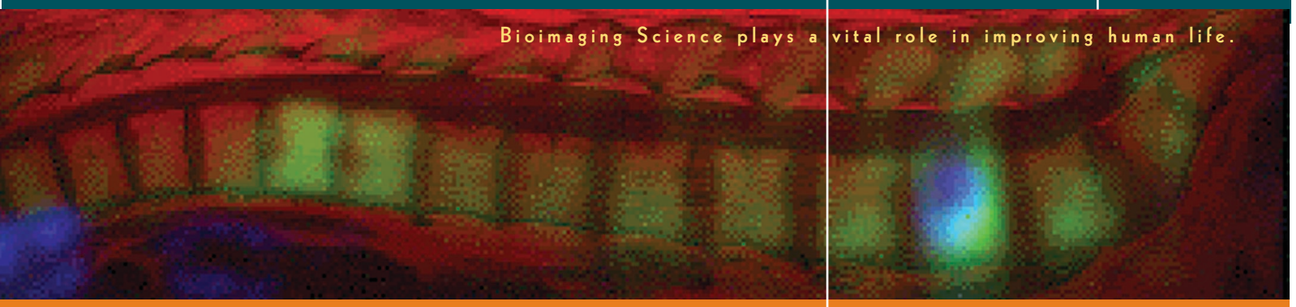
Imperial College London

Department of
Chemistry,
Imperial College
London

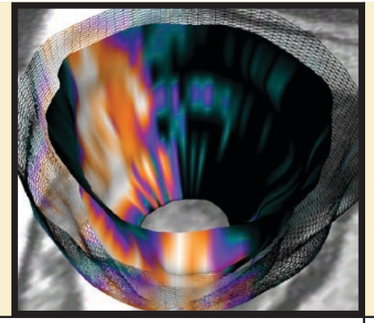
2005-06



Masters in Research in

BIOIMAGING SCIENCES

Masters in Research in BIOIMAGING SCIENCES



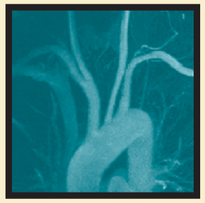
Why Bioimaging Sciences?

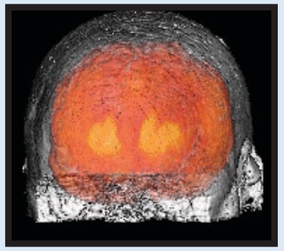
Bioimaging Science has played a vital role in improving human life. The development of a wide range of imaging techniques such as magnetic resonance imaging (MRI), positron emission tomography (PET), ultrasound and optical imaging are nowadays important tools for the early detection of disease, understanding basic molecular aspects of living organisms and the evaluation of medical treatment. This course will cover the fundamentals of modern imaging methodologies – including their techniques and application within medicine and the pharmaceutical industry, along with the chemistry behind imaging agents and biomarkers.

Imaging technologies are an increasingly important component of research and development in the pharmaceutical industry providing opportunities for pre-clinical testing of new products. It can cost £1billion to bring a new drug to market but this cost can be significantly reduced using powerful imaging techniques that speed up the process of testing new drugs. The advances in imaging technology allow researchers to gather information about the effectiveness of a drug on a specific condition or disease and observe how a drug is affecting a certain area of the body.

The UK has a very strong record in the development and clinical application of new imaging techniques and some of the major fundamental work in magnetic resonance, computed tomography, ultrasound and positron emission tomography has been performed within Imperial College. The research strength of Imperial College in Imaging Sciences is recognised both nationally and internationally, as exemplified by the creation of the Imaging Sciences Centre (ISC) – and a recent MRC discipline bridging award. The Masters in Research course will further interdisciplinary development in imaging sciences and create a multidisciplinary team involving chemists, immunologists, radiologists, image scientists, physicists, biomedical scientists and computer scientists.

The UK has a very strong record in the development and clinical application of new imaging techniques and some of the major fundamental work in magnetic resonance, computed tomography, ultrasound and positron emission tomography has been performed within Imperial College.





