

Australasian Course in Advanced Neuroscience

2025 COURSE PROGRAM



ACAN2025

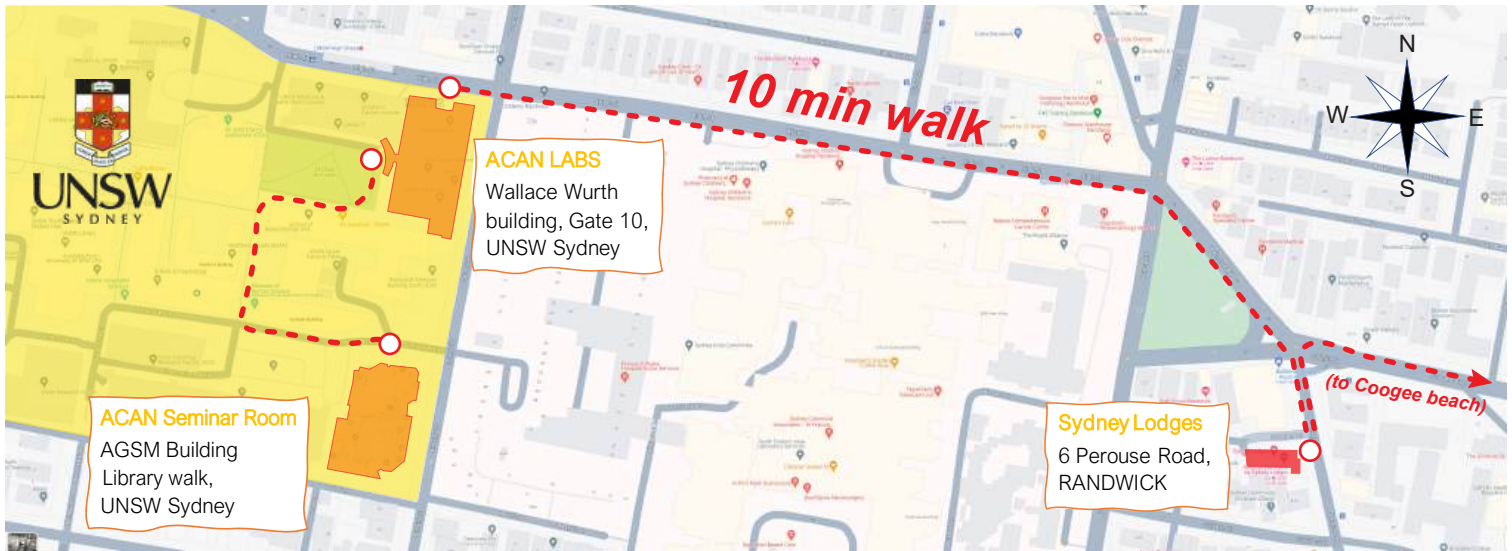
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2025 | AUSTRALASIAN COURSE IN ADVANCED NEUROSCIENCE

COURSE SITE MAP & COMMUTE



ACAN (Wallace Wurth building)



Entry vial UNSW **Gate 10**

Sydney Lodges (Perouse Randwick)



Entry via **Perouse Road**

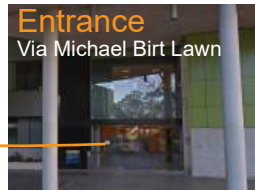
Coogee beach (follow Coogee beach Rd)



