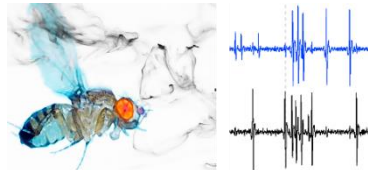


Kia ora!

Discover how nervous systems function, adapt, and drive behaviour in animals and humans. In hands-on labs, you will record neuron activity, build neural models, and experiment with learning in fruit flies. Explore advanced topics like computational neuroscience and neurogenetics – and build your own Braitenberg robot!

Teaching method:

- Lectures: In-person attendance is optional, but missed lectures must be watched online. Recordings are available immediately after each lecture until the exam.
- Research projects: Work solo or in small groups to design and execute short research projects, gaining hands-on experience with the scientific method. Labs are optional, with online alternatives available, though in-person sessions offer greater depth.
- Internal assessments:
 - Multiple-choice and/or short-answer questions about the lab activities.
 - A mandatory, in-person midterm test (multiple-choice questions).
- Journal club: Join Bart, Joe and Paul in the Neuroethology Journal Club for voluntary, ungraded discussions and presentations on current neuroscience topics—a relaxed space to deepen critical thinking.

Teaching Team

Neural bases of olfaction, learning, memory, and cognition in insects, and epilepsy in tadpoles

Paul Szyszka (coordinator)

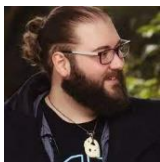
paul.szyszka@otago.ac.nz, Benham B106



Insects, computer science, neuroscience, artificial intelligence

Bart Geurten

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Artificial intelligence, neuroscience, psychology, and creative writing

Joseph Cahill-Lane

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Lecture & lab timetable

Lect	Lab	Date	Topic	Lectr
Part I: Fundamentals of neurophysiology				
1		14/07	Welcome, study guide, ion channels & membrane potential	B&P
2		16/07	Action potential & recording techniques	Paul
	1	18/07	Record neuronal spikes in a virtual electrophysiology lab (Lt)	
3		21/07	Signal integration: The role of the membrane time constant	Paul
4		23/07	Signal propagation: The role of the membrane length constant	Paul
	2	25/07	Characterize response properties of sensory neurons (Record in live or virtual (Lt) cockroach legs)	
Part II: Integrating nets and systems				
5		28/07	Synaptic transmission	Bart
6		30/07	Nervous system organisation from worms to humans	Bart
	3	01/08	Dissection of the central nervous system in a locust	
7		04/08	Organisation of movement	Bart
8		06/08	Coding of sensory information	Bart
	4	08/08	Neuropharmacology - effect of nicotine and glutamate on neurons (Record from the central nervous system in a live cricket)	
9		11/08	Olfaction	Paul
10		13/08	Vision	Bart
	5	15/08	Characterize response properties of a central neuron (Record the DCMD neuron in a live locust)	
11		18/08	Head-body coordination	Bart
12		20/08	Audition	Bart
		22/08	Midterm test (mandatory)	
Part III: Integrating systems at work				
13		25/08	Computational neuroscience: Classic models	Bart
14		27/08	Computational neuroscience: Deep learning	Bart
	6	29/08	Develop and investigate a neural circuit model for swimming and autonomous obstacle avoidance using reflexes (Crescent loom)	
MIDSEMESTER BREAK				
15		08/09	Neural plasticity and learning	Paul
16		10/09	Associative learning	Paul
	7	12/09	Reveal the connectome of a brain (Crescent loom)	
17		15/09	Experimental design	Paul
18		17/09	The rise of neurogenetics	Bart
	8	19/09	Test associative odour learning in <i>Drosophila</i> larvae	
19		22/09	Translational neurobiology	Bart
20		24/09	Limits of cognition	Bart
	9	26/09	<i>Drosophila</i> learning research project	
21		29/09	Jet propulsion in squid	Paul
22		01/10	Escape in fish - the Mauthner system	Paul
	10	03/10	<i>Drosophila</i> learning research project	
23		06/10	Social learning & cultural transmission	Paul
24		08/10	Navigation & orientation	Paul
	11	10/10	Build your own Braitenberg robot	
25		13/10	Q&A	B&P

Assignments

Due date	Assignment	Marks
30 Jul, 5:00pm	Quiz 1 about Lab 1 & 2	6
13 Aug, 5:00pm	Quiz 2 about Lab 3 & 4	6
22 Aug, 2:00pm	Midterm test	20
10 Sep, 5:00pm	Quiz 3 about Lab 5 & 6	6
24 Sep, 5:00pm	Quiz 4 about Lab 7 & 8	6
8 Oct, 5:00pm	Quiz 5 about Lab 9 & 10	6

Intended learning outcomes

- Develop a deep knowledge of how neurons and neural networks function to generate perception, movement, and behavior in animals and humans.
- Gain insight into both classic and modern techniques used to study nervous system function, animal behavior, and learning.
- Cultivate the ability to independently source information and effectively communicate knowledge and ideas orally.
- Demonstrate teamwork by designing and conducting experiments as part of a group, enhancing collaborative problem-solving abilities.
- Develop an inquiring mindset and take responsibility for your own learning. Refine observational, analytical, and interpretative skills.

