



MRC Cognition
and Brain
Sciences Unit



UNIVERSITY OF
CAMBRIDGE

Master's in Cognitive Neuroscience



Course Handbook 2024/2025

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Welcome from the Course Directors

On behalf of the entire faculty and staff, we look forward to welcoming you to the Master's in Cognitive Neuroscience programme at the University of Cambridge. We are thrilled for you join us at the MRC Cognition and Brain Sciences Unit and play a part in our exciting journey exploring the intricate workings of the human mind and brain.

Cognitive neuroscience is a dynamic and rapidly evolving field. Its very nature is **interdisciplinary**: the boundaries between psychology, neuroscience, and computer science (among others) blur. It is at this intersection that scientists make groundbreaking discoveries into how the brain gives rise to cognition, perception, language, emotion, and decision-making. Our programme is designed to provide you with a comprehensive understanding of these complex processes, equipping you with the knowledge and skills to contribute to **cutting-edge research** and **real-world applications**.

At the MRC Cognition and Brain Sciences Unit, you will work alongside researchers at the forefront of cognitive neuroscience. Our faculty members are global leaders in neuroscience, and they are passionate about sharing their expertise with the next generation of scientists. You will have the opportunity to join one of their labs, engage in stimulating discussions, collaborate on pioneering research projects, and gain valuable insights from their wealth of experience.

The Master's in Cognitive Neuroscience program is structured to provide a strong foundation in the core principles of cognitive neuroscience, while also allowing flexibility for you to explore your specific interests. You will delve into topics such as neuroimaging techniques, neural networks, cognitive neuropsychology, computational modelling, and neurobiology of mental illness. The program combines rigorous **theoretical instruction** with **hands-on practical experience**, ensuring that you develop the essential skills to conduct independent research and make meaningful contributions to the field.

As a student in our program, you will benefit from the rich academic and scientific community across the University of Cambridge. You will have access to **state-of-the-art research facilities**, including cutting-edge imaging technologies and advanced computational resources. The university's vibrant intellectual environment, combined with the historic backdrop of Cambridge, will inspire you and foster a sense of intellectual curiosity.

We believe that diversity of thought and perspective is essential for advancing scientific knowledge. Therefore, we welcome students from a **wide range of backgrounds**, including neuroscience, psychology, biology, computer science, and related disciplines. Our program thrives on interdisciplinary collaboration, and we encourage you to bring your unique insights and experiences to contribute to the rich tapestry of ideas.

Prepare to embark on an exhilarating intellectual adventure, surrounded by brilliant minds and supported by a world-class institution. Your time with us will be transformative, both personally and professionally, as you unlock the mysteries of the human brain and shape the future of cognitive neuroscience.

Welcome to the MRC Cognition and Brain Sciences Unit

The MRC Cognition and Brain Science Unit (MRC CBU) is a major international research centre in cognition and neurosciences. The Unit was founded around 80 years ago as the MRC Applied Psychology Unit, and under successive Directors, Kenneth Craik, Frederic Bartlett, Norman Mackworth, Donald Broadbent, Alan Baddeley, William Marslen-Wilson, Sue Gathercole, and Matt Lambon Ralph, has played a central role in the development of information processing theory, cognitive psychology, cognitive neuropsychology, and cognitive neuroscience.

Today the Unit is one of the **largest cognitive neuroscience institutes in the world**, with over 150 scientists and exceptional technical and support staff. They are accommodated in a dedicated facility located close to the centre of Cambridge. The Unit also functions as a hub for cognitive neuroscientists across Cambridge, with strong links with the Departments of Psychology, Psychiatry and Engineering, among others.

The Georgian Mansion at the heart of the CBU has been gradually extended over successive decades, now housing state-of-the-art facilities, including a 306-channel Vectorview Elekta Neuromag MEG system, 3T Siemens Prisma MRI scanner, 128 channel EEG system, neurostimulation, psychophysiology, hearing, and eye-tracking labs. The CBU also hosts multiple specialist research panels for neuropsychology patients, children at neurodevelopmental risk and those experiencing affective disorders. You can find out more about the research undertaken at the MRC CBU by visiting [here](#).