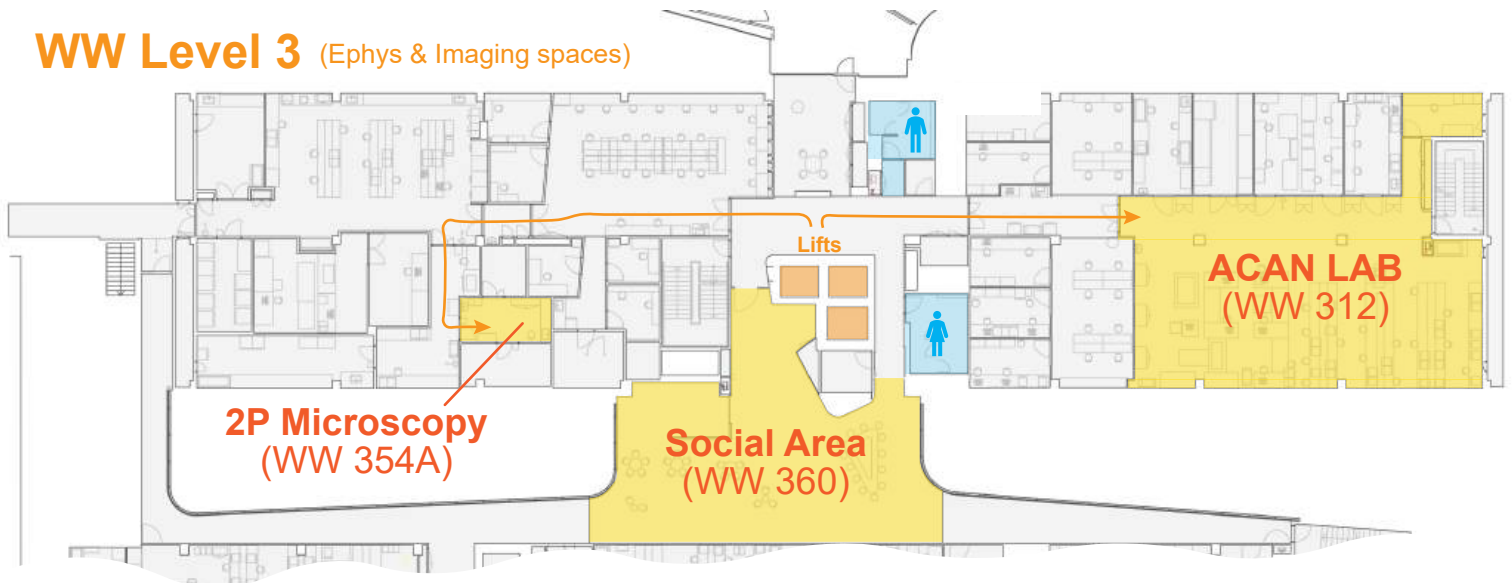
FLOOR PLAN

Wallace Wurth (WW) and AGSM buildings

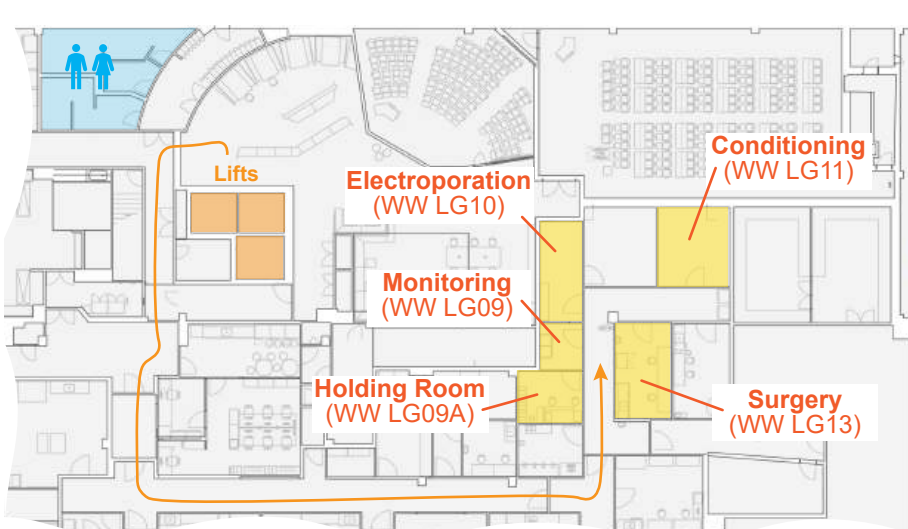
WW Ground Level (Lecture spaces)



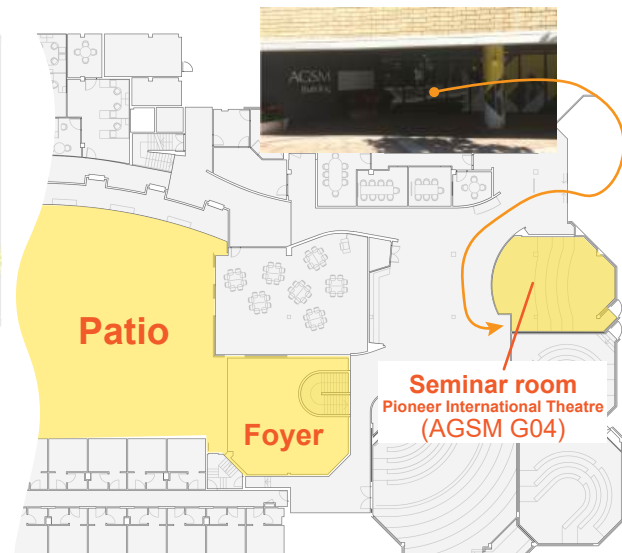
WW Level 3 (Ephys & Imaging spaces)



WW Lower Ground (Behaviour & Surgery spaces)



AGSM (Seminar Room)



Welcome | Sunday 19 JANUARY

EVENING SESSION

Functions Patio (AGSM G27)

17:30 – 18:15

Welcome drinks | Course Introduction

| | |
|-----------------------------|-----------------------------|
| Alan Finkel | <i>ACAN Founder</i> |
| John Bekkers | <i>Former ACAN Director</i> |
| Stephen Williams | <i>Former ACAN Director</i> |
| Chris Reid | <i>Former ACAN Director</i> |
| Jay Bertran-Gonzalez | <i>Course Director</i> |
| Lee Fletcher | <i>Co-director</i> |
| Kate Poole | <i>Co-director</i> |
| John Power | <i>Co-director</i> |
| Elena Bagley | <i>Co-director</i> |

ACAN Faculty and Students

18:30 – 20:30

Functions Patio (AGSM G27)

WELCOME DINNER

Students and Faculty



THEME 1 | NEURONS & NETWORKS

Monday 20 JANUARY

FUNDAMENTALS OF ELECTROPHYSIOLOGY

07:30 – 08:15

Breakfast (Perouse Randwick)

SUNRISE SESSION

Lecture Room (WW G06)

08:30 – 09:00

Introduction to Theme

Lee Fletcher | *Monash University* (VIC)

09:00 – 10:15

The Golden Rules of Electrophysiology

John Bekkers | *Eccles Institute of Neuroscience ANU* (ACT)

10:15 – 10:45

Coffee Break

MORNING SESSION

Lecture Room (WW G06)

10:45 – 12:00

Practical Aspects of Patch Clamp Recordings

Bryony Winters | *University of Sydney* (NSW)

12:00 – 13:00

Lunch (UNSW Food Court)

AFTERNOON PRAC

ACAN Lab (WW 312)

13:00 – 13:30

Pre-Lab Debrief | **Cherry Mao** (Florey VIC), **Alex Tang** (UWA WA), **Ben Lau** (UNSW NSW), **Tobias Bluett** (UQ QLD), **Bryony Winters** (USyD NSW), **Lee Fletcher** (Monash VIC)

14:00 – 18:00

Lab: Meeting the rigs | *All groups*

EVENING WORKSHOPS

ACAN Lab (WW 312)

15:00 – 18:00

Neuro-Electronics Workshop | *Group A*

Ian Forster | *Florey Institute of Neuroscience* (VIC)

18:30 – 19:30

Dinner (Social area – WW 360)

SUNSET SESSION

Lecture Room (WW G06)

19:30 – 22:00

Student Presentations



THEME 1 | NEURONS & NETWORKS

Tuesday 21 JANUARY

BUILDING BLOCKS OF NEURONS

07:30 – 07:55

Breakfast (Perouse Randwick)

SUNRISE SESSION

Lecture Room (WW G06)

09:00 – 10:15

The Electrical Structure of The Neuron

Greg Stuart | *Monash University (ANU)*

10:15 – 10:45

Coffee Break

MORNING SESSION

Lecture Room (WW G06)

10:45 – 12:00

Voltage-gated Ion Channels and Excitability

Bill Connelly | *University of Tasmania (TAS)*

12:00 – 13:00

Lunch (UNSW Food Court)

AFTERNOON PRAC

ACAN Lab (WW 312)

13:00 – 13:30

Pre-Lab Debrief | **Cherry Mao** (Florey VIC), **Alex Tang** (UWA WA), **Ben Lau** (UNSW NSW), **Tobias Bluett** (UQ QLD), **Bryony Winters** (USyD NSW), **Lee Fletcher** (Monash VIC)

13:30 – 18:00

Lab: Current and voltage relationships in neurons | *All groups*

EVENING WORKSHOPS

ACAN Lab (WW 312)

15:00 – 18:00

Neuro-Electronics Workshop | *Group B*

Ian Forster | *Florey Institute of Neuroscience (VIC)*

18:30 – 19:30

Dinner (Social area – WW 360)

SUNSET SESSION

ACAN Lab (WW 312)

19:30 – Late.

