MRes in Structural Molecular Biology

Department of Life Sciences

Student Handbook 2016/2017
The Graduate School

Welcome from Professor Sue Gibson, Director of the Graduate School

The Graduate School has several roles but our main functions are to provide a broad, effective and innovative range of professional skills development courses and to facilitate interdisciplinary interactions by providing opportunity for students to meet at academic and social events. Whether you wish to pursue a career in academia, industry or something else, professional skills development training will improve your personal impact and will help you to become a productive and successful researcher.

Professional skills courses for Master’s students are called “Masterclasses” and they cover a range of themes, for example, presentation skills, academic writing and leadership skills (http://www3.imperial.ac.uk/graduateschool/currentstudents/professionalskillsmasters/masterclassprogramme). All Masterclasses are free of charge to Imperial Master’s students and I would encourage you to take as many as you can to supplement your academic training. The Graduate School works closely with the Graduate Students’ Union (GSU) and is keen to respond to student needs so if there is an area of skills training, or an activity that you would like us to offer, but which is not currently provided, please do get in touch (graduate.school@imperial.ac.uk).

The Graduate School also runs a number of exciting social events throughout the year which are an opportunity to broaden your knowledge as well as to meet other students and have fun. Particular highlights include the Ig Nobel Awards Tour Show, the Chemistry Show and the 3 minute thesis competition. You should regularly check the Graduate School’s website and e-Newsletters to keep up to date with all the events and training courses available to you.

Finally, I hope that you enjoy your studies here at Imperial, and I wish you well.

Sue Gibson
Welcome from Dr Janet De Wilde, Head of Postgraduate Professional Development

I would like to welcome you to the graduate school courses for postgraduate professional development. The team of tutors here come from a wide variety of experiences and we understand just how important it is to develop professional skills whilst undertaking postgraduate studies and research. Not only will this development improve success during your time at Imperial College, but it will also prepare you for your future careers. We are continually working to develop and innovate the courses we offer and over this year you will see many new offerings both face to face and online. I encourage you to explore and engage with the diverse range of opportunities on offer from the team at the graduate school and I wish you well in your studies.

Janet De Wilde
Welcome from the Graduate Students’ Union

I am delighted to welcome you to Imperial, and to the Graduate Students’ Union (GSU). I hope that your time here will be fulfilling and valuable, and the GSU is here to try and facilitate this.

Imperial College London is such a wonderful and transformative place that provides a unique and thrilling environment for research and for advanced studies, and the graduate students are a vital and valued part of the wider community of Imperial. Our graduate students are at the forefront of the research done. Therefore, at the GSU we ensure that the experience here fosters both academic achievement and personal development in our students.

The GSU is a University-wide representative body for postgraduate students at Imperial. It promotes the interests and welfare of its members, provides social and recreational activities and advocate for you and your opinions to the University and bodies external to the university. I encourage you to become an active member of the GSU—through involvement in your departments and the many University societies, and through our representational and campaigning activities.

I wish you all a fantastic time here at Imperial. Please take advantage of our rich community, and hope to meet you all soon.

Ahmed Shamso
gsu.president@imperial.ac.uk
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Contents</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Introduction</td>
<td>3</td>
</tr>
<tr>
<td>b. Timetable for 2016-2016</td>
<td>4</td>
</tr>
<tr>
<td>c. Course Outline</td>
<td></td>
</tr>
<tr>
<td>I. Why an MRes in Structural Molecular Biology?</td>
<td>7</td>
</tr>
<tr>
<td>II. Aims</td>
<td>8</td>
</tr>
<tr>
<td>III. Objectives</td>
<td>8</td>
</tr>
<tr>
<td>IV. Course Structure</td>
<td>9</td>
</tr>
<tr>
<td>V. Arrangements During Projects</td>
<td>12</td>
</tr>
<tr>
<td>VI. Requirements of Reports and Viva Voce</td>
<td>13</td>
</tr>
<tr>
<td>VII. Requirements for Award of MRes Degree</td>
<td>14</td>
</tr>
<tr>
<td>VIII. Support and Guidance</td>
<td>14</td>
</tr>
<tr>
<td>IX. Student Evaluation of the Course</td>
<td>15</td>
</tr>
<tr>
<td>X. Course Committee Members</td>
<td>15</td>
</tr>
<tr>
<td>d. List of Potential project Supervisors</td>
<td>16</td>
</tr>
<tr>
<td>e. Appendix including marking criteria and M3D timetable</td>
<td>19</td>
</tr>
</tbody>
</table>
Introduction

Welcome to the Centre for Structural Biology and Department of Life Sciences for your postgraduate training! As a member of the Department you are also part of the Faculty of Natural Sciences and a member of the Graduate School of Life Sciences and Medicine. We hope that you will enjoy your period of study here and achieve success.

This Handbook contains essential information concerning the organisation and requirements of your MRes programme, together with useful information about the Department of Life Sciences and its staff.

The following staff administers the Departmental postgraduate training programme:

**Professor Murray Selkirk**  Head of Department
**Dr Niki Gounaris**  Director of Postgraduate Studies
**Professor Neil Fairweather**  Postgraduate Tutor
**Mr James Ferguson**  PGR Administrator

The following staff administers the MRes in Structural Molecular Biology course:

**Dr Alfonso de Simone** and **Dr Morgan Beeby**  Course Directors
**Professor Steve Matthews**  Chair of the Board of Examiners
**Mrs Lucy Barron**  PGT Administrator

You will meet these individuals in the first week of term; their phone numbers and email addresses can be found in Sections 3 and 4 of this Handbook.

All MRes students attend lectures and carry out research projects under the day-to-day supervision of members of the academic staff.
MRes in Structural Molecular Biology: Timetable 2016 - 2017
Part 1

Project 1: November 7 2016 - 16 March 2017 (16 weeks laboratory work, 2 weeks write up, total of 18 weeks excluding Christmas break)

Literature report: 4th April – 26th April 2017

Dates and Scheduled events

Week 1
Monday, October 3, 2016:
10.00 onwards Welcome fair, run by the College, drop in anytime from 10am – 4pm, held in the Queens Tower Rooms
10.30 - 12.00 Welcome by Course Committee, 7th floor Common Room, Sir Ernst Chain Building. Titles of 1st projects to be distributed. Potential supervisors are encouraged to attend.
16.15 – 17.00 Welcome from the Provost, Great Hall, Level 2 Sherfield Building

Tuesday, October 4, 2016:
11.00 onwards Imperial College Union Freshers’ Fair, Great Hall, Sherfield Building
15.30 – 16.30 Safety Primary Induction, G34 Lecture theatre, Sir Alexander Fleming building. Students will need to sign an attendance list. Attendance is compulsory.
16.30 – 18.00 Welcome event - Drinks reception for all South Kensington Department of Life Sciences Masters students. G47A and G47B, ground floor, Flowers Building.

