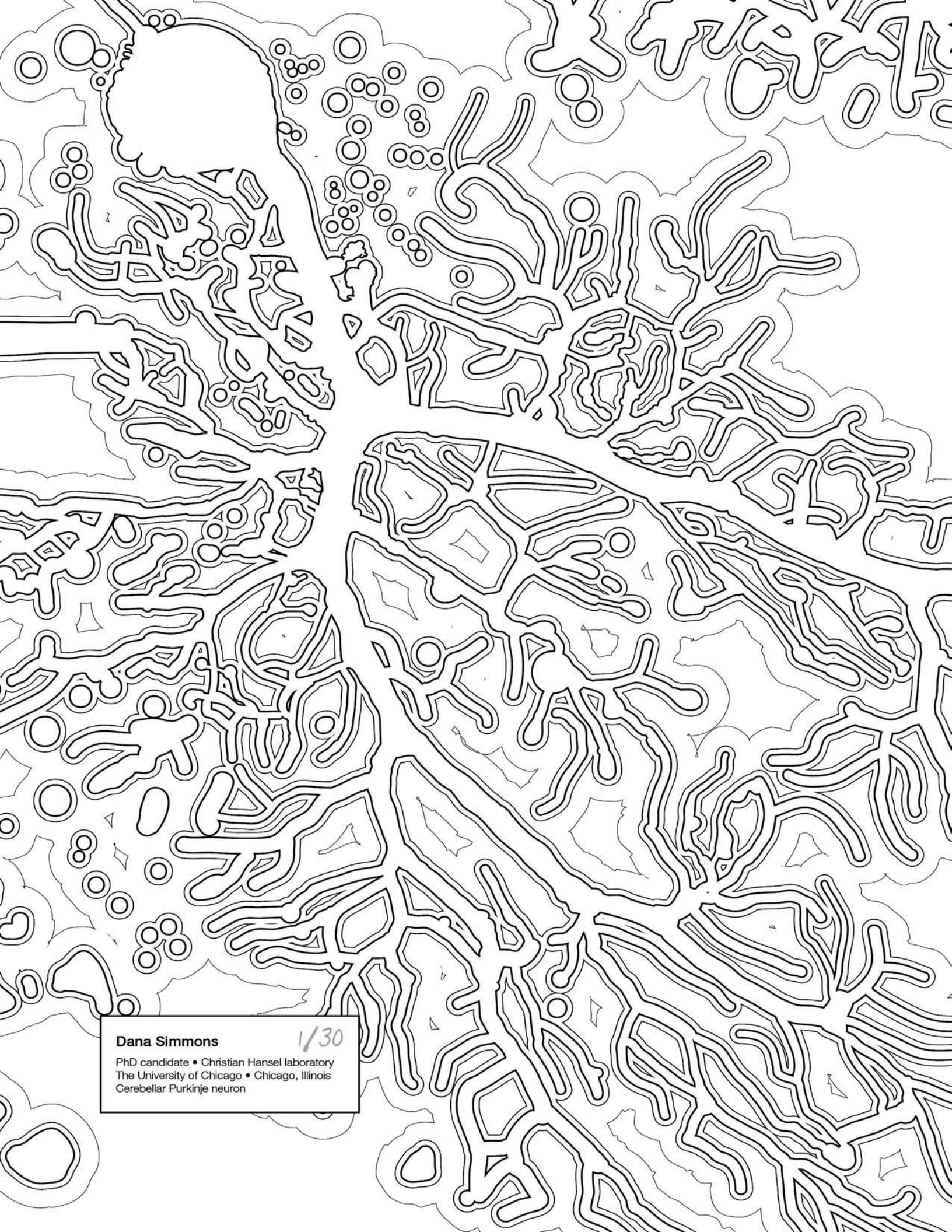

26


27


28


29

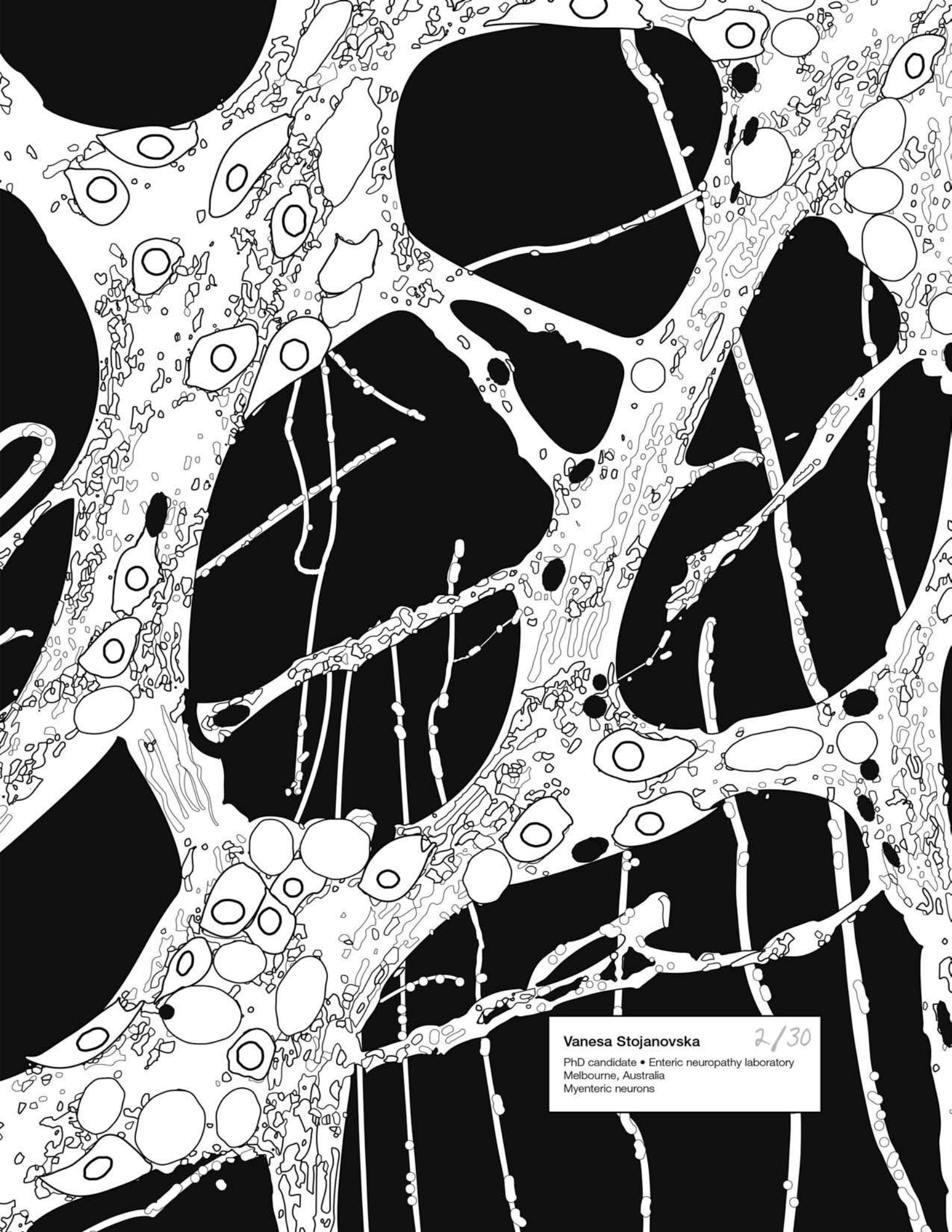

30



Dana Simmons

PhD candidate • Christian Hansel laboratory
The University of Chicago • Chicago, Illinois
Cerebellar Purkinje neuron

1/30

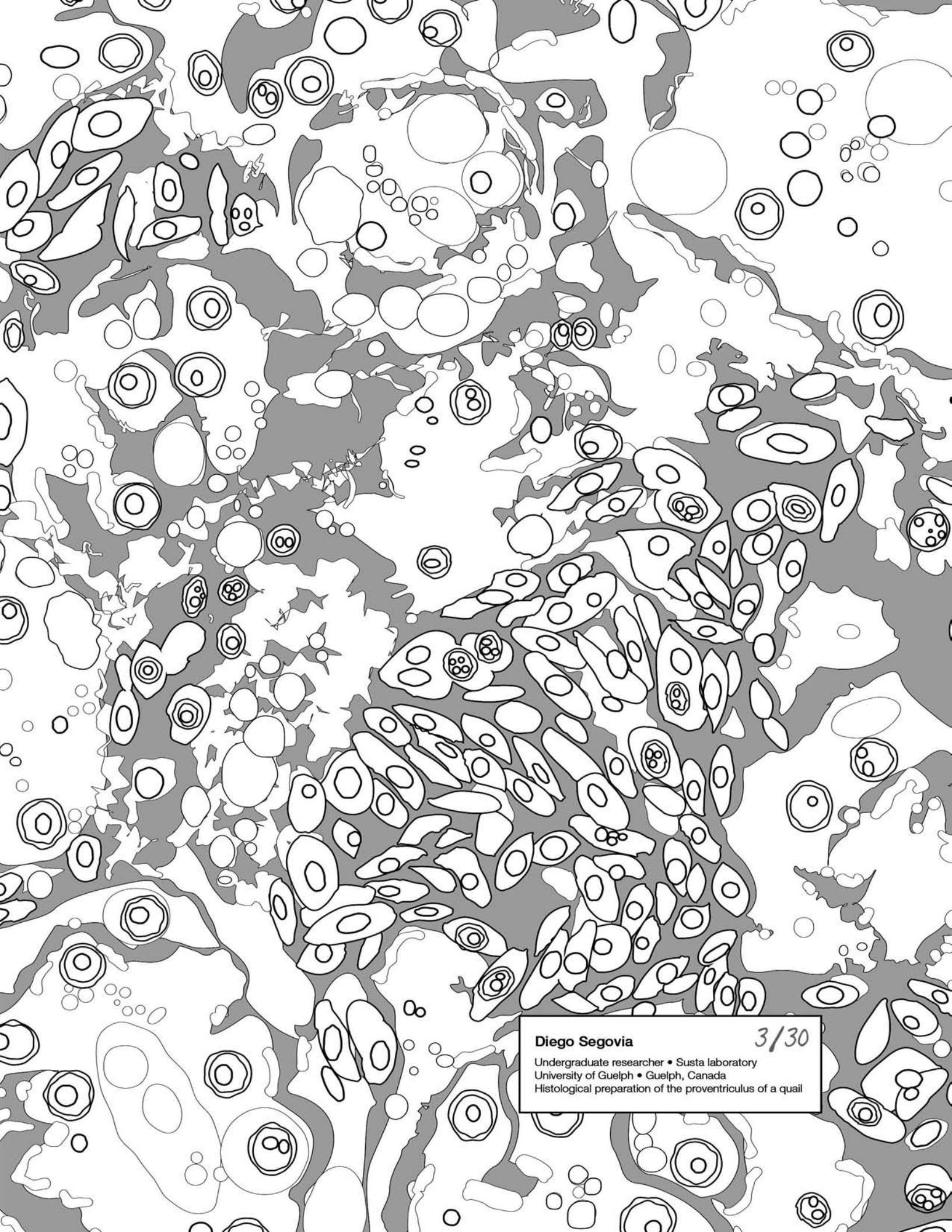


Vanesa Stojanovska

PhD candidate • Enteric neuropathy laboratory
Melbourne, Australia

2/30

Myenteric neurons

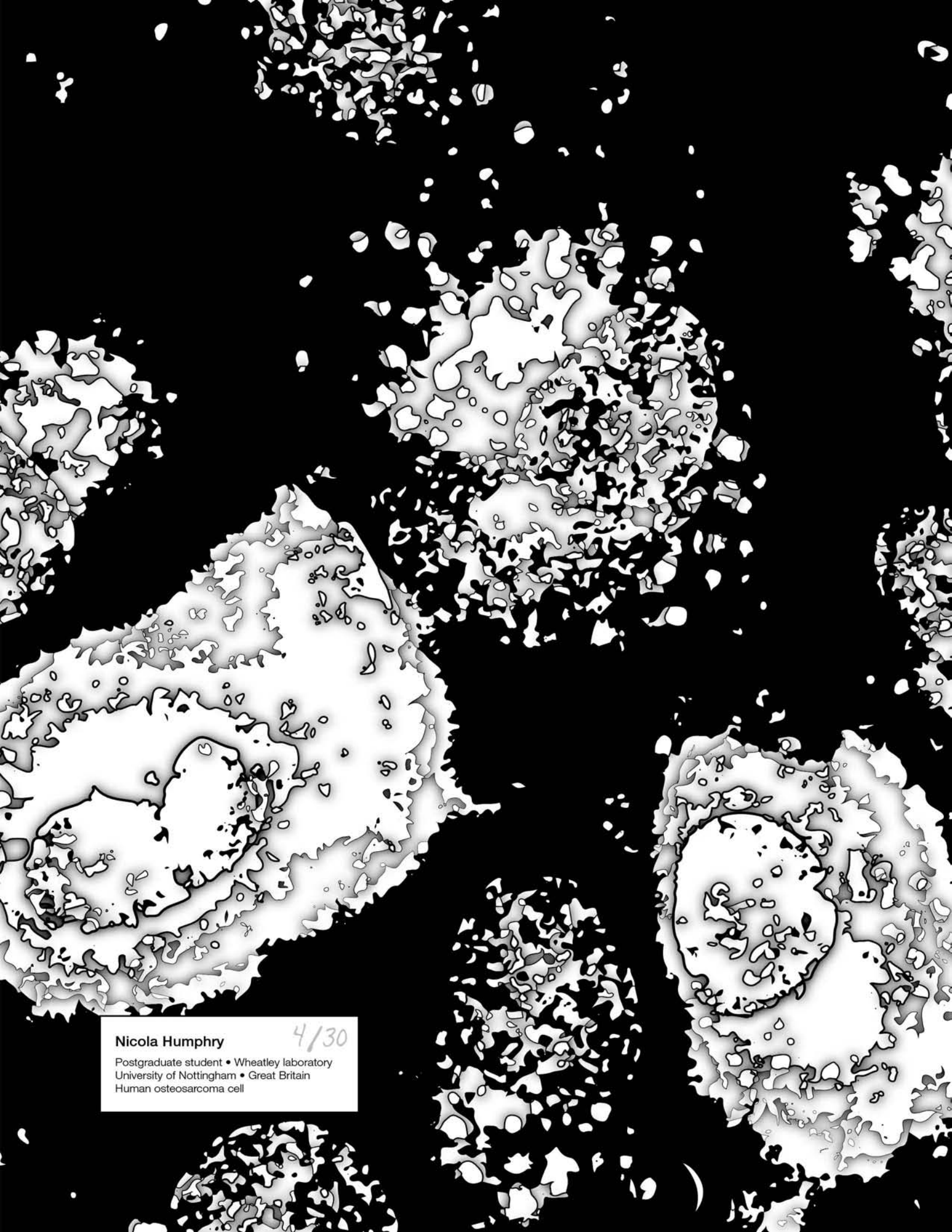


Diego Segovia

Undergraduate researcher • Susta laboratory
University of Guelph • Guelph, Canada