Lab After-hours | *All groups*



THEME 1 | NEURONS & NETWORKS

Wednesday 22 JANUARY

NEURONAL COMMUNICATION

07:30 – 08:45

Breakfast (Perouse Randwick)

SUNRISE SESSION

Lecture Room (WW G06)

09:00 – 10:15

Axons and Signal Transmission

Maarten Kole | *University of Utrecht, Netherlands Institute of Neuroscience* (Netherlands)

10:15 – 10:45

Coffee Break

MORNING SESSION

Lecture Room (WW G06)

10:45 – 12:00

Neurotransmission and Synaptic Function

Karl Iremonger | *University of Otago* (NZ)

12:00 – 13:00

Lunch (UNSW Food Court)

AFTERNOON PRAC

ACAN Lab (WW 312)

13:00 – 13:30

Pre-Lab Debrief | **Cherry Mao** (Florey VIC), **Alex Tang** (UWA WA), **Ben Lau** (UNSW NSW), **Tobias Bluett** (UQ QLD), **Bryony Winters** (USyD NSW), **Lee Fletcher** (Monash VIC)

13:30 – 18:00

Lab: Action potential dynamics | *All groups*

EVENING WORKSHOPS

ACAN Lab (WW 312)

15:00 – 18:00

Solutions and Slicing Workshop | *Group 1*

Yossi Buskila | *Western Sydney University* (NSW)

18:30 – 19:30

Dinner (Social area – WW 360)

SUNSET SESSION

ACAN Lab (WW 312)

19:30 – Late.

Lab After-hours | *All groups*



THEME 1 | NEURONS & NETWORKS

Thursday 23 JANUARY

COMMUNICATION: MESSAGE PLASTICITY

07:30 – 08:45

Breakfast (Perouse Randwick)

SUNRISE SESSION

Lecture Room (WW G06)

09:00 – 10:15

Synaptic Dynamics and Plasticity

Elena Bagley | *University of Sydney (NSW)*

10:15 – 10:45

Coffee Break

MORNING SESSION

Lecture Room (WW G06)

10:45 – 12:00

Neuronal Mechanisms of Learning and Memory

Cliff Abraham | *University of Otago (NZ)*

12:00 – 13:00

Lunch (UNSW Food Court)

AFTERNOON PRAC

ACAN Lab (WW 312)

13:00 – 13:30

Pre-Lab Debrief | **Cherry Mao** (Florey VIC), **Alex Tang** (UWA WA),
Ben Lau (UNSW NSW), **Tobias Bluett** (UQ QLD),
Bryony Winters (USyD NSW), **Lee Fletcher** (Monash VIC)

13:30 – 18:00

Lab: Excitatory and Inhibitory Synaptic Potentials | *All groups*

EVENING WORKSHOPS

ACAN Lab (WW 312)

15:00 – 18:00

Solutions and Slicing Workshop | *Group 2*

Yossi Buskila | *Western Sydney University (NSW)*

In Vivo Recording Workshop | *Group 1*

Saba Gharaei | *Eccles Institute of Neuroscience ANU (ACT)*

18:30 – 19:30

Dinner (Social area – WW 360)

SUNSET SESSION

Pioneer International Theatre (AGSM G27 G04)

19:30 – 20:30

Special Lecture Interrogation of neuronal dysfunction

Chris Reid | *Florey Institute of Neuroscience (VIC)*

20:30 – Late.

Post Lecture Discussion / Lab



THEME 1 | NEURONS & NETWORKS

Friday 24 JANUARY

NEURONAL OPERATION

| | |
|--------------------------|---|
| 07:30 – 08:45 | Breakfast (Perouse Randwick) |
| SUNRISE SESSION | Lecture Room (WW G06) |
| 09:00 – 10:15 | Dendritic Integration Stephen Williams <i>Monash University (VIC)</i> |
| 10:15 – 10:45 | Coffee Break |
| MORNING SESSION | Lecture Room (WW G06) |
| 10:45 – 12:00 | In Vivo Patch Clamp and recording techniques Saba Gharaei <i>Eccles Institute of Neuroscience ANU (ACT)</i> |
| 12:00 – 13:00 | Lunch (UNSW Food Court) |
| AFTERNOON PRAC | ACAN Lab (WW 312) |
| 13:00 – 13:30 | Pre-Lab Debrief Cherry Mao (Florey VIC), Alex Tang (UWA WA), Ben Lau (UNSW NSW), Tobias Bluett (UQ QLD), Bryony Winters (USyD NSW), Lee Fletcher (Monash VIC) |
| 13:30 – 18:00 | Lab: Neural Circuits <i>All groups</i> |
| EVENING WORKSHOPS | ACAN Lab (WW 312) |
| 15:00 – 18:00 | Solutions and Slicing Workshop <i>Group 3</i> Yossi Buskila <i>Western Sydney University (NSW)</i> In Vivo Recording Workshop <i>Group 2</i> Saba Gharaei <i>Eccles Neuroscience Institute (ACT)</i> |
| 18:30 – 19:30 | Dinner (Social area – WW 360) |
| SUNSET SESSION | ACAN Lab (WW 312) |
| 19:30 – Late. | Lab After-hours <i>All groups</i> |



THEME 1 | NEURONS & NETWORKS

Saturday 25 JANUARY

NEURONAL FUNCTION

07:30 – 08:45

Breakfast (Perouse Randwick)

SUNRISE SESSION

Lecture Room (WW G06)

09:00 – 10:15

Neural Coding and Information Theory

Ehsan Arabzadeh | *Eccles Institute of Neuroscience ANU (ACT)*

10:15 – 10:45

Coffee Break

MORNING SESSION

Lecture Room (WW G06)

10:45 – 12:00

Understanding neuronal function in the working brain

Clarissa Whitmire | *University of Queensland (UQ)*

12:00 – 13:00

Lunch (Social area – WW 360)

AFTERNOON PRAC

ACAN Lab (WW 312)

13:00 – 13:30

Pre-Lab Debrief | **Cherry Mao** (Florey VIC), **Alex Tang** (UWA WA),
Ben Lau (UNSW NSW), **Tobias Bluett** (UQ QLD),
Bryony Winters (USyD NSW), **Lee Fletcher** (Monash VIC)

13:30 – 18:00

Lab: Paired / Dendritic recordings | *All groups*

EVENING WORKSHOPS

ACAN Lab (WW 312)

15:00 – 18:00

In Vivo Recording Workshop | *Group 3*

Saba Gharaei | *Eccles Neuroscience Institute (ACT)*

18:30 – 19:30

Dinner (Social area – WW 360)

SUNSET SESSION

Pioneer International Theatre (AGSM G27 G04)

19:30 – 20:30

Special Lecture Brain networks and oscillatory activity

Matilde Balbi | *University of Queensland (QLD)*

20:30 – Late.

