Chemical Biology and Biomedical Imaging (Taught Masters)

Open all sections

What modules will I study

The modules you will study are:

- LM Molecular Probes and Imaging Techniques 10 credits Module code 03 22310
- LM Frontiers in Physical Science for Biomedical Imaging 10 credits Module code 03 22309
- LM Imaging + Image Analysis 10 credits Module code 06 22312
- LM Computational Tools for Modelling and Analysis 10 credits Module code 06 22313
- Bioscience for Engineers 10 credits Module code 04 17142
- Bio-related Chemistry 10 credits Module code 03-20495
- Molecular and cellular mechanisms of toxicity and carcinogenesis 20 credits Module code 03 01103
- Advanced professional, transferable and research skills 30 credits Module code 03-22314
- Synoptic and student centred study Module in Chemical Biology and Biomedical Imaging 10 credits
- Research project 60 credits

Supportive Learning Environment

All the taught modules (120 credits) are compulsory and this means that you study them alongside all the other students on your programme and this enables you to make new friends quickly and creates a strong and supportive leaning environment within the student cohort which is fostered by group exercises as well as individual work.

It also ensures that you get a solid academic grounding across the breadth of the course and develop the ability to work and communicate across disciplines.

For your research project (60 credits) you will have a wide choice of projects selected from our suites of projects at the interface between chemical biology, biomedicine and computer science. This is your opportunity both to specialise in still greater depth and to put into practice the skills you have developed in the taught modules.

You will select your research project after you have studied the taught modules and had the opportunity to identify those topics you would like to research in more detail.

How does the programme differ from the MRes in Chemistry for Biomedical Imaging and the PSIBS Integrated PhD programme?

Both the MSc and MRes are one-year programmes aimed to develop students knowledge and skills to equip them to work at the interfaces where chemistry is applied in biology and medicine. The two programmes differ in their relative emphasis between taught courses and training through research.

The MSc combines modules in the chemistry, physics and computer science of Biomedical Imaging with a module to train students in the fundamentals of biology and advanced courses at the interface between chemistry and biology on how chemicals interact with biomolecules and biological systems and what the consequences are, thereby providing an ideal and integrated platform of knowledge for the students to explore all aspects of chemistry in biological and medical imaging, including design of chemical probes and new analytical chemistry imaging techniques.

The MSc thus has a more substantial taught component than the MRes and that taught training stretches across more scientific areas than the training in the MRes. Research and practical skills are also developed in the MSc through a substantial, 4-month research project involving aspects of chemistry, computer science and biomedicine.

The programme is particularly suitable for students who are keen to upgrade and broaden their skill base to equip themselves for a career at the interface between Chemistry, Biology and Medicine, in industry, hospitals or research centres, but who may not at this stage, envisage a career focused exclusively on laboratory research.

For students who find that their interest in research as a career develops during the programme, the MSc does also provide a perfect platform for future study on one of our three year PhD programmes at the interface between chemistry and biomedicine, which could be undertaken in the context of the PSIBS Doctoral Training Centre.

The PSIBS integrated PhD programme is a 4-year integrated programme that seeks to train students to be able to develop the chemistry and physics of imaging techniques and the computational analysis of image data to enable and support future breakthroughs in biology and biomedicine. This programme is suitable for students who know that they want to undertake PhD studies with a view to pursuing a high-level research career and breaking the boundaries of current knowledge in industry, in biomedical or imaging research centres, in Universities or in hospital labs.

What type of research projects are undertaken in the programme?

Recent research projects offered, in Chemistry and Biomedical Imaging

Title	Lead Supervisor	Supervisor2	Supervisor3	Supervisor4	Supervisor5
Imaging the effects of formalin fixation by Magnetic Resonance Imaging and Mass Spectrometry Imaging	Josephine Bunch (PSIBS)	Melanie Britton (Chem)	Ela Claridge (Comp Sci)		
MRI of gadolinium coiled coils - a new class of contrast agent	Anna Peacock (Chem)	Melanie Britton (Chem)	Scott White (BioSc)	John Wilkie (Comp Sci)	
Fluorescence microscopies to study effects on cell morphology of	Mike Hannon	Nikolas	Steve	Ela Claridge	