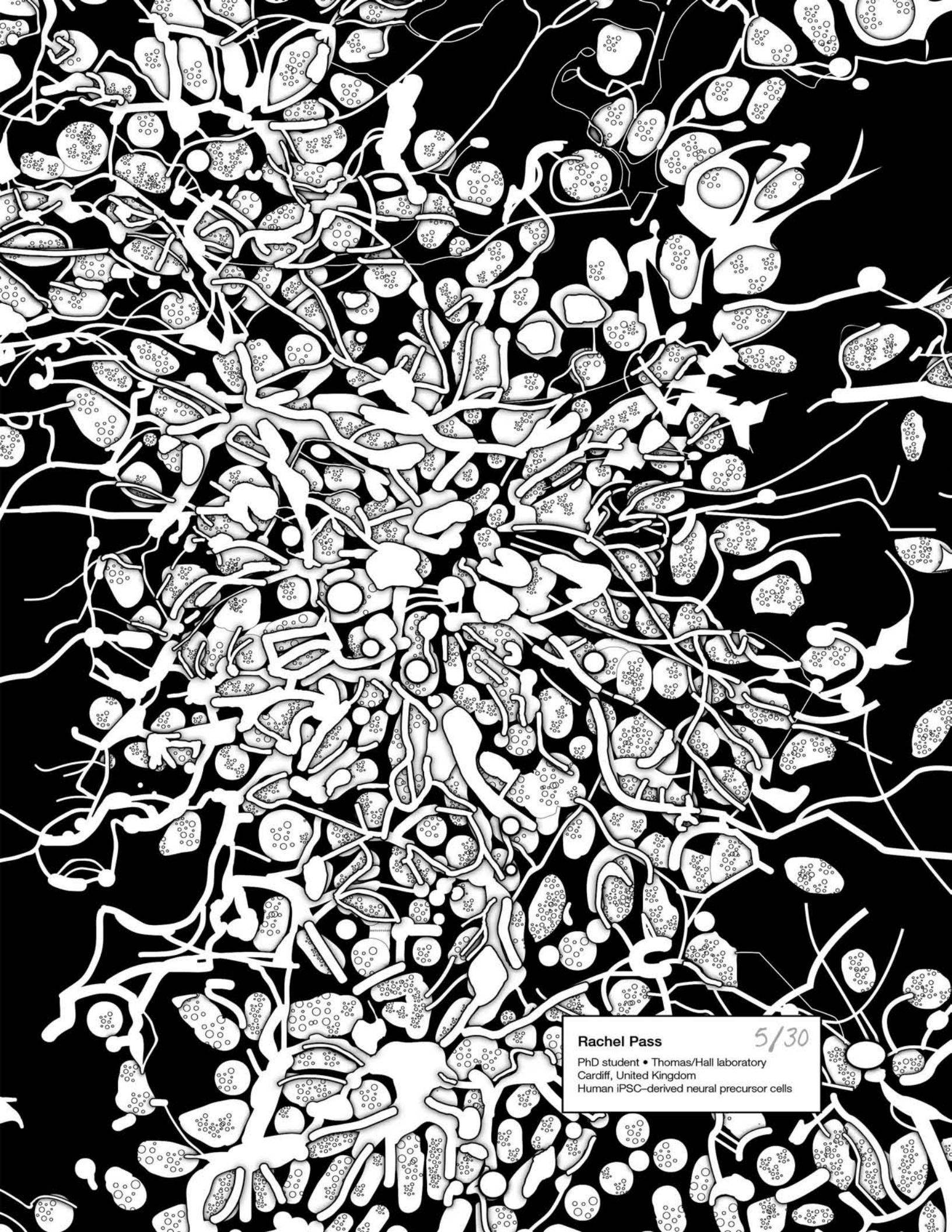
3/30

Histological preparation of the proventriculus of a quail



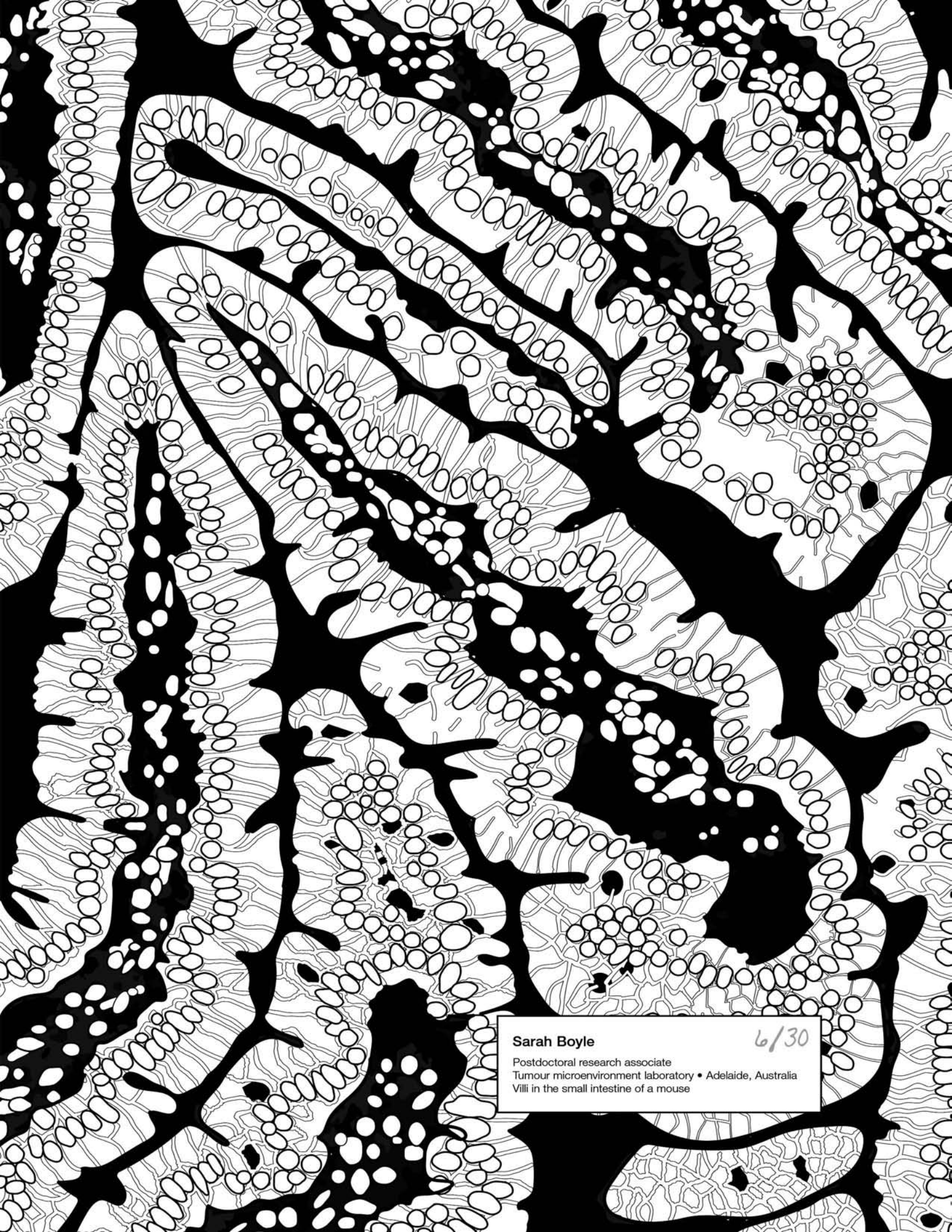
Nicola Humphry 4/30

Postgraduate student • Wheatley laboratory
University of Nottingham • Great Britain
Human osteosarcoma cell



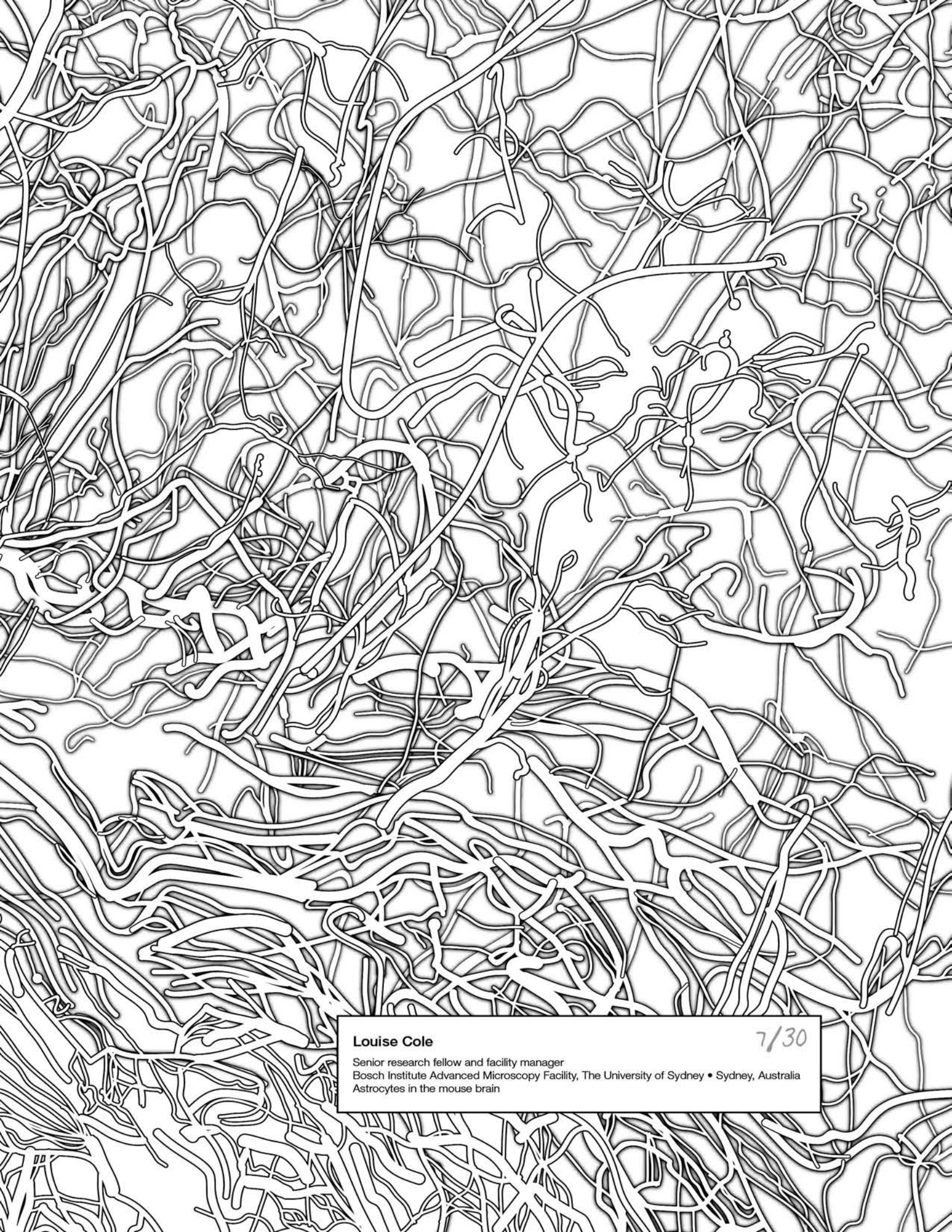
Rachel Pass 5/30

PhD student • Thomas/Hall laboratory
Cardiff, United Kingdom
Human iPSC–derived neural precursor cells