Post Lecture Discussion

Sunday 26 JANUARY

FREE DAY ACTIVITY

THEME 2 | NETWORKS & SYSTEMS

Monday 27 JANUARY

CONTROLLING NEURONS WITH LIGHT

| | |
|------------------------|--|
| 07:30 – 08:15 | Breakfast (Perouse Randwick) |
| SUNRISE SESSION | Lecture Room (WW G06) |
| 08:30 – 09:00 | Intro to Theme Kate Poole & John Power <i>UNSW Sydney</i> (NSW) |
| 09:00 – 10:15 | Fundamentals of Optics & Microscopy Michael Carnell <i>UNSW Sydney</i> (NSW) |
| 10:15 – 10:45 | Coffee Break |
| MORNING SESSION | Lecture Room (WW G06) |
| 10:45 – 12:00 | Using multiphoton imaging to study cortical processing <i>in vivo</i> Lucy Palmer <i>The Florey Institute of Neuroscience</i> (VIC) |
| 12:00 – 13:00 | Lunch (UNSW Food Court) |
| AFTERNOON PRAC | ACAN Lab (WW 312) |
| 13:00 – 13:30 | Pre-Lab Debrief <i>All groups</i> John Power <i>UNSW Sydney</i> (NSW) |
| 13:30 – 18:00 | Lab: Ca²⁺ imaging in brain slices <i>All groups</i> |
| 18:30 – 19:30 | Dinner (Social area – WW 360) |
| SUNSET SESSION | ACAN Lab (WW 312) |
| 19:30 – Late. | Lab After-hours: back at the rig! <i>All groups</i> |

THEME 2 | NETWORKS & SYSTEMS

Tuesday 28 JANUARY

MEASURING NEURAL FUNCTION WITH LIGHT

07:30 – 07:55

Breakfast (Perouse Randwick)

SUNRISE SESSION

Lecture Room (WW G06)

09:00 – 10:15

Neuronal Microcircuits and Networks and How to Probe them
Christina Mo | *Florey Institute of Neuroscience (VIC)*

10:15 – 10:45

Coffee Break

MORNING SESSION

Lecture Room (WW G06)

10:45 – 12:00

Advances in Optogenetics
John Lin | *University of Tasmania (TAS)*

12:00 – 13:00

Lunch (UNSW Food Court)

AFTERNOON PRAC

ACAN Lab (WW 312)

13:00 – 13:30

Pre-Lab Debrief | *All groups*
Kate Poole and John Power | *UNSW Sydney (NSW)*

13:30 – 18:00

Lab: Optical vs electrical stimulation | *All groups*

18:30 – 19:30

Dinner (Social area – WW 360)

SUNSET SESSION

ACAN Lab (WW 312)

19:30 – Late.

Lab After-hours | *All groups*



THEME 2 | NETWORKS & SYSTEMS

Wednesday 29 JANUARY

MULTIPHOTON IMAGING

| | |
|------------------------|---|
| 07:30 – 08:45 | Breakfast (Perouse Randwick) |
| SUNRISE SESSION | Lecture Room (WW G06) |
| 09:00 – 10:15 | Neuronal Calcium Signalling John Power UNSW (NSW) |
| 10:15 – 10:45 | Coffee Break |
| MORNING SESSION | Lecture Room (WW G06) |
| 10:45 – 12:00 | Wide-Field Imaging Jack Waters Allen Brain Institute (USA) |
| 12:00 – 13:00 | Lunch (UNSW Food Court) |
| AFTERNOON PRAC | Imaging Labs (TNF [WW 354A] & Katharina Gaus Facility) |
| 13:00 – 14:30 | Intravital Imaging (TNF) Group 1 2P imaging (KGLMF) Group 2 Spinning disk microscopy (KGLMF) Group 3 |
| 14:45 – 16:15 | Intravital Imaging (TNF) Group 2 2P imaging (KGLMF) Group 3 Spinning disk microscopy (KGLMF) Group 1 |
| 16:30– 18:00 | Intravital Imaging (TNF) Group 3 2P imaging (KGLMF) Group 1 Spinning disk microscopy (KGLMF) Group 2 |
| 18:30 – 19:30 | Dinner (Social area – WW 360) |
| SUNSET SESSION | Pioneer International Theatre (AGSM G27 G04) |
| 19:30 – 20:30 | <i>Special Lecture</i> Neuron-Glia interactions <i>in vivo</i> Hiro Wake National Institute for Physiological Sciences (JAPAN) |
| 20:30 – Late. | Post Lecture Discussion |

THEME 2 | NETWORKS & SYSTEMS

Thursday 30 JANUARY

MESOSCOPIC NEURAL SYSTEMS

07:30 – 08:45

Breakfast (Perouse Randwick)

SUNRISE SESSION

Lecture Room (WW G06)

09:00 – 10:15

Light-sheet Imaging of Whole Brain Networks in Zebra Fish
Ethan Scott | *University of Melbourne* (VIC)

10:15 – 10:45

Coffee Break

MORNING SESSION

Lecture Room (WW G06)

10:45 – 12:00

Using Brain organoids to Model Disease
Lezanne Ooi | *University of Wollongong* (NSW)

12:00 – 13:00

Lunch (UNSW Food Court)

AFTERNOON PRAC

Imaging Labs (ACAN lab & Katharina Gaus Facility)

13:00 – 14:30

Light sheet imaging of organoids (KGLMF) | *Group 1*
Whole-field imaging of organoids (WW 312) | *Group 2*
Organoid Multielectrode Array recording (WW 312) | *Group 3*

14:45 – 16:15

Light sheet imaging of organoids (KGLMF) | *Group 3*
Whole-field imaging of organoids (WW 312) | *Group 1*
Organoid Multielectrode Array recording (WW 312) | *Group 2*

16:30– 18:00

Light sheet imaging of organoids (KGLMF) | *Group 2*
Whole-field imaging of organoids (WW 312) | *Group 3*
Organoid Multielectrode Array recording (WW 312) | *Group 1*

18:30 – 19:30

Dinner (Social area – WW 360)

SUNSET SESSION

Lecture Room (WW G06)