A central goal of the MRC CBU is to identify, recruit, and equip the **next generation of world-leading scientists**. Our interdisciplinary training portfolio provides our postgraduate students with state-of-the-art skills that launch them into careers in academia, industry, charity, policy, and the clinic. Successive student cohorts take full advantage of the excellent CBU research infrastructure and expertise in experimental methodology, cognitive theory, brain imaging, and experimental clinical psychology.



The CBU postgraduate community is diverse, international, and growing. At any time there are around 60 postgraduate students at the CBU. With the launch of the new Master's in Cognitive Neuroscience this is set to grow further. This postgraduate community provides a vibrant environment in which people are encouraged to be themselves, to learn and grow together. Wherever you want your future career to take you, postgraduate training at the MRC CBU will provide the perfect platform.

Overview of the Master's in Cognitive Neuroscience

Welcome to the Master's in Cognitive Neuroscience, an innovative training programme designed to immerse students in the forefront of cognitive neuroscience research. Get ready to embark on an exhilarating journey, training in cutting-edge methods with internationally-renowned neuroscientists, and developing an independent research project in a world-leading laboratory.

Throughout the year, a series of captivating seminars will explore advanced topics in cognitive neuroscience, and train students in innovative, robust neuroscience methods. Teaching is concentrated towards the start of the year to enable you to apply the latest knowledge and insights to your own research project. Throughout the year, engaging journal clubs will provide you with the platform to analyse, present, and discuss crucial literature, fostering critical thinking and intellectual exchange.

As neuroscience methods have advanced, one of the most important skills a neuroscientist can have is the technical skills to grapple with large, complex data sets. This is why our course has a core skills training in cutting-edge biostatistics and bioinformatics methods. This will enable you to effectively navigate and analyse the diverse and complex data sets underpinning cognitive neuroscience research. It also provides a foundation beyond neuroscience for graduates to apply their skills to the myriad of real-world problems necessitating complex statistics and informatics approaches.

We also make use of innovative, multi-modal forms of assessment throughout the course. Coursework focuses on honing your written, oral, and poster presentation skills, ensuring that you can effectively communicate your ideas and findings to both academic and non-specialist audiences.

At the core of our program lies the extended research project, offering you a unique opportunity to delve deeply into a topic aligned with ongoing work in one of our world-leading research groups. This project will be designed via collaborative development with a supervisor, tailoring it to your specific interests and ideas, whilst drawing on their expertise. We want to ensure that you have intellectual ownership of your project, fostering a sense of creativity and independence.

To maintain the integrity and feasibility of the research projects, the 32-week timeframe has been carefully calibrated. While substantial, it allows ample time for both supervisors and students to plan and deliver projects effectively alongside other teaching and assessment requirements. At the end of the first term, supervisors and students will submit a joint project plan for review, ensuring the project's scope aligns with the available time frame. This review, conducted by the Course Directors, ensures that your project represents a unique contribution to the field and supports your own intellectual growth.



Throughout the program, you will have regular meetings with academic advisors who will provide guidance and support, further facilitating your intellectual growth and ensuring the successful completion of your project. We are committed to nurturing your development as talented individuals and empowering you to make meaningful, unique contributions to the field of cognitive neuroscience.

Get ready for an extraordinary experience in the Master's in Cognitive Neuroscience, where you will push the boundaries of knowledge, collaborate with leading researchers, and unlock the mysteries of the human mind and brain. Your passion, curiosity, and dedication will drive you to new heights in this transformative program.