Weeks 1 – 6 (Wednesday, October 5 – Friday, November 4, 2016): M3D course (see Appendix, p31)

October 21st: Students are assigned their 1st project

October 18: 15.00 -16.30: Lab safety training, Lecture theatre G34, Sir Alexander Fleming Building Attendance is compulsory

Bioinformatics II Lectures: Proteins:

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Lecture</th>
<th>Instructor</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/11/2016 Thurs</td>
<td>13.00-15.00</td>
<td>Bioinformatics II Proteins 1</td>
<td>Professor Sternberg</td>
<td>Flowers Building, G47A</td>
</tr>
<tr>
<td>4/11/2016 Fri</td>
<td>13:00-15:00</td>
<td>Bioinformatics II Proteins 2</td>
<td>Professor Sternberg</td>
<td>Flowers Building, G47A</td>
</tr>
<tr>
<td>8/11/2016 Tues</td>
<td>14:00-16:00</td>
<td>Bioinformatics II Proteins 3</td>
<td>Professor Sternberg</td>
<td>Read Lecture Theatre, Sherfield Building</td>
</tr>
<tr>
<td>10/11/2016 Thurs</td>
<td>10.00-12.00</td>
<td>Bioinformatics II Proteins 4</td>
<td>Professor Sternberg</td>
<td>Flowers Building, G47A</td>
</tr>
</tbody>
</table>

College closed for Christmas: 24 December 2016 – 2 January 2016, College will re-open Tuesday 3 January 2017
February 24th, 2017   Staff and students are notified of examiners and students are to set up viva time
March 1st 2017  
March 6th 2017   1.30pm: Meeting/Q&A session with the Course Directors regarding assessment for your projects. Room: 213a, SEC building.
March 16th 2017   Project 1 seminars: **13.00 – 16.00**, Room: 121, SAF building
March 16th 2017   Dissertation titles given out
March 16th 2017   **Project 1 report to be handed in 12.00, Thursday 16th March**
20th – 31st March 2017   Project 1 viva
April 3rd 2017   Dissertation titles assigned
3rd – 7th April 2017   Study week
April 14th 2017   Students are assigned Project 2
25th April 2017   **Dissertation to be handed in 12.00**

**College closed for Easter: Wednesday 12 April 2017 – Tuesday 18 April; College will re-open on Wednesday 19 April 2017**

**Part 2**

**Project 2: April 26 – August 24, 2017 (~16 weeks laboratory work, 2 weeks write up, total of 18 weeks)**

**Dates and scheduled events**

Mid August 2017: Staff and students are notified of examiners and students are to set up viva time

August 18, 2017   **Project Seminars**, 14.00 – 17.00, SAF 121

**Thursday August 24, 2017**   **2nd project report to be handed in 12.00**

August 25 - Sept 8, 2017   **Project vivas**

**Part 3: Revision for final viva**

**11th – 27th September 2017:**   Viva by external examiners, date TBC
College Closure dates 2016/2017

The MRes course is full time one year course. The college will be closed on the following dates:

College closed for Christmas: 24 December 2016 – 2 January 2017; College will re-open Tuesday 3 Jan 2017

College closed for Easter: Wednesday 12 April 2017 – Tuesday 18 April; College will re-open on Wednesday 19 April 2017

Bank Holidays:
Monday 1 May 2017
Monday 29 May 2017
Monday 28 August 2017
Course Outline

Why an MRes in Structural Molecular Biology?

In the post-genome era, there is a wealth of information about the genomes of many organisms, including humans. The next challenge is to assign and understand the functions of the final genome products – proteins; in particular to understand at the molecular and biochemical level the functions of identified disease-linked proteins and those proteins that carry out basic life processes. The requirement for three-dimensional information is an essential part of this process and provides not only fundamental insights into biological functions but also a framework for research aimed at drug discovery.

Structural molecular biology, primarily X-ray crystallography, NMR, and electron cryo-microscopy, are tools for obtaining atomic resolution structures of macromolecules and forms an indispensable part of modern molecular biology and biochemistry. Biological NMR has established a period of accelerated growth in the determination of macromolecular structures and will make an increasingly important contribution to the post-genomic era. Recent development in electron cryo-microscopy, especially in reconstruction algorithms and increasing computing power, has seen rapid improvements in both resolution and processing time. As a result, this has become an increasingly powerful and complementary method in determining structures of large macromolecular complexes and contextualizing them within the cell. In post-genomic biology there is a requirement for characterising proteins and their post-translational modifications, particularly glycosylation, given that a vast majority of intra and extracellular proteins are glycosylated. The ability to determine the nature and structure of the carbohydrate moiety is an essential part of understanding glycoprotein function. Recent developments in mass spectrometry instrumentation and methods, now allow detailed structural interpretations of these important protein modifications. All-atom and course-grained molecular dynamics simulations can then query the dynamics of the macromolecules under study.

The realisation that complementary techniques are essential for an understanding of complex macromolecules and their assemblies resulted in the establishment of the Imperial College London Centre for Structural Biology (CSB). The CSB is a College Centre with affiliated groups from three Imperial College faculties (Life Sciences, Medicine, and Physical Sciences) which aims to provide both expertise and core facilities in all areas of structural biology research including protein crystallography, NMR, electron microscopy and mass spectrometry. The CSB was awarded BBSRC centre status (April 1999) in recognition of its outstanding research programmes primarily in electron cryo-microscopy. The multi-disciplinary research building (Flowers) houses the electron microscopy and X-ray crystallography facilities. The basement of the RCS1 building houses a dedicated NMR suite, established as part of a £5.2 million SRIF2 award. The JIF refurbished ground and basement floors of the Biochemistry Building offer ‘state of the art’ mass spectrometry facilities and a new Bioreactor suite for large-scale protein production.

The MRes (Masters in Research) in Structural Molecular Biology course will provide an ideal training opportunity for students who want to pursue a career in either research, biotechnology, or the pharmaceutical industry. Traditionally, structural biologists are trained in one structural biology technique (primarily protein crystallography), with at least a PhD degree. However, with many of
the structure determination techniques becoming semi-automatic and routine, there will be a requirement for more broadly trained structural biology researchers with the capability of understanding the use of complementary techniques to derive biological function from structure. These skills would be of considerable use in academia and for recruitment to biotech and pharmaceutical companies who generally have strong ‘in house’ structural biology based research groups. The future necessity for trained students with knowledge and skills in all macromolecular structural determination techniques including protein crystallography, electron microscopy, NMR, computational methods, and structural mass spectrometry forms the foundation for the creation of this course.

Furthermore, BSc students with an interest in a research career utilizing structural biology will find this course an ideal bridge to experience different aspects of structural biology research before making a decision on a particular area of advanced postgraduate study. The Imperial College London Centre for Structural Biology (CSB) with its wealth of expertise and ‘state-of-the-art’ facilities in all major macromolecular structure determination techniques and close links to the Centre for Bioinformatics, Glycobiology Training, Research and Infrastructure Centre (GlycoTRIC), Centre for Bio-molecular Electron Microscopy and other functional biology and biomedical research groups, provides an ideal environment for students to pursue further education and gain vital experience for a successful career.

**Aims**

The aims of the MRes (masters in Research) are to provide students with broad research training in structural biology which will (a) prepare them for PhD studies (b) enable them to make a more informed choice for their PhD research (c) prepare them for a career in biotech or other drug-discovery industries (d) offer training in the area of structural molecular biology.

**Objectives**

On completion of the course the student should have:

- An understanding of basic and applied aspects of macromolecular structure including structure-function relationships and structure determination techniques
- An ability to choose an appropriate structural determination tool and initiate a typical structure determination project in order to answer a particular biological/biomedical question
- An ability to interpret typical structural data in terms of biological function, and to use structural data bases.
- An understanding of the importance and applications of interdisciplinary research.
- An ability to design, execute and present a research project.
- An ability to integrate, evaluate and critically analyze experimental data.
- A broad appreciation of the scientific opportunities within the CSB and Imperial College as a whole.
- A range of transferable skills
This will be achieved by providing:

- A course of lectures and seminars that will cover core issues and which reflect the particular needs and interests of the student.
- Hands-on experience of a wide repertoire of methods and techniques involved in structure biology
- Training in core transferable skills

Two research in-depth research projects covering different structure biology aspects in research laboratories within the Department and CSB will be carried out.

