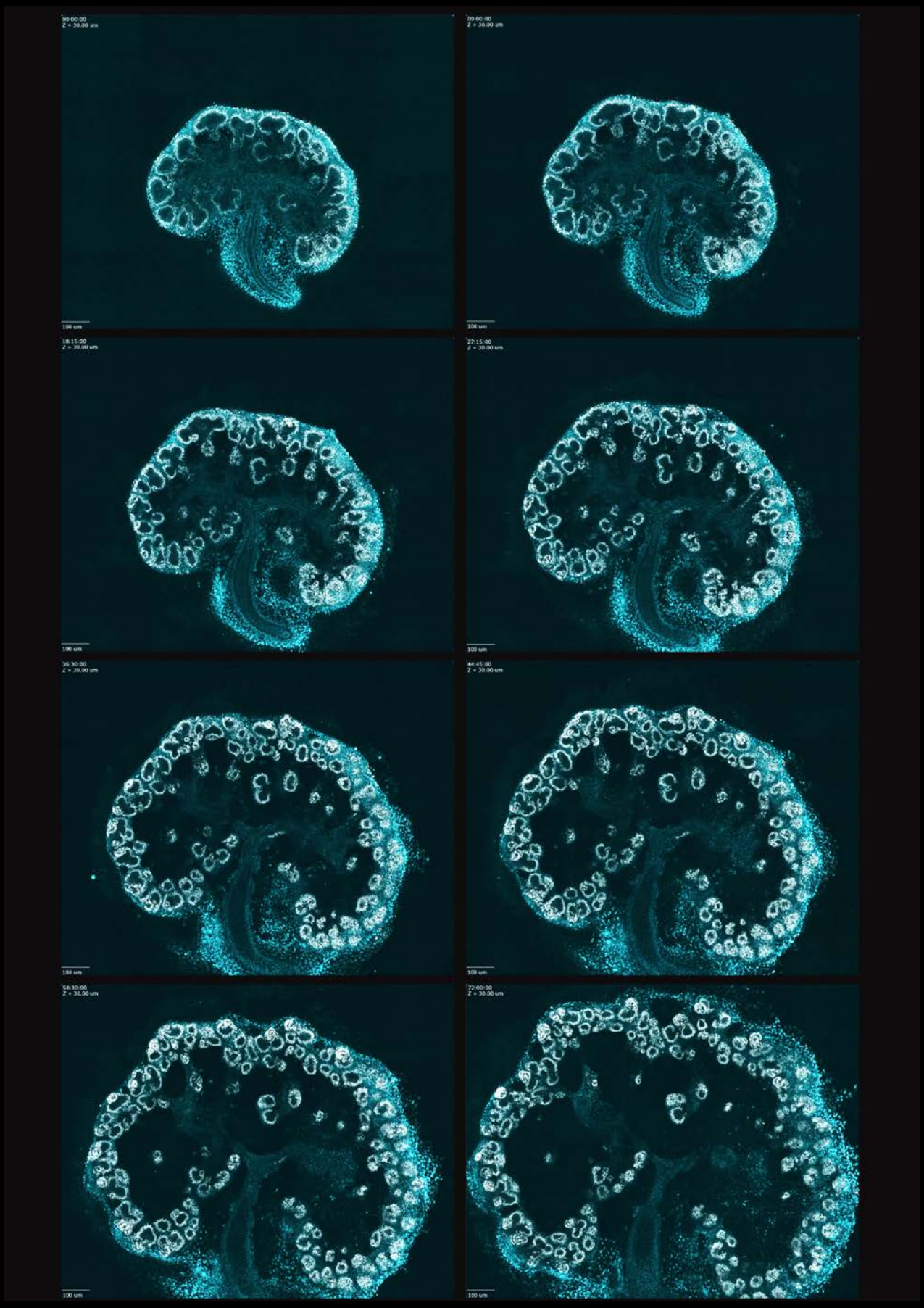
ANZSCDB

Australia and New Zealand Society for
Cell and Developmental Biology Inc.



AUTUMN NEWSLETTER 2023

ANZSCDB
Australia and New Zealand Society for Cell and Developmental Biology Inc.

NEWSLETTER May 2023

President's Report

Dear colleagues,

I hope you enjoyed a relaxing and refreshing break over the summer and that 2023 has started well for you. No doubt many of you are busy with teaching and recovering after the grant-writing season. If only our elected representatives cared as much about science as they did about underwater sea-craft and we'd be flying!

The current ANZSCDB Executive is on the downhill slope of our two-year term, with about five months left before we hand over to President-elect Aleks Filipovska and her team. However, we still have a lot of items on our agenda and some exciting announcements to make in this newsletter.

In this issue

Among the major initiatives that we wanted to tackle during our term were memberships, ANZSCDB state conferences, communications, and sponsorship. After making good progress on the first three items, we now want to focus on sponsorship, and work more on communications. We have two exciting developments to announce on these fronts.

Sponsorship
In years gone by, ANZSCDB often had one or more major sponsors who provided substantial sums of money to fund important awards and activities like the President's Medal. To increase the scope of activities that ANZSCDB can support and help diversify its revenue we launched a new sponsorship drive in 2023. Excitingly, we can announce that Zeiss Australia will sponsor ANZSCDB in 2023 and hopefully for many years to come. Please see page 2 for further details on this and page 17 for an innovative 'guided acquisition' capability from Zeiss. In addition, if you are interested in sponsoring ANZSCDB, please contact me.

Communications and Engagement representatives
In 2022, we increased communications from ANZSCDB mostly via Twitter and newsletters, but what we realised is we need more expertise and help with these efforts. As such, we have recruited the first ever ANZSCDB Communications and Engagement representatives: Sakurako Kobayashi, a PhD candidate in Prof. Ben Hogan's lab at Peter MacCallum Cancer Centre/University of Melbourne, and Ruchi Umargamwala, a PhD candidate in Prof. Sharad Kumar's lab at the Centre for Cancer Biology/University of South Australia. I look forward to working closely with both Saki

and Ruchi and making the most of their "contemporary" communications talents. You can read more about Saki and Ruchi on page 3.

ANZSCDB Prizes
In 2023, ANZSCDB will again award multiple prizes to members, both junior and senior. These prizes are:

- President's Medal
- Emerging Leader Award
- Early Career Researcher Award
- Image Award
- Publication Award

Please see page 5 for details and please consider nominating yourself or a colleague for these awards; they offer important recognition of our scientific accomplishments.

I wish you all a successful 2023 and look forward to seeing you soon.

Kieran Harvey,
President, ANZSCDB

Cover: Organogenesis
"Live imaging mammalian kidney development provides new insight into how complex tissues can be recreated in vitro."
Dr Julie Moreau Monash Biomedicine Discovery Institute

Keep up to date: Remember to follow @ANZSCDB on Twitter for news and tag us in your work-related posts for retweets.

Contribute to the ANZSCDB newsletter!

Please send items to Alex Combes, the society Secretary, or get in touch with your state representatives. We would like to hear about your latest papers, promotions, prizes and other news, perspectives, or opinion pieces about life as a student, RA, Postdoc or PI in cell biology or developmental biology. The newsletter will be published 3 times a year and distributed to all ANZSCDB members via e-mail. Previous newsletters can be found on our website. Please ensure that your submissions are succinct and have been fact-checked.