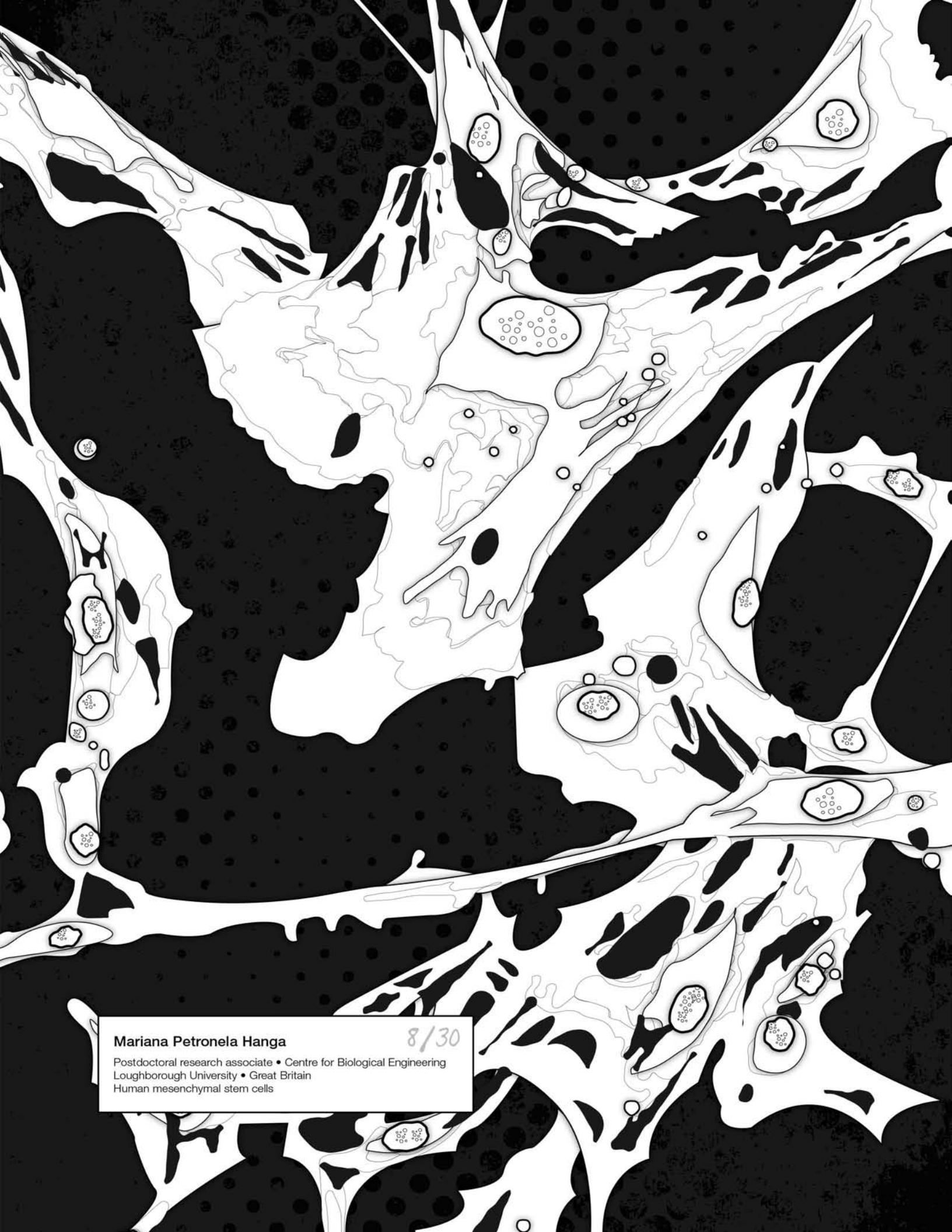
Sarah Boyle 6/30

Postdoctoral research associate
Tumour microenvironment laboratory • Adelaide, Australia
Villi in the small intestine of a mouse



Louise Cole 7/30

Senior research fellow and facility manager
Bosch Institute Advanced Microscopy Facility, The University of Sydney • Sydney, Australia
Astrocytes in the mouse brain

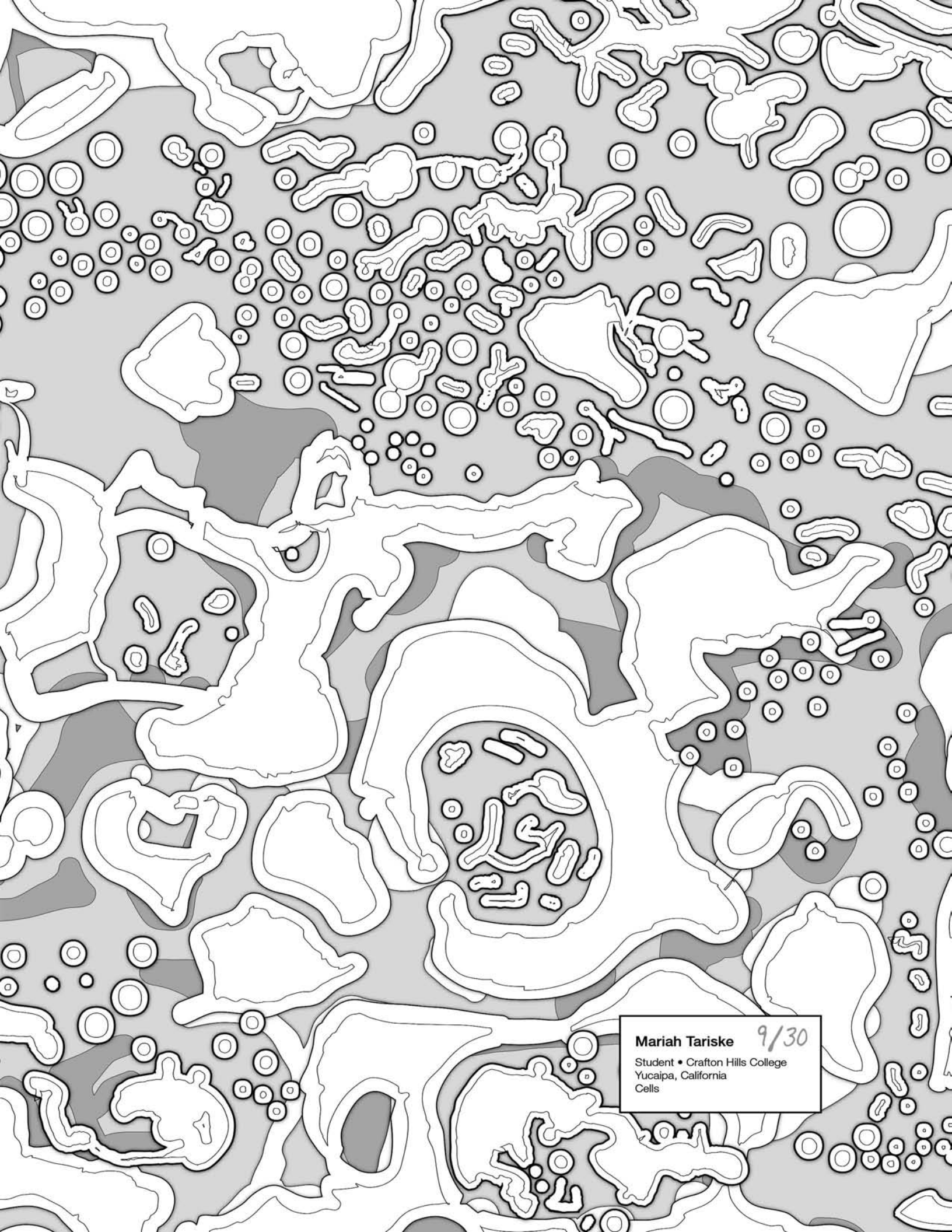


Mariana Petronela Hanga

Postdoctoral research associate • Centre for Biological Engineering
Loughborough University • Great Britain