Course Overview

The course will cover all the fundamentals of modern imaging methodologies – including their techniques and application within medicine and the pharmaceutical industry, along with the chemistry behind imaging agents, drugs and biomarkers. The course content consists of an eight-month interdisciplinary research project, taught lecture modules on elementary and advanced aspects of bioimaging techniques and applications, specialist lectures in transferable skills, literature review on an imaging-related topic, group project work and workshops on the latest developments of imaging science.

The programme is available only as a full-time one-year course and successful completion leads to the MRes degree.

Course Details – Taught Elements

From a wide range of imaging-related topics, you will choose six 8-lecture modules. The lectures will address recent developments in bioimaging research and related scientific literature and will focus on 'whole body imaging'. There will be a written examination in January. Lecture options will include:

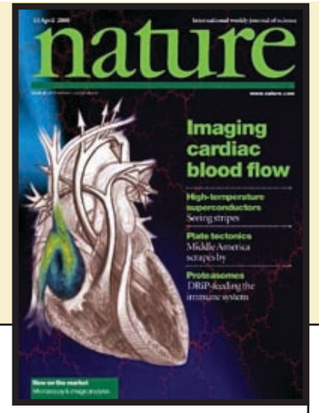
The Chemistry of Imaging	Image Computation
Positron Emission Tomography (PET)	Ultrasound and Microwave Imaging
Magnetic Resonance Imaging (MRI)	Anatomy and Physiology
Optical Imaging	Pharmacology of Imaging

In addition, you will also attend specialised non-examined lectures, featuring state of the art knowledge within imaging science, along with training sessions on laboratory techniques, safety, project management, experimental design and teamwork.

During the first term, you will write a literature review on an imaging-related topic, during which regular contact will be made with the supervisor. This is designed to aid scientific communication and data retrieval, as well as gaining an insight into a topical area of interest within bioimaging science.

Fundamental

IMAGINGMETHODOLOGIES



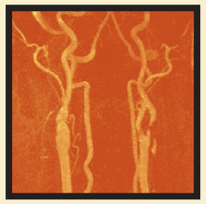
Course Details – Research Project

After Christmas, you will undertake a research project, which will be of 8-months duration and be jointly supervised by scientists at Imperial College and Industry. The supervisors will be internationally-leading chemists, immunologists, radiologists, image scientists, physicists, biomedical scientists and computer scientists. It is expected that many of the research projects will feature industrial collaboration and there will be opportunities to visit and carry out research in the industrial supervisors laboratories.

The collaborators will have different areas of expertise e.g. a synthetic chemist along with a physicist or a biomedic with a computer scientist. This is designed to create a truly interdisciplinary project and enable you to gain access to as wide a range of techniques and experience as possible. The projects will be based entirely in the research laboratories of the supervisors so allowing you to benefit from interaction with supervisors, postdoctoral and postgraduate researchers from the different disciplines. You will also attend meetings of both supervisors groups and will be expected to attend a range of relevant research seminars. You will be encouraged to publish the results of your research in peer-reviewed international journals, and you will submit a final report on the project for assessment in early September followed by an oral presentation.

Imperial College is an internationally leading research centre and there are many imaging-related groups within the College that have achieved the top 5* rating in the Government's most recent assessment of research quality. For example in positron emission tomography (PET), magnetic resonance (MRI), X-ray tomography (CT), ultrasound, fluorescence imaging and applied optics, and in relevant areas including chemistry, computer science, engineering and biological chemistry. It is anticipated that you will gain hands-on experience in one or more of these areas by working in leading research groups.

Imperial College is an internationally leading research centre and there are many imaging-related groups within the College that have achieved the top 5* rating in the Government's most recent assessment of research quality.



Developments in

BIOIMAGING RESEARCH

Course Aims

On graduation from the course you will be in an excellent position to begin a PhD or pursue an industrial career in imaging science. You will have developed the ability to carry out research within multidisciplinary teams, and possess knowledge of basic and advanced concepts in bioimaging sciences. The transferable skills will aid you in pursuing your chosen career and in communicating your ideas to others. The course aims to produce highly trained and motivated scientists who will be ideal candidates for research (industrial and academic) positions within imaging science.

With the current world-wide lack of well-trained imaging scientists we are confident that MRes in Bioimaging Sciences graduates will have exceptional career prospects.

