The EPSRC Centre for Doctoral Training in the Advanced Characterisation of Materials

STUDENT HANDBOOK 2016/17

Contents

Welcome to CDT-ACM

On behalf of the CDT-ACM management team we are writing to offer you the warmest of welcomes to the Centre for Doctoral Training in the Advanced Characterisation of Materials. Some of you will be joining us as new students, and some of you will be returning to the centre after successful first and second years, and we hope that you will all continue to find your time in the centre a dynamic and rewarding experience.

You will know which university you are formally registered at and therefore which set of progression rules you are to follow. You will also know that your project is designed in such a way that you will be benefitting from the expertise and facilities at both UCL and ICL. You will also benefit from a placement of at least three months at a partner site (industry or overseas university) so that you will be resourceful, resilient and adaptable by the time you graduate.

We are committed to giving you a stellar research training experience in key aspects of the advanced characterisation of materials. We will deliver a multi-facetted curriculum that will be embedded in your studentship and much of this curriculum based training will take place in the first two years. Cohort building and skills-based activities will also be an important part of your student experience.

You will be carrying out a cutting edge research project using the complementary skills and experience of two of the world's leading research universities. You will be looking at a state-of-the-art material system using advanced characterisation techniques, and you will be placing your research findings in a wider context. You will be acquiring a breadth of understanding of the wide range of characterisation techniques available to the scientific community and you will also be able to make informed decisions about which techniques to use, and in which order to use them, to solve specific problems. In addition to this breadth of knowledge of the very wide range of characterisation techniques available, you will also gain an in-depth understanding of a few specific techniques; these will enable you to generate new knowledge, the key defining characteristic of the PhD.

Over the next four years you will attend conferences and publish papers and there will be opportunities for Outreach to local schools and colleges. As you go with us on this journey we encourage you to think about your CV at the end of the journey and how you wish to present yourself to future employers. Take ownership of this task and make sure you are acquiring the skills, experience and knowledge to build a successful career.

It is not uncommon for research students to experience 'bumps in the road' at some stage. We are here to help and when problems cannot be resolved by your supervisory team and we can refer you to the departmental and college support structures. The CDT-ACM management team will be in charge of pastoral support and staff will meet you all early on in the programme. The key to resolving any problems is communication. It is very important to identify and resolve problems as soon as possible, so please, do not keep it to yourself, talk to someone and let us help you to sort it out.

As part of our CDT we are going to ask you to help us define and deliver the curriculum and cohort activities and your ideas and opinions are very important to us. All of us, students, supervisors, the CDT-ACM management team, the research co-ordinators and the technical support staff, are one team, all working together to ensure that you get the very best research training experience possible. In that vein please read this handbook carefully and let us know of any ways in which you think it might be improved.

Once again welcome to the CDT-ACM; the competition for places on this CDT is very strong and you have been selected because you have the academic potential, the enthusiasm and the positive mental attitude that assures us that you will be very successful, and great ambassadors of our programme.

With very best wishes

Stephen Skinner and Neil Curson

Our Mission Statement

To provide you with:

- A four-year PhD training programme in the application of advanced characterisation techniques applied to materials in key thematic areas of societal importance
- Professional skills training and cohort building activities
- A breadth of understanding through an embedded curriculum of the wide range of techniques available to solve materials problems
- An in-depth understanding through your PhD research project of relevant techniques used to look at a material(s) drawn from a thematic area of societal importance such as energy, healthcare, information technology, transport, security, environment or nanotechnology.
- A training on real-world problems in close partnership with industry
- A three month placement in industry or an overseas university

Meet the Team

Imperial College Staff

Professor Stephen Skinner,
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Dr David Payne
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UCL Staff

Dr Neil Curson,
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Dr Ed Romans
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Committee Structure

CDT ACM Management Committee

Stephen Skinner	ICL chair
Neil Curson	UCL chair
Hafiza Bibi	
Claire Smithson	
Dorothy Duffy	
David Payne	
Geoff Thornton	
Ed Romans	
Camille Petit	
Alex Porter	

CDT ACM Curriculum and Cohort Committee

Camille Petit	ICL chair
Ed Romans	UCL chair
Neil Curson	
Stephen Skinner	

CDT ACM Industrial liaison committee/ industrial advisory panel

Stephen Skinner
Neil Curson

CDT ACM Admissions Committee

David Payne
Dorothy Duffy

Timetable

A provisional timetable will be circulated at the beginning of the academic year. The timetable will then be confirmed at the beginning of each term.