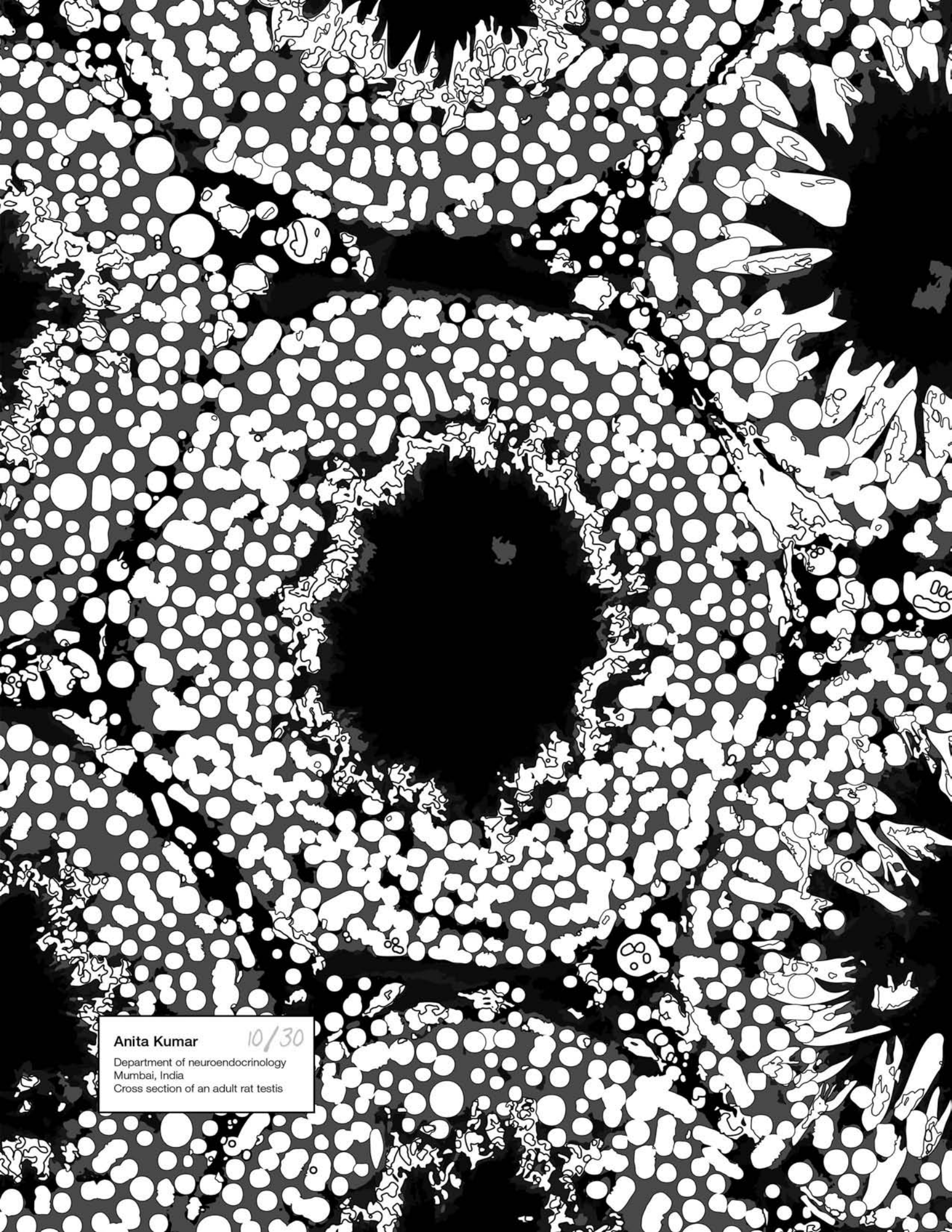
8/30

Human mesenchymal stem cells



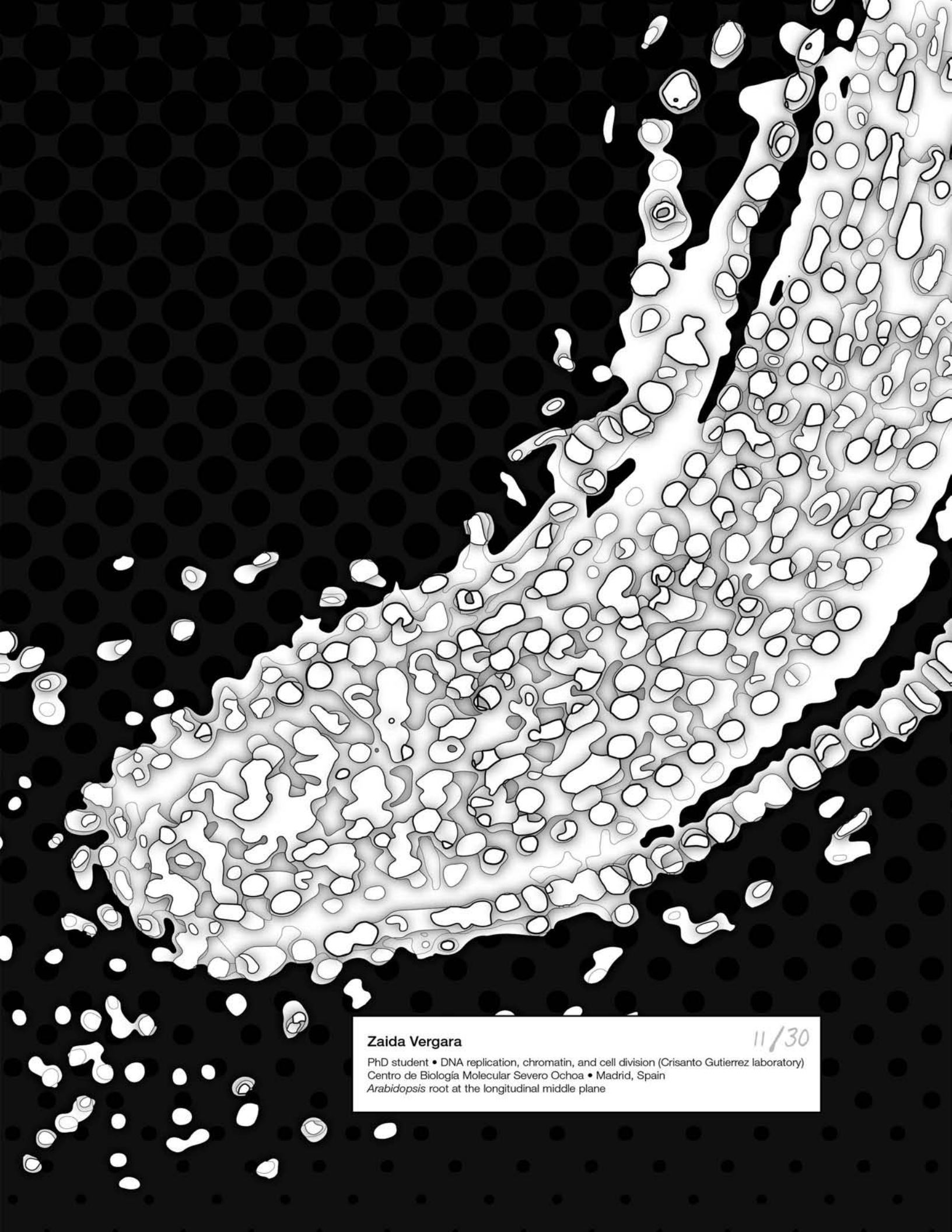
Mariah Tariske 9/30

Student • Crafton Hills College
Yucaipa, California
Cells



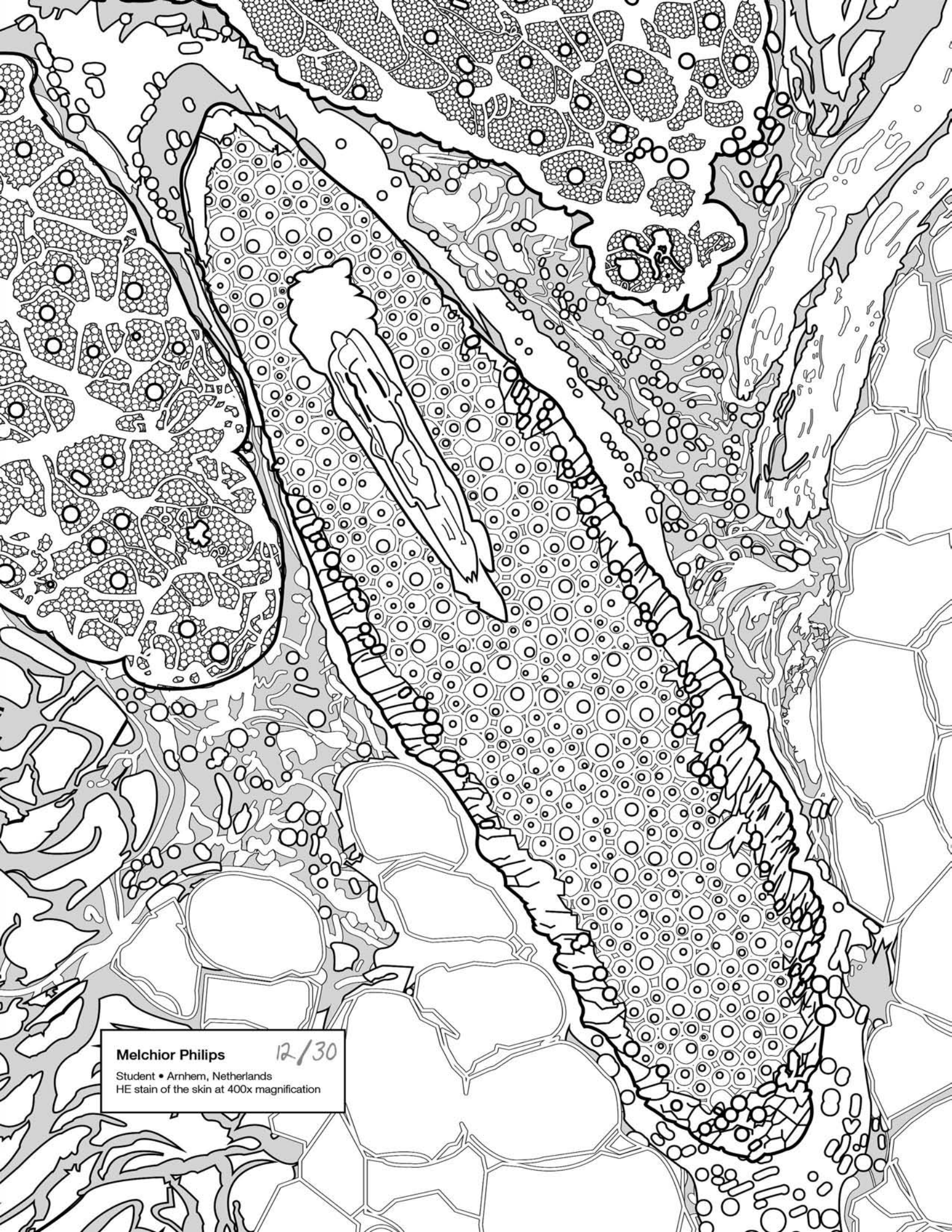
Anita Kumar 10/30

Department of neuroendocrinology
Mumbai, India
Cross section of an adult rat testis



Zaida Vergara 11/30

PhD student • DNA replication, chromatin, and cell division (Crisanto Gutierrez laboratory)
Centro de Biología Molecular Severo Ochoa • Madrid, Spain
Arabidopsis root at the longitudinal middle plane

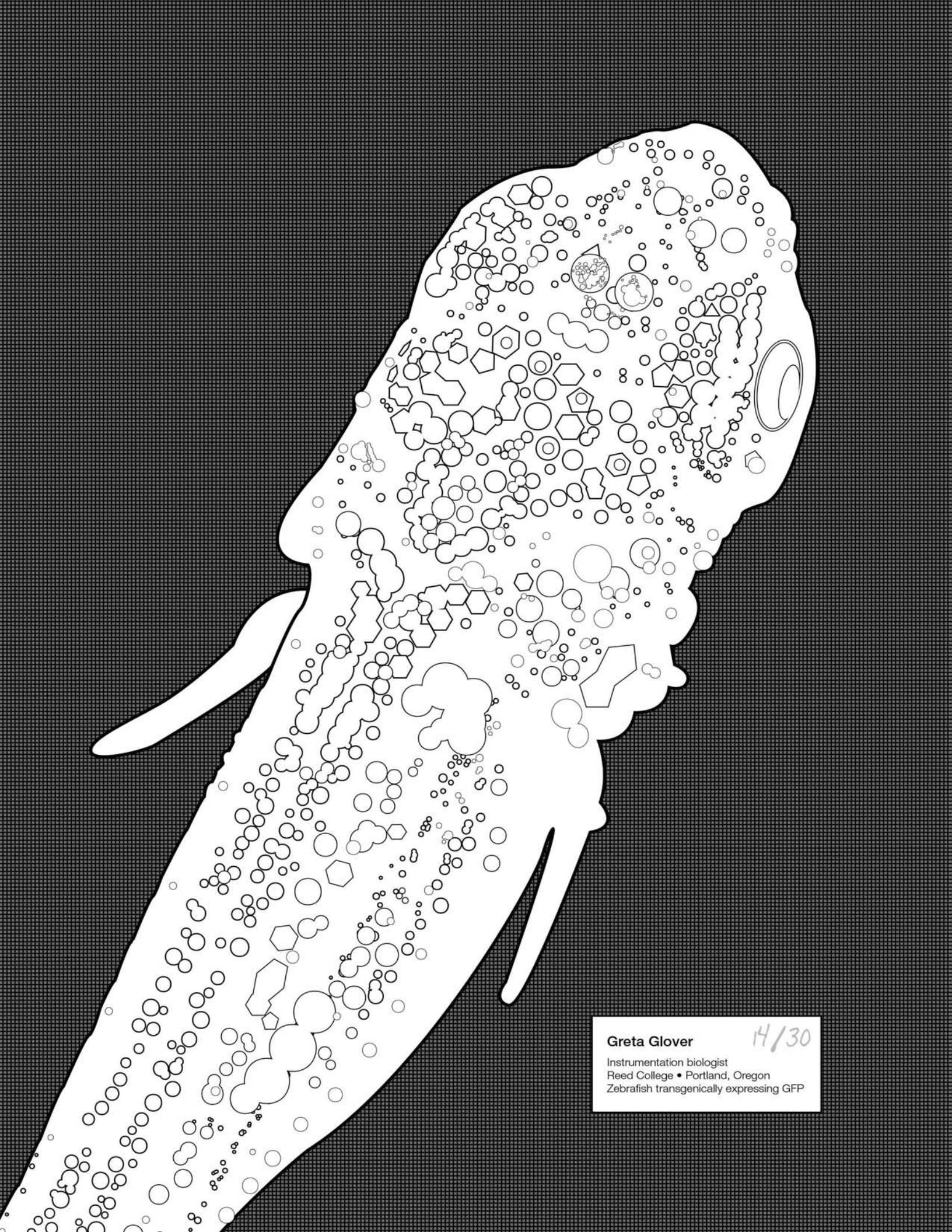


Melchior Philips 12/30

Student • Arnhem, Netherlands
HE stain of the skin at 400x magnification

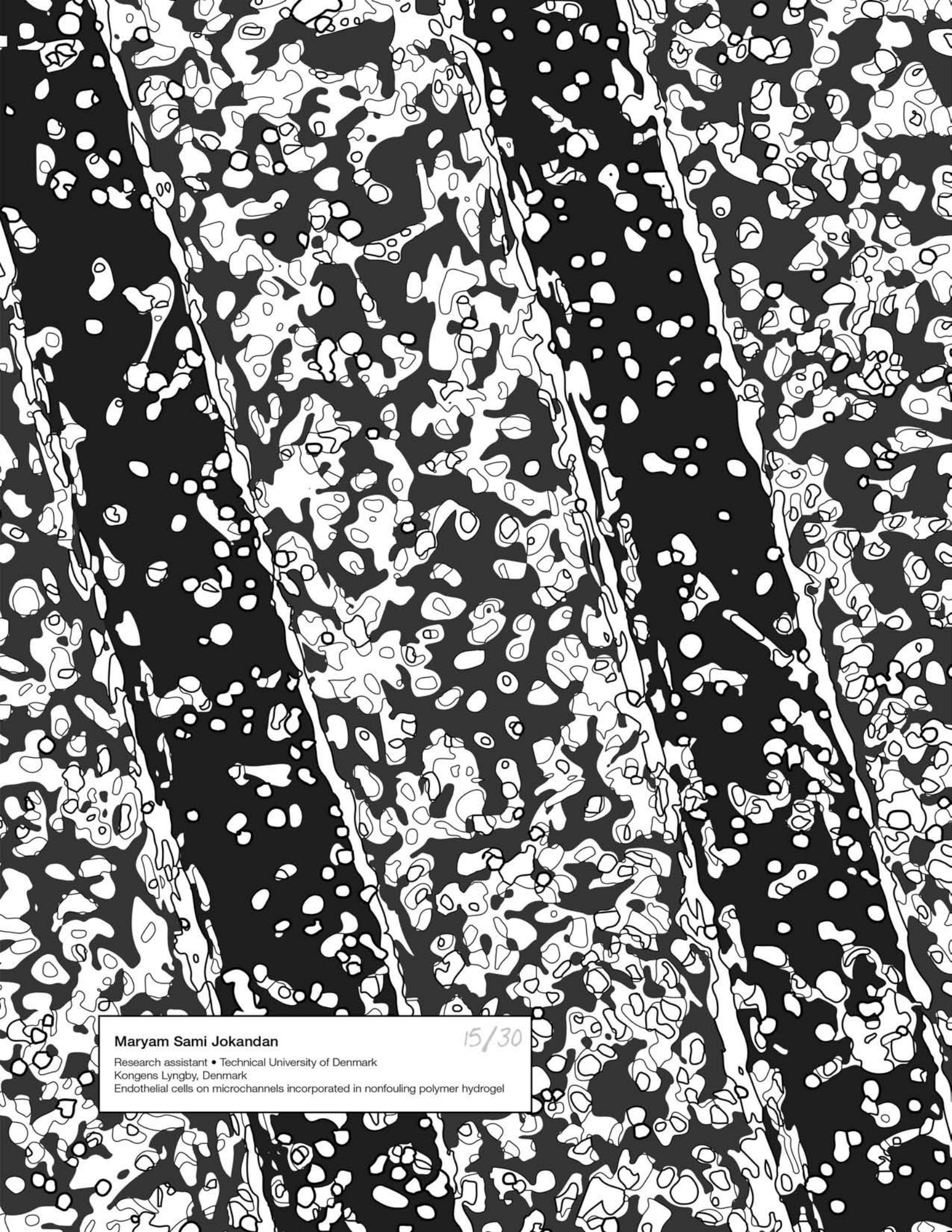
Arun Timmaraju 13/30

Michael Rossi laboratory
West Haven, CT
MDA-MB-231 cells



Greta Glover 14/30

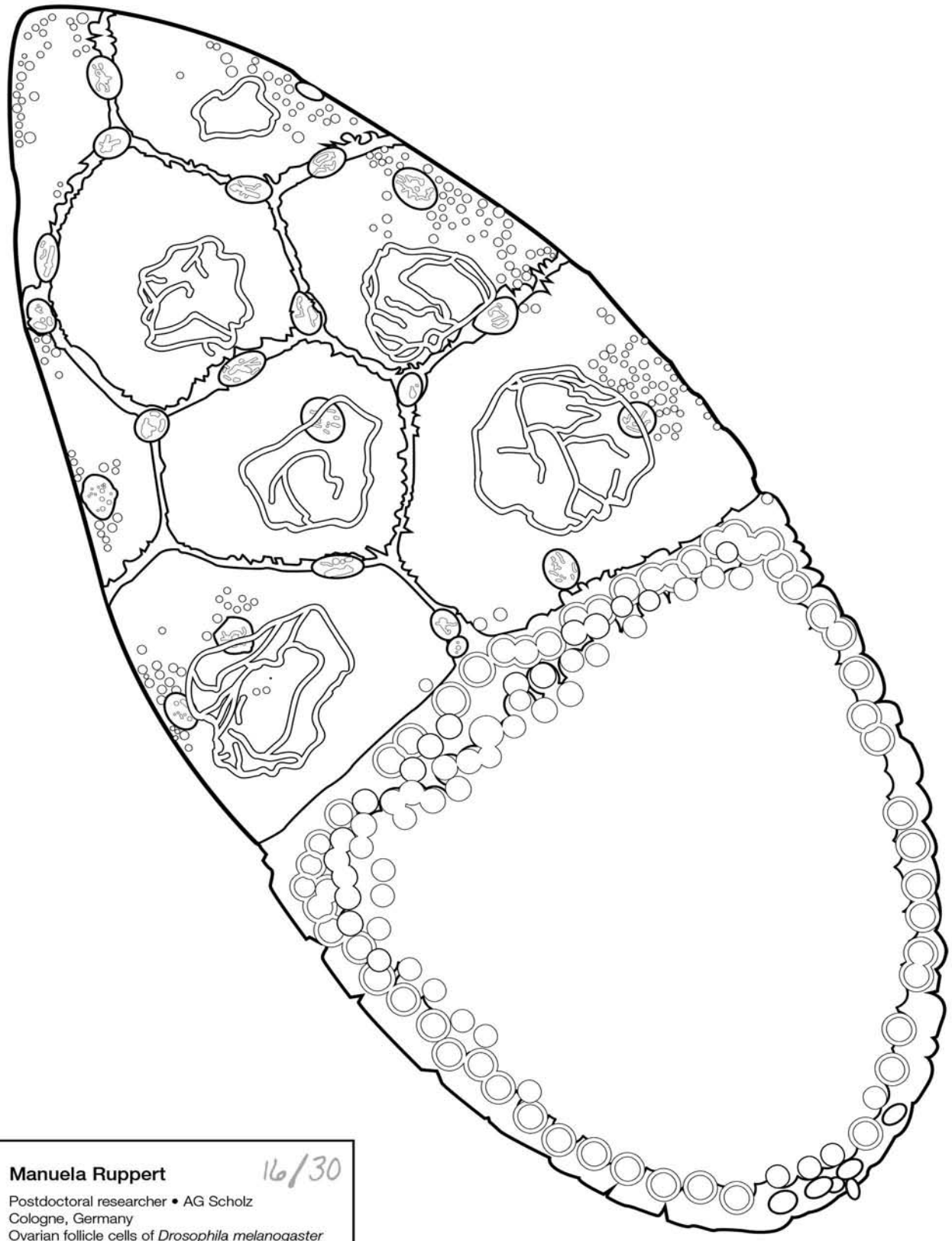
Instrumentation biologist
Reed College • Portland, Oregon
Zebrafish transgenically expressing GFP