19:45 – 21:15

Data Analysis Tutorial

THEME 2 | NETWORKS & SYSTEMS

Friday 31 JANUARY

MICROSCOPIC NEURAL SYSTEMS

07:30 – 08:45

Breakfast (Perouse Randwick)

SUNRISE SESSION

Lecture Room (WW G06)

09:00 – 10:15

Probing Synaptic Function with Super-Resolution Microscopy
Fred Meunier | *University of Queensland* (QLD)

10:15 – 10:45

Coffee Break

MORNING SESSION

Lecture Room (WW G06)

10:45 – 12:00

The Molecular Structure of Learning and Memory
Victor Anggono | *University of Queensland* (QLD)

12:00 – 13:00

Lunch (UNSW Food Court)

AFTERNOON PRAC

Imaging Lab (Katharina Gaus Light Microscopy Facility)

13:00 – 14:00

TIRF Microscopy (KGLMF) | *Group 1*

Super-resolution imaging (KGLMF) | *Group 2*

14:00 – 15:00

TIRF Microscopy (KGLMF) | *Group 2*

Super-resolution imaging (KGLMF) | *Group 3*

15:00 – 16:00

TIRF Microscopy (KGLMF) | *Group 3*

Super-resolution imaging (KGLMF) | *Group 1*

16:00 – 18:00

Super-resolution analysis pipeline (WW G06) | All groups

18:30 – 19:30

Dinner (Social area – WW 360)

SUNSET SESSION

Pioneer International Theatre (AGSM G27 G04)

19:30 – 20:30

Special Lecture Shining a Light on Survival
Yeka Aponte | *NIDA/NIH* (USA)

20:30 – Late.

Post Lecture Discussion



THEME 2 | NETWORKS & SYSTEMS

Saturday 1 FEBRUARY

WRAP UP!

07:30 – 08:45

Breakfast (Perouse Randwick)

MORNING

ACAN Lab (WW 312) | Lecture Room (WW G06)

09:00 – 12:00

Data Analysis | *All Groups*

12:00 – 13:00

Lunch (Social area – WW 360)

AFTERNOON

Lecture Room (WW G06)

13:00 – 15:00

Data Presentations | *All students*

18:30 – 19:30

Dinner (Social area – WW 360)

SUNSET SESSION

Pioneer International Theatre (AGSM G27 G04)

19:30 – 20:30

Special Lecture **Decoding the Brain**

Matthew Larkum | *Humboldt Universität (Germany)*

20:30 – Late.

Post Lecture Discussion

Sunday 2 FEBRUARY

FREE DAY ACTIVITY



THEME 3 | SYSTEMS & BEHAVIOUR

Monday 3 FEBRUARY

LEARNING & BEHAVIOUR

| | |
|------------------------|--|
| 07:30 – 08:15 | Breakfast (Perouse Randwick) |
| SUNRISE SESSION | Lecture Room (WW G06) |
| 08:30 – 09:00 | Intro to Theme Jay Bertran-Gonzalez UNSW Sydney (NSW) |
| 09:00 – 10:15 | Associative Learning and Behaviour Nathan Holmes UNSW Sydney (NSW) |
| 10:15 – 10:45 | Coffee Break |
| MORNING SESSION | Lecture Room (WW G06) |
| 10:45 – 12:00 | Interrogating Neural Systems Function with Behaviour Karly Turner UNSW Sydney (NSW) |
| 12:00 – 13:00 | Lunch (UNSW Food Court) |
| AFTERNOON PRAC | Lecture Room Computing Lab Behaviour Lab |
| 13:00 – 18:00 | Designing our Behavioural Experiment <i>Group rotations</i> Jay Bertran-Gonzalez UNSW Sydney (NSW) WW G06 Controlling a Conditioning Rig <i>Group rotations</i> Karly Turner UNSW Sydney (NSW) WW G06 Meet Your Mouse & Training Day 1 <i>Group rotations</i> Chelsea Goulton UNSW Sydney (NSW) WW LG11 |
| 18:30 – 19:30 | Dinner (Social area – WW 360) |
| SUNSET SESSION | Pioneer International Theatre (AGSM G27 G04) |
| 19:30 – 20:30 | <i>Special Lecture</i> Origins of the Neuroscience of Associative Learning Simon Killcross UNSW Sydney (NSW) |
| 20:30 – Late. | Post Lecture Discussion |



THEME 3 | SYSTEMS & BEHAVIOUR

Tuesday 4 FEBRUARY

SETTING UP BRAIN SYSTEMS

07:30 – 07:55

Breakfast (Perouse Randwick)

SUNRISE SESSION

Lecture Room (WW G06)

09:00 – 10:15

Evolution & Development of the Cerebral Cortex
Rodrigo Suárez | *University of Queensland (QLD)*

10:15 – 10:45

Coffee Break

MORNING SESSION

Lecture Room (WW G06)

10:45 – 12:00

Studies of Neurogenesis and Neural Circuit Formation
Laura Fenlon | *University of Queensland (QLD)*

12:00 – 13:00

Lunch (UNSW Food Court)

AFTERNOON PRAC

ACAN Computing Lab | Behaviour Lab

13:00 – 18:00

Training Day 2 | *All Groups* | WW LG11

Prac 3_1 | **In Utero Electroporation** | *Group 1* | LG10

Prac 3_2 | **Advanced Behaviour** | *Group 2* | WW G06

Prac 3_3 | **In Vivo Fibre Photometry** | *Group 3* | WW LG13

18:30 – 19:30

Dinner (Social area – WW 360)

SUNSET SESSION

Pioneer International Theatre (AGSM G27 G04)

19:30 – 20:30

Special Lecture Slow Neurotransmission & Affective Behaviour
Michael Bruchas | *University of Washington (USA)*

20:30 – Late.

Post Lecture Discussion

THEME 3 | SYSTEMS & BEHAVIOUR

Wednesday 5 FEBRUARY

LEARNING AND NEUROMODULATION (I)

07:30 – 08:45

Breakfast (Perouse Randwick)

SUNRISE SESSION

Lecture Room (WW G06)

09:00 – 10:15

Studying Neural Systems in vivo

Lizzie Manning | *University of Newcastle* (NSW)

10:15 – 10:45

Coffee Break

MORNING SESSION

Lecture Room (WW G06)

10:45 – 12:00

Capturing Learning through Fibre Photometry

Philip Jean-Richard Dit Bressel | *UNSW Sydney* (NSW)

12:00 – 13:00

Lunch (UNSW Food Court)

AFTERNOON PRAC

ACAN Computing Lab | Behaviour Lab

13:00 – 18:00

Training Day 3 | *All Groups* | WW LG11

Prac 3_1 | *In Utero Electroporation* | *Group 2* | LG10

Prac 3_2 | *Advanced Behaviour* | *Group 3* | WW G06

Prac 3_3 | *In Vivo Fibre Photometry* | *Group 1* | WW LG13

18:30 – 19:30

Dinner (Social area – WW 360)

SUNSET SESSION

Pioneer International Theatre (AGSM G27 G04)

19:30 – 20:30

Special Lecture Unique Signatures for Learning in Distinct Dopamine Circuits

Melissa Sharpe | *University of Sydney* (NSW)

20:30 – Late.

