









COURSE PROGRAM

Table of Contents

Course Site Map & Commute	2
Course Venue	3
Program	4
Welcome Sunday 25 June	4
Week 1 Fundamentals of Electrophysiology	5
Monday 26 June	5
Tuesday 27 June	6
Wednesday 28 June	7
Thursday 29 June	8
Friday 30 June	9
Saturday 1 July	10
Week 2 Cortical Processing and Neuronal Networks	11
Monday 3 July	11
Tuesday 4 July	12
Wednesday 5 July	13
Thursday 6 July	14
Friday 7 July	15
Saturday 8 July	16
Week 3 Brain Systems and Behaviour	17
Monday 10 July	17
Tuesday 11 July	18
Wednesday 12 July	19
Thursday 13 July	20
Friday 14 July	21
Saturday 15 July	22
Course Faculty	23
Board of Directors Coordinators Lecturers	23
Instructors	24
Students	
Student biosketches	
Sponsors and Institutional Support	

COURSE SITE MAP & COMMUTE







Welcome | Sunday 25 JUNE

NOTE: Accommodation check-in (at the University College) will run from 12 to 17:30

EVENING SESSION University College at the University of Melbourne

17:30 – 18:15 Welcome drinks | Course Introduction

Greg Stuart	ACAN Chair
Janet Keast	ANS President Course
Chris Reid	Director
Karl Iremonger	Co-director (Week 1)
Lucy Palmer	Co-director (Week 2)
Jay Bertran-Gonzalez	Co-director (Week 3)

18:30 – OPENING EVENT (<u>Naughtons Parkville Hotel</u>) Students and Faculty



The Excitable Cell and Synaptic Transmission

Monday 26 JUNE

07:00 – 07:45	Breakfast (University College)
SUNRISE SESSION	HFL Lecture Theatre
08:00 - 09:00	Health & Safety Induction and Intro to Week Theme Fran Tait and Karl Iremonger <i>University of Otago</i> (NZ)
09:00 – 10:15	The Golden Rules of Electrophysiology John Bekkers The Eccles Institute of Neuroscience (ACT)
10:15 – 10:45	Coffee Break
MORNING SESSION	HFL Lecture Theatre
10:45 – 12:00	Practical Aspects of Patch Clamp Recordings
	Lee Fletcher Queensland Brain Institute (QLD)
12:00 – 13:00	Lunch (Graduate House)
AFTERNOON PRAC	ACAN LAB - HFL Level 3
13:00 – 18:00	Introduction to Rigs + Setup All students
	Brain slice preparation Yossi Buskila rotations
	Ephys electronics lan Forster rotations
18:00 – 19:00	Dinner (University College)
SUNSET SESSION	University College at the University of Melbourne
19:00 – Late.	Student Project Presentations & Discussion 12 talks, 3 min



The Excitable Cell and Synaptic Transmission

Tuesday 27 JUNE

07:00 – 08:00	Breakfast (University College)
SUNRISE SESSION	HFL Lecture Theatre
09:00 – 10:15	Voltage Gated Ion Channels & Excitability Bill Connelly University of Tasmania (TAS)
10:15 – 10:45	Coffee Break
MORNING SESSION	HFL Lecture Theatre
10:45 – 12:00	The Electrical Structure of Neurons
	Greg Stuart Monash University (VIC)
12:00 – 13:00	Lunch (Graduate House)
AFTERNOON PRAC	ACAN LAB - HFL Level 3
13:00 – 18:00	Basics of patch clamping All students
	Brain slice preparation Yossi Buskila rotations
	Ephys electronics Ian Forster rotations
18:00 – 19:00	Dinner (University College)
SUNSET PRAC	ACAN LAB - HFL Level 3
19:00 – Late.	Back to the Lab! All students encouraged



The Excitable Cell and Synaptic Transmission

Wednesday 28 JUNE

07:00 – 08:00	Breakfast (University College)
SUNRISE SESSION	HFL Lecture Theatre
09:00 – 10:15	Introduction to Physiology of the Synapse Karl Iremonger University of Otago (NZ)
10:15 – 10:45	Coffee Break
MORNING SESSION	HFL Lecture Theatre
10:45 – 12:00	Mechanisms and Dynamics of Neurotransmitter Release
	Sarah Gordon The Florey Institute of Neuroscience (VIC)
12:00 – 13:00	Lunch (Graduate House)
AFTERNOON PRAC	ACAN LAB - HFL Level 3
13:00 – 18:00	Rig time All students
18:00 - 19:00	Dinner (University College)
SUNSET PRAC	ACAN LAB - HFL Level 3
19:00 – Late.	Back to the Lab! All students encouraged