**Course Structure**

This year long course consists of mainly two independent research projects (17 - 19 weeks each) that incorporate at least two of the five structural biology areas:

- X-ray crystallography
- Biological NMR
- Electron cryo-microscopy
- Computational structural biology and structural bioinformatics
- Mass spectrometry

Each project will be conducted in one of the College research groups using structural biology approaches, and will allow you to obtain an in-depth practical experience of laboratory research in at least one of the structural biology areas. At the end of the each project, you will be expected to summarize your research in a written report in the format of scientific publication. A viva voce will also be conducted by two members of academic staff, to assess your research and research report, as well as your general understanding of structural biology research. Each project accounts for 40% towards the final mark.

There will be two student symposiums (one after each project). This would enable the students to present their work to their peers and receive feedback. Each talk will last 15 minutes plus five minutes discussion. The oral presentation will be marked (by the viva examiners) and each accounts for 5% towards the final mark.

A dissertation is required (~3000 words) which allows the students to investigate and debate on one or more aspects of structural biology. The dissertation will be marked by two examiners and will account for 10% of the final mark.

A series of lectures, tutorials and practical will be given to cover theoretical background and knowledge of principles of protein structures, protein structural determination techniques. These are specially aimed at students from non-biochemical disciplines.

A set of lectures covering the principles of various aspects of structural biology, will be offered including:

1. Macromolecular Structure Principles
2. Macromolecular Structure Determination
The first aspect will be covered by some of the lecture modules in the MSc in Bioinformatics II convened by Professor Mike Sternberg. The second aspect will be covered by lectures from the final year BSc course entitled ‘Macromolecules in 3D’ convened by Professor Steve Matthews.

You will also acquire a range of professional and transferable skills through workshops and courses given by the Faculty of Life Sciences and by the Graduate School of Life Sciences and Medicine (see www.gradlsm.imperial.ac.uk for details).

In addition, you will also attend seminars from the various Seminar Programmes, together with journal clubs and work-in-progress meetings, which are relevant to your interests. Students will also present and discuss their work at lab meetings in the labs of their current research project and will have regular meetings about progress with their supervisors.

MRes Journal club

An informal journal club will be run during Project 1 and Project 2 on Thursday afternoons at 5pm. This is an excellent opportunity to read wider into contemporary structural biology, and in the past has been an opportunity to meet with your MRes colleagues on a regular basis. More details will be provided before commencing Project 1.

Research Projects

The majority of the MRes course consists of two research projects in research groups utilizing structural biology approaches. These research groups are affiliated with the Imperial College CSB which has state-of-the-art facilities in all major structural determination areas and has an international reputation for research in a wide range of biological areas:

X-ray crystallography.

Within the CSB, there are several internationally acclaimed research groups using protein X-ray crystallography to understand complex biological systems and processes. To enable protein crystallographic research within the college the CSB manages ‘state of the art’ X-ray protein crystallographic facilities located in the Flowers Building. The facility was established (Dec 2001) and has a full-time facility manager, part-time technician and Users group. Research include structure determination programmes in:

a. Human disease and infection  
b. Photosynthesis and bioenergetics  
c. Transcriptional regulation  
d. Enzyme catalysis  
e. Membrane protein structure-function  
f. Macromolecular machines

Nuclear Magnetic Resonance

The CSB and the department host the cross-faculty NMR (CFNMR) centre which houses recently-upgraded high field 600MHz and 800MHz NMR spectrometers. Both are four-channel, cryoprobe-equipped instruments optimised for Structural Biology applications. The centre provides local office, wet lab and computing facilities for data analysis and also has a dedicated Facility Manager responsible for training and support of those wishing to apply the technique to their research.
Highlighted research areas include structure determination programmes in:

a. Pathogen virulence  
b. Translation and Transcription  
c. Membrane fusion  
d. RNA polymerase architecture  
e. Protein design  
f. Developments of novel NMR methods

**Electron Cryo-Microscopy**  
The Electron Microscopy Centre is an internationally leading centre of excellence for electron cryo-microscopy (both single particle and cryo-tomography). The centre was created in 1997 and has four electron microscopes including the latest addition of a Tecnai F20 microscope equipped with the state-of-the-art Direct Electron Detector. The centre has a full time manager to maintain the facility, which hosts a growing number of users from both Imperial College and other collaborating institutions around Europe. The research of groups that use the centre include:

- Photosynthetic antenna complexes in Cyanobacteria  
- Photosystems I and II  
- AAA ATPases  
- Transcriptional regulators and complexes  
- Key Complexes in DNA damage signalling and repair  
- Function and evolution of rotary motors

**Mass spectrometry**  
An especially important emerging field in post-genome biology is proteomics and in particular the subsets of glycoproteomics and glycomics, given that large numbers of both intra and extra-cellular proteins are glycosylated. The use of mass spectrometry to determine the structures of proteins, glycoproteins and carbohydrate moieties has been pioneered at Imperial College by Professors Howard Morris and Anne Dell and the current instrumentation includes state of the art Electrospray Q-TOF technology for nanoLC MS and MS/MS, (incorporating both Q-TOF and Q Star instruments) VOYAGER STR MALDI-TOF, and MALDI TOF-TOF MS and MS/MS technologies (two new instruments). Current research areas include determining protein, glycoprotein and carbohydrate structures important in human health and disease in areas such as:

a. Human fertilization  
b. Pathogenic bacteria  
c. Insulin resistance  
d. Dystroglycan research  
e. Heparin structure and Glycochip technology  
f. Cellular differentiation
**Bioinformatics**

The post genome era is characterised by an expansion of bioinformatic information across numerous domains including data on genetics, genomics, protein sequence, protein structure, protein function, protein and DNA expression. Often the volume and complexity of the data is limiting its interpretation and a major role of bioinformatics is to ensure that the information is optimally exploited. The main bioinformatics research activities within the Department of Life Sciences are:

- Structural bioinformatics
- Advanced computational methods of sequence analysis
- Proteomic and microarray analysis

**Arrangements during projects**

It is important to ensure that safety precautions are observed and students must follow all instructions given. Students must leave the building at 10.30 pm each day (opens at 8.00 am) and work must be planned accordingly.

For safety reasons, students will not be allowed to work in laboratories after 6.00 pm or at weekends unless there is someone in the laboratory to oversee the student’s work; supervisors are responsible for making such arrangements.

Please note that students must observe confidentiality. They must not give copies of their project reports to anyone, or discuss data with anyone outside this department, without prior consent of their supervisor.

Students are required to attend a number of safety courses as discussed at the beginning of the course. Please see the following link for details of how to sign up:

[http://www.imperial.ac.uk/staff-development/safety-training/safety-courses/](http://www.imperial.ac.uk/staff-development/safety-training/safety-courses/)

**Plagiarism**

The University has explicit rules concerning plagiarism. This states: "All work submitted for a University of London degree must be expressed in your own words and consist of your own ideas and judgments. Presentation of another person’s thoughts or words as though they were your own may lead to an allegation of cheating, with potentially serious consequences for yourself"

This means that **under no circumstances** may you copy another student's review or practical write-ups. All your written work (both course and examination) must be in your own words. If you copy or adapt words or diagrams from a paper or a textbook, you must reference the source.

The College requires all Masters students to take a **compulsory online plagiarism course**. Details will be circulated to students in the Autumn term. Further information can be found here: [http://www.imperial.ac.uk/study/pg/graduate-school/professional-skills/masters/online/](http://www.imperial.ac.uk/study/pg/graduate-school/professional-skills/masters/online/)
Illness and Other Problems

If you miss any part of a course, and especially if you miss handing in course work through illness you must notify your project supervisor and the course director as soon as possible in writing (email is sufficient). This information is required to avoid penalties for late hand in of work and importantly for final moderation in cases of more serious disruption to your work. All information will be kept to the minimum number of people within the Department but you must state if the information is to be kept completely confidential.