Course learning outcomes

Students will be able to demonstrate the following knowledge and understanding:

- demonstrate advanced knowledge and understanding of methods in neuroimaging and analysis, including in scientific computing, with knowledge acquired in the taught elements of the course and applied during their research project;
- demonstrate in-depth knowledge of the background to their selected research project including the research methods and methods of data analysis used;
- demonstrate a broad understanding of modern research techniques applicable to cognitive neuroscience research from the series of technical lectures;
- demonstrate knowledge of the theoretical approaches relevant to their specialisation and training in critical thinking in the area, assessed by the written and oral presentations;
- demonstrate expertise in research methods, data analysis and statistics, assessed by the short biostatistics assessment and application of the methods to interpret the data collected during the research project;
- demonstrate originality in the application of knowledge, together with the practical understanding of how research and enquiry are used to create and interpret knowledge in the field, obtained through undertaking the prolonged research project;
- have a broad overview of research in medical science as well as career opportunities both in research and industry.

Students will also acquire the following skills and attributes:

- analyse critical research literature and contemporary topics in the areas of their specialisation, and present such analyses in written and oral formats;
- explain the importance and impact of topics in their area of specialisation to specialist and non-specialist audiences;
- demonstrate proficiency in experimental and data analysis techniques;
- demonstrate critical thinking and problem-solving approaches to experimental data;
- participate in scientific discourse through written material, oral and poster presentations



Details of the course programme

Taught Material, coursework and presentation skills

Our comprehensive curriculum not only focuses on in-depth knowledge of cognitive neuroscience but also equips you with valuable transferable skills that will empower you throughout your academic and professional journey.

The core of our teaching takes the form of approximately 20 hours of lectures on current topics in cognitive neuroscience. These lectures will cover a wide range of fascinating areas, including memory, perception, attention, hearing, language, and the translation of fundamental research into mental health, affective disorders, ageing, and childhood development. Alongside this formal teaching, you'll have the chance to engage with prominent external speakers through an additional 20 hours of invigorating seminars hosted by the CBU.

Technical training is central to our course, and includes a comprehensive training in advanced methodological approaches in neuroimaging, with approximately 40 hours of specialised lectures and hands-on training sessions. You'll explore topics such as magnetic resonance physics, diffusion imaging, functional magnetic resonance imaging, graph theory, positron emission tomography, electroencephalography, magnetoencephalography, effective connectivity, brain simulation techniques, and multiple analytic pipelines and tools, including multi-voxel pattern analysis. This broad coverage of methodologies will equip you with the tools needed to conduct your own groundbreaking research in cognitive neuroscience.



In addition to this core taught material, we offer approximately 30 hours of transferable skills training, drawing from modules provided by the popular Postgraduate Researcher Development program. This training will cover essential aspects such as slide and poster design principles, effective delivery of scientific oral and poster presentations, and honing your writing skills. You will also benefit from the biostatistics training delivered by the Bioinformatics Training facility and Bioinformatics initiative from the Cambridge Centre for Data-Driven Discovery. This will provide a good grounding in contemporary statistical approaches, relevant to cognitive neuroscience and pitched at the appropriate level. Additionally, you will receive approximately 16 hours of training in Open Science and reproducibility through enrollment in the highly regarded robust Behavioural Science course, delivered in-house by the CBU.

The taught material will be thoughtfully structured, with a focus on front-loading the content into Michaelmas term and the start of Lent term, allowing you to establish a solid foundation before embarking on your research projects. Other course elements - like journal clubs and external seminars - will be delivered through a series of weekly sessions throughout the year, ensuring a steady flow of knowledge and engagement.

Extended research projects

The 32-week project will be the focal point of your studies, allowing you to dedicate the majority of your time to groundbreaking research. To kickstart this journey, you will be presented with a carefully curated list of potential projects ideas and supervisors to choose from. Separate to your potential supervisor, the course

leadership will assign you a dedicated advisor who will work closely with you, guiding you through the available projects and providing valuable insights and support.

During the first four weeks of the Michaelmas term, you will have dedicated time and support to meet with supervisors and explore potential projects in depth. Together, you will develop a research project outline, outlining the aims, methods, and expected outcomes. This crucial step will ensure that your project aligns with the course requirements and can be successfully completed within the designated timeframe. To ensure clarity and accountability, you will be required to submit a brief project plan for approval by the course leadership team before commencing work on your research project. This step allows the Course Directors to provide guidance to both students and supervisors, ensuring that the scale and scope of the project are appropriate and achievable.

