



Australia's  
Global  
University

Faculty of Medicine & Health  
School of Medical Sciences

# NEUR4421

## Biomedical Perspectives in Neuroscience

COURSE OUTLINE

TERM 2, 2021

CRICOS Provider Code 00098G

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Please read this outline in conjunction with the following pages on the

[School of Medical Sciences website:](#)

- [Advice for Students](#)
- [Learning Resources](#)

(or see "STUDENTS" tab at [medicallsciences.med.unsw.edu.au](http://medicallsciences.med.unsw.edu.au) )

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## NEUR4421 Course Information

This course offers workshops on specific current 'hot topic' issues in biomedical neurobiology, where you will be exposed to the latest research. Hands-on activities will give you real insight into modern neuroscience techniques, their correct implementation and their limitations. It is designed specifically for Neuroscience Honours students.

Biomedical Perspectives in Neuroscience (NEUR4421) is a course worth six units of credit (6 UOC) administered by the School of Medical Sciences. It is delivered across 9 teaching weeks in Term 2.

Condition of Enrolment: must enrolled in Neuroscience Honours.

### OBJECTIVES OF THE COURSE

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- To develop the students' theoretical knowledge base in biomedical neuroscience.
- To develop the students' capacity for critical analysis of the primary literature.
- To develop the students' ability to concisely present scientific data.
- To develop the students' ability to communicate scientific research to a lay audience.

### COURSE CONVENORS and WORKSHOP FACILITATORS

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Dr John Power  
Phone: 9065 1809  
Email: [john.power@unsw.edu.au](mailto:john.power@unsw.edu.au)  
Room: 356, Level 3SW, Wallace Wurth Building

Dr Natasha Kumar  
Phone: 9385 1713  
Email: [natasha.kumar@unsw.edu.au](mailto:natasha.kumar@unsw.edu.au)  
Room: 325, Level 3E, Wallace Wurth building

*Workshop facilitators in this course:*

Dr Georg von Jonquieres  
Dr Jennie Cederholm  
Prof Kim Delbaere  
Dr Steve Kassem  
A/Prof Richard Vickery  
Dr Martin Heroux  
A/Prof Gila Moalem-Taylor

[g.jonquieres@unsw.edu.au](mailto:g.jonquieres@unsw.edu.au)  
[j.cederholm@unsw.edu.au](mailto:j.cederholm@unsw.edu.au)  
[k.delbaere@neura.edu.au](mailto:k.delbaere@neura.edu.au)  
[m.kassem@unsw.edu.au](mailto:m.kassem@unsw.edu.au)  
[richard.vickery@unsw.edu.au](mailto:richard.vickery@unsw.edu.au)  
[m.heroux@neura.edu.au](mailto:m.heroux@neura.edu.au)  
[gila@unsw.edu.au](mailto:gila@unsw.edu.au)

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## **COURSE STRUCTURE**

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The course is structured as a series of workshops. Two half-day workshops focus on professional skills (communication, statistical inference, career development). All students attend these workshops. In addition, students will be allocated to 2 research themed workshops. The research themed workshops (7-8 contact hours per workshop) include lectures, journal article presentations, and hands on activities related to a specific biomedical research topic.

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## **APPROACH TO LEARNING AND TEACHING**

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Neuroscience is conceived of as a core field of knowledge to which many different disciplines contribute. Neuroscience is primarily an experimental discipline and so a proper appreciation of neuroscience requires an understanding of both what is known, and of the limitations imposed by our study tools. This course exposes student to the diverse range of disciplines, techniques and thought in modern neuroscience.

The lectures by discipline experts will cover the scope and range of approaches in neuroscience and provides the student with a broad base of knowledge from which to appreciate neuroscientific developments. The seminar presentations will encourage students to engage with this material on a deeper level. Working in small groups to present recent research findings will help develop teamwork skills.

The laboratory/tutorial exercises will give students a hands-on appreciation of neuroscience applications and will enable them to learn while doing. The essay assessment enables deep learning that brings the student to the forefront of knowledge in a narrow field of modern neuroscience.