Requirements for reports and viva voce

a) Students should discuss their reports with their supervisors before starting to write up. It is suggested that students begin to write the introduction and methods as soon as they are able and at least two weeks before submission students should concentrate on completing the report. Please ensure your report is written in succinct academic English; we strongly recommend you familiarize yourself with Imperial’s Centre for Academic English for personalized guidance on writing.

b) When using a computer to write the report, students are advised to make back-up copies of their work frequently. Disk failure can occur and must be planned for. Project reports must be submitted by the deadline.

c) Reports should be approximately 5,000 words plus diagrams, graphs, photographs and references. A 25mm margin should be left on the left-hand side to facilitate binding. It is important to ensure that the report is concise and well presented.

d) The format should follow that of a scientific paper (e.g. Cell or Journal of Molecular Biology) and must include the following sections: Abstract, Introduction, Results, Discussion, Materials and Methods and References. Abstracts should be no more than one side of paper and should include your name, project number and project title. A full reference citation must be given (see Journal of Molecular Biology instructions for authors). You are strongly advised to use reference managers. Figures must be properly labelled with detailed annotations. Figure legends must be self explanatory and contain a title. Figure legends and Figures should be grouped on the same page if possible. Please refer to Cell’s website under the section of Instructions for Authors.

e) 3 hard comb bound copies of the completed write-ups should be bound and submitted to the Education Office, Room 202, Sir Ernst Chain Building. 1 electronic copy should also be submitted via the Student Blackboard site.

f) A list of Examiners will be e-mailed to you before the viva voce

g) Students must arrange with their Examiners to establish the venue and time for their viva examination.

h) Each viva will last about 45-60 minutes though it can vary depending on the individuals. Two examiners will be present and the supervisor will not be there. Students should be prepared to discuss their project in detail and be prepared to answer questions of a general structural biology nature as well as specific ones about the project. Taught course elements will also be examined.
Requirements for the Dissertation

The dissertation should be in the format of a literature review (e.g. Curr. Opinion in Structural Biology) and approximately 3000 words. 2 stapled hard copies of the dissertation must be handed in. 1 electronic copy should also be submitted via the Student Blackboard site. You may only show one draft to your supervisor for comments. Dissertations are marked by the supervisor and one second marker.

Requirements for the award of the Master of Research (MRes) Degree

Students must achieve a pass mark in both projects in the Course. The pass mark is 50% (grade C). Grade A (70% and above) constitutes Distinction. Failure to achieve a minimum of 50% in any of the two projects will result in failure of the Course.

For each project a scientific report must be written and submitted by the appropriate deadline. Late submission is not permitted. Up to 5% will be taken off the mark of any late work. The general format of the presentation will be discussed with the Course Director. Following submission of the report, students will be examined orally, on the work submitted, by two examiners other than the supervisor. In addition, students will be required to give a presentation in a seminar format. This will count towards your final project grade. During September there will be an oral examination for all students covering all aspects of the Course. The external examiners appointed by the University will carry out this examination.

Students are expected to carry out their research work on a daily basis. Hours of work will be discussed with the appropriate supervisor and the Course Director. Should a student be unable to be present, due to illness or personal reasons, both the Course Director and the supervisor must be informed. Absence from lectures must be notified to the Course Director. Documentation in support of the reasons leading to absence may be requested. Successful students will be awarded the degree of Master of Research (MRes) and the Diploma of Imperial College (DIC).

Professional Skills Development Programme

The Graduate School has produced a short information leaflet for Master’s students which will be available to students at each of the welcome talks. Please see the timetable for the first week on page 5 which will tell you the timings for the Professional skills talk.

Support and Guidance

Student Mentors will be assigned for the whole year. The Mentor should be the student's first point of contact should a problem arise. Additionally, the Mentor will have at least one scheduled meeting with the student to discuss progress and will report to the Course Directors. Independently, the Course Directors will meet all students at specified times when guidance and feedback on progress will be provided.
New Students Website
You are reminded of the following website that contains relevant information for all new students:
http://www3.imperial.ac.uk/students/newstudents

Please also see the Welcome Week Timetable for more information:
http://www3.imperial.ac.uk/students/newstudents/yourfirstweek/welcomeweek

Student Evaluation of the Course

Regular meetings between the Course Directors and students will determine evaluation of the course.

Course Committee Members

Course Directors: Dr Morgan Beeby, Level 5, Sir Ernst Chain/Biochemistry Building, Tel: 45251,
Email: m.beeby@imperial.ac.uk

And: Dr Alfonso de Simone Level 6, Sir Ernst Chain/Biochemistry Building, Tel: 43052,
Email: a.de-simon@imperial.ac.uk

Chair of the Board of Examiners: Professor Steve Matthews, Level 5, Sir Ernst Chain/Biochemistry Building,
Tel: 45315, email: s.j.matthews@imperial.ac.uk

Course Administrator: Mrs Lucy Barron, Level 2, Sir Ernst Chain/Biochemistry Building, email:
l.barron@imperial.ac.uk
<table>
<thead>
<tr>
<th>Name</th>
<th>Email</th>
<th>Speciality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Alfonso De Simone</td>
<td>a.de-simon@</td>
<td>Physical principles of bio-macromolecules</td>
</tr>
<tr>
<td>Prof. Anne Dell</td>
<td>a.dell@</td>
<td>Structural glycobiology, biopolymer mass spectrometry</td>
</tr>
<tr>
<td>Dr Doryen Bubeck</td>
<td>d.bubeck@</td>
<td>Structure Biology</td>
</tr>
<tr>
<td>Dr Bernadette Byrne</td>
<td>b.byrne@</td>
<td>Membrane protein expression and crystallography</td>
</tr>
<tr>
<td>Prof. Bill Rutherford</td>
<td>a.rutherford@</td>
<td>Water oxidising enzyme, Photosystem II</td>
</tr>
<tr>
<td>Dr. David Mann</td>
<td>d.mann@</td>
<td>Cell division</td>
</tr>
<tr>
<td>Dr Erhard Hohenester</td>
<td>e. hohenester@</td>
<td>Protein crystallography, extracellular matrix proteins</td>
</tr>
<tr>
<td>Dr Ernesto Cota</td>
<td>e.cota@</td>
<td>Protein crystallisation</td>
</tr>
<tr>
<td>Dr Geoff Baldwin</td>
<td>g.Baldwin@</td>
<td>Protein enzymology, DNA repair mechanism</td>
</tr>
<tr>
<td>Dr. James Murray</td>
<td>j.w.murray@</td>
<td>catalysts and structural studies of photosynthetic complexes</td>
</tr>
<tr>
<td>Dr Jasper van Thor</td>
<td>j.vanthor@</td>
<td>Spectroscopy, structural and theoretical studies of Photoreceptors</td>
</tr>
<tr>
<td>Dr John Pinney</td>
<td>j.pinney@</td>
<td>Theoretical Systems Biology</td>
</tr>
<tr>
<td>Dr Karen Polizzi</td>
<td>k.polizzi@</td>
<td>in vivo biosensors and synthetic biology</td>
</tr>
<tr>
<td>Dr Konstantinos Beis</td>
<td>konstantinos.beis@</td>
<td>Elucidation of the 3D structures of membrane proteins</td>
</tr>
<tr>
<td>Prof. Kurt Drickamer</td>
<td>k.drickamer@</td>
<td>Molecular function of sugar-binding receptors in cellular recognition events</td>
</tr>
<tr>
<td>Dr. Maruf Ali</td>
<td>maruf.ali@</td>
<td>Structural and mechanic insights of unfolded protein response</td>
</tr>
<tr>
<td>Dr Maureen Taylor</td>
<td>m.taylor@</td>
<td>Molecular function of sugar-binding receptors in cellular recognition events</td>
</tr>
<tr>
<td>Prof. Michael Sternberg</td>
<td>m.j.sternberg@</td>
<td>Structural Bioinformatics</td>
</tr>
<tr>
<td>Prof. Michael Stumpf</td>
<td>m.stumpf@</td>
<td>Theoretical genomics</td>
</tr>
<tr>
<td>Prof. Paul Freemont</td>
<td>p.freemont@</td>
<td>Structural molecular biology</td>
</tr>
<tr>
<td>Prof. Peter Nixon</td>
<td>p.nixon@</td>
<td>Solar Energy</td>
</tr>
<tr>
<td>Dr Robert Endres</td>
<td>r.endres@</td>
<td>Biophysics, modelling of biological networks</td>
</tr>
<tr>
<td>Dr. Robert Weinzierl</td>
<td>r.weinzierl@</td>
<td>Structure &amp; Function of archaeal &amp; eukaryotic RNA polymerases</td>
</tr>
<tr>
<td>Prof. So Iwata</td>
<td>s.iwata@</td>
<td>Membrane protein crystallography</td>
</tr>
<tr>
<td>Prof. Stephen Curry</td>
<td>s.curry@</td>
<td>Protein crystallography, Virus replication; fatty acid transport; protein-drug interactions</td>
</tr>
<tr>
<td>Dr. Stephen Hare</td>
<td>s.hare@</td>
<td>Structural Biology of neisserial pathogenesis</td>
</tr>
<tr>
<td>Prof. Steve Matthews</td>
<td>s.j.matthews@</td>
<td>Biological NMR</td>
</tr>
<tr>
<td>Dr Stuart Haslam</td>
<td>s.haslam@</td>
<td>Biopolymer mass spectrometry</td>
</tr>
<tr>
<td>Dr Morgan Beeby</td>
<td>m.beeby@</td>
<td>Electron cryotomography</td>
</tr>
<tr>
<td>Dr Harry Low</td>
<td>h.low@</td>
<td>Structural biology of membrane architect and regulation</td>
</tr>
<tr>
<td>Prof. Xiaodong Zhang</td>
<td>xiaodong.zhang@</td>
<td>Structural studies of macromolecular machines</td>
</tr>
</tbody>
</table>
Appendix -