The Excitable Cell and Synaptic Transmission

Thursday 29 JUNE

07:00 - 08:00	Breakfast (University College)
SUNRISE SESSION	HFL Lecture Theatre
09:00 – 10:15	Dendritic Integration Stephen Williams <i>Queensland Brain Institute</i> (QLD)
10:15 – 10:45	Coffee Break
MORNING SESSION	HFL Lecture Theatre
10:45 – 12:00	In Vivo Patch Clamp Saba Gharaei The Eccles Institute of Neuroscience (ACT)
12:00 – 13:00	Lunch
AFTERNOON PRAC	ACAN LAB - HFL Level 3
13:00 – 18:00	Rig time All students
	In Vivo Patch Saba Gharaei rotations
18:00 – 19:00	Dinner (University College)
EVENING SESSION	University College at the University of Melbourne
19:30 – 20:30	Hot Topic How does the brain really work? Matthew Larkum Humboldt University of Berlin (GER)



The Excitable Cell and Synaptic Transmission

Friday 30 JUNE

Breakfast (University College)
HFL Lecture Theatre
Neural Coding and Information Theory Ehsan Arabzadeh The Eccles Institute of Neuroscience (ACT)
Coffee Break
HFL Lecture Theatre
Long Term Synaptic Plasticity
Cliff Abraham University of Otago (NZ)
Lunch
ACAN LAB - HFL Level 3
Rig time All students
In Vivo Patch Saba Gharaei rotations
Dinner (University College)
ACAN LAB - HFL Level 3



The Excitable Cell and Synaptic Transmission

Saturday 1 JULY

07:00 – 08:00	Breakfast (University College)
SUNRISE SESSION	HFL Lecture Theatre
09:00 – 10:15	Electrophysiology Data Analysis Cherry Mao Ian Forster Ben Lau
10:15 – 10:45	Coffee Break
MORNING PRAC	ACAN LAB - HFL Level 3 HFL Meeting
10:00 – 13:00	Room Data Analysis All students
13:00 – 14:00	Lunch (Graduate House)
AFTERNOON PRAC	ACAN LAB - HFL Level 3 HFL Meeting
14:00 – 17:00	Room Data Presentations All students
	Week 1 debrief All students
17:30 – 19:00	Dinner (University College)
EVENING SESSION	The City of Melbourne
19:00 – Late.	FREE NIGHT



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07:30 – 08:45	Breakfast (University College)
SUNRISE SESSION	HFL Lecture Theatre
09:00 – 09:10	Intro to Theme and Student Groups Lucy Palmer The Florey Institute of Neuroscience (VIC)
09:10 – 10:15	Fundamentals of Optics & Microscopy Tim Karle The Florey Institute (VIC)
10:15 – 10:45	Coffee Break
MORNING SESSION	
10:45 – 12:00	Advances in Optogenetics and Chemogenetics Andrew Allen <i>University of Melbourne</i> (VIC)
12:00 – 13:00	Lunch (Graduate House)
AFTERNOON PRAC	ACAN LAB - HFL Level 7 KMB Level 3
13:00 – 18:00	In Vitro Opto- and Chemogenetics All Groups
	Analysis of Ion Channels in Expression Systems rotations Ian Forster Ming Soh Geza Berecki
18:30 – 19:30	Dinner (University College)
EVENING PRAC	ACAN LAB - HFL Level 3
19:30 – Late.	Back to the Lab!



Tuesday 4 JULY	
07:30 – 08:45	Breakfast (University College)
SUNRISE SESSION	HFL Lecture Theatre
09:00 – 10:15	Calcium Indicators John Power UNSW Sydney (NSW)
10:15 – 10:45	Coffee Break
MORNING SESSION	
10:45 – 12:00	Two-Photon Imaging Tatsuo Sato <i>Monash University</i> (VIC)
12:00 – 13:00	Lunch (Graduate House)
AFTERNOON PRAC 13:00 – 18:00	ACAN LAB - HFL Level 3
	In Vitro Calcium Imaging All Groups
	Analysis of Ion Channels in Expression Systems rotations
	Ian Forster Ming Soh Geza Berecki
18:30 – 19:30	Dinner (University College)
EVENING PRAC	ACAN LAB - HFL Level 3
19:30 – Late.	Back to the Lab!