The culmination of your research project will be presented in two components, showcasing the different academic and scientific skills you have learned. Firstly, you will craft a concise yet comprehensive literature review, delving into the existing body of knowledge surrounding your chosen topic, with a maximum word limit of 5000 words. This review will demonstrate your ability to critically analyse and synthesise relevant research, setting the stage for your own investigation.

The second component will encompass the aims, methods, results, analysis, and discussion of your research, again with a maximum word limit of 5000 words. Here, you will unveil your own empirical findings, employing rigorous methodologies and statistical analyses. You will engage in thoughtful interpretation, linking your results to existing literature and offering novel insights into the fascinating field of cognitive neuroscience.



This research project is a great opportunity for you to make significant contributions to the field, broaden your understanding, and hone your research and academic writing skills. And who knows, it could also be a chance to leave your own mark on the ever-evolving landscape of cognitive neuroscience.

Research seminars

Two regular seminar series, each occurring weekly during term time, will enrich your academic journey. These seminars offer unique opportunities to engage with esteemed researchers, explore cutting-edge topics, and foster intellectual discussions within the vibrant academic community of the MRC Cognition and Brain Sciences Unit.

1) Wednesday Lunchtime Seminar Series (WLTS):

Every Wednesday, esteemed researchers, faculty members, and guest speakers will take the stage to present their latest findings, share groundbreaking research, and discuss exciting developments in the field of cognitive neuroscience. These lunchtime seminars provide a platform for in-depth exploration of ongoing research projects, focussed most heavily on those being conducted within Cambridge.

2) Chaucer Club:

This external seminar series brings together leading experts and visionaries from around the world to share their groundbreaking research and insights in cognitive neuroscience. The Chaucer Club seminars are thought-provoking sessions that will challenge your thinking, expose you to diverse perspectives, and ignite

your passion for cognitive neuroscience. Engage in lively discussions, network with prominent researchers, and expand your understanding of the field by joining us for these exceptional seminars.

Both the WLTS and Chaucer Club seminars serve as integral components of our academic community, and are a required element for all students and staff members at the CBU. They provide a forum for the exchange of ideas, the exploration of emerging research directions, and the cultivation of critical thinking skills.

Journal Clubs

The Master's in Cognitive Neuroscience offers an array of student-directed elements that will make your learning experience truly engaging and interactive. One of the highlights is the journal club presentations and discussions, where you will have the opportunity to explore research papers, controversial topics, and state-of-the-art techniques. These sessions will be led by experienced researchers from the host department who will act as facilitators, guiding and supporting you in structuring discussions and ensuring the integrity, accuracy, and quality of the discourse. It's a chance to delve deep into the latest advancements in the field and actively contribute to the selection of topics.

We believe in fostering a collaborative learning environment, and that's why we are thrilled to offer supported teaching opportunities to PhD students who express an interest. This means you may have the chance to gain valuable teaching experience under the guidance of experienced mentors, further enhancing your academic and professional development.

While these interactive elements are not formally assessed, they form an integral part of the course experience. We want to ensure that you have a comprehensive understanding of cognitive neuroscience and actively engage in stimulating discussions and hands-on activities. These elements provide a unique platform for you to refine your critical thinking skills, develop your own perspectives, and contribute to the vibrant intellectual community within the program.

Details of assessments

The assessment structure for the course is divided into three parts, each of which will receive 33% of the overall degree mark.

Section 1: taught material, coursework and presentation skills (33%)

Throughout your postgraduate training, your progress and mastery of the course material will be assessed through a diverse range of evaluation methods. We have carefully designed the assessment framework to provide a comprehensive and holistic evaluation of your knowledge, skills, and understanding of the field.