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## **STUDENT LEARNING OUTCOMES**

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By the end of this course students are expected to:

1. Demonstrate a broad understanding of a body of knowledge and theoretical concepts.
  2. Demonstrate cognitive skills that review, analyse, consolidate and synthesize knowledge.
  3. Demonstrate an understanding of, and the ability to apply, the principles of teamwork and collaboration.
  4. Demonstrate communication skills to present a clear and coherent exposition of knowledge and ideas to a variety of audiences.
  5. Demonstrate the ability to effectively communicate scientific research in both written and aural forms, to both a specialist and a lay audience.
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## **COURSE EVALUATION AND DEVELOPMENT**

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Each year feedback is sought from students about the course and continual improvements are made based on this feedback. Below is a summary of the feedback and our response to how we will improve this year's course delivery.

### **Student Feedback from myExperience:**

There were no student myExperience submissions.

### **Outcomes of end of term course review:**

The course was reviewed by the Neuroscience Honours Committee on an annual basis. The committee raised concerns about the density of assessment imposed by the trimester calendar and its effect on students' stress levels in the pandemic era. To ease assessment burden the following changes were implemented.

1. The Essay assessment was removed.
  2. Workshops will incorporate concepts previously associated with the essay. The weighting of quizzes will be increased to 40%.
  3. A peer review component (5%) will be added to journal club presentation assessment.
  4. The weighting of the Three Minute Thesis assessment will be increased to 30%
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## ASSESSMENT PROCEDURES

Student Journal Presentation	30%
Online quizzes	40%
3 Minute Thesis Presentation	30%

A penalty will apply for late submissions of assessment tasks (10% per day).

### Student Journal Presentation

Students will present, in small groups, a journal article to the class using PowerPoint or equivalent. The presentation will include an explanation of the motivation for the study, a description of the experimental approach, and a critical analysis of the results and the authors conclusions. Students will receive written feedback from the workshop facilitator, the course coordinator, and peers. Assessment will be marked by the workshop hosts and/or course conveners. Students will be graded on their presentation (25%) and peer review of a different presentation (5%).

### Online quizzes

Workshops will be followed by Moodle quizzes. Quiz questions will be based on the material covered in the workshop and will enable students to assess their level of understanding of the material presented in the workshop. Quizzes are available via the online learning management system and typically consist of multiple choice or short answer questions. Students will receive feedback after submitting their answers.

### 3 Minute Thesis Presentation

An essential skill for a modern scientist is the ability to communicate research projects and findings to a broad audience. This is particularly important in an academic setting as the research conducted at universities and research institutes is primary funding through public money. To develop the communication skills of post-graduate research students The University of Queensland created a Three Minute Thesis (3MT®) competition. The competition has been adopted by universities throughout the world.

Students will prepare a 3 minute presentation of their thesis research “*to date*” in accordance with the Three Minute Thesis rules.

Students will receive formative feedback from the audience, and the course conveners. Assessment will be marked, and written feedback will be provided by the course conveners.

## ASSESSMENT SCHEDULE

Task	Course Learning outcome (CLO)	Due Date
Student Journal Presentation	CLO1, CLO2, CLO3, CLO4	During assigned elective workshop
Online quizzes	CLO1	1 week after each workshop. Week 5 workshop quiz be in week 7.
3 Minute Thesis Presentation	CLO4, CLO5	Week of July 26

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## GENERAL INFORMATION

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The School of Medical Sciences (SoMS) located in the Wallace Wurth building, and is within the Faculty of Medicine. General inquiries regarding courses coordinated by SoMS should be submitted via the UNSW Student Portal Web Forms: <http://unsw.to/webforms>.

### ***Postgraduate research degrees***

The School of Medical Sciences offers students the opportunity to enter a Masters (MSc) or Doctorate (PhD) program in Physiology, Pharmacology, Anatomy or Pathology which is available on the 'Students' menu item of the [SoMS website](#).

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## Attendance Requirements

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For details on the Policy on Class Attendance and Absence see [Advice for Students](#) and the [Policy on Class Attendance and Absence](#).

Guidelines on extra-curricular activities affecting attendance can be found on the School of Medical sciences Website under Special Consideration.

Attendance at laboratory and tutorial classes is compulsory and must be recorded in the class roll on the day of the class. Arrival more than 15 minutes after the start of the class will be recorded as non-attendance. Satisfactory completion of the work set for each class is essential. It should be noted that non-attendance for other than documented medical or other serious reasons, or unsatisfactory performance, for more than one class per course may result in an additional practical assessment exam or in ineligibility to pass the course.