Wednesday 5 JULY

07:30 – 08:45	Breakfast (University College)
SUNRISE SESSION	HFL Lecture Theatre
07:30 – 08:45	Breakfast (University College)
SUNRISE SESSION	HFL Lecture Theatre
09:00 – 10:15	Widefield calcium imaging
	Jack Waters Allen Institute of Brain Science (USA)
10:45 – 12:00	Calcium Imaging - Zebrafish
	Ethan Scott University of Melbourne (VIC)
12:00 – 13:00	Lunch (Graduate House)
AFTERNOON PRAC	ACAN LAB - HFL Level 7 KMB Level 3
13:00 – 16:00	2P Calcium Imaging - Fish Groups 1-2
	2P Calcium Imaging - Mouse Groups 3-4
EVENING PRAC	ACAN LAB - HFL Level 7 KMB Level 3
16:00 – 18:15	2P Calcium Imaging - Fish Group 3-4
	2P Calcium Imaging - Mouse Groups 1-2
18:30 – 19:30	Dinner (University College)
SUNSET SESSION	University College at the University of Melbourne
19:30 – 20:30	Tutorial Analyse your imaging Data All Groups



Thursday 6 JULY	
07:30 – 08:45	Breakfast (University College)
SUNRISE SESSION	HFL Lecture Theatre
09:00 – 10:15	Fluorescence Imaging in Disease Matilde Balbi <i>Queensland Brain Institute</i> (QLD)
10:15 – 10:45	Coffee Break
MORNING SESSION	
10:45 – 12:00	Advanced Imaging Techniques Fred Meunier Queensland Brain Institute (QLD)
12:00 – 13:00	Lunch (Graduate House)
AFTERNOON PRAC	ACAN LAB - HFL Level 7 KMB Level 3
13:00 – 16:00	Single Molecule Tracking Workshop All Groups
EVENING PRAC	ACAN LAB - HFL Level 7 KMB Level 3
16:00 – 18:15	Widefield Imaging Demo All Groups
18:30 – 19:30	Dinner (University College)
SUNSET SESSION	University College at the University of Melbourne
19:00 - 20:00	Special Lecture Axons and Excitability
	Maarten Kole University of Utrecht (Netherlands)
20:00 – Late.	Post Lecture Discussion



Friday 7 JULY

MORNING SESSION	HFL Lecture Theatre
08:00 – 12:00	Neural Imaging with Miniaturized Microscopes in Freely Behaving Animals
	Daniel Aharoni University of California Los Angeles (USA)
12:00 – 13:00	Lunch (Graduate House)
AFTERNOON PRAC	ACAN LAB - HFL Level 3
13:00 – 18:00	Miniscope design, build and use All Groups
18:30 – 19:30	Dinner (University College)
SUNSET PRAC	ACAN LAB - HFL Level 3
19:30 – Late.	Miniscope data analysis



Saturday 8 JULY	
07:30 – 08:45	Breakfast (University College)
MORNING SESSION	HFL Meeting Room Social Area
09:00 – 12:00	Data Analysis and Preparation of Presentations All students
12:00 - 13:00	Lunch (Graduate House)
AFTERNOON PRAC	HFL Meeting Room
13:00 – 15:30	Student Presentations Groups 1 & 2
EVENING PRAC	HFL Meeting Room
15:30 – 18:00	Student Presentations Groups 3 & 4
18:30 – 19:30	Dinner (University College)
EVENING SESSION	The City of Melbourne
19:30 – Late.	FREE NIGHT

Sunday 9 JULY

FREE DAY ACTIVITY



Monday 10 JULY

07:30 – 08:15	Breakfast (University College)
SUNRISE SESSION	KMB Education Room
08:30 – 09:00	Intro to Week Theme Jay Bertran-Gonzalez <i>UNSW Sydney</i> (NSW)
09:00 – 10:15	The Molecular Structure of Learning and Memory Victor Anggono <i>Queensland Brain Institute</i> (QLD)
10:15 – 10:45	Coffee Break
MORNING SESSION	KMB Education Room
10:45 – 12:00	Interrogating Neural Systems Function with Behaviour Karly Turner UNSW Sydney (NSW)
12:00 – 13:00	Lunch (Graduate House)
AFTERNOON PRAC	KMB Education Room Computing Lab ACAN Lab
13:00 – 18:00	Designing our Behavioural Experiment Group rotations Jay Bertran-Gonzalez UNSW Sydney (NSW)
	Controlling a Conditioning Rig Group rotations Beatrice Leung UNSW Sydney (NSW)
	Meet Your Mouse & Training Day 1 Group rotations Chelsea Goulton UNSW Sydney (NSW)
18:30 – 19:30	Dinner (University College)
SUNSET SESSION	University College at the University of Melbourne
19:30 – 20:30	Special Lecture Why and When is Dopamine Valuable? Melissa Sharpe UCLA (USA)
20:30 – Late.	Post Lecture Discussion