Lectures (in person, live Echo streams, and recordings)

Monday at 11am in OBS117 and Wednesday at 1pm in QUAD1

You are expected to have listened to and understood the lectures before you do the labs.

Journal clubs (in person, voluntary)

Wednesday 12-1pm in Benham seminar room (Benham building).

Labs (in person and online options)

Friday 2-6pm

- In person: Zoology teaching labs M203 and M211 (Marples building)

In person lab attendance is recommended but voluntary (lab coat required). Labs can also be done online at your own time.

Before doing a lab, you need to work through lab-related documents provided on Blackboard → Course documents → Lab ##). If there is no online-version of a lab, working through those lab-related documents will be sufficient to achieve the intended learning objectives. For each lab, your learning performance will be assessed weekly with quizzes, reflections, or data analysis reports on Blackboard → Assignments.

Expected workload

Most weeks you will be expected to spend 2 hours in lectures, 3-4 hours in laboratories, and 5 hours in self-directed activities such as preparing for the Friday labs, revisiting the lectures, reading, and working on assignments.

Assessment

Internal assessment (max 50%)

Quizzes about labs (Multiple choice and/or short answer questions) 30%

Midterm test (Multiple choice questions) 20%

Final exam (50%)

3 hours long, in person, on paper, closed book, centrally run by the Uni. Multiple choice questions related to the lectures 50%

Grading scheme:

A+	A	A-	B+	B	B-	C+	C	C-	D	E
90-100	85-89	80-84	75-79	70-74	65-69	60-64	55-59	50-54	40-49	<40

Minimum mark requirement

You must achieve a minimum mark of 45% in internal assessment, a minimum mark of 40% in the final exam, and a minimum mark of at least 50% overall. A student who does not meet these minimum requirements will be awarded an F (fail with no mark).

Online learning platform

We use Blackboard. Blackboard is a web-based learning platform that we use to help manage teaching and learning in the course. On Blackboard you will find resource material, a list of lectures and tutorials, a discussion site, assignments, and your own personal grade sheet.

We will use some of these tools later in the course, but for now we just want to make sure you can access these pages. First, go to the Blackboard home page by following these steps:

1. Click on to your browser.
2. Go to <https://blackboard.otago.ac.nz>
3. You will be asked to Login by typing in your username and password (use your university-wide Student ID and password). Once you have logged in you will find yourself on your personal Blackboard page.
4. On the right-hand side of the site you will see the heading 'My Courses'. All the papers in which you are enrolled should be listed. Click on this button.
5. Once you are in the website bookmark it or add it to your 'favourites'.

Discussion forums

We encourage you to use our ZOO314 Blackboard Discussion Forums for asking questions about this course. You can post questions anonymously.

Check Blackboard and student email regularly.

Important messages, including those that may affect your grade, will be sent to your Otago student email address, and posted as Blackboard announcements.

Let us know if you need assistance.

If you have study-related questions or feedback, please let us know so that we can help resolve any issues early.

Lecture recordings

Lecture recordings will be available via Blackboard without restrictions until the exam date.

Assignment submission

All assignments must be submitted electronically via Blackboard. If you encounter a technical problem while submitting an assignment, print it as a pdf and email it to the lecturer concerned (editable attachments may be rejected by the email system). Note that this is only to document submission time - you should contact Otago IT support for assistance in uploading your assignment to Blackboard at the first opportunity.

Late submissions and Extensions

Quiz extensions are not granted because correct responses are provided the day after the due date for reflection. If a quiz is missed with a valid excuse (circumstances outside your control), it won't count towards the grade and remaining quizzes will be weighted more so that they sum up to 40% of your total marks. Missing a quiz without a valid excuse results in loss of points.

If you are sick, or other circumstances outside your control prevent you from attending a quiz, please contact paul.szyszka@otago.ac.nz.

Special consideration

Final exams are administered by the Examinations Office. For more information about special consideration on the final exam see: <https://www.otago.ac.nz/study/exams/otago062916.html>.

Plagiarism

You must not plagiarize (submitted work must be your own). Plagiarism is defined as copying or paraphrasing another's work, whether intentionally or not, and presenting it as one's own.

For additional information about plagiarism see the Otago plagiarism policy: <https://www.otago.ac.nz/study/academicintegrity/index.html>.

Animal experiments

This course includes labs in which you will experiment with living and dead insects. In person attendance of labs is voluntary. Please approach the lecturers if you have concerns.

Student support

Contact Student Health for any personal or medical problem. If you have a disability or condition that may adversely affect your studies, please let your lecturer know. We rely on you to make your needs known and will try to meet these needs.

Specialized support within Zoology:

- Disabilities support: Caroline Beck (caroline.beck@otago.ac.nz)
- Zoology Māori student support and Kaiāwhina: Jo Monks (jo.monks@otago.ac.nz)
- Zoology Pacific Island student support: Jenny Jandt (jenny.jandt@otago.ac.nz)
- Neuroscience Māori and Pacific student support and Kaiāwhina: Paul Szyszka (paul.szyszka@otago.ac.nz)