15/30

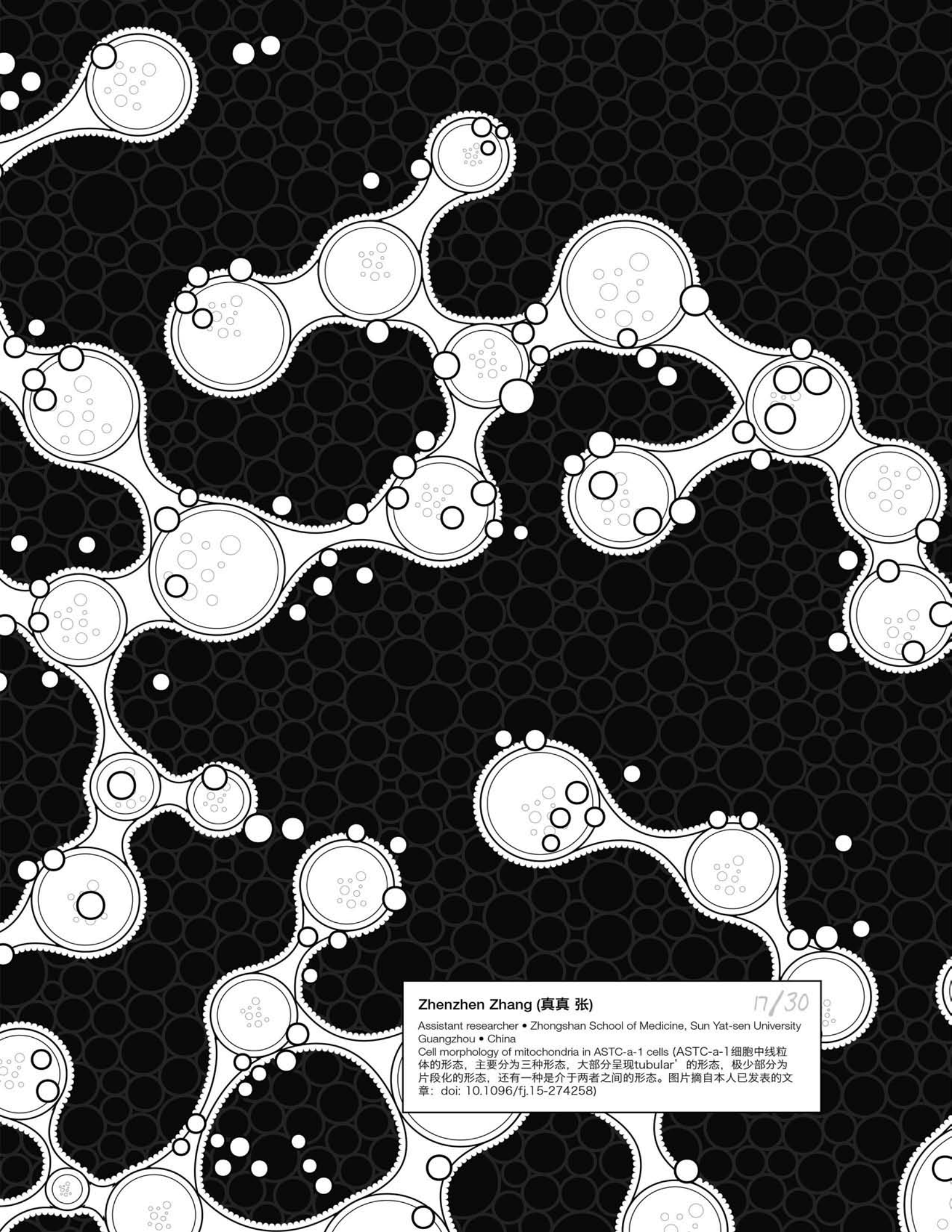
Maryam Sami Jokandan

Research assistant • Technical University of Denmark
Kongens Lyngby, Denmark
Endothelial cells on microchannels incorporated in nonfouling polymer hydrogel



Manuela Ruppert 16/30

Postdoctoral researcher • AG Scholz
Cologne, Germany
Ovarian follicle cells of *Drosophila melanogaster*

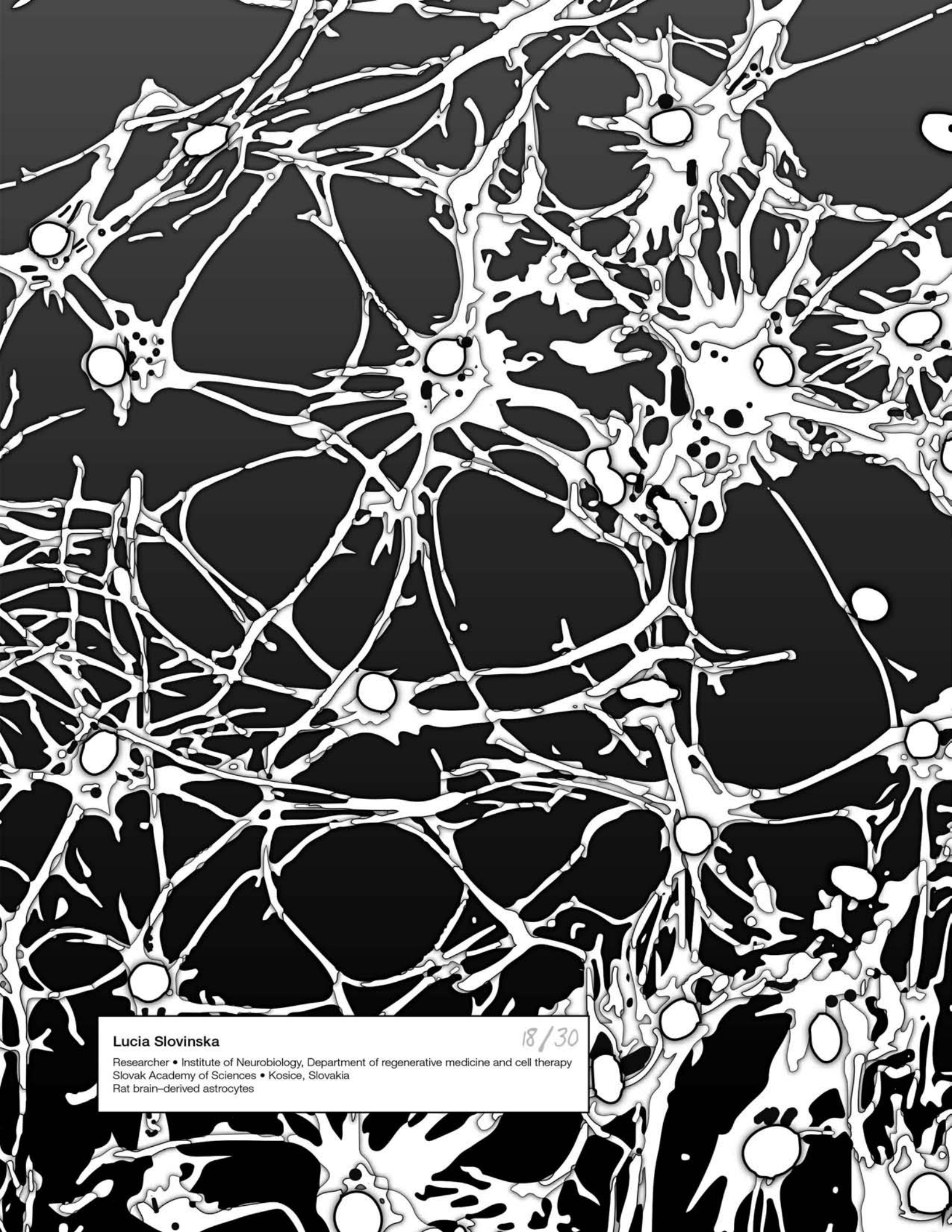


Zhenzhen Zhang (真真 张)

17/30

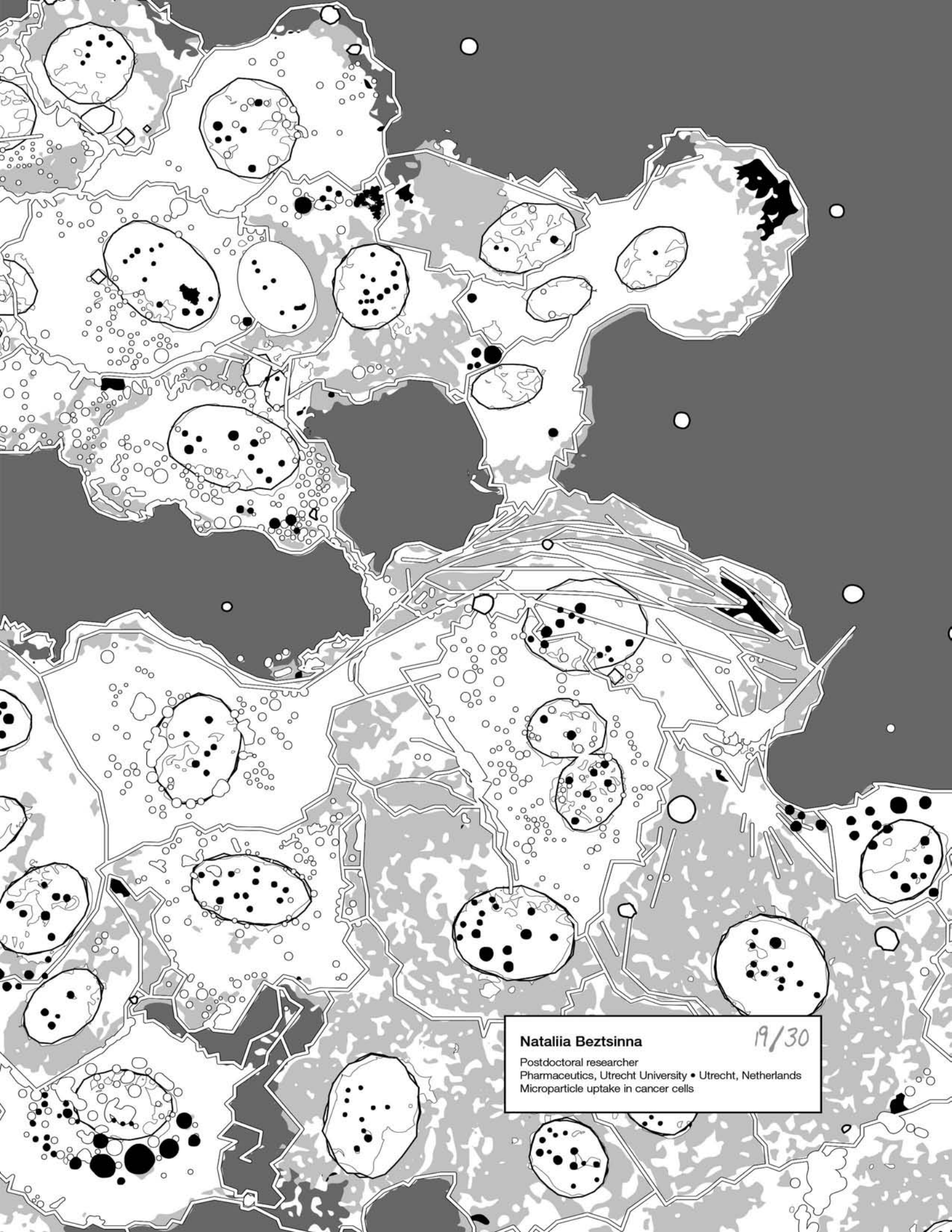
Assistant researcher • Zhongshan School of Medicine, Sun Yat-sen University
Guangzhou • China

Cell morphology of mitochondria in ASTC-a-1 cells (ASTC-a-1细胞中线粒体的形态，主要分为三种形态，大部分呈现tubular' 的形态，极少部分为片段化的形态，还有一种是介于两者之间的形态。图片摘自本人已发表的文章：doi: 10.1096/fj.15-274258)