Guidance on citing URLs in essays
URLs are best avoided as references in essays, because of their relative impermanence, frequent bias, and general lack of attribution and peer-review. Citing them is only justifiable under specific circumstances.

Online journals and books
If the URL is merely an online copy of a journal or book, then use the proper citation along with the URL and date of access:


This style should be used for online journals, articles viewed through citation databases such PubMed, CD-ROMs, books accessed through Project Gutenberg, government publications, *etc*.

Online databases
The Internet contains data that are not present in the literature in their complete form. This is particularly true for DNA sequences, which are posted to sites such as NCBI, and X-ray crystallographic coordinate files, which are available from RCSB. These will usually be associated with a journal article, which you should cite:


Other sites
If the webpage is not associated with any sort of ‘real’ literature, it is acceptable to cite the URL directly as though it were a book, with the URL as the ‘publisher’:


A future reader should be able to find the material you have cited easily; even if the URL no longer exists. These citations can only be justified if:

The information is more accurate than a conventional source would be, or is not available elsewhere. You should always use primary literature (*Nature*) in preference to secondary or tertiary (*New Scientist*, *The Times*).

The source is credible. Such sources *might* include the DTI, NASA, the Environment Agency or the Met office. These will generally be governmental websites or similar.

**If the URL does not meet these criteria, then do not use it at all** (unless you have been specifically asked to write an essay on e.g. media-driven health scares). The Internet is a good source of inspiration, but a terrible source of peer-reviewed data. Never base an essay on the first hit from Google.
Imperial College London
Biological Sciences

MRes in Structural Molecular Biology
Examination Marking Scheme

Projects

Students will be assessed by written report, oral presentation, and viva voce (including an oral presentation) after the completion of each of the two projects (in March and September). Furthermore, students are expected to complete a dissertation (~3000 words) which allows the students to investigate and debate on one or more aspects of structural biology. The dissertation accounts for 10% of the final mark. The written report (~5000 words, excluding tables, figures and references) will be independently assessed by the project supervisor and two teaching staffs acting as examiners. Details of the individual taught programme followed by each student will also be provided. The marks for each project will be equally weighted, each contributing 40% of the final mark. The oral presentation will be in the form of a symposium where all students present their projects to other students, supervisors, and examiners. Each talk will be 10 minutes plus 5 minutes discussion and account for 5% of the total mark. Aspects of the taught elements should be reflected in the written report and will be assessed in the viva voce. The pass mark will be 50%. Students who have achieved 70% or above for both projects will be recommended for a Distinction while students who have achieved 60% or above for both projects will be recommended for a Merit.

Within each project the elements to be assessed will contribute as following (total 40%):

- Supervisor’s marks on laboratory 10%
- Supervisor’s marks on report 7.5%
- Examiners mark on report 15%
- Examiners’ mark on viva 7.5%

**Internal Examiners**

In case of significant discrepancy between the supervisor’s mark and the examiners’ mark, the internal examiners’ committee (which includes the course directors and the examination officer) will moderate and recommend the decisions to the visiting examiners.

**Visiting examiners**

At the end of the year the student will be examined by viva voce by two visiting examiners. The examiners will be given the students’ project reports as well as details of the individual taught programme followed by each student prior to the examination. The visiting examiners will then moderate the marks. The final viva voce will moderate the marks awarded (taken into account the recommendations by the internal examiners) and determine whether students should be awarded a Distinction, Merit, Pass or Fail.
Criteria for Assessment of Written work

These criteria are used during the MRes in Structural Molecular Biology course to assess project reports. Due allowance is made for what is reasonably achievable in the time available.

<table>
<thead>
<tr>
<th>Literal Grade</th>
<th>Percentage Grade</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>A*</td>
<td>85-100</td>
<td>Exceptional. Exceptionally well-presented exposition of the subject showing: (i) complete command of the relevant concepts and facts, (ii) a high critical or analytical ability**, (iii) originality, and (iv) evidence of substantial outside reading.</td>
</tr>
<tr>
<td>A+</td>
<td>80</td>
<td>Excellent. A very well presented exposition of the subject, showing all of the above features, but not fully achieving one or two of them.</td>
</tr>
<tr>
<td>A</td>
<td>76</td>
<td>Good. Work: (i) shows a clear grasp of the relevant concepts and facts, (ii) gives an accurate account of the relevant material, and (iii) shows evidence of some outside reading, or of critical or analytical ability**.</td>
</tr>
<tr>
<td>A-</td>
<td>72</td>
<td>Adequate. Work: (i) shows a grasp of the basic concepts and facts, (ii) gives an accurate account of at least half of the relevant taught material, but (iii) does not go beyond that, or goes beyond that but includes significant errors.</td>
</tr>
<tr>
<td>B+</td>
<td>68</td>
<td>Fail. Work: (i) shows only a weak grasp of the fundamental concepts and facts, and is marred by errors or omissions.</td>
</tr>
<tr>
<td>B</td>
<td>65</td>
<td>Work: (i) shows a confused understanding of the topic, and (ii) contains major errors and omissions.</td>
</tr>
<tr>
<td>B-</td>
<td>62</td>
<td>Work is too inaccurate, too irrelevant, or too brief to indicate more than a vague understanding of the topic.</td>
</tr>
<tr>
<td>C+</td>
<td>58</td>
<td>Presents very little that is correct and relevant.</td>
</tr>
<tr>
<td>C</td>
<td>55</td>
<td>Contains nothing correct that is relevant to topic. Mark to be given where the work is discovered not to be that of the candidate (plagiarised). Further disciplinary action is usually taken in cases of plagiarism.</td>
</tr>
<tr>
<td>C-</td>
<td>52</td>
<td></td>
</tr>
<tr>
<td>F+</td>
<td>45-49</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>F-</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
These criteria are used during the MRes in Structural Biology course to assess laboratory projects. Account is taken of the nature of the work, and the instructions provided. Due allowance is made for what is reasonably achievable under laboratory conditions and in the time available.