metallo-cylinde anti-cancer drugs	(PSIBS)	Hodges (BioSc)	Thomas (Cardio Sci)	(Comp Sci)	
Development of fluorophore tagged DNA probes for cellular imaging applications	Jim Tucker (Chem)	Gerard Nash (Med Sch)	Roy Bicknell (Med Sch)	John Wilkie (Comp Sci)	Hamid Dehghani (Comp Sci)
Development, delivery and imaging of nanoparticles as cellular probes	Zoe Pikramenou (Chem)	Steve Thomas (Cardio Sci)	Josephine Bunch (PSIBS)	Ela Claridge (Comp Sci)	
A Comparison of Normalisation Strategies For Improved Interpretation of Small Molecule MALDI MS Images	Josephine Bunch (Chem)	Iain Styles (Comp Sci)	Patricia Lalor (Med Sch)		
Luminescent nanoparticle delivery and release in platelets	Zoe Pikramenou (Chem)	Steve Thomas (Cardio Sci)	Ela Claridge (Comp Sci)	Josephine Bunch (Chem)	
3D Reconstruction of MALDI images using various Registration Techniques	Josephine Bunch (Chem)	Iain Styles (Comp Sci)	Patricia Lalor (Med Sch)		
Imaging the physio chemical properties of lipid droplets from cancer cells using magnetic resonance	Melanie Britton (Chem)	Josephine Bunch (PSIBS)	Ela Claridge (Comp Sci)		
Multimodal MRI active agents for liver imaging	Zoe Pikramenou (Chem)	Mike Hannon (PSIBS)	David Adams (Med Sch)	James Dicks (QE)	Hamid Dehghani (Comp Sci)
Nanoparticle Assisted Laser Desorption Ionisation Mass Spectrometry Imaging of Lipids and Drugs in Thin Tissue Sections	Josephine Bunch (PSIBS)	Zoe Pikramenou (Chem)	Iain Styles (Comp Sci)		
Development of Optimum Sample Handling Procedures for Mass Spectrometry Imaging and Modelling of Eye Histology	Josephine Bunch (PSIBS)	Iain Styles (Comp Sci)	Ela Claridge (Comp Sci)		
cKit Fluorescent Ligands for Oncology and in vitro Physiology	Mike Hannon (PSIBS)	Keith Brain (Clin & Exp Med)	John Wilkie (Comp Sci)		

Opportunities for future study

For students who find that their interest in research as a career develops during the programme, the MSc provides a perfect platform for future study on one of our three year PhD programmes at the interface between chemistry and biomedicine, which could be undertaken in the context of the PSIBS Doctoral Training Centre. Your enhanced knowledge base and your research and practical skills developed through your 4-month MSc research project mean that you will be well prepared and off to a flying start in your PhD.

Students who are committed to a career in research at the outset may find the MRes programme more suited to their interests, but both the MSc and MRes courses offer any excellent foundation for future PhD studies.

Future careers and the value of cross-disciplinary training

Future careers

The course will enable you to broaden your skill base and equip yourself for a career at the interface between Chemistry, Biology and Medicine, in industry, hospitals or research centres.

The course also develops your skills in a variety of other areas, such as how to research a topic in the literature, how to design practical experiments, tackling and solving unfamiliar problems, report writing, oral presentations and communicating with the public. You will develop your skills of critical analysis and evaluation of methods and hypotheses, team working and independent learning, and computer skills. These are all key skills used in many jobs and these skills will position you to tackle a wide spectrum of different careers in the marketplace (for example journalism, accountancy and finance, analysts, marketing, sales) should you decide not to pursue a career in science or healthcare, or you should elect to change direction mid-careers. They also encompass some of the key skills that are needed in more senior (often managerial) roles in industry, hospitals or research centres, enhancing your prospects of developing once in your chosen role.

The Value of cross-disciplinary training

The ability to work and communicate across disciplines is particularly valued in industry where a flexible skill base allows their researchers to move between different types of research projects in response to breaking developments or changing strategic needs. The skill of communicating with people from different scientific disciplines, that our students develop, is similarly valued by practitioners, as such communicators are the key people that enable multi-disciplinary research teams to operate and have the ability to cross fertilise ideas between different projects.

Many of the great challenges in modern biomedicine (diagnosing disease, curing cancer, treating alzheimers etc) are so complex that they need a multi-disciplinary research approach. For example developing new ways to diagnose disease needs understanding of the disease and how it manifests itself, of how probes can be developed that respond to those biological changes, and how instrumentation and techniques can detect the physical changes in the probe to afford the diagnostic image of the disease. By developing such multi-disciplinary skills you will equip yourself to be able to make research breakthroughs not possible by contemporaries with single disciplinary skill sets and thus improve your attractiveness as a future postgraduate employee in the life healthcare and medical science industries

Entry Requirements

Applicants must have a good honours degree (or equivalent) in Chemistry or a cognate discipline (examples would include: Biochemistry, Pharmacy, Forensic Science). We accept a range of qualifications from different countries.

We seek highly motivated candidates with a strong interest in developing themselves and their skills and the ability to maximise the benefits of training at the interface between chemistry and biomedicine

Further information including fees are located on the Chemical Biology and Biomedical Imaging Masters/MSC course profile. (/postgraduate/courses/taught/chemistry/chemistry-biology-biomedical-imaging-masters.aspx)

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