Lucia Slovinska 18/30

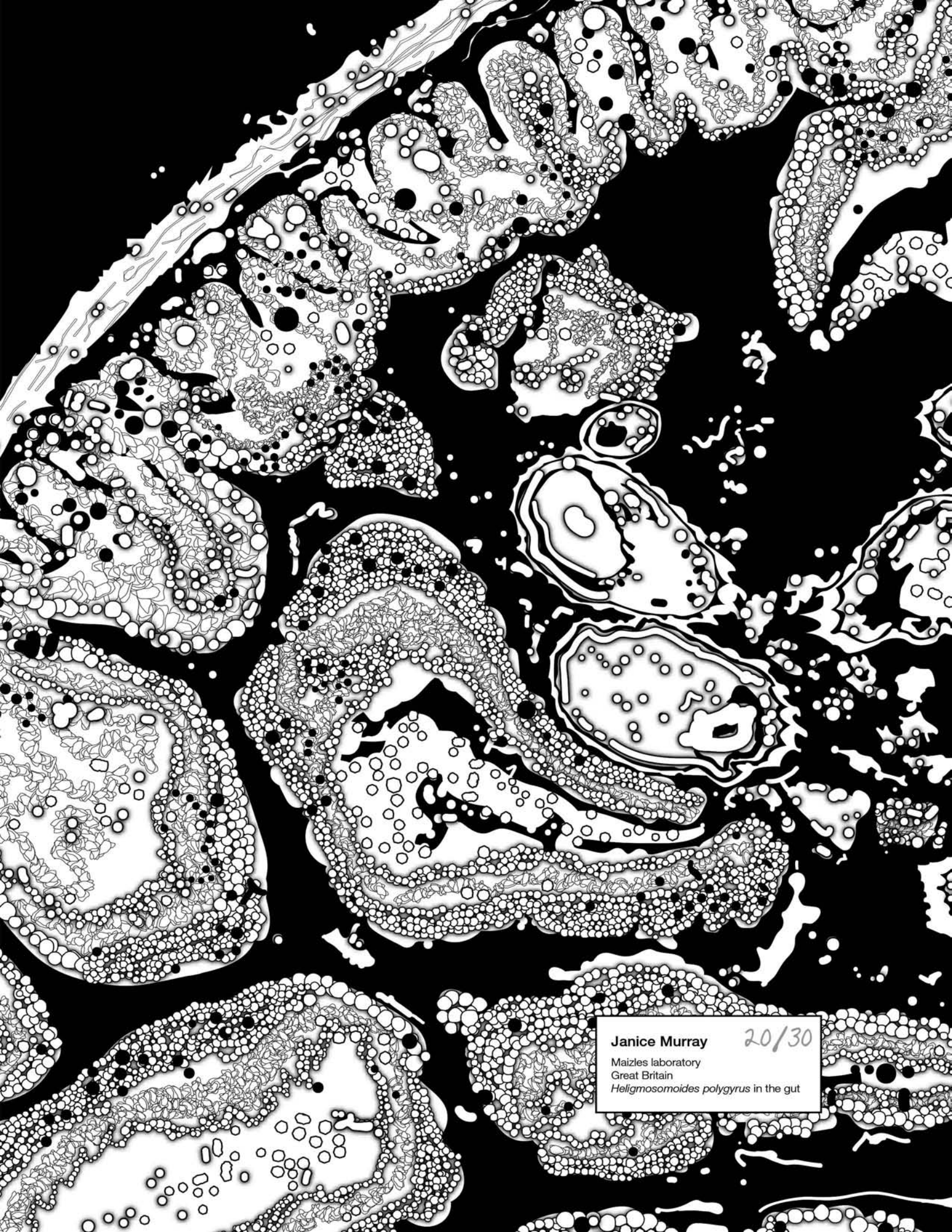
Researcher • Institute of Neurobiology, Department of regenerative medicine and cell therapy
Slovak Academy of Sciences • Kosice, Slovakia
Rat brain–derived astrocytes



Nataliia Beztsinna

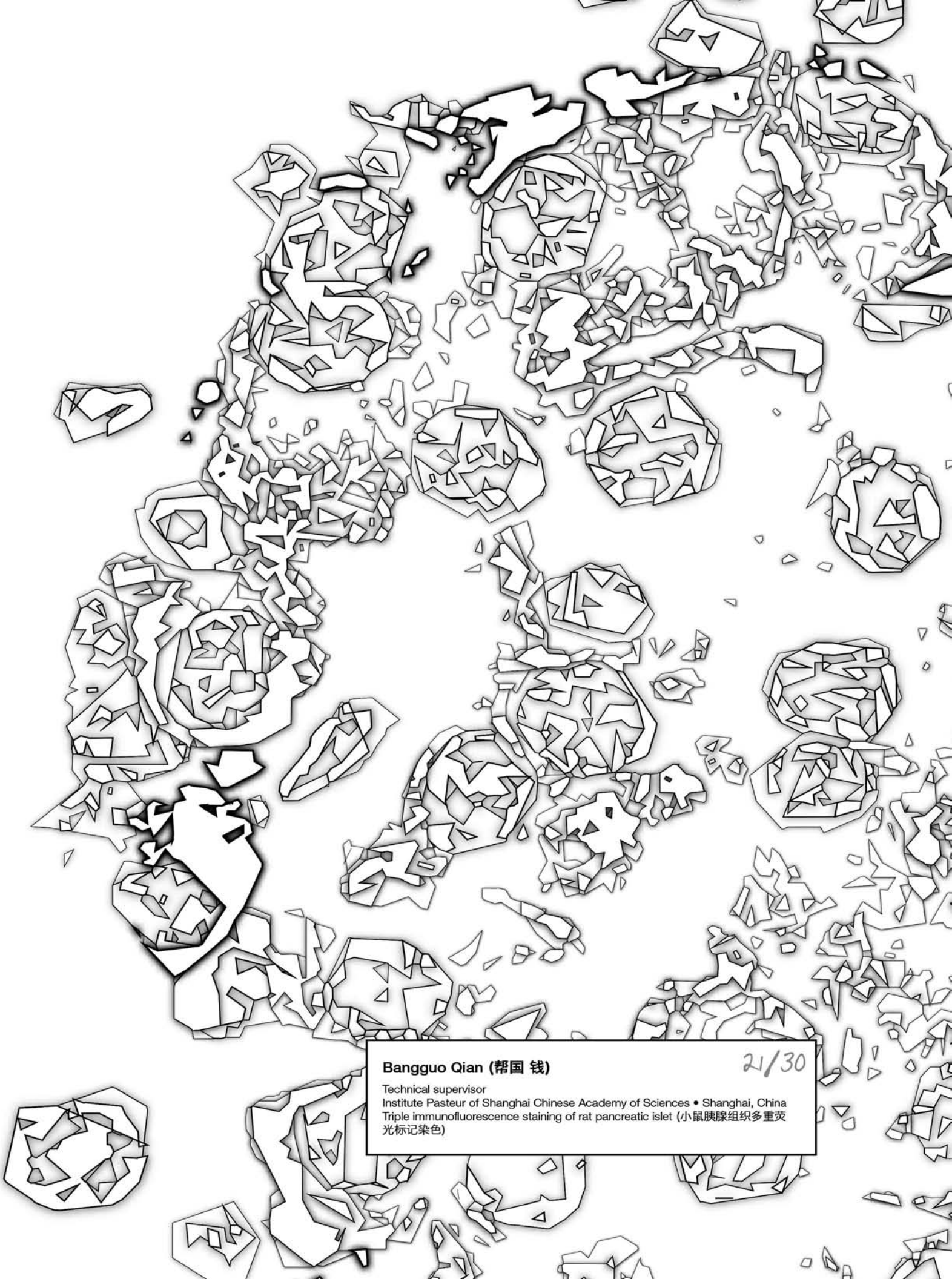
Postdoctoral researcher
Pharmaceutics, Utrecht University • Utrecht, Netherlands
Microparticle uptake in cancer cells

19/30



Janice Murray 20/30

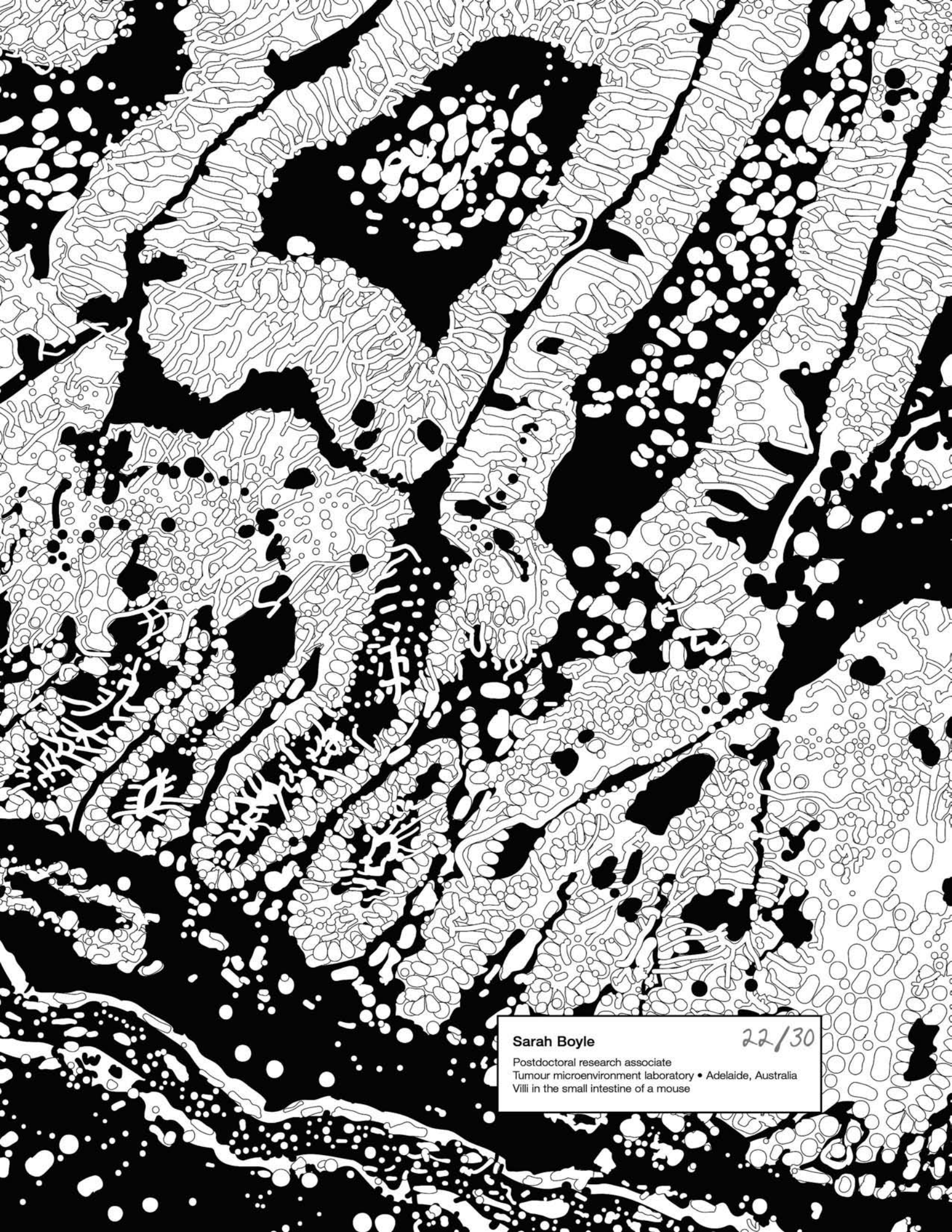
Maizles laboratory
Great Britain
Heligmosomoides polygyrus in the gut



Bangguo Qian (帮国 钱)

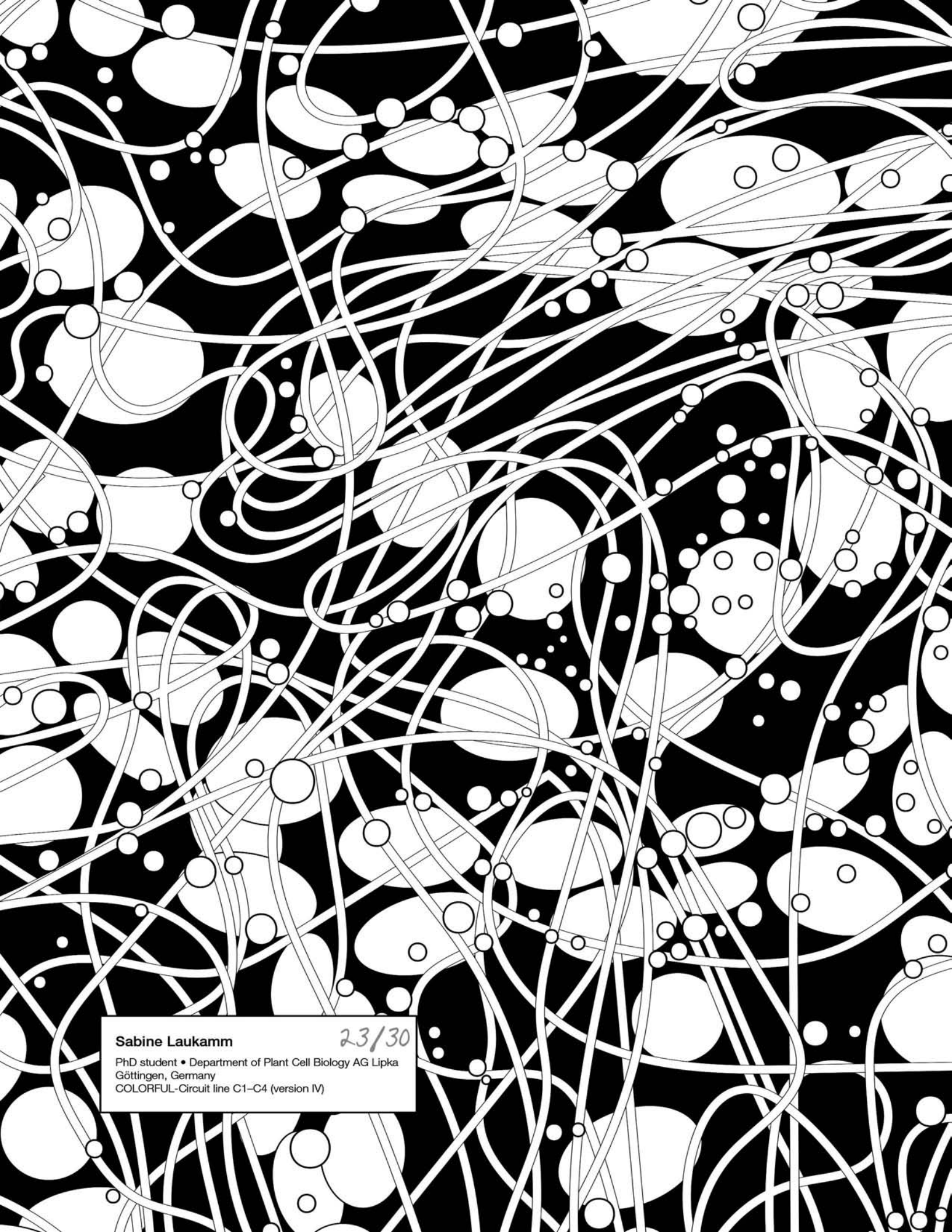
21/30

Technical supervisor
Institute Pasteur of Shanghai Chinese Academy of Sciences • Shanghai, China
Triple immunofluorescence staining of rat pancreatic islet (小鼠胰腺组织多重荧光标记染色)



Sarah Boyle 22/30

Postdoctoral research associate
Tumour microenvironment laboratory • Adelaide, Australia
Villi in the small intestine of a mouse