Post Lecture Discussion

THEME 3 | SYSTEMS & BEHAVIOUR

Thursday 6 FEBRUARY

LEARNING AND NEUROMODULATION (II)

07:30 – 08:45

Breakfast (Perouse Randwick)

SUNRISE SESSION

Lecture Room (WW G06)

09:00 – 10:15

Acetylcholine Systems in the Striatum

Nathalie Dehorter | *University of Queensland* (UQ)

10:15 – 10:45

Coffee Break

MORNING SESSION

Lecture Room (WW G06)

10:45 – 12:00

Muscarinic Control of Neural Function and Chemogenetics

Leigh Walker | *The Florey Institute of Neuroscience* (VIC)

12:00 – 13:00

Lunch (UNSW Food Court)

AFTERNOON PRAC

ACAN Computing Lab | Behaviour Lab

13:00 – 18:00

Learning Encoding Test 1 | *All Groups* | WW LG11

Prac 3_1 | **In Utero Electroporation** | *Group 3* | LG10

Prac 3_2 | **Advanced Behaviour** | *Group 1* | WW G06

Prac 3_3 | **In Vivo Fibre Photometry** | *Group 2* | WW LG13

18:30 – 19:30

Dinner (Social area – WW 360)

SUNSET SESSION

Pioneer International Theatre (AGSM G27 G04)

19:30 – 20:30

Special Lecture Dopamine, Acetylcholine and Corticostriatal plasticity

John Reynolds | *University of Otago* (NZ)

20:30 – Late.

Post Lecture Discussion

THEME 3 | SYSTEMS & BEHAVIOUR

Friday 7 FEBRUARY

SYSTEMS FAILURE

07:30 – 08:45

Breakfast (Perouse Randwick)

SUNRISE SESSION

Lecture Room (WW G06)

09:00 – 10:15

Subcortical Systems and Disease

Robyn Brown | *The Florey Institute of Neuroscience* (VIC)

10:15 – 10:45

Coffee Break

MORNING SESSION

Lecture Room (WW G06)

10:45 – 12:00

Synaptic Genes & Cognition

Jess Nithianantharajah | *Florey Institute of Neuroscience* (VIC)

12:00 – 13:00

Lunch (UNSW Food Court)

AFTERNOON PRAC

Lecture Room | Behaviour Lab

13:00 – 18:00

Learning Encoding Test 2 | *All Groups* | WW LG11

INTEGRATIVE WORKSHOP | WW G06

Miriam Matamales | *UNSW Sydney* (NSW)

Discussion-based session aimed at integrating the fundamental concepts acquired during the course with a novel experimental research program individually or as groups. Students will work on their research question together with faculty.

18:30 – 19:30

Dinner (Social area – WW 360)

SUNSET SESSION

Lecture Room & Computing Lab (WW G06)

19:30 – Late.

Preparation of Presentations | *All Groups*



THEME 3 | SYSTEMS & BEHAVIOUR

Saturday 8 FEBRUARY

WRAP UP!

07:30 – 08:45

Breakfast (Perouse Randwick)

MORNING PRAC

Lecture Room & Computing Lab (WW G06)

09:00 – 12:00

Preparation of Presentations | *All Groups*

Behavioural data processing | *Selected groups*

12:00 – 13:00

Lunch (Social area – WW 360)

AFTERNOON SESSION

Lecture Room (WW G06)

13:00 – 19:30

Student Presentations | *All students*

Conditioning Experiment Results | *All students*

SUNSET SESSION

Coogee Beach

19:30 – 21:00

END OF COURSE DINNER

21:00 – Late.

Drinks Coogee + The Spot

Sunday 9 FEBRUARY

RETURN HOME

07:30 – 09:00

Breakfast (Perouse Randwick)

09:00 –

Checkout and Safe return home.

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Laura Fenlon (UQ)

Rodrigo Suarez (UQ)

STUDENTS

AHTIAINEN Annika (Tampere, Finland)

CHUA Han Chow (USyD, NSW)

CHUNG Sidney (Eccles, ACT)

DAVIES Jim (Otago, NZ)

DI NATALE Madeleine (Florey, VIC)

ITALIANO Michael (UNSW, NSW)

KEEVERS Luke (UNSW, NSW)

RICCI Raphael (UQ, QLD)

RILEY Bronwyn (Auckland, NZ)

RUFFEL Morgane (Utrecht, Netherlands)

SOMANAHALLI PURUSHOTHAM Sushmitha (UWS, NSW)

TEYMORNEJAD Sadaf (Monash, VIC)

STUDENT BIOSKETCHES

Annika AHTIAINEN

I am a PhD student in the Computational Biophysics and Imaging Group, led by Professor Jari Hyttinen, at the Faculty of Medicine and Health Technology, Tampere University, Finland. I am currently finalizing my PhD studies and preparing for my doctoral defense, which is scheduled for 2025. My research focuses on exploring neuron-astrocyte interactions using various in vitro models and assessment techniques. I have worked with dissociated and topologically controlled neural cultures grown on microelectrode arrays (MEAs) to study how chemical compounds and electrical stimulation affect neuronal and neuron-astrocyte co-culture electrophysiology and biochemistry. My work has particularly focused on investigating the role of astrocytes in GABA modulation. I am excited to return to Australia, where I completed my master's thesis research as a visiting researcher some years ago. Through ACAN, I aim to further enhance my practical expertise and deepen my knowledge of advanced neurobiology techniques.