Tuesday 11 JULY

07:30 – 07:55	Breakfast (University College)
SUNRISE SESSION	KMB Education Room
09:00 – 10:15	Evolution & Development of the Cerebral Cortex Rodrigo Suárez University of Queensland (QLD)
10:15 – 10:45	Coffee Break
MORNING SESSION	KMB Education Room
10:45 – 12:00	Studies of Neurogenesis and Neural Circuit Formation
	Laura Fenlon University of Queensland (QLD)
12:00 – 13:00	Lunch (Graduate House)
AFTERNOON PRAC	ACAN LAB - HFL Level 3 HFL Computing Room Training
13:00 – 18:00	Day 2 All Groups
	Prac 3_1 In Utero Electroporation Group 1
	Prac 3_2 Advanced Behaviour Analysis Group 2
	Prac 3_3 <i>In Vivo</i> Fibre Photometry <i>Group 3</i>
18:30 – 19:30	Dinner (University College)
SUNSET SESSION	University College at the University of Melbourne
19:30 – 20:30	Special Lecture Slow Neurotransmission & Flexible Behaviour
	Miriam Matamales UNSW Sydney (NSW)
20:30 – Late.	Post Lecture Discussion



Wednesday 12 JULY

07:30 – 08:45	Breakfast (University College)
SUNRISE SESSION	KMB Education Room
09:00 – 10:15	Studying Neural Systems <i>in vivo</i> Lizzie Manning <i>University of Newcastle</i> (NSW)
10:15 – 10:45	Coffee Break
MORNING SESSION	KMB Education Room
10:45 – 12:00	Capturing Learning through Fibre Photometry Philip Jean-Richard Dit Bressel UNSW Sydney (NSW)
12:00 – 13:00	Lunch (Graduate House)
AFTERNOON PRAC	ACAN LAB - HFL Level 3 HFL Computing Room
13:00 – 18:00	Training Day 3 All Groups
	Prac 3_1 In Utero Electroporation Group 2
	Prac 3_1 <i>In Utero</i> Electroporation <i>Group 2</i> Prac 3_2 Advanced Behaviour Analysis <i>Group 3</i>
	Prac 3_1 <i>In Utero</i> Electroporation <i>Group 2</i> Prac 3_2 Advanced Behaviour Analysis <i>Group 3</i> Prac 3_3 <i>In Vivo</i> Fibre Photometry <i>Group 1</i>
18:30 – 19:30	Prac 3_1 <i>In Utero</i> Electroporation <i>Group 2</i> Prac 3_2 Advanced Behaviour Analysis <i>Group 3</i> Prac 3_3 <i>In Vivo</i> Fibre Photometry <i>Group 1</i> Dinner (University College)
18:30 – 19:30 SUNSET SESSION	Prac 3_1 <i>In Utero</i> Electroporation <i>Group 2</i> Prac 3_2 Advanced Behaviour Analysis <i>Group 3</i> Prac 3_3 <i>In Vivo</i> Fibre Photometry <i>Group 1</i> Dinner (University College) University College at the University of Melbourne
18:30 – 19:30 SUNSET SESSION 19:30 – 20:30	 Prac 3_1 <i>In Utero</i> Electroporation <i>Group 2</i> Prac 3_2 Advanced Behaviour Analysis <i>Group 3</i> Prac 3_3 <i>In Vivo</i> Fibre Photometry <i>Group 1</i> Dinner (University College) University College at the University of Melbourne <i>Special Lecture</i> Are we Wrong About Learning?
18:30 – 19:30 SUNSET SESSION 19:30 – 20:30	 Prac 3_1 <i>In Utero</i> Electroporation <i>Group 2</i> Prac 3_2 Advanced Behaviour Analysis <i>Group 3</i> Prac 3_3 <i>In Vivo</i> Fibre Photometry <i>Group 1</i> Dinner (University College) University College at the University of Melbourne <i>Special Lecture</i> Are we Wrong About Learning? Gavan McNally UNSW Sydney (NSW)



Thursday 13 JULY

07:30 – 08:45	Breakfast (University College)
SUNRISE SESSION	KMB Education Room
09:00 – 10:15	Acetylcholine Systems in the Striatum Nathalie Dehorter The Eccles Institute of Neuroscience (ACT)
10:15 – 10:45	Coffee Break
MORNING SESSION	KMB Education Room
10:45 – 12:00	Muscarinic Control of Neural Function
	Leigh Walker The Florey Institute of Neuroscience (VIC)
12:00 – 13:00	Lunch (Graduate House)
AFTERNOON PRAC	ACAN LAB - HFL Level 3 HFL Computing Room
13:00 – 18:00	Training Day 4 All Groups
	Prac 3_1 In Utero Electroporation Group 3
	Prac 3_2 Advanced Behaviour Analysis Group 1
	Prac 3_3 In Vivo Fibre Photometry Group 2
18:30 – 19:30	Dinner (University College)
SUNSET SESSION	University College at the University of Melbourne
19:30 – 20:30	Special Lecture Optical Approaches to Deconstructing Circuits
	Controlling Motivation and Stress
	Chris Dayas University of Newcastle (NSW)
20:30 – Late.	Post Lecture Discussion