Welcome to our new sponsor Zeiss Microscopy!

ANZSCDB welcomes the support of Zeiss Microscopy. We are thrilled to have Zeiss contribute to society awards and activities. Zeiss microscopes have long enabled cutting-edge research in cell biology and developmental biology within Australia and New Zealand. See page 17 for an overview of a new Guided Acquisition Workflow from Zeiss to automatically identify and selectively image biological events such as cell division, or samples of a particular shape and size.

ANZSCDB would also like to acknowledge ongoing support from ***Australian Bioresources*** *(page 13) and* ***ATA Scientific*** *(page 14).*

ANZSCDB Diversity & Inclusion Statement Now Live

The ANZSCDB Executive has formulated a Diversity & Inclusion Statement to foster a welcoming environment that respects, acknowledges and celebrates differences. The statement is now available to all ANZSCDB members at:
https://www.anzscdb.org/diversity-and-inclusion

Communications & Engagement

The ANZSCDB Executive welcome Ruchi Umargamwala & Saki Kobayashi to the team! Ruchi and Saki will be working with ANZSCDB State Representatives & Executive to source, curate and publish content for the ANZSCDB newsletter, email list and social media. We aim to identify and promote topics of interest to the society, seek and distribute member news, and establish pathways for advocacy and policy development. Please get in touch with article ideas, to help promote your event, or to discuss how ANZSCDB can advocate for issues relevant to you.

Ruchi Umargamwala,
Centre for Cancer Biology,
University of South Australia
Ruchi is a PhD Candidate in the Kumar laboratory. Her research utilises Drosophila and mammalian cell models to investigate ubiquitin regulation of autophagy in cell and tissue homeostasis.
Twitter @RuchUmargamwala

Sakurako Kobayashi,
Peter MacCallum Cancer Centre,
University of Melbourne
Saki is a PhD candidate in the Hogan laboratory, studying lymphatic development. Her research utilises zebrafish embryos to study the Hippo-Yap signalling axis within the vasculature.
Twitter: @Kobayashi1S

Ruchi & Saki have suggested a number of new initiatives to help boost engagement within our community:

- Interviews with directors of research institutes and heads of research technology platforms.
- Invite contributions from ANZSCDB-affiliated student groups to discuss the ideas and goals of future leaders in cell biology and developmental biology.
- Prioritise recognition of Early Career Researchers and PhD students by developing researcher profiles.

Please get in touch if you'd like to contribute or volunteer to be featured.

Upcoming elections for ANZSCDB State/NZ Representatives

State and NZ representatives play essential roles for ANZSCDB. They promote the society and its activities by **fostering local communities**, **recruiting new members** and **gathering news for communication** to our membership base. ANZSCDB's aim is to have enthusiastic and capable state/NZ reps that reflect the full diversity of our community.

A major responsibility of State and NZ representatives is to **organise a local scientific meeting**, which brings together students, early career researchers and more established scientists. These meetings are vital for Australian and New Zealand cell biologists and developmental biologists to meet, discuss cutting-edge science and raise the profile of our community nationally and internationally. They also provide invaluable career development opportunities to our members and an excellent opportunity to recruit new members to our Society.

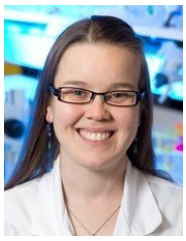
Ideally, every Australian state, as well as the ACT and New Zealand will have two ANZSCDB representatives at any one time, with one cycling off each year and a new representative elected each year. This arrangement aids in maintaining continuity of organisation of annual local meetings, as well as ANZSCDB governance.

In September 2023, ANZSCDB will hold elections for one new representative for the following states (with a term date of Oct 2023- Sep 2025): NSW, Qld, Vic, SA, TAS, ACT, New Zealand. Elections to recruit two new representatives for **WA** will also be held.

If you wish to nominate yourself to be an ANZSCDB State/NZ representative, please email the ANZSCDB secretary Alex Combes (alex.combes@monash.edu) with the subject line: "Nomination for ANZSCDB representative".

Please encourage your colleagues to nominate themselves. We encourage you to reach out to a State representative or executive to discuss the role.

Some of our current State Representatives are profiled below. Read on for profiles of new Representatives for NSW, ACT, & NZ (page 6)



VIC: Dr Brooke Huuskes (Left) focusses on understanding the causes of chronic kidney disease with an interest in harnessing the immune system to trigger renal regeneration. Twitter BrookeHuuskes

SA: Dr Yasmyn Winstanley (Right) is a postdoctoral researcher in the Ovarian Cell Biology group at the University of Adelaide. Her research focusses on cellular mechanisms that regulate the first five days of embryonic development. Twitter YEWinstanley

TAS: Dr Jessica Fletcher (Left) studies oligodendrocyte differentiation and myelination at the University of Tasmania, and is currently using iPSCs to identify causes of brain dysfunction in MS. Twitter @FletcherJL

WA: Dr Yu Suk Choi (Right) is a senior lecturer and researcher at the University of Western Australia, who investigates new ways to combat disease by developing biomaterials to study mechanobiology. Dr Choi focusses on how tissue micro-environment interactions can utilised in regenerative medicine. Web Yu-Suk-Choi

Find out more about your local state representatives online

Nominations now open for ANZSCDB Annual Awards 2023

ANZSCDB provides awards to recognise excellence and support career development at all stages. Please nominate yourself or a colleague in the categories outlined below.

President's Medal

The iconic ANZSCDB President's Medal recognizes a career of outstanding achievement in the discipline of cell biology or developmental biology in Australia or New Zealand. It is the highest award of the Australia and New Zealand Society for Cell and Developmental Biology, awarded in 2022 to Prof. Jose Polo. More info. Nominations for the President's Medal are to be sent to President Kieran Harvey, cc anzscdb@asnevents.net.au.

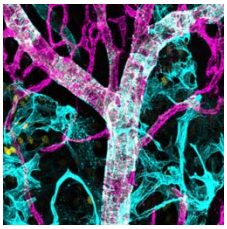
Emerging Leader Award

This award was established to encourage and support investigators who are building independent careers in cell biology and developmental biology in Australia and New Zealand. This award is **open to ANZSCDB members who have worked up to 10 years in an independent position at close of nomination**. Send nominations to President Kieran Harvey, cc anzscdb@asnevents.net.au.

Left: 2022 winner A/Prof Kelly Smith. More info.

Early Career Researcher Awards

These awards encourage and support early-career researchers who are working towards independent research careers in Australia and New Zealand within the disciplines of cell and developmental biology. **Up to two awards** will be available to recognise researchers working in Cell Biology or Developmental Biology. Eligibility for is restricted to candidates who have worked up to 5 years FTE post-PhD award at close of nomination. **Left:** 2022 winners Dr Lillian Schimmel and Dr Ivar Noordstra. Submission details at bottom of page. More info.



ANZSCDB Image Awards

These awards showcase the beauty of cell biology and developmental biology by celebrating the awe-inspiring imaging of our ANZSCDB members. **Up to two awards will be available** to recognise outstanding static or timelapse images. Permission must be granted for ANZSCDB to share and distribute images so please check with your Group Leader before entry. Submission details below. More info.