Han Chow CHUA

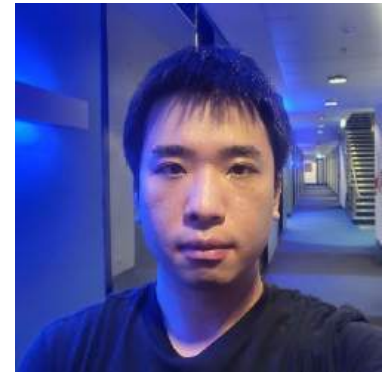


Han Chow Chua is a lecturer in pharmacology at The University of Sydney, the same university where he earned his Bachelor of Pharmacy (Honours I) and PhD in 2012 and 2017, respectively. During his graduate studies, Chow worked with Professor Mary Collins (Chebib) to elucidate the pharmacological effects of a variety of anaesthetic and anxiolytic compounds at GABAA receptors using a combination of molecular biology and electrophysiological techniques. He then moved to Copenhagen, Denmark to work with Professor Stephan Pless to study the controversial sodium leak channel (NALCN). During his postdoc, Chow successfully identified three auxiliary proteins absolutely required for the functional expression of NALCN, allowing him to perform in vitro

characterisation of this enigmatic channel, providing unprecedented insights into NALCN function and physiology. In 2023, Chow accepted a lecturer position at the Sydney Pharmacy School, where he will continue his research on ion channels in health and disease.

Sidney CHUNG

I am a first year PhD student in the Eccles Institute of Neuroscience at ANU, working as part of the Neural Coding Group under the supervision of Ehsan Arabzadeh. After completing my undergraduate studies in psychology and neuroscience at ANU, I undertook a Masters in neuroscience, during which I did a one-year research project in the Neural Coding Group. My project involved the use of deep-learning-based pose-tracking to quantitatively analyse behaviour in free-moving mice, specifically in the context of how novelty can influence active sensation. I stayed on in the group for my PhD, with my current project focusing on uncertainty in sensory perception and decision-making. For this project, I am using a behavioural paradigm where mice are trained to perform an auditory stimulus detection task, with a reward delivered at a variable delay. I then mix white noise with the stimulus at different signal-to-noise levels to create uncertainty in whether the stimulus was present, and determine the animal's confidence in its decision by measuring how long it's willing to wait for a reward. As my project moves forward, I also plan to use in vivo neuronal recordings and neuromodulation techniques like chemogenetics to investigate the brain regions underlying uncertainty.



Jim DAVIES



Kia ora. I am a second-year PhD student in Cliff Abraham's lab at the University of Otago. I completed my Honours in 2022, looking at the effects of ADAM10 and sAPPa inhibition on synaptic plasticity. Both proteins are impacted by Alzheimer's pathology and are potential targets for treatment. This led to my PhD project, where I am trying to enhance sAPPa levels within the brain to treat Alzheimer's. Specifically, I am testing the efficacy of a viral gene therapy in treating Alzheimer's-like symptoms in a mouse model. I'm using a variety of tests, including behaviour, in vitro electrophysiology, immunofluorescence, western blots and ELISAs. After my PhD, I'd like to continue researching Alzheimer's with

rodents. I'd particularly like to apply in vivo testing to bridge the gap between the controlled environment of in vitro studies and the complexity of whole-animal behaviour.

Maddy Di Natale



Dr Madeleine (Maddy) Di Natale is an early career postdoctoral researcher within the Anatomy and Physiology Department, University of Melbourne. She is currently working within the Plasticity of the Enteric Nervous System laboratory co-led by Dr Lincon Stamp and Dr Marlene Hao. Prior to joining the Stamp/Hao team, Maddy worked with Prof. John Furness for nearly seven years where she moved from Research Assistant to PhD student, to Postdoc. She was awarded her PhD in February 2024 and received the 2023 Excellence Award and Mendelsohn Neuroscience Award through the University of Melbourne for the works completed during her PhD. Maddy has been working within the neurogastro-

enterology field for seven years on a range of projects, including neurodegenerative disorders and how they impact the gut, circadian rhythm and food entrainment, inflammatory bowel disease, and mapping autonomic neurotransmission of the stomach. Maddy moved to the Stamp/Hao team in January 2025 where her current research focuses on developing off-the-shelf stem cell therapies for paediatric gastrointestinal dysfunction including Hirschsprung disease, gastroparesis and achalasia. She plans to utilise cutting edge technologies such as electrophysiology, advanced surgical techniques, live animal imaging, and pharmacogenetic and optogenetic tools to tackle these gut motility disorders

Michael ITALIANO

I am a final-year PhD candidate at the University of New South Wales. My background in biomedical and electrical engineering initially led me to neural engineering through an undergraduate research project that involved leveraging machine learning to optimise electrical waveforms for neural stimulation. Since then, my PhD has involved delving into the fascinating fields of neuroscience and electrophysiology, working within a research group that characterises and refines neuromodulation-based treatment strategies using healthy and diseased models. My current research focuses on improving artificial vision restoration by characterising retinal electrical stimulation strategies and assessing possible changes in the intrinsic properties of retinal ganglion cells caused by disease. To achieve this, I combine computational modelling, histology, and ex vivo patch clamping (with synaptic blockers) to improve our understanding of the relationship between retinal degeneration, retinal electrophysiology, and electrical stimulation. I aspire to pursue a career focused on bettering our understanding of neuronal systems and how they change during disease, with the goal of leveraging such insights to improve the efficacy of neuromodulation treatment strategies. Toward this goal, after finalising my thesis in 2025, I intend to pursue a postdoctoral position to broaden my skillset and actively apply the experience gained through ACAN.



Luke KEEVERS



I am a second-year PhD candidate in psychology at UNSW Sydney, supervised by Dr. Philip Jean-Richard-dit-Bressel and Professor Gavan McNally. After completing a BPsych (Hons I) at UNSW in 2022, I began working in the Behavioural Neuroscience Lab, first as a research assistant and now as a graduate student. Our lab investigates the neurobiology of learning and decision-making, with my research focusing specifically on aversive learning. The central aim of my project is to understand how the brain attributes aversive events to either our behaviour or the environment, enabling appropriate behavioural adaptation. My work examines the role of bidirectional circuitry between the basolateral amygdala and distinct subregions of the prefrontal cortex in supporting different forms of aversive learning. To achieve this, I employ techniques such as circuit mapping, fibre photometry, and optogenetics in rats performing a complex aversive learning task. Through this research, I hope to contribute to a deeper understanding of how the brain drives learning and behavioural flexibility in response to aversive experiences. I am keen to further develop my technical expertise at ACAN and connect with like-minded, passionate neuroscientists.