Friday 14 JULY

07:30 – 08:45	Breakfast (University College)
SUNRISE SESSION	KMB Education Room
09:00 – 10:15	Subcortical Systems and Disease Robyn Brown The Florey Institute of Neuroscience (VIC)
10:15 – 10:45	Coffee Break
MORNING SESSION	KMB Education Room
10:45 – 12:00	Synaptic Genes & Cognition
	Jess Nithianantharajah Florey Institute of Neuroscience (VIC)
12:00 – 13:00	Lunch (Graduate House)
AFTERNOON PRAC	ACAN LAB & HFL Social Area in Level 3
13:00 – 18:00	Learning Encoding Test 1 All Groups
	Data Analysis and Preparation of Presentations All Groups





Saturday 15 JULY

07:30 – 08:45	Breakfast (University College) and Check-out
MORNING PRAC 09:00 – 12:00	ACAN LAB – HFL Level 3 Learning Encoding Test 2 <i>All Groups</i>
MORNING SESSION 09:00 – 12:00	HFL Social Area – HFL L3 Data Presentations <i>All students</i> Conditioning Experiment Results <i>All students</i>
12:00 – 13:00	Lunch (Graduate House) and Safe Return Home



COURSE FACULTY

BOARD OF DIRECTORS

Lucy Palmer (Florey) Jay Bertran-Gonzalez (UNSW) Karl Iremonger (Otago) Christopher Reid (Florey) Elena Bagley (USyD)

COORDINATORS

Alex Tang (UWA) Chelsea Goulton (UNSW) Luca Godenzini (Florey) Sean Murphy (Florey) Stuart McDougall (Florey)

LECTURERS

Andrew Allen (UniMelb) Bill Connelly (UTAS) Chris Dayas (UoN) Cliff Abraham (Otago) Daniel Aharoni (UCLA) Ehsan Arabzadeh (ANU) Ethan Scott (UniMelb) Fred Meunier (QBI) Gavan McNally (UNSW) Greg Stuart (Monash) Jack Waters (Allen Brain) John Bekkers (ANU) John Power (UNSW) Karly Turner (UNSW) Laura Fenlon (QBI) Lee Fletcher (QBI) Leigh Walker (Florey) Lizzie Manning (UoN) Matilde Balbi (QBI) Matthew Larkum (Humboldt U) Melissa Sharpe (UCLA) Miriam Matamales (UNSW) Nathalie Dehorter (QBI) Philip Jean-Richard Dit Bressel (UNSW) Robyn Brown (UniMelb) Rodrigo Suarez (QBI) Saba Gharaei (ANU) Sarah Gordon (Florey) Stephen Williams (QBI) Tatsuo Sato (Monash) Tim Karle (Florey) Victor Anggono (QBI)



COURSE FACULTY

LABORATORY INSTRUCTORS

Alex Tang (UWA) Ann-Sofie Bjerre (Florey) Beatrice Leung (UNSW) Ben Lau (UNSW) Chelsea Goulton (UNSW) Cherry Mao (Florey) Christopher Nolan (UNSW) Dechuan Sun (Florey) George Stuyt (Florey) Geza Berecki (Florey) Heidi McAlpine (Florey) Ian Forster (Florey) Luca Godezini (Florey) Marious Rosier (Florey) Melody Li (Florey) Ming Shiuan Soh (Florey) Mona Amiri (Florey) Rachel Gormal (QBI) Roberta Goncalves Anversa (Florey) Tom Burton (UNSW) Tristan Wallis (Florey) Yi Hu (Florey) Yossi Buskila (UWS)



STUDENTS

AMRUTHA Leena

BEROS Jamie

BLACK Dylan

CHEN Mo

JACOBS Jono

LUI Si Yin

McKENZIE Chaseley

MILLS Zoe

NELSON Conor

O'SHEA Mia

PEARSON Lily

ZHANG Muqin



STUDENT BIOSKETCHES

Leena AMRUTHA

My name is Leena Amrutha, and I am a second year PhD student under the supervision of Dr Ehsan Kheradpezhouh and Prof Ehsan Arabzadeh at the Eccles Institution of Neuroscience at ANU. I work in the neural coding lab where we address fundamental questions in the field of systems neuroscience by quantifying brain activity underlying sensory coding and behaviour. My project is focused on the cellular mechanisms in which TRP channels are involved in sensory processing in the cortex. I started off in this lab as an undergraduate student characterising the co-localisation of these channels, using immunohistochemistry and confocal imaging. I then continued this project into my honours year. During this time, I utilised in vitro electrophysiology to examine the interactions between TRP channels



in the CNS. As a PhD student I have expanded the project in vivo to understand the role of these channels in sensory processing. I am currently investigating whether TRP channels synergistically modulate encoding of sensory information by employing behavioural studies, while measuring neuronal activity through calcium imaging.