ANZSCDB Publication Awards

These awards aim to encourage and support ANZSCDB students who are working towards the completion of higher research degrees. **Up to two awards will be available** to recognise high quality peer-reviewed work from students who are currently undertaking a higher degree, or PhD-related publications from graduates within 2 years of completion. **Left:** 2022 winner Talhah Salmi. More info.

Email Nominations for ECR, Image, and Publication awards
to Secretary Alex Combes, cc anzscdb@asnevents.net.au

🎉🥳🎈Welcome to our new ANZSCDB Representatives 🎉🥳🎈

New South Wales

Alexis Diaz-Vegas: Dr Diaz-Vegas is a postdoctoral researcher at The University of Sydney in the Metabolic Cybernetics group. His primary research focus is exploring the role of mitochondria in insulin resistance and the cellular stress response. Twitter @adiazvegas | Web James-Group.

Australian Capital Territory

Teresa Bonello: Dr Theresa Bonello is a Research Fellow based at the John Curtin School of Medical Research at the Australian National University. Dr Bonello has a long-standing interest in how cells polarise and respond to mechanical cues. Teresa uses epithelial models from flies to organoids and provides fundamental insight into conserved signalling pathways central to development and cancer. Twitter @DrTeresaBonello | Web Thompson-Group

Rachel Woodhouse: Dr Rachel Woodhouse is a Research Fellow based at the John Curtin School of Medical Research at the Australian National University. Dr Woodhouse applies expertise in epigenetics to target mechanisms of immune evasion in cancer and overcome resistance to chemotherapy. Twitter @rachelinthelab | Web Burr-Group

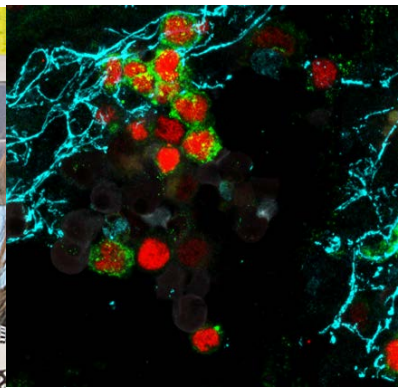
New Zealand

Laura Gumy: Dr Laura Gumy is a Senior Lecturer at the University of Otago. Dr Gumy's research focusses on intracellular transport processes and cytoskeletal remodelling in neurons. These are fundamental pathways that when impaired can lead to neuronal dysfunction or nerve regeneration deficits. The Gumy lab uses live imaging, biochemical and genetic methods to identify and interrogate molecular interactions with a role in neural repair. Twitter @lauragumy | Web Laura Gumy

News and Activities

CCB members Sharad Kumar and Loretta Dorstyn have been awarded a Cancer Council SA grant with international collaborator Chiaki Takahashi to explore the link between a high-fat diet (HFD) during early adolescence and breast cancer susceptibility. The team will use a unique mouse model to define the molecular changes caused by HFD and explore biomarkers for early detection of breast cancer.

Dr Jantina Manning, A/Prof Shilpanjali Jesudason and Prof Carol Pollock have been awarded a 2023 Diabetes Australia General Grant for a project exploring NEDD4L as a new regulator and potential biomarker in diabetic nephropathy. Diabetic nephropathy (DN), is the leading cause of chronic kidney disease worldwide and a major contributor to end-stage kidney disease. Variation in the NEDD4L gene (mouse Nedd4-2), which regulates several ion channels and transporters, has been implicated in DN. The project will explore the contribution of NEDD4L/Nedd4-2 to DN in mouse models and human samples to explore new biomarkers & therapeutic targets in DN.



New work from **Natasha Harvey's group at the Centre for Cancer Biology** has been recently published in *Nature*. This exciting new research led by first author- **Dr Jan Kazenwadel** (far left)- identified an enhancer regulating Prox1 expression and lymphatic identity and for the first time uncovered the ability of lymphatic endothelial cells to produce haematopoietic cells (left). This discovery was a result of a fantastic collaboration between multiple research teams based in Australia and overseas. DOI: https://doi.org/10.1038/s41586-022-05650-9.

Dr Sarah Boyle from the Tumour Microenvironment Laboratory at the CCB has published a new review article "Hormonal regulation of the breast cancer microenvironment" in the Journal of Molecular Endocrinology, summarizing the associations of hormone receptor profiles with composition of the microenvironment, how hormones directly influence cells and the paracrine mechanisms that lead to the formation of a tumor-promoting ECM. This paper is part of a collection of articles highlighting the research in the field of basic endocrinology undertaken by early- and mid-career researchers. DOI: https://doi.org/10.1530/JME-22-0174

Professor Paul Timpson & Dr Max Nobis have developed a new AKT-FRET biosensor mouse, to visualise AKT activity and dynamics in vivo. AKT signalling has a central role in fundamental cellular processes such as proliferation, survival and migration. AKT signalling is also known to regulate metabolic disorders and cancer. Using optical windows and intravital microscopy, the team characterised changes in AKT dynamics in living tissues, monitoring the response induced by glucose and insulin in adipose tissue, and verifying increased AKT in cancer models. Spheroid and organotypic models carrying the AKT biosensor provided

realtime feedback on the response to drug targeting in vitro to evaluate and optimise therapeutic strategies for prostate cancer. Check out the paper in *Science Advances* https://doi.org/10.1126/sciadv.adf9063

Advocacy

Professors Ben Hogan & Natasha Harvey have published a commentary article in *Nature Cardiovascular Research* highlighting how shifts toward translational and applied research have come at the expense of fundamental discovery research in many countries. They make a compelling argument that fundamental research needs to be maintained to drive future translational outcomes.

No crops without seeds: the risks in declining support for fundamental research. *Nat Cardiovasc Res* (2023). https://doi.org/10.1038/s44161-023-00225-x

Other news

CCB Researchers, Guillermo Gomez, Rob King and Richard D'Andrea took part in the SA Discovery Tour, riding around SA **to raise funds for Tour de Cure** and help fund vital cancer projects and increase awareness. The 2023 event was a 340km ride through the Adelaide Hills and Barossa from Sunday, 2 to Tuesday, 4 April.

The total funds raised has reached $520K, which are equally donated to UniSA and the Flinders Foundation cancer research programs. One of the UniSA teams that will receive the funding is Guillermo Gomez's laboratory, for their work to develop models derived from patient tumour tissue which will facilitate rapid screening for new drugs capable of crossing the blood-brain barrier, thereby improving therapies for brain tumours. Congratulations to the CCB team (pictured below left; photo: Richard D'Andrea) and everyone else involved in this great achievement!

The Centre for Cancer Biology recently celebrated 5 years of conducting world-class cancer research in the Bradley Building. Staff and students gathered to celebrate with cake. A new cohort of Honours, Masters and PhD students starting at the CCB pictured above right. Photo: @DrNatashaHarvey

Upcoming meetings & seminars

ComBio 2024 will be held as part of [Biomolecular Horizons 2024], which will bring together the International Union of Biochemistry and Molecular Biology, the Federation of Asian & Oceanian Biochemists & Molecular Biologists & Australian Societies that usually contribute to ComBio, including ANZSCDB.