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## Equitable Learning Services

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The UNSW [Equitable Learning Services](#) is a free and confidential service that provides practical support to students living with a disability or a health / mental health concern. After registering with the Service, the advisors will then meet with you to create an individualised support plan for your studies.

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## Special Consideration

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Please see [UNSW-Special Consideration](#) and [Student Advice-Special Consideration](#)

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## Academic Integrity and Plagiarism

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The [UNSW Student Code](#) outlines the standard of conduct expected of students with respect to their academic integrity and plagiarism. More details of what constitutes plagiarism can be found [here](#).

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## WORKSHOP SCHEDULE

### Introduction, statistics, & thesis writing [Power, Heroux, Vickery]

Week 1: June 3<sup>rd</sup> 1pm – 4.30pm

Basic concepts and common misconceptions about statistical inference will be reviewed. Scientific writing will be discussed and students will receive tips on how to prepare their honours thesis.

### Careers and Communication [Kumar, Cederholm]

Week 10: During August 2<sup>nd</sup>-6<sup>th</sup>

This workshop focuses on career opportunities (academic and non-academic) and communicating scientific results to the general public. What are some career options? How does one apply for a job or PhD studies?

### Elective Workshops

#### The neuropsychology of healthy ageing and falls in older adults [Kim Delbaere]

Week 4: Tuesday 22<sup>nd</sup> June (10am-2pm) and Thursday 24<sup>th</sup> June (10am-12pm)

Falls pose a major threat to the well-being and quality of life of older people. Falls can result in fractures and other injuries, disability and fear and can trigger a decline in physical function and loss of independence and autonomy. While falls are not a diagnostic category, they are often indicative of underlying problems due to age-related changes in the physiological domains contributing to postural stability or specific undiagnosed or chronic disease. In this course, you will learn more about the role of the brain in these fall events. Walking is a goal-directed task that requires continuous information processing to allow for appropriate step placements, to counter unexpected perturbations and negotiate environmental hazards. We will discuss the important role of higher order cognitive processing, i.e. executive functioning and attentional resources, in predisposing older people to falls and provide some practical exposure to assessment tools. You will also learn about strategies to prevent falls in older people. There is good evidence for exercise to prevent falls, particularly in less frail older people, if the program is carefully designed to involve high balance challenging exercises. Emerging evidence suggests that providing additional cognitive challenges to physical exercises and training reactive balance responses to unexpected perturbation may enhance fall prevention effects. Innovative methods involving computerised technology are increasingly being used to deliver interventions for fall prevention, to improve the reach, uptake, feedback and adherence to programs, with promising results.



**Neuroanatomy and brain atlas construction [Kassem]**

Week 5: Tues June 29<sup>th</sup> (10am-2pm) and Thursday July 1<sup>st</sup> (10am-2pm)

For scientists to test hypotheses inspired by human considerations on experimental animals we must identify homologies that exist between them. This workshop will give an overview of the neuroanatomy of the human and animal (rat, mouse, monkey, etc.) and how atlases of the brain are made and used. We will discuss the histology needed, introduce newer methods such as MRI and tractography, as well as the historical and philosophical grounds on which this works are produced.

**Primer on transgenic technology [Natasha Kumar, Georgon Jonquieres]**

Week 7: Monday July 12 (1pm-5pm), Thursday July 15 (1pm-5pm)

Workshop will overview how transgenic organisms are engineered and how they enable researchers to study genetic diseases. We will investigate transgene constructs, a diversity of mouse genetics (crelox, transactional, CRISPRCas9), viral vectors Hands on workshop includes plasmid endonuclease digest, determination of DNA sequences containing either deletions or insertions based on DNA gel electrophoresis data that would directly affect neuronal function. You will learn to use bioinformatics tools allowing you to investigate sequence alignment, cross species conservation, putative transcription binding sites, siRNA design for a gene of interest.

**Recording Neuronal Activity [John Power, Gila Moalem-Taylor]**

Week 8: During July 19<sup>th</sup> -23<sup>rd</sup>

Workshop will explain electrophysiological and optical methods of recording neuronal activity along with the uses and limitations of each technique. Some of these techniques will be demonstrated in the lab and students will have the opportunity to make their own neuronal recordings.

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