Section 1 of the assessment will encompass the following components:

- 1) A small biostatistics assessment: Towards the end of the first term, you will be evaluated on your understanding and application of key biostatistical concepts. This assessment will test your ability to *analyse and interpret data effectively*.
- 2) Multiple-choice question (MCQ) exam: You will also undertake an MCQ exam consisting of one question per lecture from the cognitive neuroscience lecture series. This exam will require you to showcase your *breadth of knowledge*, demonstrating a comprehensive understanding of the topics covered throughout the course. You will attempt all 20 questions (one per lecture).
- 3) "Perspectives" piece: In this assignment, you will have the opportunity to compare and contrast three papers on any topic in cognitive neuroscience, allowing you to delve into a specific area and provide a detailed overview of the different perspectives and approaches within the chosen field. Your written piece, with a word limit of 2000 words, will showcase your ability to *critically evaluate and synthesise complex scientific literature*.
- 4) Oral seminar-style presentation: During the Lent term, you will deliver an engaging oral presentation on a laboratory or analytical method that has significantly impacted the field of cognitive neuroscience. This presentation will highlight your *research and presentation skills*, as well as your ability to *communicate complex scientific concepts effectively*.
- 5) Poster presentation: As an integral part of the research project, you will present your findings with a poster presentation. Marks for this presentation will be awarded based on the layout of your poster, the clarity with which you present your data, and your overall ability to deliver a clear and engaging oral presentation of your poster. Note that the assessment of the poster presentation will focus on honing your *scientific presentation skills* (rather than the scientific content itself).

By employing this multimodal assessment approach, we aim to evaluate not only your knowledge and understanding but also your critical thinking abilities, research capabilities, and presentation skills. This assessment framework ensures that your progress and development as a cognitive neuroscientist are effectively recognised. We believe that assessment is not only a means of evaluating your performance but also an opportunity for you to showcase your unique skills and abilities. We are committed to providing you with constructive feedback and support throughout your journey, enabling you to grow and excel in the field of cognitive neuroscience.

Sections 2 and 3: Literature review and project write up (33% for each section)

The second and third assessment sections will evaluate your grasp of the subject matter and your ability to apply your knowledge in a research context. These assessments will play a significant role in determining your final mark for the course.

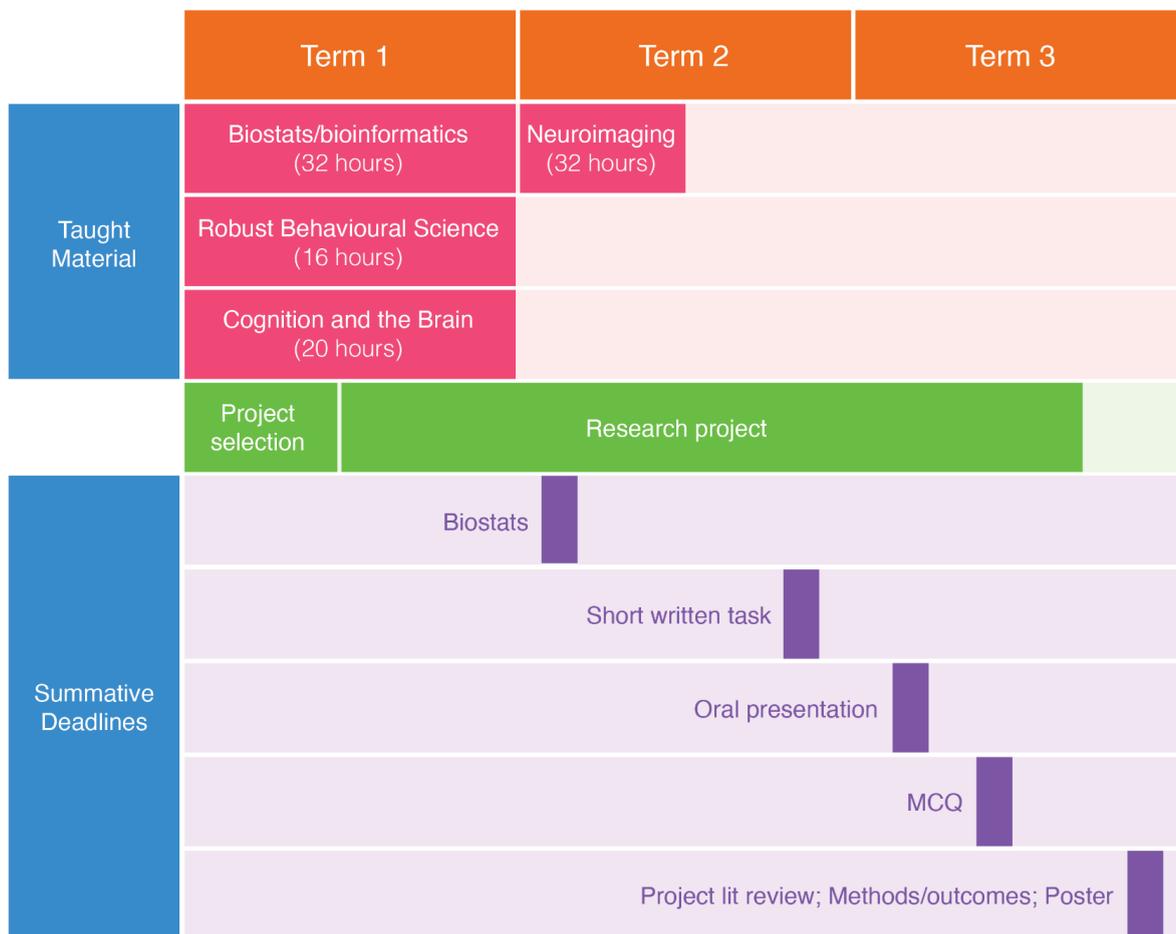
In the second section of the course, you will undertake a comprehensive literature review of the field. This review, with a maximum word limit of 5000 words, will serve as a foundation for your research project, providing essential background information and contextualising the significance of your chosen area of study. Your literature review will be assessed based on the depth of your research, your critical analysis, and your