Stem Cell Conversations Seminar Series and Developmental Biology Conversations Seminar Series

Looking to engage with other ECRs in the stem cell and developmental biology fields? Join Stem Cell Conversations on Zoom Wednesdays 11-11:30 am. A series run by ECRs for ECRs, it provides a warm and welcoming atmosphere where you can gain experience and exposure, exchange ideas, and connect with like-minded colleagues. Each 30-minute Conversation features two outstanding researchers presenting on the same topic, followed by an open Conversation about their research. **National and local Stem Cell Conversations are held monthly, and a Developmental Biology Conversation is held on the last Wednesday of each month.** To learn more or join our mailing list, email CSCS-conversation@unimelb.edu.au. We look forward to you joining the Conversation!

2023 ANZSCDB

Australia and New Zealand Society for Cell and Developmental Biology Inc.

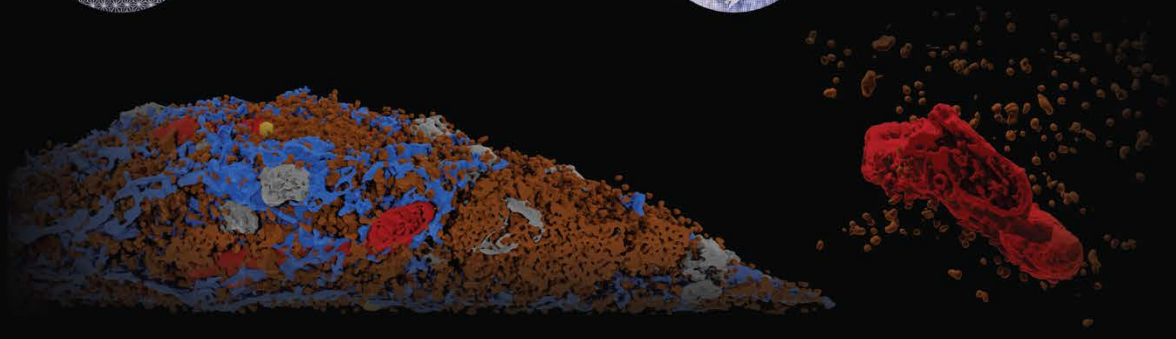
WA SYMPOSIUM

18th October

Harry Perkins Institute of Medical Research
McCusker Auditorium, QQ Block, QEII Medical Centre

Professor Justine Mintern
Melbourne University

Professor Robert Parton
University of Queensland



A full day symposium covering excellence in WA research in:

- Cell biology
- Imaging
- Cardiovascular disease
- Development
- Cancer biology
- Immunology
- Metabolism
- Genetics and genomics
- Synthethic biology
- Organelle biology

Free registration by August 1st

Register via QR code or link:
https://form.jotform.com/231161507327853

*Prizes for oral and poster presentations for ANZSCDB members only
join here: www.anzscdb.org/membership-2

Save the date for ANZSCDB State meetings in 2023

New South Wales
Date: November 30th, 2023
Venue: The University of Sydney, Camperdown (specific location to be confirmed)
Schedule: Conference from 8:45am to 4:30pm, followed by networking and drinks
Keynote Speakers:

- Dr. Anai Gonzalez Cordero, The University of Sydney
- Professor Peter Gunning, University of New South Wales
- Associate Professor Kelly Smith, University of Melbourne
- Professor David Komander, University of Melbourne

South Australia
Date: October 18th, 2023
Venue: The University of South Australia, Bradley Building (HB8-18)
Invited Speakers:

- Dr. Jennifer Zenker, Australian Regenerative Medicine Institute
- Associate Professor Kelly Smith, University of Melbourne
- Dr Lachlan Jolly, University of Adelaide

Queensland
Date: December 1st, 2023
Venue: Institute for Molecular Bioscience, University of Queensland
Details on speakers and schedule to come.

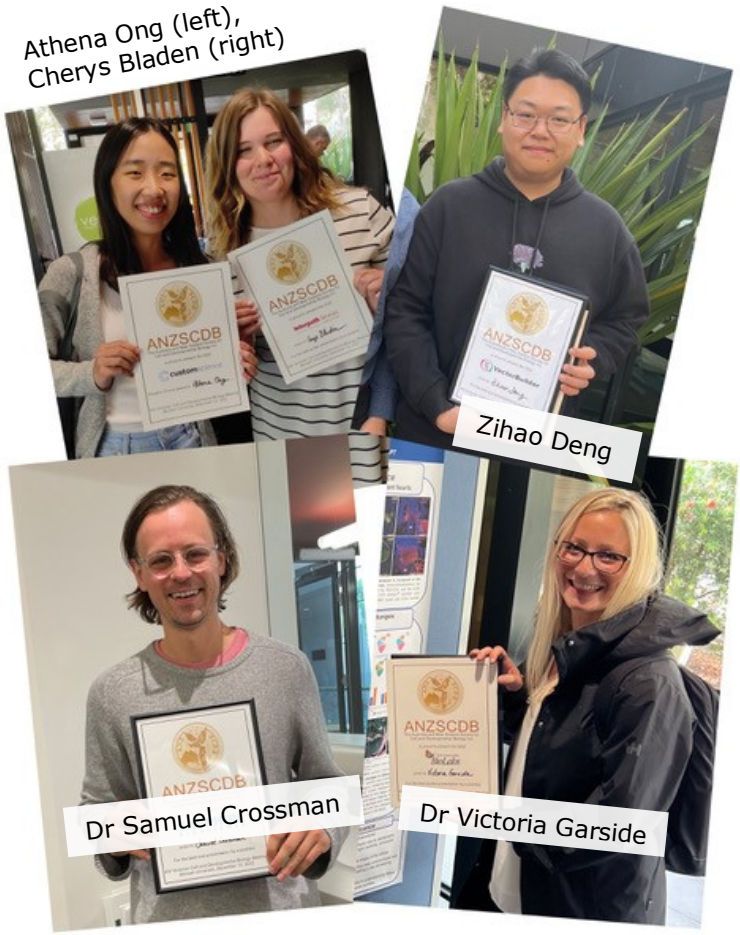
Western Australia
Date: October 18th, 2023
Venue: The Harry Perkins Institute of Medical Research
Invited Speakers:

- Professor Justine Mintern, University of Melbourne
- Professor Robert Parton, University of Queensland

SA State Rep speaking at Pint of Science

On 23rd of May 2023, South Australian ANZSCDB State Representative, Dr Anna Oszmiana will speak about her latest work as part of the Pint of Science festival event at Wheatsheaf Hotel in Adelaide. Anna is a postdoc at the Centre for Cancer Biology, working in Natasha Harvey's group. Her work aims to define signals and genes that control the development of lymphatic vessels. Anna's talk will cover the new research from their team which uncovered a surprising ability of lymphatic endothelial cells to give rise to blood cells. Tickets can be purchased here: https://pintofscience.com.au/event/battling-the-bugs
Full program for Pint of Science 2023 is available online: pintofscience.com.au

14th ANZSCDB Victorian Meeting Report



The 14th Victorian Cell and Developmental Biology meeting was held on the 13th of December 2022 at Monash University. We saw over 115 cell and developmental biologists come together from all over Victoria to enjoy three outstanding plenary speakers, twelve 10-minute oral and 23 posters presentations, and of course, to develop and maintain collaborations.