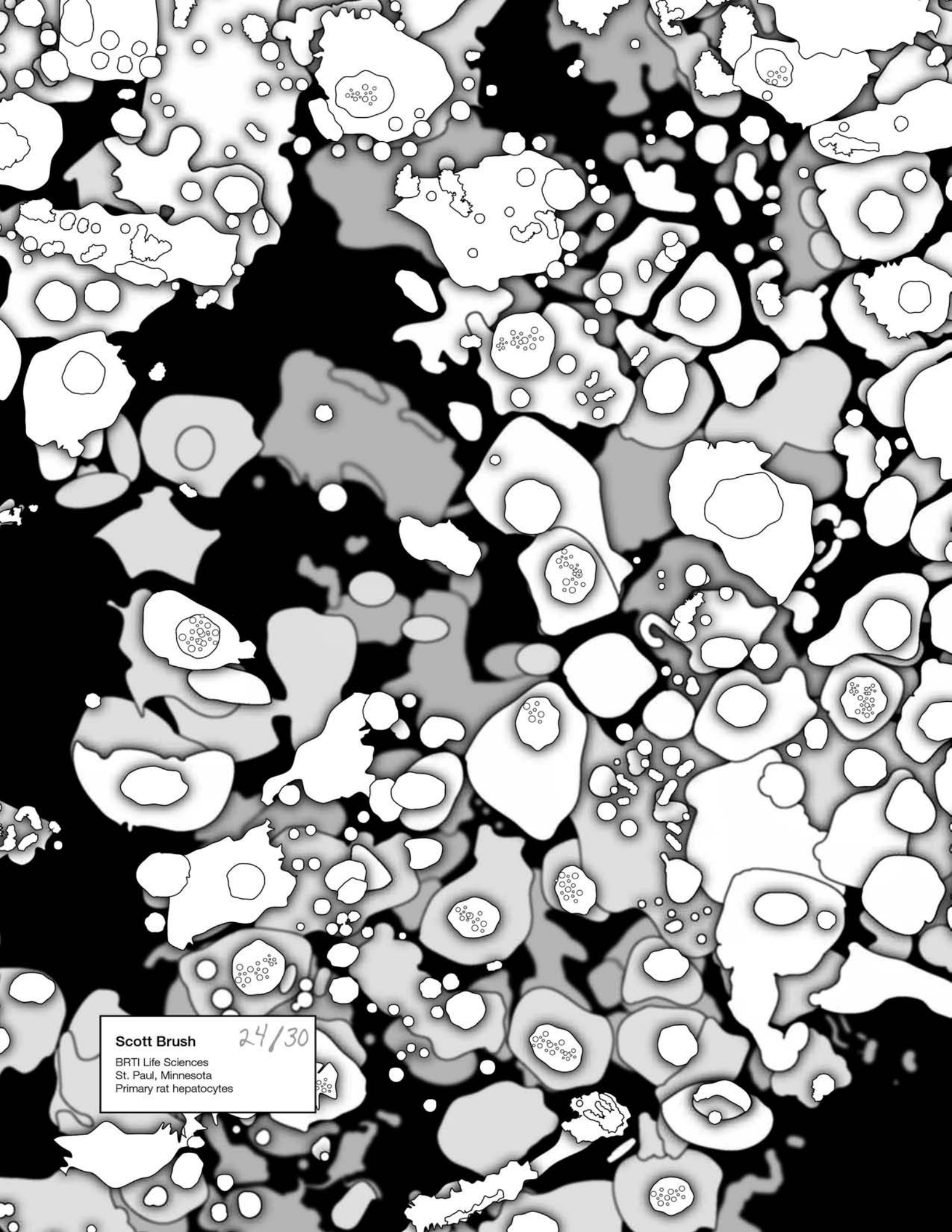


Sabine Laukamm

PhD student • Department of Plant Cell Biology AG Lipka
Göttingen, Germany

23/30

COLORFUL-Circuit line C1–C4 (version IV)



Scott Brush 24/30

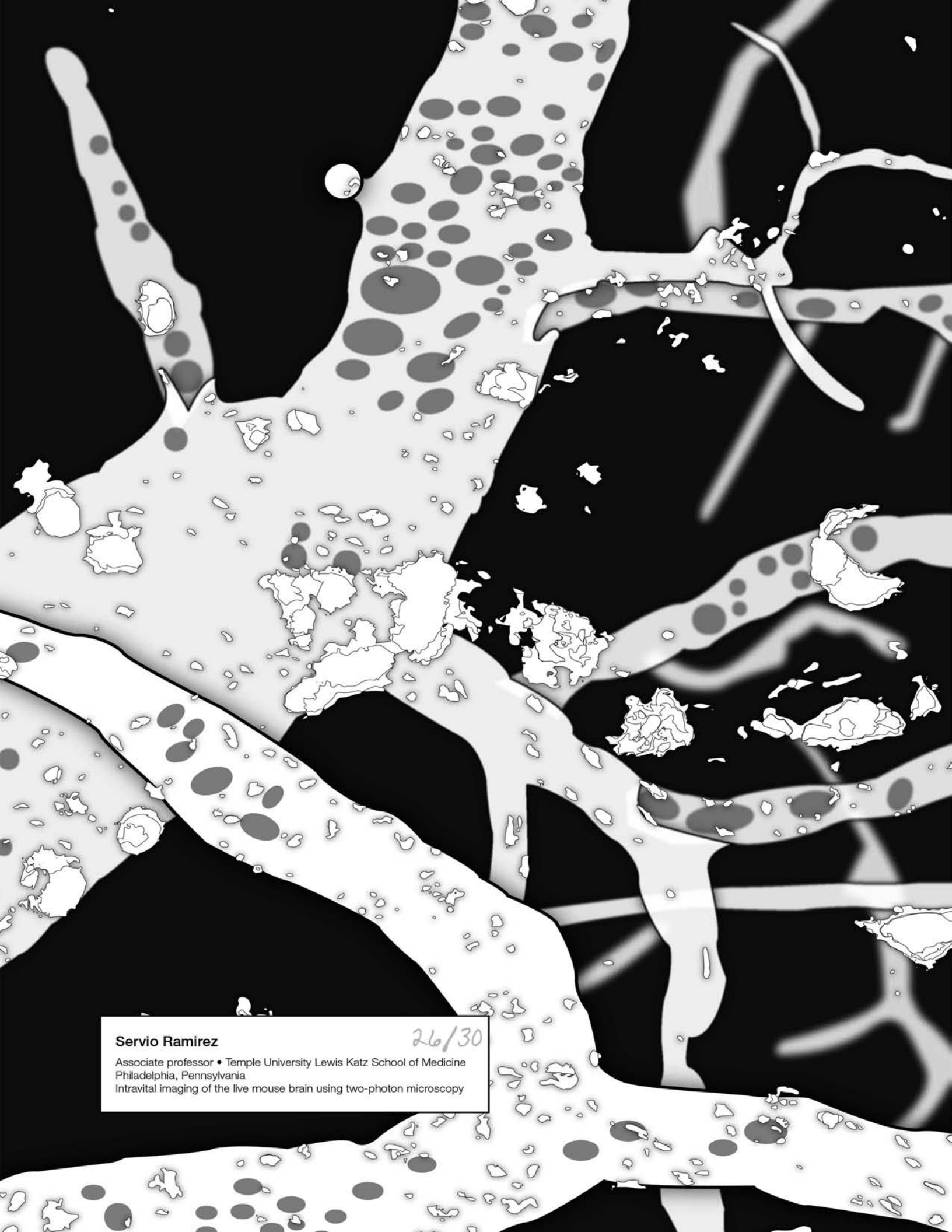
BRTI Life Sciences
St. Paul, Minnesota
Primary rat hepatocytes

Lorenz Fuelle

PhD student • Immunology and Environment, LIMES Institute
University of Bonn • Bonn, Germany

25/30

Dendritic cells

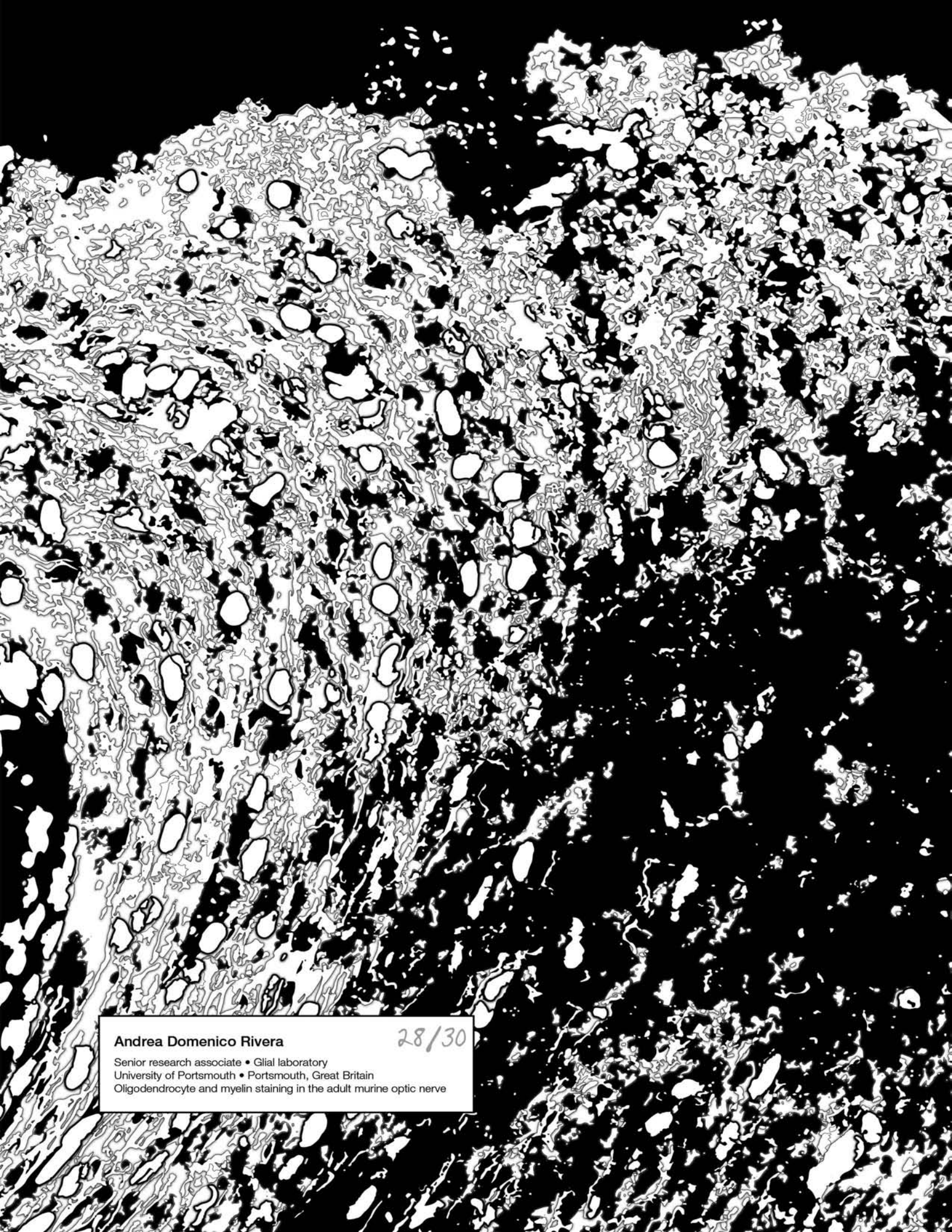


Servio Ramirez 26/30

Associate professor • Temple University Lewis Katz School of Medicine
Philadelphia, Pennsylvania
Intravital imaging of the live mouse brain using two-photon microscopy

Ge Li (李戈) 27/30

Zhongshan School of Medicine
Sun Yat-sen University • Guangzhou, China
Astrocytes differentiated from neural stem cells *in vitro* (图片中的细胞为神经干细胞分化而成的星形胶质细胞，星形胶质细胞是神经系统中重要的组成部分，起支撑、营养和保护神经元的作用。图中的星形胶质细胞之间伸出突起相互接触形成网络，很好的模拟了体内星形胶质细胞的保护功能，而星形的胞体交错分布又仿佛新生的柳条摇曳风中，带给人生机盎然的春意。欣赏此图，颇有“与君赏春柳，做饮杯中云”的闲情雅致。)

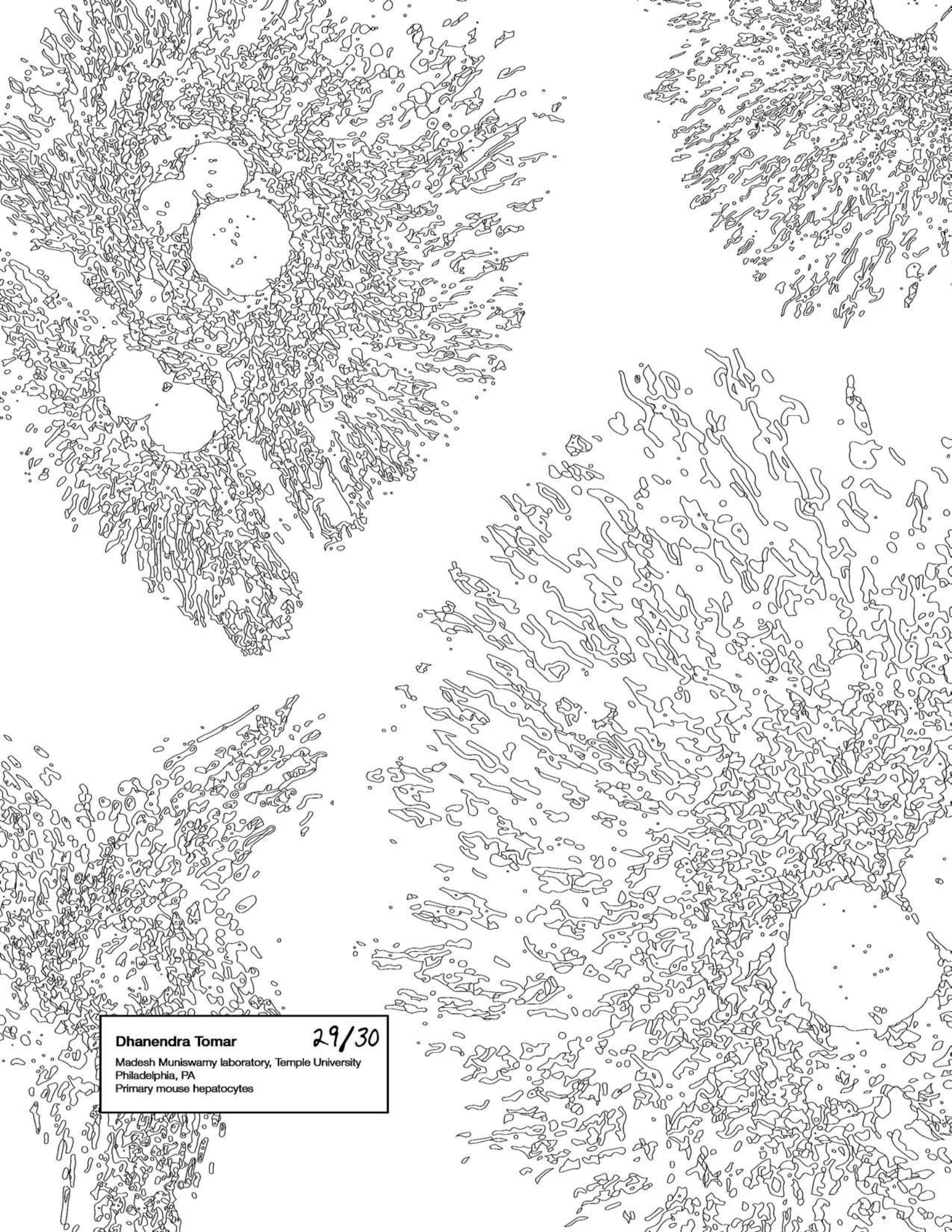


Andrea Domenico Rivera

Senior research associate • Glial laboratory
University of Portsmouth • Portsmouth, Great Britain