Raffael RICCI

I am an early career neuroscientist investigating the capacity for neural progenitor cell behaviour to shape neural circuit formation, maintenance and function during development and throughout adulthood. More specifically, the role of oligodendrocyte progenitors and myelin in brain circuit formation and maintenance. My research examines the brain under health and pathological conditions by performing manipulations relevant to autism spectrum disorder, multiple sclerosis and schizophrenia. During my PhD at University of Tasmania and under the supervision of Prof Kaylene Young, I studied the effect of neuronal activity on cells of the oligodendrocyte lineage. I found that voltage-gated calcium channels are critical for oligodendrocyte progenitor cell survival and characterised the impact of kainate receptor dysfunction on neuropathology and behaviour in mice. While under the supervision of Prof Helen Cooper at the Queensland Brain Institute – University of Queensland - I studied how the WRC-Cyfp1-FMRP protein network impaired apical radial glial progenitor function and neural migration, leading to cortical malformation and neural circuitry alterations resulting in Autism-like traits in mice. In 2023, I joined Dr Carlie Cullen's team at Mater Research Institute – University of Queensland – and currently am using transgenic mice strategies to determine how aberrant myelination can contribute to onset of neuropsychiatric and neurodegenerative disorders. I have a long-standing interest in neuroscience research, that extends from understanding how brain function is regulated during development and in healthy ageing, and the dysregulated signalling pathways that enable neurodevelopmental and neurodegenerative disorders.

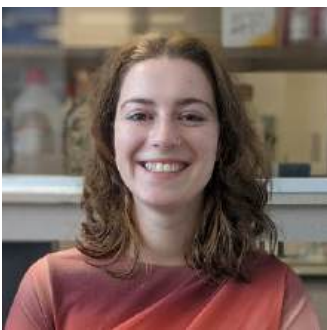


Bronwyn RILEY

My name is Bronwyn Riley and I am a second year PhD student in the basal ganglia neurophysiology group at the University of Auckland, under the supervision of Dr Peter Freestone. I am researching a poorly understood brain region - the tail striatum – which is involved in sensory processing and could contribute to sensory symptoms (e.g. visual and auditory hallucinations) of dopaminergic diseases like schizophrenia and Parkinson's disease. In my project I am using whole cell patch clamping in brain slices to characterise electrophysiological properties of medium spiny neurons (MSNs) in the tail striatum and determine how these properties are altered by changes in extracellular dopamine. I am also investigating the functional connectivity of tail striatum MSNs with sensory cortices (visual and auditory) using optogenetics. Of particular interest is whether different subdivisions of the tail striatum (medial vs intermediate vs lateral) receive different sensory input. In my previous work I used fast scan cyclic voltammetry in brain slice to show that different divisions of the tail striatum have unique dopamine transmission properties (Riley et al., 2024).



Morgane RUFFEL



I am Morgane Ruffel, a first year PhD student under the supervision of Prof. Dr. Maarten Kole and co-supervision of Prof. Dr. Christiaan Levelt at the Netherlands Institute for Neuroscience in Amsterdam, the Netherlands. I completed my undergraduate studies in France, where I am originally from. I worked under the supervision of Prof. Dr. Vincent Breton-Provencher in Québec, Canada for my master's where I investigated the role of interneurons in layer 1 of the primary motor cortex in sensorimotor learning. I learned how to perform in vivo two-photon calcium imaging and developed a sensorimotor learning protocol for mice. This experience developed my strong interest in interneurons modulation in the cortex and their effect on the circuitry and behaviour, and drives me to dig deeper into molecular mechanisms of this modulation. My current project focuses on investigating the synaptic and cellular mechanisms by which chandelier cells modulate the axon initial segment of pyramidal cells and their role in predictive coding using cell-type specific optogenetic manipulations combined with state-of-art slice electrophysiological techniques. I am looking forward to deepen my theoretical and practical knowledge about ex vivo electrophysiological techniques as well as methods of analysis and other recording techniques at ACAN 2024.

Sushmitha Somanahalli PURUSHOTHAM



My name is Sushmitha. I am a third-year PhD candidate in the Cellular Neurophysiology lab at Western Sydney University's School of Medicine, supervised by A/Prof. Yossi Buskila and co-supervised by A/Prof. Erika Gyengesi. I hold a Master of Technology in Biotechnology Engineering from RV College of Engineering, India, and previously worked as a Research Assistant at JNCASR, India under the supervision of A/Prof. James Premdoss Clement Chelliah where I explored the ability of small epigenetic molecules to restore synaptic and behavioural deficits in the Syngap1+/- mice model of Autism Spectrum Disorder (ASD) by employing Immunohistochemistry, Behaviour, and molecular biology techniques. My PhD project focuses on deducing the relationship between astrocytic K⁺ homeostasis and neuroinflammation in a mouse model for Amyotrophic Lateral Sclerosis (ALS). It evaluates the potential of phytosomal curcumin, a cytokine-suppressive anti-inflammatory drug to alleviate motor deficits in a mouse model of ALS using behavioural tests. Specifically, I investigate astrocytic K⁺ clearance rate, neuronal hyperexcitability, and neuroinflammation levels in the motor cortex and spinal cord using extracellular electrophysiological recordings and immunohistochemistry. Furthermore, I aim to decipher the relationship between potassium homeostasis and neuroinflammation, characterising astrocytic heterogeneity in the brain and how they change during disease progression using single-cell qPCR, a critical aspect of ALS pathology.

Sadaf TEYMORNEJAD

I am currently a second-year PhD student at the Biomedicine Discovery Institute, Monash University, under the supervision of Professor Marcello Rosa, Head of the Laboratory for Cognitive and Sensory Systems Neuroscience. Our laboratory uses a multitude of anatomical and physiological techniques to investigate the organisation of the cerebral cortex, with special emphasis on the visual system. My research interests lie in neuroanatomy, an area that I first explored during my honours year, where I investigated the effects of environmental and social enrichment on the chronic outcomes of paediatric traumatic brain injury. The findings from this work were published in the Journal of Experimental Neurology. In my PhD, I am studying the distribution and molecular properties of inhibitory interneurons, particularly vasoactive intestinal polypeptide (VIP)-expressing and neurogliaform (NGF) cells, in healthy and aged marmoset monkeys (*Callithrix jacchus*). My research focuses on comparing these interneurons in the frontal (later-maturing) and visual (early-maturing) cortical areas, utilising techniques such as immunohistochemistry, immunofluorescence staining and various imaging methods. Moving forward, I aim to integrate functional physiological techniques, such as patch-clamp recording acquired through ACAN, to deepen our understanding of these interneurons, particularly NGFs, and their roles within primate cortical circuits.



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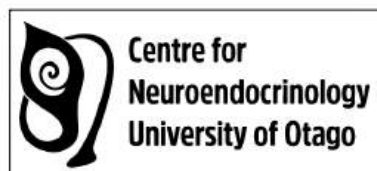


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