The day started with a fantastic plenary from Dr. Najoua Lalaoui (Peter Mac), giving us insight into the role that RIP kinases play in programmed cell death, followed by outstanding talks from the students and postdocs of our society. An extended lunch allowed us to enjoy delicious food and stimulating discussions at the posters. After lunch, we heard from Dr. Vaishnavi Ananthanaryanan (UNSW) who showed us beautiful images of both microtubules and mitochondria, while explaining their interplay during cell homeostasis. After hearing more from our students and postdocs, our final plenary was from A./Prof. Edwina McGlinn (Monash) who brought the day to a close with a *tour de force* of mouse genetics to unravel the regulatory mechanisms regulating vertebrate axial development. The day concluded at "The Nott," a local watering hole for those at Monash, who invited their fellow Victorians in for a drink and a chat

Congratulations to those who took home prizes (pictured above): **Best student talk**: Zihao Deng; **Best postdoc talk:** Samuel Crossman; **Best student poster:** Cerys Bladen; **Best postdoc poster:** Victoria Garside; **People's choice:** Athena Ong.

Of course, this day would not have been possible without the generous support from our sponsors (logos below). We would also like to thank everyone involved in the day, including speakers, poster presenters, judges, and attendees.

The 14th ANZSCDB Victorian meeting was proudly brought to you by the local organising committee Dr. Jan Manent, Dr. Brooke Huuskes, Dr. Mirren Charnley, Dr. Wei Cao, Dr. Andrew Cox, Dr. Diana Vidovic and Dr. Aishwarya Kulkarni.

Thanks to our sponsors:

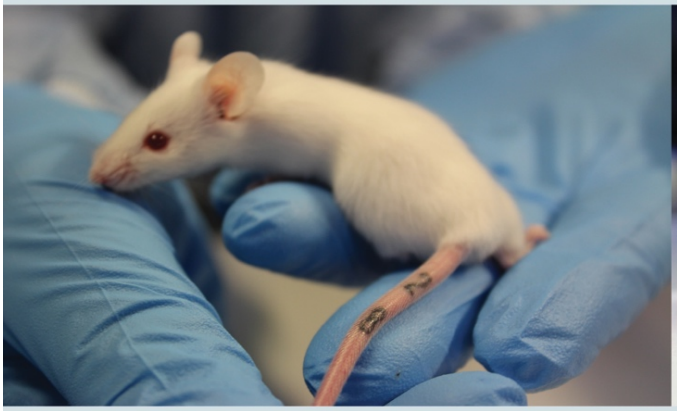
VectorBuilder · SAPPHIRE BIOSCIENCE · MONASH University · ARMI Australian Regenerative Medicine Institute · decode science · customscience · scientifix · TECNIPLAST · laftech LAF Technologies Pty Ltd · New England BioLabs · Interpath Services Leading the way

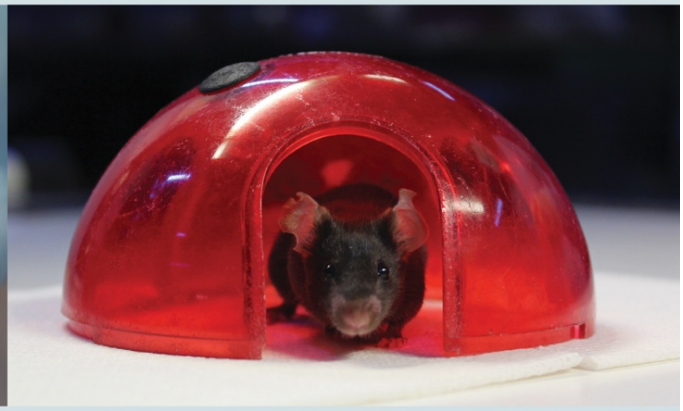
Australian BioResources

Highest Quality SPF Mice

- B6.129S7-Rag1^{tm1Mom}/JAusb* ('Rag1')
- B6.SJL-Ptprc^{a}Pepc^{b}/BoyJAusb* ('B6 CD45.1')
- C57BL/6JAusb*
- FVB/NJAusb*
- NOD.Cg-Prkdc^{scid}Il2rg^{tm1Wjl}/SzJAusb* ('NSG')
- BALB/cJAusb*
- BALB/c-Fox1nu/Ausb ('Nude')
- SwissTacAusb

*Propagated under License Agreement with The Jackson Laboratory





Special Orders

- Time mated (including ultrasound confirmation of pregnancy)
- Tail Tattoos for easy identification
- Weight orders
- Ex-breeders
- Aged stock
- Surgical procedures - vasectomy, ovarectomy, castration

Contact: orders@abr.org.au
Further information: www.abr.org.au/animals

The Jackson Laboratory

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E: enquiries@abr.org.au

Garvan Institute of Medical Research

NATA

Observing cell growth without influencing cell metabolism using the Phasefocus Livecyte

At the Texas Tech University core imaging facility researchers working in medicinal chemistry, drug development, toxicology, and angiogenesis development have access to a range of high-resolution light microscopes and technical support that's state-of-the-art. The Imaging Center recently enhanced their capabilities with the installation their new Phasefocus Livecyte kinetic cytometer – a cutting-edge technology able to produce high-contrast videos of live cells without the need for fluorescent labels. Livecyte is continuing to impress each user by the quality of data generated and huge array of analysis possibilities that has enabled them to ask questions that no other system can answer.

What is the problem are we solving?

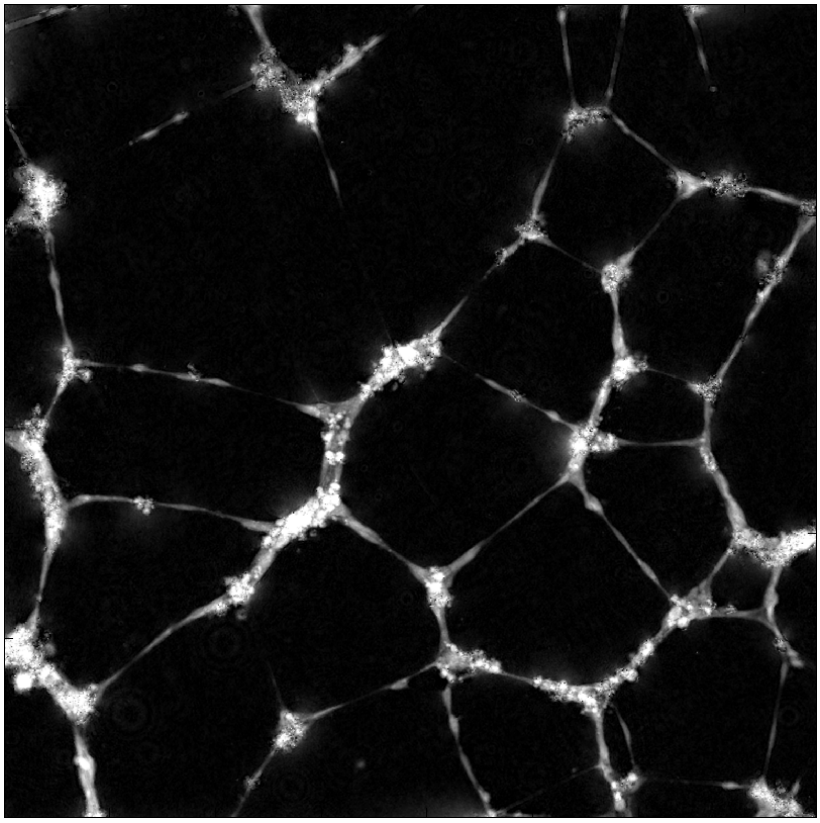
Dr. Constantinos Mikelis, Adjunct Associate Professor, and Dr. Ulrich Bickel, Professor in the Department of Pharmaceutical Sciences, of Texas Tech University, had a need for a device that could perform live cell imaging to observe cell growth in culture for prolonged periods of time, unperturbed.