ability to synthesise and present the information effectively. This assignment will contribute to 33% of your final mark, highlighting its importance in demonstrating your understanding of the field and your ability to engage with relevant academic literature.

In the third assessment section you will focus on presenting the outcomes of your research project. This component, accounting for another 33% of your final mark, will require you to articulate the aims, methods, results, data analysis, and discussion of your project within a maximum word limit of 5000 words. You will showcase your research skills, analytical thinking, and ability to draw meaningful conclusions from your data. This assessment emphasises your ability to communicate your findings effectively, highlighting the significance of your research within the broader context of cognitive neuroscience.

These assessments not only allow you to demonstrate your academic abilities but also provide an opportunity for you to contribute to the existing body of knowledge in the field of cognitive neuroscience. Both sections will be evaluated by experienced faculty members who will assess your work based on its quality, originality, and scientific rigour.

Course Timetable



Student support

At the MRC Cognition and Brain Sciences Unit, we prioritise providing broad support to our students throughout their postgraduate journey. Here are the various sources of support available to you as an incoming student:

Course Directors and Administrators

In addition to the supervisory team, our postgraduates have access to dedicated support from the Course Directors, two as well as the Graduate Administrator. They are available to address academic, supervisory, financial, and health-related concerns as they arise.

Supervisory Teams

Each student is assigned a supervisory team, consisting of a Primary Supervisor and an Advisor. The Primary Supervisor offers guidance and support on the 32-week research project, while the Advisor serves as an additional source of advice. We encourage the involvement of early career scientists as co-Supervisors and Advisors, to facilitate students' training in the most up-to-date research skills. To ensure a supportive and inclusive environment, all our staff, including supervisors, complete training in University Equality and Diversity and Understanding Unconscious/Implicit Bias.

College Graduate Tutors

In addition to the support available at the MRC Cognition and Brain Sciences Unit, you will also benefit from the guidance and assistance of a Graduate Tutor assigned to your College. These College Tutors are here to offer advice and support on both academic and non-academic matters throughout your time as a student.

Your Graduate Tutor will be a valuable resource for addressing any concerns or questions you may have, whether they are related to your academic studies, pastoral care, financial matters, or emotional well-being. They are there to provide guidance and support you in navigating the various aspects of university life. Whether you need assistance managing your workload, or seeking advice on personal matters, your Graduate Tutor is readily available to help. They have extensive knowledge and experience within the College system and can offer valuable insights tailored to your specific needs.