Jamie BEROS



Dr Jamie Beros is an early career researcher at the University of Western Australia and the Perron Institute. He was awarded his PhD in 2020 with his work focusing on the mechanisms underlying development of the visual system during the early postnatal period. Dr Beros currently works in the Brain Plasticity Lab under the supervision of Associate Professor Jennifer Rodger. His research interests are associated with understanding the developmental mechanisms that shape the brain for adolescent and adult life, and investigating ways of inducing beneficial changes in the brain to improve function. Specifically, investigating the use of non-invasive brain stimulation, such as repetitive transcranial magnetic stimulation (rTMS), in the developing brain. During his PhD, Dr Beros was awarded a Nicolas

Baudin scholarship to undertake an internship at Neurocentre Magendie (Bordeaux, France) to investigate the contribution of adult neurogenesis to the acquisition of fear memories. Since his return to WA, he has helped establish an optogenetic and multiphoton platform at UWA and the Perron Institute and has secured funding to further research rTMS and childhood development utilising these tools.



Dylan BLACK

Dr Dylan A. Black (PhD 2022, The University of Sydney) is an early-career researcher based at the School of Biomedical Sciences and Queensland Brain Institute at The University of Queensland. His dissertation research focused on the developmental roles of highly conserved axonal guidance molecules, with an emphasis on better understanding their behavioural relevance by applying machine learning methods for animal positional tracking (Young et al. 2023, Dev Neuro). His work to date has also used environmental-enrichment paradigms to examine how guidance molecule-dependent changes in retinofugal brain wiring are influenced by the early postnatal environment (Blok and Black et al. 2020, Frontiers in Behavioural Neuroscience). Other research directions have included



adapting behavioural assays to study the therapeutic potential of novel opsins for vision restoration in inherited retinal dystrophies (Too et al. 2022, Scientific Reports). Dylan has experience in histological analysis, microscopy, optogenetics, animal surgeries, in-pouch electroporation, in vivo 2-photon and wide-field imaging, and various behavioural analytic paradigms. He enjoys scientific computing and is proficient in Python and R programming, and associated machine learning frameworks. Dylan is now a member of the Brain Evo-Devo laboratory led by Dr Rodrigo Suárez and Dr Laura Fenlon, where he is researching the origin and developmental role of spontaneous electrical activity in the embryonic marsupial isocortex of the fat-tailed dunnart.

Mo CHEN



Mo Chen is Research Australia Discovery Awardee (2020-2021) and has a PhD in neuroscience about spinal cord injury repair, with seven years of experience and expertise in cell biology and medical bioengineering. This includes developing cell transplantation products to treat spinal cord injury and analyzing various 3D culture systems, such as low attachment 3D culture, mammalian cell culture with bioreactors, and hydrogel-based 3D culture. He has published 11 journal papers (10 Q1 and 1 Q2) in the last three years, with 189 citations. The most significant of these papers focused on the therapeutic properties of Olfactory Ensheathing Cells (OECs) in the spinal cord injury site and the 3D culture technique. Chen's groundbreaking brain organoids technology, with two patents (Provisional

patent number 2017904456 and 2017904064) for the root technology, and new patent applications are currently being prepared for the updated version. His contributions to 3D cell culture are that he has broken through the limitations of traditional 3D cell production concepts and he is the first to apply cell self-organisation theory to pre-clinical research. In 2023, he was awarded a Griffith University Postdoctoral Fellowship (2023-2025) and he is CIA on an MRFF ECR/MCR project (2023-2026, \$762k from MRFF, \$762k from partners, total project value \$1.52 million).