Things do unfortunately change but we will endeavour to give you as much notice as possible.

Attendance and participation

We are committed to giving you the very best research training possible. A structured timetable and a series of introductory events will compliment your research, and they are an integral part of your CDT-ACM research training. It follows that the core timetable and cohort building activities are compulsory. You must not book a lab session if there is a timetabled CDT-ACM event. If you are unable to attend an activity you will need to inform your Research Co-ordinator and obtain the consent of your CDT Director. If a CDT-ACM student is regularly absent from these courses and cohort building activities then they have in effect decided not to participate in the course and they will be asked to withdraw from the CDT.

IMPORTANT: Please note that if you miss any courses or workshops because you are on placement or for other reasons such as illness, you will be expected to attend the activities in the following academic year.

Overleaf you will find information about courses and assessments. If you have any questions, please get in touch with the Research Co-ordinators. Any changes to the timetable will be made on the google calendar and also to the timetable uploaded on the Intranet.

Exemption from attending a CDT-ACM timetabled course

There will be occasions where students have already had extensive hands-on experience using one of the techniques that we teach in our experimental or computational courses. These cases are rare, but under such circumstances the student may be excused from taking part, or all, of the course. If this is the case, the student may still be asked to complete the written assignments associated with that course. Also, before being given permission to miss (part of) the course, the student must have a one-to-one viva/oral exam with the course teacher or one of the CDT-ACM directors. This viva will determine how much knowledge the student has about the course topic, and whether it is really appropriate for them to miss (part of) the course. Please contact your host university CDT-ACM director if you think that this situation applies for any of your timetabled courses.

Course Outlines

Cohort 3 Courses

Residential Course at Cumberland Lodge (Autumn Term)
On this residential course you will join PhD students from the Department of Electronic & Electrical Engineering at UCL to take part in a three-day course which aims to introduce you to life as a PhD student at UCL, and will give you useful tips on how to begin your research. You will attend lectures on ethics, business and enterprise, funding opportunities and will take part in team-building exercises.

Institute of Making (Autumn Term)
To be able to fully characterise a material and begin to understand the chemistry and physics that determine its properties, you must have a detailed understanding of how different characterisation instruments operate. There is no better way to learn how an instrument works than to build one yourself! In this challenge we want you to build a microscope. You will be provided with the materials and basic instructions. The microscope must allow images to be captured (how you deliver this feature is up to you). The quality of the microscopes will be judged based upon the resolving power and overall design. This activity is intended to be a cohort building exercise which will enable you to devise a solution to a problem set by the CDT. Before you attend this course you will need to join the Institute of Making (see page 16).

Materials Characterisation (Autumn Term)
This course is designed to give students a firm foundation in the fundamentals of Materials Characterisation required in subsequent years of study, in particular in their long research project and internships. The mission of Materials Characterisation is to explain the use of advanced techniques for the study of structure-property relationships in materials. The course content takes into account the exposure of the students to characterisation methods in years 1 and 2.

Scanning Probe Microscopy (Autumn Term)
The term scanning probe microscopy (SPM) covers a number of related experimental techniques in which an ultra sharp tip is scanned over a surface in a raster fashion. The interaction between the tip and the surface is monitored and used to build up a profile of how that interaction changes of a function of position. For example, in atomic force microscopy (AFM), the force between the tip and the sample is the measured interaction, and the vertical tip position is adjusted to kept that interaction constant. If the vertical tip position is plotted as a function of lateral position, a 3D image representing the height profile the surface (to a good approximation) is obtained. The resolution of different SPM techniques can vary from micrometres to atomic resolution. You will have two introductory lectures on the basics of SPM, by a leading academic who uses these techniques in their research field (no more than one lecture per day), with the rest of your time spent in the laboratory learning how to use at least two types of scanning probe microscopy (AFM and scanning tunnelling microscopy). You will learn how to use the techniques as imaging tools, for spectroscopy measurements and for chemical modification of surfaces.

Optics Lab Course (Spring Term)
The Optics laboratory will follow the same format as the SPM lab described above. The interrogation of material properties using light is an ancient and ubiquitous part of science. The techniques you learn here will compliment the x-ray techniques you will learn about at Imperial College and the synchrotron radiation techniques you will learn about at the Diamond Light Source. Nowadays it is possible to obtain invaluable information about the bulk and surface properties of materials using simple lab based equipment. You will learn about Raman Spectroscopy, UV-Vis Spectroscopy and Fourier Transform Infrared Spectroscopy. The techniques involve the measurement of inelastically scattered monochromatic light (Raman), adsorbed or reflected monochromatic light obtained at different frequencies (UV-Vis) or analysis of the Fourier transform of the absorbed light from a broadband light source (FTIR). You will learn how to use all these techniques and what information each of the techniques can give you. You will then be given mystery samples and asked to determine what they are, based on their properties.