Why is that a problem?

Live cell fluorescence microscopy enables an in-depth understanding of the dynamic of cellular processes, but it also comes with disadvantages, such as photobleaching and phototoxicity, which interfere with cell survival.

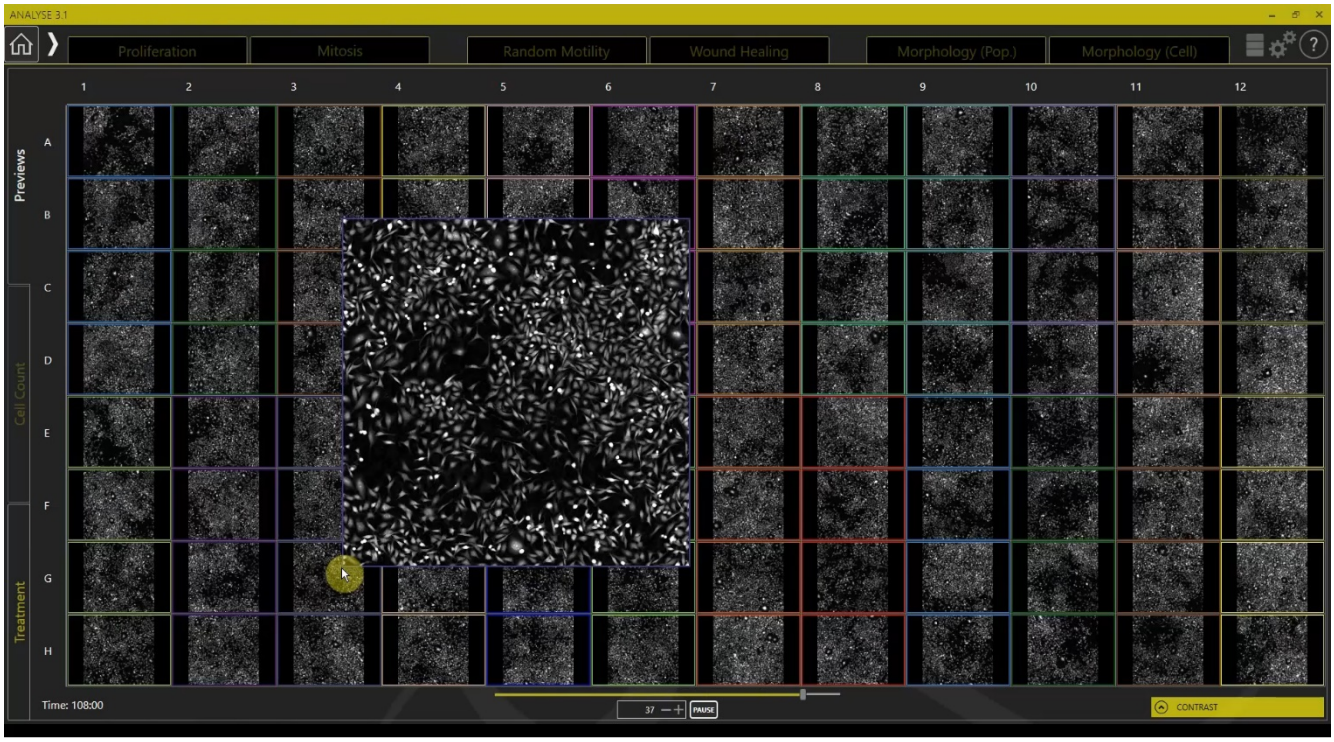
How does Livecyte solve this?

Livecyte is unique in that it uses Ptychography - a quantitative phase imaging technique - to produce high-contrast images without the need for toxic fluorescent illumination or dyes. Livecyte allows the user to observe cell growth, for example, in culture for prolonged periods without influencing cell metabolism or damaging the cells.



It is also very difficult to quantify and perform single-cell analysis visually and manually, but Livecyte does this automatically. It allows researchers to generate a significant amount of statistical data in a limited time and because the Livecyte can be used in a broad range of applications and experiments, it is an ideal instrument for a core imaging facility.

Livecyte™ utilises ptychography to capture relative phase shift information, allowing high contrast images to be generated using low level illumination. Individual cells can be identified and characterised according to morphological and behavioural characteristics, providing accurate data for quantitative analysis. It provides fluorescence-like images without the compromise. Label-free imaging using low level illumination allows individual cells to be continuously monitored for weeks at a time, without altering cell behaviour.



Find out more

Dr. Constantinos Mikelis and Dr. Ulrich Bickel have been using the Livecyte in cancer and vascular research in pharmaceutical sciences. They noted,

"Livecyte is the only instrument that has these qualifications so it was the natural choice"

"I have not seen another system that is able to do the same things, in the same manner"

The unique perspective provided by this approach has allowed the Livecyte to be used to observe cancer growth phases and develop monolayers in serial cells.

Take a look at this recent video as they share their experiences in their core imaging facility - https://vimeo.com/761375849

If you would like to learn more about the Livecyte's capabilities, or to request a guided demonstration with a product specialist, please contact us

ATA Scientific Pty Ltd
+61 2 9541 3500
enquiries@atascientific.com.au
www.atascientific.com.au

FIVE COMPELLING REASONS TO USE LIVECYTE:

1. Nothing like it https://bit.ly/3oywmE5

A huge array of analysis possibilities allow you to ask questions that no other system can answer - Dr Mat Hardman, University of Hull

2. Disrupts common theory

Livecyte was used to disprove a long held theory about how stable nevus melanocytes switch to cancerous melanoma cells - Dr Robert Judson-Torres, Huntsman Institute

3. Expect the unexpected

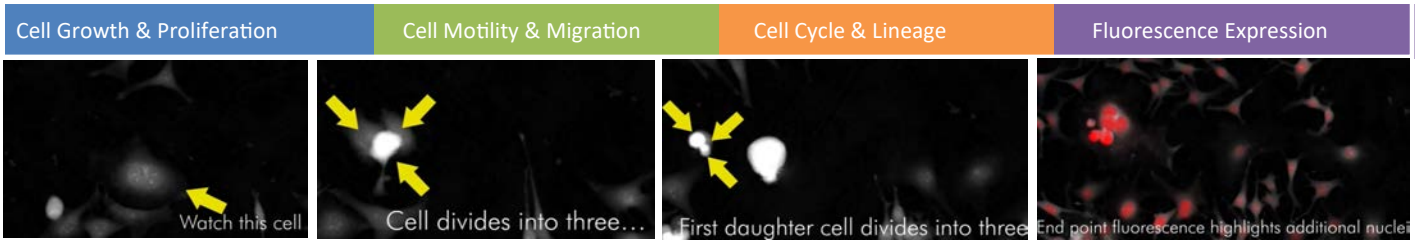
Livecyte has led to observations of unexpected cell behaviour when quantifying live-cell drug resistance - Dr Kurt Anderson and Dr Alix Le Marois, The Francis Crick Institute

4. See change as it happens

Used primary prostate cells to study new cancer treatment - Professor Norman Maitland, University of York

5. Simplifying not simpler

Livecyte removes barriers to entry for junior students - Greg Perry, St George's University of London



Uncover strange behaviours. See more at vimeo.com/Phasefocus

POWERFUL INTEGRATED LIVE-CELL ANALYSIS TOOLBOX

✓ Generate multiple outputs with one experiment

✓ Leverage powerful tracking algorithms to explore population heterogeneity and track single cell lineage

✓ Compare cell behaviours at population and single cell level

✓ Ptychography technology removes the need for expensive lasers reducing running costs unlike other systems

Register your interest for a demo today!