<table>
<thead>
<tr>
<th>Literal Grade</th>
<th>Percentage Grade</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>A*</td>
<td>85-100</td>
<td>Exceptional. Quality and quantity of data comparable to that in research articles published in the best journals. All procedures thoroughly understood and applied correctly, including (where applicable) statistical analysis. Shows an understanding of the limits of the experimental procedures, and possible alternative strategies and techniques. Shows an appreciation of possible sources of errors and significance of results. Shows evidence of outside reading, independent thought and originality.</td>
</tr>
<tr>
<td>A+</td>
<td>80</td>
<td>Excellent. Experimental procedures understood and applied correctly, with most experiments successfully completed. Shows the above features, but not fully achieving one of them. No significant deficiencies.</td>
</tr>
<tr>
<td>A</td>
<td>76</td>
<td>Good. Most experimental procedures understood and applied correctly with some experiments successfully completed. Only minor problems.</td>
</tr>
<tr>
<td>A-</td>
<td>72</td>
<td>Adequate. Some experimental procedures understood and applied correctly with a few experiments successfully completed.</td>
</tr>
<tr>
<td>B+</td>
<td>68</td>
<td>Fail. Weak understanding of experimental procedures. Some significant experimental errors. Very few experiments successfully completed.</td>
</tr>
<tr>
<td>B</td>
<td>65</td>
<td>Confused understanding of experimental procedures. Major experimental errors.</td>
</tr>
<tr>
<td>B-</td>
<td>62</td>
<td></td>
</tr>
<tr>
<td>C+</td>
<td>58</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>C-</td>
<td>52</td>
<td></td>
</tr>
<tr>
<td>F+</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>F-</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>Only one or two experiments successfully completed.</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Vague understanding of experimental procedures. No experiments successfully completed.</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>Few experiments attempted. No understanding of experimental procedures. Failure to follow protocols properly.</td>
</tr>
</tbody>
</table>

One or two experiments attempted, but without any understanding or success.

Experiment not attempted. Mark given where the work presented is discovered not to be that of the candidate (plagiarised). Further disciplinary action is usually taken in cases of plagiarism.
Imperial College London MRes in Structural Molecular Biology
Criteria for Assessment of Work Presented Orally

These criteria are used during the *MRes in Structural Molecular Biology* course to assess project oral examinations. Due allowance is made for what is reasonably achievable under the conditions of the presentation (resources available, time allowed, etc.).

<table>
<thead>
<tr>
<th>Literal Grade</th>
<th>Percentage Grade</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>A*</td>
<td>85-100</td>
<td><strong>Exceptional.</strong> Presentation demonstrates: <em>(i)</em> complete understanding of the material to be presented showing high critical or analytical ability**, as relevant, <em>(ii)</em> clear and logical organisation of the material, <em>(iii)</em> excellent use of appropriate resources and teaching aids, <em>(iv)</em> preparatory work including substantial background reading, and <em>(v)</em> ability to instruct with clarity of exposition and productive engagement with the audience resulting in a very positive learning experience.</td>
</tr>
<tr>
<td>A+</td>
<td>80</td>
<td><strong>Excellent.</strong> A very well presented exposition of the subject, showing all the above features, but not fully achieving one of them.</td>
</tr>
<tr>
<td>A</td>
<td>76</td>
<td><strong>Very Good.</strong> Presentation has the following features: <em>(i)</em> shows a clear understanding of the material with an accurate account that demonstrates good critical or analytical ability**, <em>(ii)</em> good use of resources, <em>(iii)</em> evidence of appropriate background reading, and <em>(iv)</em> succeeds in delivering all the relevant material clearly to the audience so that they appreciate its significance.</td>
</tr>
<tr>
<td>A-</td>
<td>72</td>
<td><strong>Good.</strong> Presentation: <em>(i)</em> shows a grasp of the material, <em>(ii)</em> gives an accurate account of most of the relevant material, <em>(iii)</em> shows evidence of some background reading and <em>(iv)</em> successfully delivers most of the material to the audience in a way that they can understand it, but does not go beyond that.</td>
</tr>
<tr>
<td>B+</td>
<td>68</td>
<td><strong>Fail.</strong> Presentation: <em>(i)</em> shows only a basic grasp of the material <em>(ii)</em> shows evidence of little background reading or preparation, <em>(iii)</em> delivers most of the material accurately but makes errors or omissions resulting in a poor learning experience for the audience.</td>
</tr>
<tr>
<td>B</td>
<td>65</td>
<td><strong>C+</strong> 58</td>
</tr>
<tr>
<td>B-</td>
<td>62</td>
<td><strong>C</strong> 55</td>
</tr>
<tr>
<td>C+</td>
<td>58</td>
<td><strong>Fail.</strong> Presentation: <em>(i)</em> shows only a basic grasp of the material <em>(ii)</em> shows evidence of little background reading or preparation, <em>(iii)</em> delivers most of the material accurately but makes errors or omissions resulting in a poor learning experience for the audience.</td>
</tr>
<tr>
<td>C</td>
<td>55</td>
<td><strong>C-</strong> 52</td>
</tr>
<tr>
<td>C-</td>
<td>52</td>
<td><strong>Fail.</strong> Presentation: <em>(i)</em> shows only a basic grasp of the material <em>(ii)</em> shows evidence of little background reading or preparation, <em>(iii)</em> delivers most of the material accurately but makes errors or omissions resulting in a poor learning experience for the audience.</td>
</tr>
<tr>
<td>F</td>
<td>45-49</td>
<td><strong>Fail.</strong> Presentation: <em>(i)</em> shows only a basic grasp of the material <em>(ii)</em> shows evidence of little background reading or preparation, <em>(iii)</em> delivers most of the material accurately but makes errors or omissions resulting in a poor learning experience for the audience.</td>
</tr>
<tr>
<td>0</td>
<td></td>
<td>Failure to make a presentation at all.</td>
</tr>
</tbody>
</table>

**Analytical** = assessing a hypothesis or statement by breaking it down into its elements and examining their inter-relationships and contribution to the whole; cf. **Critical** = judging a hypothesis or conclusion by examining the validity of the evidence adduced for it.
Information for Students with disabilities, specific learning difficulties or long-term health issues

At Imperial College we recognise that studying at university can be a challenge, especially if you have a disability. We are keen that you have every opportunity to fulfil your potential and graduate with the degree you deserve. It is therefore important that you let us know about any disability, specific learning difficulty or health problem as soon as possible so that we can give expert advice and support to enable you to do this.

Some people never think of themselves as having a disability, but students who have experienced any of the issues listed below have found that a little extra help and support has made all the difference to their study experience.