Jono JACOBS

I am Jono Jacobs (BE (Mechanical); GradDip (Psychology); BPysSc (Hons I)), a former mechanical engineer from Perth. I moved to Sydney in 2015 to study Bachelor of Science – Advanced Mathematics program at The University of Sydney. Mid-way through my degree I moved into business and financial analytics, where I spent 5 years mentoring a finance team, as well as implementing a number of financial models and analytical processes that helped grow business EBITDA by ~350% over my tenure (\$32m in 2016; \$108m in 2021). During the later years of my employment, I developed a deep interest in psychology and neuroscience, leading me to a career change through a PhD in the



Neuromodulatory Systems and Behaviour Group, UNSW Psychology. The aim of my research is to reveal characteristic spatio-temporal molecular activation motifs in the striatum that represent the encoding of pure instrumental learning signatures and predict future behavioural adaption. To investigate this problem, I am developing a new machine-learning image analysis pipeline for processing large volumes of neural data collected in animals as they learn instrumental behaviours (in the order of 10⁵ neurons), resulting in extremely high spatial resolution. Furthermore, I am enriching these data by utilizing a unique aspect of the sensor's dynamics to extract additional pseudo-temporal dimensionality after image acquisition. This analysis may enable the transformation of static images into dynamic activation flows, providing the first complete spatio-temporal characterization of goal-directed learning signatures in the striatum. Outside of the professional environment, you will find me road cycling, running, or cooking (mostly) palatable food.

Si Yin LUI



I am a 3rd year PhD student at UNSW Sydney. I completed undergraduate studies and a master's degree at University of Auckland. My current project focuses on the ventral striatopallidal system in appetitive behaviour. This project uses electrophysiology (whole-cell patch-clamp in acute rat brain slices), behavioural protocol and optogenetics. Electrophysiology is used to explore the characteristics of the circuitry involving the nucleus accumbens and ventral pallidum. Specifically, this includes investigating synaptic plasticity changes, neurotransmitter release, cell's electrophysiological parameters and pharmacological intervention. I would like to have a better grasp of the fundamentals of electrophysiology, learn new types of recordings and methods of analysis.

I perform stereotaxic surgery to inject viral vector (for channelrhodpsin-2 expression) and retrograde tracers (CTB or mCherry) before the animals undergo an alcohol selfadministration protocol (I call it the "happy hour experiment"!) and electrophysiology experiments. My PhD supervisors are Gavan McNally and John Power. In my master's project, I investigated local microcircuitry in the subthalamic nucleus of mice using whole-cell patch-clamp in acute brain slices and optogenetics. This involved processing large amounts of electrophysiological data collected with point photostimulation – this gave the data an additional dimension of spatial information at subcellular resolution. My master's supervisor was Peter Freestone. My other research experience from previous summer research projects includes electrochemistry in acute rat brain slices, assisting in human transcranial magnetic stimulation and post-stroke motor tests in rats.



Chaseley McKENZIE

I'm currently a second year PhD student at the Florey Institute of Neuroscience and Mental Health, studying under Professor Christopher Reid in the Neurophysiology of Excitable Networks Laboratory. I completed an Honours year with the Reid lab in 2019 with a project focusing on understanding the disease mechanisms of an HCN1 developmental and epileptic encephalopathy. I then stayed as a Research Assistant to continue to develop and learn new skills and understanding in neurophysiology techniques. My PhD research focuses on disease mechanisms and precision treatments for HCN1 developmental epileptic encephalopathies (DEEs). I have established a common "cation-leak"



mechanism underlying disease in the majority of HCN1 DEE cases using two-electrode voltage-clamp techniques in Xenopus oocytes. I have also identified small molecule drugs that can rescue the cation leak biophysical consequences in several HCN1 pathogenic variants and demonstrated that the drugs reduce excitability in the Hcn1 M294L mouse model of HCN1 DEE. My project now involves completing single-cell electrophysiology in mouse brain slices to determine if the drugs can also rescue cellular phenotypes, and I aspire to use imaging techniques such as the miniscope to understand neuronal network scale deficits in the mouse. I am thrilled to be able to continue to learn these techniques and others at ACAN 2023.

Zoe MILLS



Hi, I'm Zoe Mills! After attaining my undergraduate degree studying Neuroscience and Genetics at the University of Otago, I am now a second year Ph.D. student in the Montgomery lab group at Auckland University. I am deeply fascinated by the mechanisms of synaptic plasticity and the complexities of neurotransmission. My current research focuses on neuronal dysfunction in patients with Phelan-McDermid Syndrome, a monogenic form of Autism Spectrum Disorder. Using induced pluripotent stem cells, I hope to identify electrophysiological phenotypes of human neurons expressing ASD- associated mutation in the SHANK3 region and assess the therapeutic effect of zinc treatment in rescuing these deficits. I

am thrilled about the prospects of ACAN and the opportunity to learn techniques which are so fundamental to my research with other like-minded neuroscientists.