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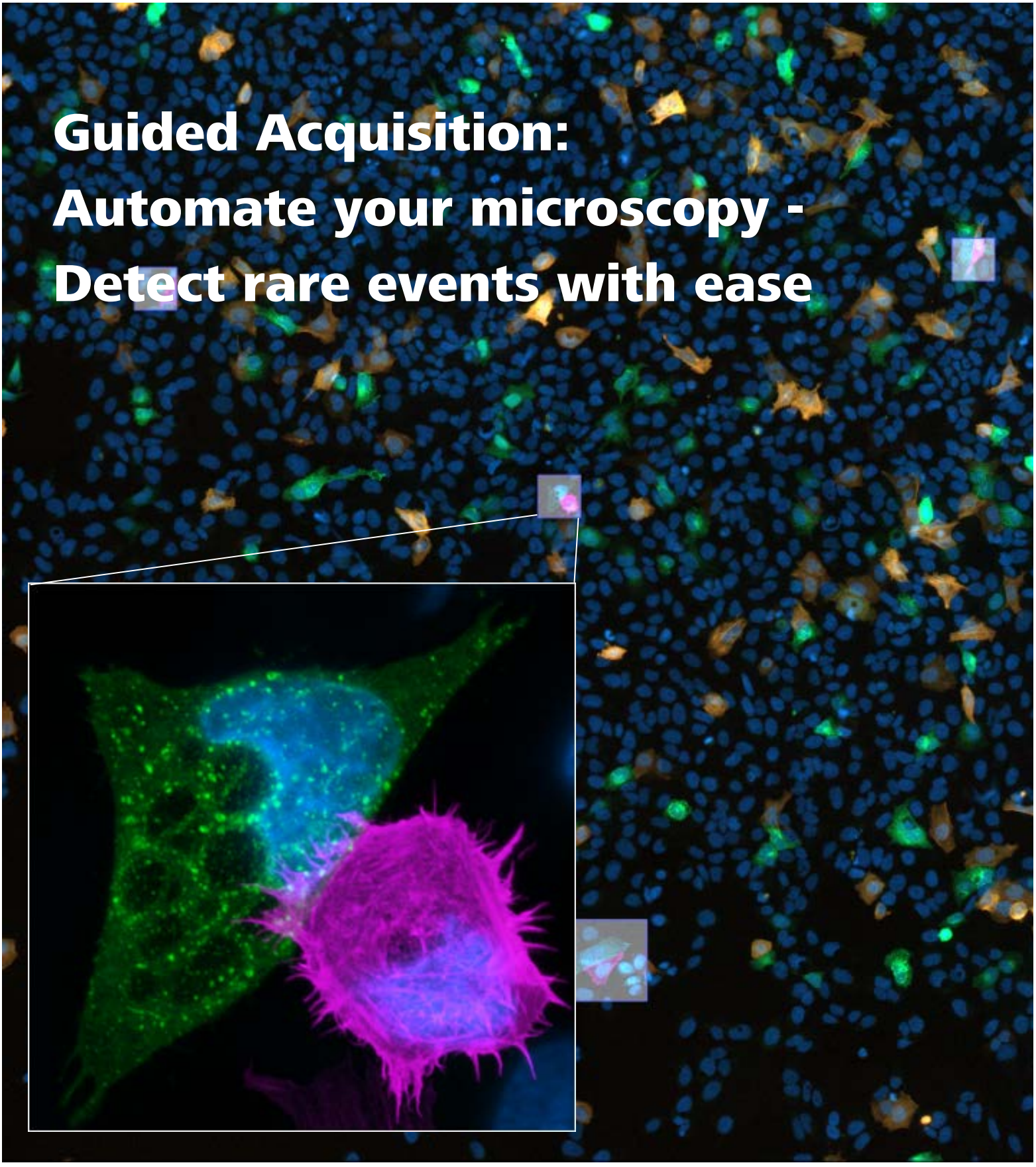
Guided Acquisition: Automate your microscopy - Detect rare events with ease



ZEN Guided Acquisition for Life Sciences Applications

ZEISS

Seeing beyond

zeiss.com/ZEN

ZEN Module Guided Acquisition

Automate your microscopy, detect rare events with ease

Rare event detection in high demand

In life science research it is often necessary to selectively examine specific objects from a large population, e.g. to identify and selectively image a few dividing cells in a petri dish, to trace one specific neuron in a sectioned brain slice, or to acquire a 3-dimensional volume of cultured organoids with a certain size and shape. Such experiments are usually time consuming and prone to bias depending on the individual operator, especially if the events happen rarely. The ZEN Module Guided Acquisition has been designed to simplify this process by combining microscopy automation with image analysis. It can be used with multiple ZEISS imaging platforms such as Axio Observer 7 with scanning stage, Celldiscoverer 7, or LSM 980 with Airyscan 2.

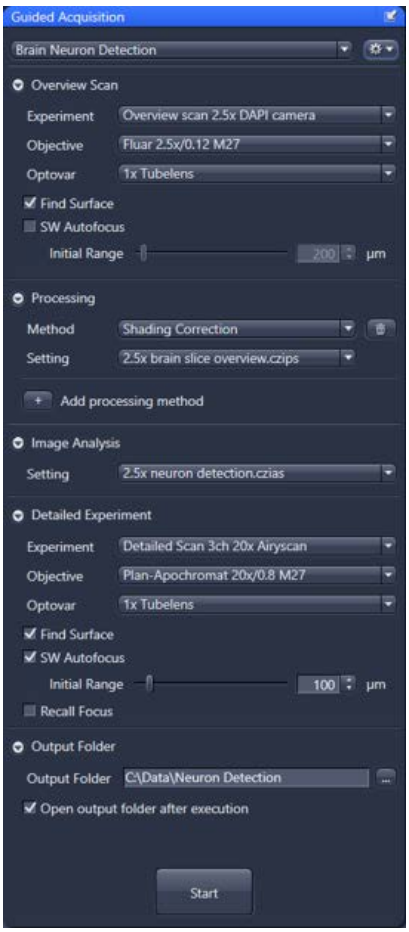
Guided Acquisition Workflow

1. Scan a large area with low magnification and fast imaging modality

2. Perform a pre-defined image analysis to detect objects of interest

3. Acquire detailed images for every detected object using specified settings

Once the Guided Acquisition workflow is optimized for a given sample, all settings can be saved and reused for another similar sample with one simple click.