- ♠ Specific learning difficulties (such as dyslexia, dyspraxia, AD[H]D)
- ♠ Autistic spectrum disorder (such as Asperger’s)
- ♠ Deafness or hearing difficulties
- ♠ Long term mental health difficulties (such as chronic anxiety, bipolar disorder, depression)
- ♠ Medical conditions (such as epilepsy, arthritis, diabetes, Crohn’s disease)
- ♠ Physical disabilities or mobility impairments
- ♠ Visual difficulties

Where to find help:

1. **Your Disability Liaison Officer**: Professor Neil Fairweather, n.fairweather@imperial.ac.uk ext 45247

   Professor Neil Fairweather is your first point of contact within your department and is there to help you with arranging any support within the department that you need. Neil is also the person who will apply for Special Examination arrangements on your behalf. You need to contact him without delay if you think that you may need extra time or other adjustments for your examinations.

   http://www3.imperial.ac.uk/registry/exams/specialexamarrangements

2. **Disability Advisory Service**: http://www3.imperial.ac.uk/disabilityadvisoryservice

   The Disability Advisory Service works with individual students no matter what their disability to ensure that they have the support they need. We can also help if you think that you may have an unrecognised study problem such as dyslexia. Our service is both confidential (information about you is only passed on to other people in the university with your agreement) and individual in that any support is tailored to what you need.

   Some of the sorts of things we can help with are:

   - ♠ Being an advocate on your behalf with others in the College such as your departmental liaison officer senior tutor or exams officer, the accommodation office or the estates department
   - ♠ Checking that your evidence of disability is appropriate and up-to-date
   - ♠ Arranging a diagnostic assessment for specific learning difficulties
   - ♠ Help with applying to the College for the cost of an assessment
   - ♠ Help with your application for the Disabled Students Allowance (DSA) see below
   - ♠ Helping students not eligible for the Disabled Students Allowance in obtaining support
from other sources

• ♠ Help with arranging extra Library support
• ♠ Supporting applications for continuing accommodation for your second or later years

3. Disabled Students Allowance:
http://www3.imperial.ac.uk/disabilityadvisoryservice/supportatimperial

Students who are home for fees and who have a disability can apply for a grant called the Disabled Students Allowance which can pay any extra costs that are a direct result of disability. This fund is not means-tested and is also a grant not a loan so any home student with a disability can apply and will not be expected to pay it back. Remember students with unseen disabilities such as mental health difficulties, dyslexic type difficulties or long term health problems are also eligible for this fund.

Some useful Links

• Academic and Examination regulations:
http://www3.imperial.ac.uk/registry/proceduresandregulations/regulations

• Link to religious obligations in assessments:
https://workspace.imperial.ac.uk/registry/Public/Exams/Exams%20and%20religious%20obligations.pdf

• The College’s Regulations for Students:
http://www3.imperial.ac.uk/registry/proceduresandregulations

• Mitigation / extenuating circumstances policy and procedures:
http://www3.imperial.ac.uk/registry/proceduresandregulations/policiesandprocedures/examinationassessment

• Complaints and Appeals procedures:
http://www3.imperial.ac.uk/registry/proceduresandregulations/policiesandprocedures/complaintsappeals


• Cheating offences policy and procedures:
http://www3.imperial.ac.uk/registry/proceduresandregulations/policiesandprocedures/disciplinary

• Where applicable – Fitness to Practise Medicine:
http://www3.imperial.ac.uk/registry/proceduresandregulations/policiesandprocedures/disciplinary

• Personal Tutor system, links to Roles and Responsibilities of Personal Tutors:
http://www3.imperial.ac.uk/registry/proceduresandregulations/qualityassurance/goodpractice

• Information for students with disabilities, including the Disability Advisory Service:
http://www3.imperial.ac.uk/disabilityadvisoryservice

• Other welfare and pastoral care/support resources both Departmental and College-wide (e.g. College Tutors, Dean of Students, Counselling Service, Health Centre, NHS Dentist, Student Hub, Chaplaincy,
support for International Students inc. ELSP:
http://www.imperial.ac.uk/academic-english
http://www3.imperial.ac.uk/students/welfareandadvice
http://www3.imperial.ac.uk/students/international

• Information about the Library:
http://www3.imperial.ac.uk/library

• ICU:
http://www.imperialcollegeunion.org/

• For Master’s courses - GSU:
https://union.ic.ac.uk/presidents/gsu/

• Details of departmental/College Committees, including Staff-Student Committees.
(The College’s Staff-Student Committee Good Practice Guidelines are available at:
http://www3.imperial.ac.uk/registry/proceduresandregulations/qualityassurance/goodpractice)

• Other support services (e.g. Registry, Careers Advisory Service):
http://www3.imperial.ac.uk/registry
http://www3.imperial.ac.uk/careers

• Information about the Graduate School:
http://www3.imperial.ac.uk/graduateschools

• Professional Skills Training:
http://www3.imperial.ac.uk/graduateschool/currentstudents/professionalskillsmasters

• For MRes courses – MRes Code of Practice:
http://www3.imperial.ac.uk/registry/proceduresandregulations/qualityassurance/codesofpractice/codeofpracticeformresprogrammes
Student Charter- Our Principles

Imperial College London embodies and delivers world class scholarship, education and research in science, engineering, medicine and business, with particular regard to their application in industry, commerce and healthcare.

The College is diverse and international - it comprises academic staff, students and support staff of varied disciplines and backgrounds. It encourages collaboration, actively opposes discrimination and recognises the importance of making a positive impact in the wider community.

This page defines the guiding principles of the Imperial community. The principles were developed by academic and support staff in partnership with undergraduate and postgraduate students and will be reviewed annually.

Imperial will provide through its staff:

(a) A world class education embedded in a research environment
The College provides a wide range of facilities and resources to support learning and research:
• Research Facilities and Laboratories
• The Library
• ICT
The College will ensure a high standard of teaching and research supervision is maintained through embedded internal Quality Assurance processes for both undergraduate and postgraduate programmes. The College has also defined what attributes it expects all its graduates to have developed during their time with us. Research will be conducted under the direction of supervisors who have the necessary expertise and knowledge, and in a laboratory or other setting that is appropriately equipped.

(b) Advice, guidance and support
The College provides pastoral support and services to enhance student well-being:
• Welfare and advice for students
• The Careers Service provides careers advice to College students and alumni
• The College’s International Office provides specific support for international students
• The Graduate School provides support and professional development tailored to postgraduate students
• A range of sports facilities are available, many of which are free to students
• The Imperial Study Guides provide guidance and advice to ease the transition to learning at undergraduate and Master’s level

(c) The opportunity for students to contribute to the evaluation and development of programmes and services
Imperial makes constant efforts to improve the student experience. Student feedback directs this process. There are many ways for students to contribute feedback:
• Elected student representatives report to Staff-Student Committees. Find your student representative.
• The College runs regular surveys to obtain feedback
• The Imperial College Union plays a central role in encouraging student engagement with the College

Imperial will provide students with:

(a) Clear programme information and assessment criteria
Programme information can be found in course handbooks, programme specifications and in the undergraduate prospectus and postgraduate prospectus.
(b) Clear and fair academic regulations, policies and procedures
The following explain the key regulations for students:
• Academic and Examination Regulations
• Regulations for Students [pdf]

The Registry holds information on the College's
• Disciplinary Procedures
• Appeals Procedures
• Complaints Procedure
Further information may be obtained from course handbooks, the Registry or from course organisers.

(c) Details of full course costs and financial support
The College provides full and transparent details of course cost:
• Tuition fees
• Accommodation fees for undergraduates
• Accommodation fees for postgraduates

There are various funding schemes available for prospective and current undergraduate and postgraduate students:
• Student Financial Support

(d) An appropriate and inclusive framework for study, learning and research
The College provides a wide range of facilities and resources to support learning and research:
• Research Facilities and Laboratories
• The Library
• ICT

The College will ensure a high standard of teaching and research supervision is maintained through embedded internal Quality Assurance processes for both undergraduate and postgraduate programmes. The College has also defined what attributes it expects all its graduates to have developed during their time with us. Research will be conducted under the direction of supervisors who have the necessary expertise and knowledge, and in a laboratory or other setting that is appropriately equipped.

