

Chemistry for Biomedical Research (Masters by Research)

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What modules will I study?

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Core Modules

- LM Molecules and Materials in Biomedicine
10 credits
(Module Code 04 26646)
- LM Frontiers in Biomedicine for EPS
10 credits
(Module Code 04 26643)
- Bioscience for Engineers
10 credits
(Module Code 04 17142)
- Communication Skills
10 credits
- Research project in Chemistry and Biomedical Research, including Ethics and Safety aspects
120 credits

Optional Modules

- LM Frontiers in Physical Science Analytical and Measurement Techniques
10 credits
(Module Code 03 20495)
- Bio-Related Chemistry
10 credits
(Module Code 03 26648)
- Computational Tools for Modelling & Analysis
10 credits
(Module Code 04 26644)

What elements of choice is there?

Both the core modules (40 credits) and research project (120 credits) are compulsory and this means that you study them alongside all the other students on your programme. 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 on which to build your research skills and develop the ability to work and communicate across disciplines.

There is a small element of choice in the programme and you will be required to choose 2 of the 3 optional modules. However should you wish to apply for second year entry into the PhD with Integ Study, Physical Sciences for Health Programme (623A) you will be required to undertake modules 03 26648 and 04 26644.

For your research project (120 credits) you will have a wide choice of projects selected from our suites of projects that will combine biological and biomedical science, physical science and the chemistry that underpins biomedical research. This is your opportunity to put into practice the skills you develop in the taught modules and to undertake an exciting piece of frontier and interdisciplinary research.

You may select your research project at the outset of the programme, but can change that selection if your interests change during your studies on the first three taught modules (up to the end of November). Alternatively you may choose to wait and choose in November when you have commenced the programme.

How does the programme differ from the Sci-Ph Integrated PhD programme?

The MRes is a one-year programme aimed to develop student's knowledge and skills to equip them to work at the interfaces where chemistry is applied in biology and medicine.

The MRes has a research and practical skills focus and is particularly suitable for students who already know that they wish to pursue a career focused on research whether in industry, in biomedical research centres, in Universities or in hospital labs. Students completing the MRes programme are well trained researchers with the skills to perform in a variety of research-related roles in the healthcare and biomedical industries. For those MRes students who decide they want to deepen their research skills still further, there is an option to transfer into year 2 of the Physical Sciences for Health (Sci-Phy-4-Health) integrated PhD programme, and use their first year as part of their studies for a Doctorate.

The Sci-Phy-4-Health integrated PhD programme is a 4-year integrated programme that seeks to develop elements of physical science and computational analysis to address key challenges in 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 centres, in Universities or in hospital labs.

Recent research projects offered, in Chemistry and Biomedical Research

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Title	Lead Supervisor	Supervisor 2	Supervisor 3	Supervisor 4
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 metallo-cylinde anti-cancer drugs	Mike Hannon (Sci-Phy)	Nikolas Hodges (BioSc)	Steve Thomas (Cardio Sci)	Ela Claridge (Comp Sci)
Development of fluorophore tagged DNA probes for cellular imaging applications	Jim Tucker (Chem)	Gerard Nash (Med Sch)	Roy Bicknell (Med Sch)	Hamid Dehghani & John Wilkie (Comp Sci)
Development, delivery and imaging of nanoparticles as cellular probes	Zoe Pikramenou (Chem)	Steve Thomas (Cardio Sci)	Ela Claridge (Comp Sci)	
A Comparison of Normalisation Strategies For Improved Interpretation of Small Molecule MALDI MS Images	Helen Cooper (Biosci)	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)	
3D Reconstruction of MALDI images using various Registration Techniques	Helen Cooper (Biosci)	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 (Chem)	Ela Claridge (Comp Sci)	
Multimodal MRI active agents for liver imaging	Zoe Pikramenou (Chem)	Mike Hannon (PSIBS)	David Adams (Med Sch)	Hamid Dehghani (Comp Sci) & James Dicks (QE)
cKit Fluorescent Ligands for Oncology and in vitro Physiology	Mike Hannon (Sci-Phy)	Keith Brain (Clin & Exp Med)	John Wilkie (Comp Sci)	

What are my opportunities for future study after this programme?

The programme is a self-contained programme in itself, but also provides an ideal platform for students who subsequently wish to continue their training and study for a PhD. The research and practical skills developed through course and particularly the experience of research in the major research project mean that you will be well prepared and able to make a flying start in your PhD.

This programme offers the possibility (subject to satisfactory performance) to transfer directly into year 2 of the interdisciplinary Sci-Phy-4-Health 4-year integrated PhD programme.

Alternatively the programme provides a solid foundation for entry into year 1 of our three year PhD programmes at the interface between chemistry and biomedicine, which could be undertaken in the context of the Research and Training Centre in Physical Sciences for Health.

Students wishing to transfer into the 4-year Sci-Phy-4-Health integrated PhD at the end of this MRes programme must have achieved an average of 60% or more in their taught modules and 60% or more in their research project, and must have the approval of the Sci-Phy steering committee and the University. They will be expected to have integrated some computational practical experiences into their research projects. These students will forgo the MRes qualification and instead proceed directly into year 2 of the Sci-Phy integrated PhD. In year 2, alongside their PhD research and other Sci-Phy training activities they will additionally take Sci-Phy module LM Computational Tools for Modelling and Analysis (04 26644) and some aspects of LM PSIBS Advanced Professional, Transferable and Research Skills (03 22311) so as to gain the full experience of the Sci-Phy training programme.

What sort of careers does the programme equip me for?

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

You will develop your skills in a variety of 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

Why is a cross-disciplinary training particularly valuable?

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 Alzheimer's 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 and 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.

For further information including fees please see the [Chemistry for Biomedical Research MRes course profile](#) ([//postgraduate/courses/combined/chemistry/chemistry-biomedical-imaging-mres.aspx](#)).

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