- Low magnification
- Large area
- High throughput

- Image Analysis
- High specificity
- High efficiency

- High resolution
- Multi-dimension
- Full flexibility

1. Overview Scan

The purpose of the overview scan is to quickly tile-scan large areas using low magnification objectives and fast imaging settings (e.g. single DAPI channel using a camera with short exposure time and 2x2 binning). The image quality of this overview scan must be just good enough, for the following image analysis step to reliably detect the objects of interest. Imaging parameters for the overview scan can be adjusted and saved into one
"Experiment" setting. The focusing strategy can be specified as part of the "Experiment" setting complemented by additional Guided Acquisition options. Both the hardware focusing device Definite Focus 2 and Software Autofocus can combined for highest flexibility. An optional image processing step allows to perform, e.g. Airyscan processing or shading correction, of the overview scan prior to Object Detection if necessary.

2. Object Detection

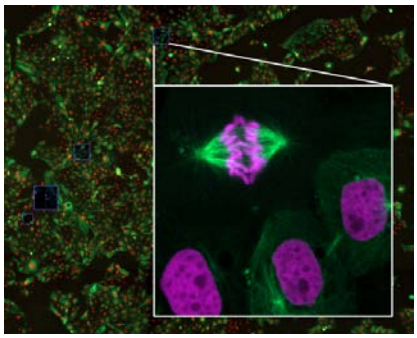
For the detection of objects of interest in the overview scan, Guided Acquisition uses the powerful and flexible ZEN Image Analysis module. Objects are isolated by image segmentation, using algorithms based on global thresholding, local variance, or Machine Learning (requires additionally the ZEN Intellesis module).

Additional filtering refines the list of detected objects based on their intensity, size or shape. Image analysis can be performed on both multi-channel fluorescent images and RGB color images, with various bit-depths. For downstream Detailed Acquisition, the location (X/Y scanning stage coordinates) and size (X/Y bounding box) of the detected objects is automatically recorded.

3. Detailed Acquisition

The third step consists of a different set of "Experiment" settings, typically with high magnification, high resolution, and multiple dimensions, which is performed for each detected object. If the size of a detected object is larger than a single field of view, a tile scan will be automatically configured, based on its bounding box size. All objects that were previously detected by the image analysis step will be acquired sequentially based on their stage coordinates. For each object, a different focus offset can be defined to accommodate samples with differing depths.
At the end of the workflow, all images (overview scan and detailed acquisitions) and settings (experiment, processing and analysis settings, and tables of detected objects) will be stored in one folder for easy access.

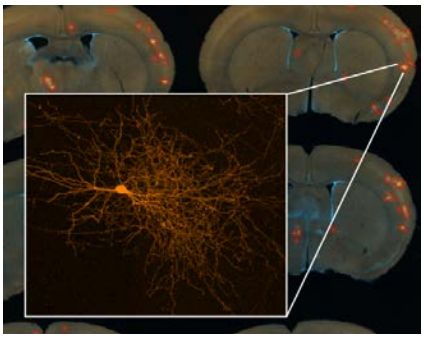
Guided Acquisition in Action



Mitotic Cell Detection from Petri Dish

In this example, porcine kidney cells (LLC-PK1) were cultured in a 35 mm glass bottom petri dish. The nuclei were labeled with Histone 2B mCherry, and microtubles with tubulin mEmerald. The goal was to detect the mitotic cells in the population. The experiment was performed using ZEISS Celldiscoverer 7. The overview scan was acquired with a Plan-Apochromat 5x/0.35 objective, 1x magnification changer, and the Axiocam 506 mono; the detailed acquisition was performed with a Plan-Apochromat 50x/1.2 water immersion objective, 0.5x magnification changer, and Airyscan MPLX HS mode. Image Analysis was performed on the nuclear channel, where mean intensity and area were used to detect the mitotic cells.

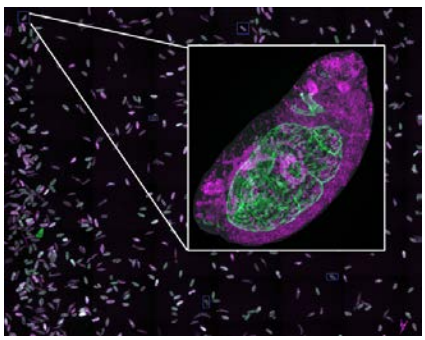
Sample obtained from ZEISS Oberkochen demo lab



Labeled neuron detection from mouse brain sections

In this example, 15 sectioned mouse brains were prepared on a standard microscope glass slide. The nuclei were labeled with DAPI, and the cells-of-interest are cortical interneurons which express membrane Tdtomato by low titre retroviral infection. The experiment was conducted using ZEISS Celldiscoverer 7. The overview scan was acquired with a Plan-Apochromat 5x/0.35 objective, 0.5x magnification changer, and the Axiocam 506 mono; the detailed acquisition was performed with a Plan-Apochromat 20x/0.95 objective, 0.5x magnification, Airyscan MPLX HS mode, and Z-stacks (figure shows maximum intensity projection of the detected neuron). Image Analysis was performed on the neuronal channel, where mean and range of intensity were used for detection.

Sample courtesy of Dr. L. Lim, Katholieke Universiteit Leuven/VIB Center for Brain & Disease Research, Belgium



Drosophila embryo detection with lateral oriented gut structure from a prepared slide

In this example, a group of fixed drosophila embryos were prepared on a standard microscope glass slide. Longitudinal visceral muscles (one type of gut muscles) were labeled with Alexa 488, and Cut (one type of homeodomain transcription factor) with Cy3. The experiment was performed using ZEISS Celldiscoverer 7. The overview scan was acquired with a Plan-Apochromat 5x/0.35 objective, 0.5x magnification changer, and the Axiocam 506 mono; the detailed acquisition was performed with a Plan-Apochromat 20x/0.95 objective, 0.5x magnification changer, Airyscan MPLX HS mode, and Z-stacks (figure shows maximum intensity projection of the detected embryo). Image Analysis was performed on the gut structure, where green positive embryos were detected first by mean intensity, then filtered by geometric features to identify those with preferred lateral orientation.

Sample courtesy of Dr. G. Wolfstetter, University of Gothenburg, Germany

Guided Acquisition is available for multiple platforms

Hardware Requirements:
Axio Observer Z1/7
Axio Imager M1/M2/Z1/Z2
Axio Examiner
Axioscope 7
Axio Zoom.V16
Celldiscoverer 7 (with LSM 900)
LSM 800 (with Airyscan)
LSM 800 MAT
LSM 900 (with Airyscan 2)
LSM 900 MAT
LSM 980 (with Airyscan 2)
Scanning stage is required for all stands
Motorozed objective nosepiece is recommended
Definite Focus 2 is recommended for Axio Observer 7

Software Requirements:
ZEN blue 3.1 and above
ZEN blue 3.2 is required for overview image processing and detector parcentricity correction
ZEN module Image Analysis is required
ZEN module Tile & Position is recommended
ZEN module autofocus is recommended for software autofocus
ZEN module Intellesis is recommended for machine learning based image segmentation
Additional automation possible via the ZEN module Macro Environment
Seamless integration with ZEN Connect and Direct Processing modules

Definite Focus 2 is recommended for Axio Observer 7

*Front page image shows Guided Acquisition for detection of cell-cell interaction between mammalian U2OS cells expressing late endosome (Rab5-mEmerald) or actin (lifeAct-tdTomato). Sample from ZEISS Oberkochen demo lab

Carl Zeiss Microscopy GmbH
07745 Jena, Germany
microscopy@zeiss.com
zeiss.com/microscopy