Imperial students should:

(a) Take responsibility for managing their own learning
Imperial students should be independent learners and researchers. To gain the most from their time at the College students should:
• Explore their subject area beyond any prescribed curriculum or course materials
• Develop new knowledge or understanding through their research projects
• Submit work by stated deadlines
• Actively explore sources of academic and pastoral support if required
• Develop their non-academic interests and potential
• Consider what professional skills they need for employability

Help and practical advice is available in:
• The Imperial Study Guide (undergraduate students)
• The Imperial Study Guide for Masters' Students (Master's students)
• 'Students and Supervisors: what to expect' and the Code of Practice (research students)

(b) Engage with the College to review and enhance provision
Imperial makes constant efforts to improve the student experience. Student feedback directs this process. There are many ways for students to contribute feedback:
• Elected student representatives report to Staff-Student Committees. Find your student representative.
• The College runs regular surveys to obtain feedback
• The Imperial College Union plays a central role in encouraging student engagement with the College

(c) Respect, and contribute to, the Imperial community
• The Regulations for Students [pdf] explain that Imperial students must treat all members of the Imperial community and College property with respect.
• The College also has clear policies and procedures to ensure that the Imperial community embraces diversity and equal opportunities.
• Imperial students can make a positive contribution to the College and wider community through the Imperial College Union clubs and societies.

The Imperial College Students' Union will:

(a) Support all students through the provision of independent academic and welfare assistance
• Imperial College Union offers The Advice Centre where students can receive impartial advice on issues relating to academic life
• The work of the Sabbatical Officers is dedicated to welfare and education

(b) Encourage student participation in all aspects of the College
• Students can contact their elected Sabbatical Officers.
• Elected departmental student representatives report to Staff-Student Committees. Find your student representative.
• Students can contribute to the running of the Union through the Imperial College Union Committees.
• Students may also participate through the City and Guilds College Union for Engineering students, the ICSM Students' Union for Medical students, the Royal College of Science Union and the Graduate Students' Association.

(c) Provide a range of clubs, societies, student-led projects and social activities throughout the year
There are around 300 clubs, societies and projects which students are able to join.

(d) Represent the interests of students at local, national and international level
The Imperial College Union expresses the views of the Imperial student body on topics relevant to students such as the cost of tuition, early student loan repayment, widening access, fee waivers, student choice and quotas.
(Full detail of Our Principles can be found at: http://www3.imperial.ac.uk/students/ourprinciples)
## Macromolecules in 3D Timetable 2016-17

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Lecture Time</th>
<th>Lecturer</th>
<th>Room</th>
<th>Course work (CW) arrangements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wed 5 Oct</td>
<td>10:00-12:00</td>
<td>MB</td>
<td>LINK</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Thur 6 Oct</td>
<td>10:00-12:00</td>
<td>MB</td>
<td>LINK</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Fri 7 Oct</td>
<td>10:00-12:00</td>
<td>MB</td>
<td>LINK</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Mon 10 Oct</td>
<td>10:00-12:00</td>
<td>EH</td>
<td>LINK</td>
<td>INTRO Hsp70 CW ¹</td>
</tr>
<tr>
<td></td>
<td>Tue 11 Oct</td>
<td>10:00-12:00</td>
<td>EH</td>
<td>LINK</td>
<td>Hsp70 NMR CW ²</td>
</tr>
<tr>
<td></td>
<td>Wed 12 Oct</td>
<td>10:00-12:00</td>
<td>EH</td>
<td>LINK</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Thur 13 Oct</td>
<td>10:00-12:00</td>
<td>SM</td>
<td>LINK</td>
<td>Hsp70 NMR CW ²</td>
</tr>
<tr>
<td></td>
<td>Fri 14 Oct</td>
<td>10:00-12:00</td>
<td>SM</td>
<td>LINK</td>
<td>Hsp70 NMR CW ²</td>
</tr>
<tr>
<td>3</td>
<td>Mon 17 Oct</td>
<td>10:00-12:00</td>
<td>SM/AdS</td>
<td>LINK</td>
<td>Hsp70 NMR CW ²</td>
</tr>
<tr>
<td></td>
<td>Tue 18 Oct</td>
<td>10:00-12:00</td>
<td>AdS</td>
<td>LINK</td>
<td>Hsp70 NMR CW ²</td>
</tr>
<tr>
<td></td>
<td>Thur 20 Oct</td>
<td>10:00-12:00</td>
<td>MS</td>
<td>LINK</td>
<td>SAF 121</td>
</tr>
<tr>
<td></td>
<td>Thur 20 Oct</td>
<td>2:00-4:00</td>
<td>RvM</td>
<td>SAF 121</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fri 21 Oct</td>
<td>10:00-12:00</td>
<td>JMurray</td>
<td>SAF G47A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fri 21 Oct</td>
<td>3:00-5:00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Mon 24 Oct</td>
<td>10:00-12:00</td>
<td>EC</td>
<td>LINK</td>
<td>Hsp70 X-ray CW ²</td>
</tr>
<tr>
<td></td>
<td>Tue 25 Oct</td>
<td>10:00-12:00</td>
<td>LINK</td>
<td></td>
<td>Hsp70 X-ray CW ²</td>
</tr>
<tr>
<td></td>
<td>Wed 26 Oct</td>
<td>10:00-12:00</td>
<td>LINK</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thur 27 Oct</td>
<td>9:00-10:00</td>
<td>Tut EH</td>
<td>SAF121</td>
<td>SAF120</td>
</tr>
<tr>
<td></td>
<td>Thur 27 Oct</td>
<td>2:00-4:00</td>
<td>Tut SM/ADS/EC</td>
<td>SAF121</td>
<td>SAF120</td>
</tr>
<tr>
<td></td>
<td>Fri 28 Oct</td>
<td>10:00-12:00</td>
<td>Sems—JMurray</td>
<td>SAF121</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CW write-up advice ³</td>
</tr>
<tr>
<td>5</td>
<td>Mon 31 Oct</td>
<td>10:00-12:00</td>
<td>Tut M3/JMurray</td>
<td>LINK</td>
<td>Sem-SCMB 2pm</td>
</tr>
<tr>
<td></td>
<td>Tue 1 Nov</td>
<td>10:00-12:00</td>
<td>Sems—ADS</td>
<td>LINK</td>
<td>Sem-EC 2pm</td>
</tr>
<tr>
<td></td>
<td>Wed 2 Nov</td>
<td>All day</td>
<td>DIAMOND (KB+SM)</td>
<td>LINK</td>
<td>FIELD TRIP</td>
</tr>
<tr>
<td></td>
<td>Thur 3 Nov</td>
<td>10:00-12:00</td>
<td>Tut M3</td>
<td>LINK</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fri 4 Nov</td>
<td>10:00-12:00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Staff involved

- SM - Stephen Matthews (s.j.mathews) – Course convener
- ADS – Alfonso De Simone (a.de-simone)
- MB – Morgan Beeby (m.beeby)
- MS – Mike Sternberg (m.sternberg)
- EC – Ernesto Cota (e.cota)
- EH – Erhard Hohenester (e.hohenester)
- JM – James Murray (j.w.murray)
- KB – Kostas Beis (konstantinos.beis)
- RvM (Rob van Montfort – Institute of Cancer Research)

### Room bookings

- 310, Biochemistry Building; TIME: 2-5pm