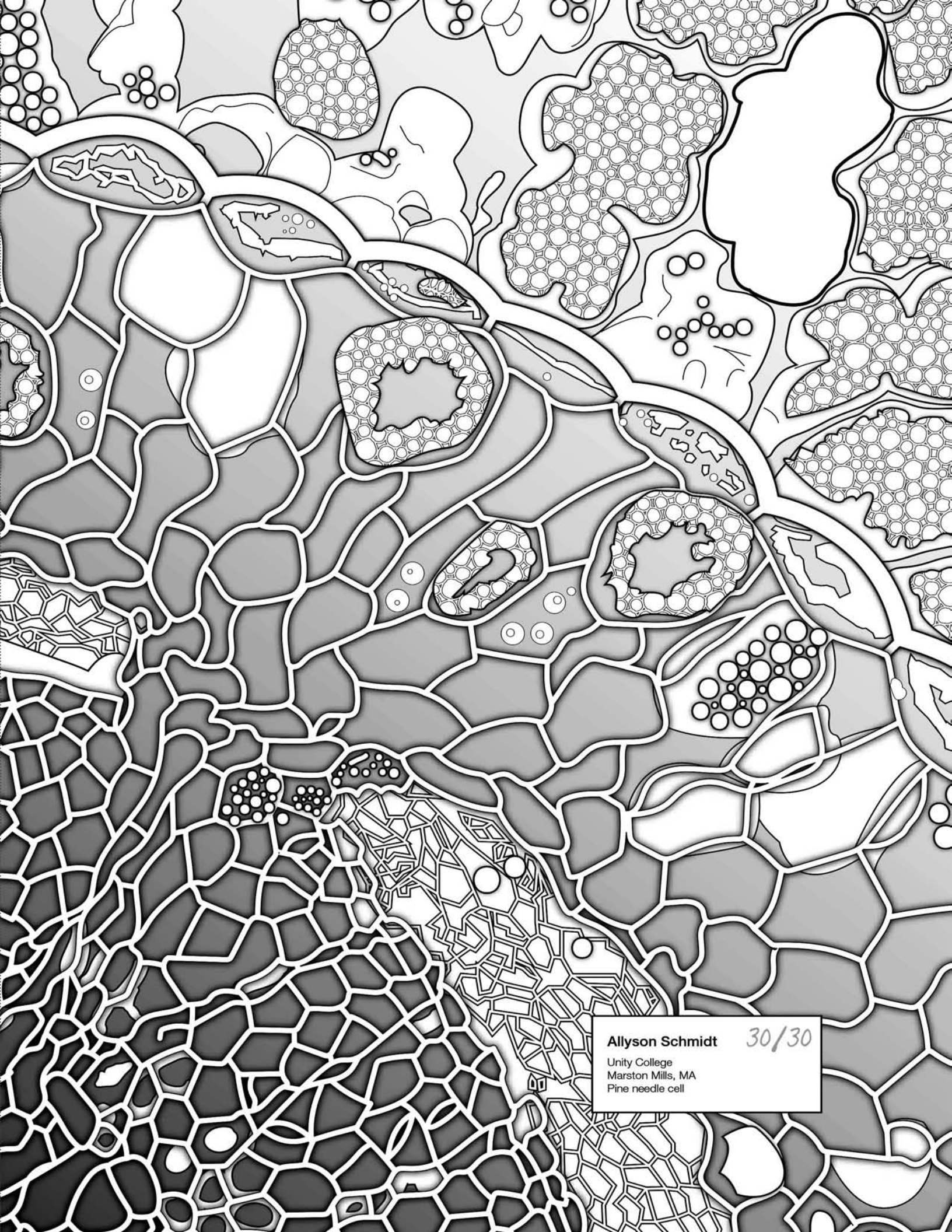
28/30

Oligodendrocyte and myelin staining in the adult murine optic nerve



Dhanendra Tomar 29/30

Madesh Muniswamy laboratory, Temple University
Philadelphia, PA
Primary mouse hepatocytes



Allyson Schmidt 30/30

Unity College
Marston Mills, MA
Pine needle cell

Five steps for publication-quality cell imaging the first time

Follow this proven guide to capture the best possible fixed-cell images

Introduction

We are all driven by great scientific innovation and believe that the journey to discovery is as important as the discovery itself. Choosing the right path can hasten your success and the wrong path can lead to missteps that extend the journey unnecessarily at the expense of time, money, and frustration.

With 40 years dedicated to cell imaging research, we offer long-proven tools and protocols to create quality cell images confidently the first time. In fact, Invitrogen™ imaging reagents are cited more frequently in published research than any others. Leverage our experience to enable your success and avoid costly missteps.

Whether you are new to cell imaging, or an experienced researcher wanting to confirm your knowledge, consider these 5 proven steps to help ensure that your cell images are publication-ready the first time.

1 **Fix, permeabilize, and block**

Prepare your cells for labeling

To achieve optimal imaging quality, begin by setting up your study to spotlight proteins and cell structures of interest, while keeping everything else out of the picture. Fixation and permeabilization prepare the cell samples for labeling—first, by locking cellular structures, proteins, and nucleic acids in place, and then by making it possible for antibodies and fluorescent stains to permeate the interior of cells and label the targets of interest. Blocking minimizes the signal-to-noise ratio, thereby preventing the fluorescent labels from inadvertently binding to proteins that are not relevant to your research.

Product highlight

Image-iT Fixation/Permeabilization Kit

The Invitrogen™ Image-iT™ Fixation/Permeabilization Kit is a complete fixation and permeabilization solution containing all the reagents necessary to prepare your cells for antibody staining and imaging. The high-quality components come in a box with single-use vials and easy-to-follow protocols to help preserve cell morphology and reduce background staining.

2 **Label**

Labeling various targets with separate fluorescent colors allows you to visualize different structures or proteins within a cell in the same sample. Ways to label your target fluorescently include fluorescent dyes, immunolabeling, and fluorescent fusion proteins—all of which can provide a means to selectively mark structures and proteins within the cell, allowing you to see them more easily when you image.

Product highlight

Primary antibodies

The Invitrogen™ portfolio offers more than 51,000 high-quality primary antibodies. Some of these antibodies are attached directly to the broad range of intensely fluorescent markers and labels including Invitrogen™ Alexa Fluor™ dyes.

Many fluorescence tools for cell biology are essentially fluorophores that have been modified in different ways or conjugated to various molecules to give them a certain function or allow them to bind to specific organelles or proteins.

Through chemical modifications, a single fluorophore can be produced in a number of variant forms, each with a different specificity. For example, the green-fluorescent Invitrogen™ Alexa Fluor™ 488 dye molecule can be modified to target actin filaments, can be attached to an IgG for use in immunolabeling, or can act as a whole-cell stain.

Explore our extensive portfolio of antibodies at **thermofisher.com/primaryantibodies**

3 **Detect**

Fine-tune fluorescence signals for observation

Detecting the complex biological assemblies requires maximum clarity of fluorescence signals and separation of signals from background noise. Standard immunofluorescent labeling rarely provides the highest-quality signal-to-noise visibility. The difference between producing a good and a great publication-quality image requires fine-tuning your sample's signal for peak specificity, definition, and amplification.

Quickly and easily choose the labeling solution you need at **thermofisher.com/immunofluorescence**

High- to medium-abundance protein targets

Secondary antibodies are used for the indirect detection of target antigens. While primary antibodies bind directly to the target, secondary antibodies bind indirectly by using the primary antibody as a bridge to the targeted biomolecule. This methodology serves to amplify the signal and increase sensitivity to maximize detection.

Find out more about secondary antibodies at **thermofisher.com/secondaryantibodies**

Medium- to low-abundance protein targets

Streptavidin conjugates can result in an increase in the number of fluorophores that label your target to boost their signals. For improved detection sensitivity, streptavidin-based amplification techniques are widely used in fluorescence imaging to detect primary and secondary antibodies.

Find out more about imaging with streptavidin at **thermofisher.com/streptavidin**

Low-abundance protein targets

For detection of low-abundance protein targets that are not detectable by conventional means, tyramide signal amplification (TSA™, PerkinElmer) provides sensitive detection without compromising resolution. TSA technology employs an enzyme that releases reactive dyes in the presence of hydrogen peroxide to bring targets out of the background with definition and clarity.

Product highlight

Tyramide SuperBoost Kits

The Invitrogen™ SuperBoost™ technology is the most sensitive fluorescence imaging detection method for low-abundance protein targets. Offering sensitivity 10–200 times that of the standard immunocytochemistry (ICC), immunohistochemistry (IHC), and *in situ* hybridization (ISH) methods, SuperBoost kits are designed for superior signal amplification, definition, and clarity needed for high-resolution imaging. Combining the brightness of Alexa Fluor dyes with trusted poly HRP–mediated tyramide signal amplification, the SuperBoost reagent generates sensitivity typically 2–10 times above that of standard treatments, including TSA™ reagents.

Learn more at **thermofisher.com/superboost**

4 Protect

Maintain photostability of fluorescence signals of samples

Fluorophores are ideal for high-quality cell imaging but are inevitably prone to photobleaching, a photochemical degradation or fading of fluorescence signals. Any reduction in photosensitivity can skew your data and yield false results. Antifade mountants are designed to protect the photostability of fluorescently labeled proteins and maintain image integrity from weeks to months.

Product highlight

ProLong Diamond Antifade Mountants

To minimize photobleaching of experimental samples, Invitrogen™ ProLong™ Diamond Antifade Mountants increase the photostability of fluorophores. It cures within 24 hours, forming a semi-rigid gel with a refractive index of 1.46 and preserves the signal of fluorescently labeled proteins for long-term archival.

Learn more at **thermofisher.com/antifades**

5 Image

Capture research discoveries with maximum clarity and definition

In today's competitive scientific environment, generating publication-quality images is critical to your success. To capture top-quality images, you need an imaging platform with top-of-the-line imaging components, including:

- High-quality cameras and optics to capture high-resolution images
- LED illumination to produce superior signal-to-noise ratios
- Easy-to-use image capture and processing software for ready-to-publish images

Product highlight

EVOS cell imaging systems

Invitrogen™ EVOS™ cell imaging systems help you perform a variety of routine and specialty applications to capture images for publication. Eliminate the complexities of microscopy without compromising performance. The EVOS line of cell imaging systems makes cell imaging accessible to almost every lab and budget.

Explore the EVOS lineup at **thermofisher.com/evos**

Ordering information

Label	Ex/Em	Cat. No.				
		Streptavidin	Tyramide SuperBoost kits			
			Goat anti–mouse IgG	Goat anti–rabbit IgG	Goat anti–mouse IgG	Goat anti–rabbit IgG
Alexa Fluor 488	495/519	S11223	B40912	B40922	A-21121	A-11070
Alexa Fluor 555	555/565	S21381	B40913	B40923	A-21137	A-21430
Alexa Fluor 594	591/617	S11227	B40915	B40925	A-21044	A-11072
Alexa Fluor 647	650/668	S21374	B40916	B40926	A-21240	A-21245
Biotin-XX	–	–	B40911	B40921	A10519	B-2770

Product	Quantity	Cat. No.
Image-iT Fixation/Permeabilization Kit	• Fixative: High-purity 4% formaldehyde in PBS, pH = 7.3 • Permeabilization solution: 0.5% Triton™ X-100 • Blocking buffer: 3% BSA, fraction V, delipidated, New Zealand source, in DPBS • Wash solution: PBS, pH 7.4	R37602
BlockAid Blocking Solution	50 mL	B10710
ProLong Diamond Antifade Mountant with DAPI	5 x 2 mL	P36962
ProLong Gold Antifade Mountant with DAPI	10 mL	P36931
ProLong Diamond Antifade Mountant	5 x 2 mL	P36961
NucBlue Fixed Cell ReadyProbes Reagent	6 x 2.5 mL	R37606
NucRed Dead 647 ReadyProbes Reagent	6 x 2.5 mL	R37113
ActinGreen™ 488 ReadyProbes® Reagent	2 x 2.5 mL	R37110
ActinRed™ 555 ReadyProbes® Reagent	2 x 2.5 mL	R37112
Image-iT® FX Signal Enhancer ReadyProbes® Reagent	6 x 2.5 mL	R37107

Find out more at **thermofisher.com/cellimaging**

ThermoFisher SCIENTIFIC