Conor NELSON

I am Conor Nelson, a PhD student in the University of Auckland's Molecular Neurotherapeutics lab, supervised by Associate Professor Deborah Young and Dr Angela Wu. Our lab specialises in the use of adeno-associated viral (AAV) vectors for gene therapies and as research tools. My research interests lie in the realm of novel therapeutics, and I have previously structured my learning around genetics, pharmacology, and neuroscience. This led me to complete my honours project in Associate Professor Deborah Young's lab, working on a novel regulatory system for gene therapies. I have since started my PhD in the same group, working to validate a novel antibody-based therapy targeting the GluN1



subunit of NMDA receptors that has cognition-enhancing and neuroprotective properties. My PhD thesis investigates the utility of this novel GluN1 antibody as a therapeutic agent for Huntington's disease (HD). I am testing two therapeutic approaches; 1) determining whether passive systemic transfer of recombinant GluN1 (recGluN1) antibodies can reverse motor dysfunction and neuropathology in the YAC128 transgenic mouse model of HD; 2) whether an AAV-based genetic vaccine can be used to elicit the production of recGluN1 antibodies that are also protective in this mouse model. I have received financial support from the Auckland Medical Research Foundation and the HOPE Foundation for Research in Aging. A major benefit of this has been the opportunity to speak about my work at charity events organised by these foundations, which has sparked an interest in science communication. This interest has led to my involvement in the HealtheX research conference, of which I am a current co-chair.

Mia O'SHEA



Mia O'Shea, Bsc (Hons), is a second year PhD candidate in the Department of Biochemistry and Pharmacology at the University of Melbourne under the supervision of Dr Robyn Brown, Head of the Behavioural Neuropharmacology Laboratory. The research group investigates the neural mechanisms underlying pathological forms of motivated behaviour such as compulsive overeating and drug addiction. Mia's thesis is specifically focused on identifying the neural pathways involved in stress-induced binge eating, with the aim of understanding why emotional and stress-related eating appears to be sex-specific. This project utilises a mouse model of stress-induced binge eating established in Robyn Brown's laboratory, that pairs a mild frustrative stressor with

intermittent access to a food reward to induce episodes of "binge-like" eating in mice. Currently, Mia is using a transgenic mouse line to investigate corticotrophin-releasing hormone as a candidate factor influencing the sex-differences apparent in this model. She is also conducting an ongoing investigation, which comprises both clinical and preclinical aspects, into the influence of gonadal hormones (e.g., testosterone, estrogen) on driving dimorphism in stress and dysregulated eating. Moving forward, Mia hopes to employ a range of different techniques, including those she will learn at ACAN, to delve deeper into the neurobiology underpinning sex-differences in stress-induced eating.



Lily PEARSON

My name is Lily Pearson, and I am a 3rd year PhD candidate at the Translational Neuroscience Facility, School of Biomedical Sciences, UNSW Sydney. I undertook my undergraduate studies at ANU, where I studied Medical Science. My curiosity for further scientific exploration was sparked by how many questions in neuroscience and genetics remain unanswered, but also how people can develop technologies that provide the perspective required to dive deeper. I started my PhD to learn how to create problem-solving ideas from cutting-edge perspectives and techniques. My current project investigates the expression distribution and genetic signature of subpopulations of primary auditory neurons in the inner ear in transgenic reporter mice. I have maintained these lines over



the past few years to breed a homozygous line that shows distinct neuronal expression patterns. I have developed protocols using confocal and light sheet microscopy to visualise the entire population of these neurons throughout the auditory and vestibular ganglion and discriminate them against subtypes markers. I particularly enjoy testing new antibody combinations to refine the auditory and vestibular neuron populations in the inner ear. I am currently working to genetically characterise this population through genetic and transcriptomic techniques including multi-step PCRs, nanopore sequencing and scRNAseq. The next phase of my project involves functionally characterising the population of neurons, I hope to refine my skills in more functional physiological techniques during ACAN.

Muquin ZHANG



My name is Muqin Zhang, and I am a second-year PhD candidate from John Bekkers's lab at the Eccles Institute of Neuroscience at ANU. I completed my Master Research under the supervision of Prof. John Bekkers, studying the mechanisms of variable firing of Neurogliaform cells in the piriform cortex. My current PhD project is in two parts. In the first part, I am using in vitro patch clamp recordings to map out patterns of synaptic connectivity between identified subtypes of GABAergic neurons in the piriform cortex of mice, with the aim of identifying the canonical inhibitory circuits in this cortex. The second part of my PhD project is equally fascinating, as it focuses on studying the role of synaptic inhibition in hyperexcitability in the piriform cortex using a novel transgenic mouse

model of epilepsy known as the Hcn1 M294L mouse. To achieve this, I will use a combination of in vivo and in vitro electrophysiology and imaging techniques to gain a better understanding of how the circuit of the brain works and how it is impacted by epilepsy. I am excited about the program and eager to learn about the techniques that will be taught.



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