The College Tutors play an essential role in fostering a supportive and nurturing environment within the College community. They are dedicated to your success and well-being, ensuring that you have the necessary support and resources to thrive both academically and personally. Make sure to take advantage of this valuable resource by reaching out to your assigned Graduate Tutor whenever you require assistance. They are here to listen, guide, and provide you with the support you need throughout your academic journey.



Unit Madre and Padre Scheme

To provide personal support, we also have two dedicated pastoral tutors, known as Madre and Padre, who are specifically there for students. They offer assistance in various areas, including achieving work-life balance, promoting well-being, identifying professional development opportunities, improving supervisor-student relations, overcoming nervousness related to work-based activities, and providing guidance during unforeseen circumstances such as illness or bereavement. They can also provide information and referrals to internal and external resources related to financial assistance and well-being. During the pandemic, they organized workshops by guest speakers on topics identified by students as significant concerns, such as improving sleep and fatigue and addressing imposter syndrome. Additionally, we have an in-house clinical psychologist responsible for safeguarding, who can provide interim support in more severe circumstances while students await assistance from local clinical services.

Unit mentorship scheme

The CBU Equality & Diversity committee oversees an in-house Mentor Scheme. When you express interest in joining the mentor scheme, you will be assigned a postdoctoral mentor. This mentor will provide confidential support and advice on academic matters, future career prospects, and other issues. Regular meetings will be encouraged to facilitate this mentorship relationship.

Postgraduate representatives

All students also have access to two senior postgraduate student representatives who are responsible for conveying the needs of the postgraduate community at the CBU to senior Unit Management. This includes welfare issues, organising an annual retreat (see below), and proposing new structures for postgraduate teaching and research at the Unit.

Annual retreat

Our postgraduates benefit greatly from the supportive student community within the CBU. To strengthen this sense of community, a student-led graduate retreat is organised annually. The retreat incorporates new arrivals and promotes community building across the student body. Students themselves plan the itinerary, with the support and encouragement of the CBU postgraduate team. Internal and external speakers guide discussions on various themes, including the supervision process, mental health, hot topics in open science, and career guidance.

University Counselling Service

The University's dedicated Counselling Service is available to provide support and resources. University life can present various challenges, and we want to ensure your well-being and mental health are prioritised. Here's what you need to know about our Counselling Service:

- 1) Meetings with Counsellors: trained counsellors can offer individual support and guidance. You can schedule confidential meetings with them to discuss any personal, emotional, or mental health concerns you may have. These sessions provide a safe and non-judgmental space for you to explore your feelings, gain insights, and develop strategies to manage the challenges you may encounter during your academic journey.
- 2) Workshops: The Counselling Service also organises workshops that address common issues faced by students. These workshops cover a wide range of topics such as stress management, anxiety reduction, building resilience, improving study skills, and enhancing well-being. Participating in these workshops can equip you with practical tools and techniques to navigate the demands of university life more effectively.
- 3) Self-Help Resources: We offer a variety of self-help resources to complement the support provided by our counsellors and workshops. These resources are designed to empower you with strategies and information that can assist in promoting your mental health and overall well-being. Whether you prefer reading materials, online modules, or interactive exercises, our self-help resources are easily accessible and tailored to address common student concerns.

To access further information and explore the services available through our Counselling Service, please visit their website at: www.counselling.cam.ac.uk/studentcounseling. Here, you will find detailed information about scheduling appointments, accessing workshops, and utilising the self-help resources offered.

Joining Cambridge Neuroscience and CamBRAIN

At Cambridge, students become part of a cross-departmental neuroscience community, Cambridge Neuroscience, which hosts weekly interdisciplinary seminars and regular meetings, as well as early-career researcher-focused events (the latter under the banner CamBRAIN, organised by students and postdoctoral researchers).

Read about the Cambridge Neuroscience community [here](#)

Read about CamBRAIN [here](#)