Personal and Transferable Skills

Imperial College recognises the importance of postgraduate education and the development of transferable skills that will be useful in industrial or academic environments. You will be trained in a wide range of skills following exposure to the various teaching and learning aspects of the MRes course.

1. *Communicate effectively through oral presentations, computer processing and presentations, written reports and scientific publications* – via coursework and developed through feedback on assessed reports and oral presentations.

2. *Management skills: decision processes, objective criteria, problem definition, project design and evaluation, risk management, teamwork and coordination* – via the group projects and the research project and regular meetings with research teams.

3. *Integrate and evaluate information from a variety of sources* – via the literature report.

4. *Transfer techniques and solutions from one discipline to another* – is a core activity of the research projects and is additionally taught in lectures.

5. *Use information and communications technology* – taught in lectures, developed through project work and individual learning.

6. *Manage resources and time.*

7. *Learn independently with open-mindedness and critical enquiry.*

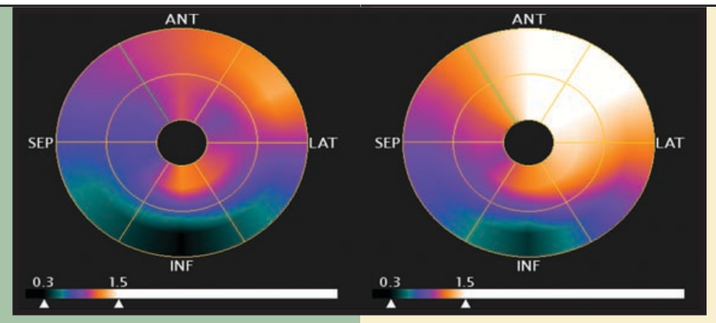
In addition to the elements of the MRes course, as a postgraduate student, you will be a member of GSEPS (Graduate School of Engineering and Physical Sciences) and during the year you will be offered a range of courses:

Intellectual Property Management
This module covers patents, licensing and joint ventures, and provides an opportunity to meet the Imperial College staff responsible for commercialisation of academic research.

Presentation and Communication Skills
This course provides tuition in delivering scientific presentations and dealing with the media.

Safety Awareness
Chemical and biological safety. Discussion of safe working practice and legislation governing health and safety, particularly in the context of managerial responsibilities.

Science and Society
The Centre for Science Communication will lead a workshop on Science and Society which examines the role of science in the modern world and how it is reported in the media.



Application and Selection Process

The course does not assume any previous knowledge of imaging-related topics but a commitment to a career in bioimaging sciences is a part of the selection process.

Applicants should normally have obtained or expect to obtain a first or an upper second class degree in a physical sciences-based subject from a UK academic institution or an equivalent overseas qualification. If a candidate impresses at the interview stage, consideration will be given for admission at the minimum level of the College academic regulations i.e. a lower Second Class Honours degree in a Physical Sciences-based subject.

Candidates with degrees in other sciences and/or appropriate experience may also be considered.

You can download an application form and associated documents from www.imperial.ac.uk/P1397.htm

There is no closing date for applications but early applications are advisable. We will interview candidates for places throughout the year.

For further information about the Imperial College application process, please visit: **www.imperial.ac.uk/pgoptions**

If you have any questions, please contact the course administrator, Dr. Nick Long **n.long@imperial.ac.uk (+44 (0)20 7594 5781)** and visit **http://www.imperial.ac.uk/chemistry/forstudents/postgraduatecourses**

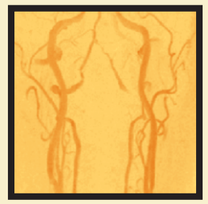
Funding

There are a number of fully-funded EPSRC/Industrial studentships available for UK and EU students. These will pay tuition fees (around £3,100) and living expenses (around £14,000). Those wishing to join the course from outside the EU will have to fund their own living costs and pay fees of £18,950.

Applications should be returned to:

Ms. Doris Pappoe,
Chemistry Department,
Imperial College London,
South Kensington,
London, SW7 2AZ.

Tel: +44 (0)20 7594 5864
Email: d.pappoe@imperial.ac.uk



Imperial College
London