Electron Microscopy (Spring Term)
This course aims to complement the practical work carried out on the electron microscopes. Lectures will cover the basics of TEM, SEM and FIB and then focus on specific analytical techniques that can be carried out on the instruments in our department. In particular we will look at electron diffraction, high resolution imaging, energy dispersive x-ray analysis (EDX), electron backscatter diffraction (EBSD), electron energy loss spectroscopy (EELS) and electron tomography. This lecture course should help improve understanding of instrumentation and techniques that are already being employed in research, and introduce researchers to more advanced capabilities of the instrumentation.

Hicham Idriss Lecture Series (Spring term)
These lectures will cover catalytic and surface reactions for a selected set of main chemical processes. It will also covers the basic principles of catalysis and photo-catalysis governed by transition state theory, stabilization of surface intermediates and electron transfer reactions. Materials characterization and reaction dynamics will be followed mainly by core level spectroscopy from both its fundamental and applied aspects. The last part of the lectures will focus on materials used for energy futures including semiconductor photo-catalysts, plasmonic and photonic band gap materials.

Residential Course at the Diamond Light Source Facility at ISIS (Summer Term)
Diamond Light Source is the UK's synchotron. On this five-day residential course you will take tours of the facilities, attend lectures on topics such as 'materials under extreme conditions' and molecular spectropscopy. You will also be able to take part in practical workshops on imaging and tomography single crystal diffraction.

Laboratory Technique Workshops (Spring and Summer Terms)
These workshops will cover topics such X-ray diffraction, DataAnalysis, PEM (thermal modelling and analysis), SIM (secondary ion mass spectrometry)

Spin Resonance (Summer Term)
This course, consisting of lectures and laboratory workshops introduces students to Sprin Resonance. When the molecules of a solid exhibit paramagnetism as a result of unpaired electron spins, transitions can be induced between spin states by applying a magnetic field and then supplying electromagnetic energy, usually in the microwave range of frequencies. The resulting absorption spectra are described as electron spin resonance (ESR). Spin resonance has been used as an investigative tool for the study of radicals formed in solid materials and gives information about the locations and mechanisms of radiation damage.

Matlab (Spring Term)
This course provides an introduction to matlab for CDT students. It does not assume any prior matlab experience and should also be helpful to students who have used matlab in the past but would like a quick refresher. The course is divided into two parts. The first part introduces students to the basics: using matlab for elementary linear algebra, programming, and data visualisation. The second part of the course is structured around a programming project. Students, working in small groups, will develop codes to: 1.) solve a system of ODEs and 2.) analyse and visualise the results.

Cohort 2 Courses

HIgh Performance Computing (Autumn Term)
The course provides an introduction to the use of the High Performance Computing (HPC) facilities at Imperial. High performance computing using supercomputers enables researchers to investigate much larger and complex research questions than can be tackled with a desktop machine. It enables researchers at Imperial and UCL to tackle emerging problems in areas as diverse as molecular simulation, surface science, nanomaterials and energy storage.

Cleanroom Course (Autumn Term)
The ability to fabricate micro- and nano-scale structures in a clean environment is an essential requirement for many aspects of scientific research and development, ranging from quantum devices to biological sensors. The cleanroom training course will take place in the London Centre for Nanotechnology (LCN) cleanroom at UCL, which is a Class 1000 state-of-the-art cleanroom spanning one entire floor of the LCN building. The course will enable you to learn the basic cleanroom processes of photolithography, etching and metal evaporation. You will be taken through the entire process of device fabrication, starting from a bare wafer and ending with a completed device, which you will then characterise.

Cohort 1 Courses and Activities

Proposal writing (Autumn Term)
You are asked to write a three-page research funding proposal (e.g. for beamtime, for industrial funding, for research council funding), with the ACM-CDT committee acting as a peer-review body. The purpose of this assessment is to build on your creativity and research skills, and to strengthen your ability to articulate and defend your ideas. Each student is required to submit one proposal (no joint proposal allowed). The topic of the proposal should be different to that of your current research project although it could be related.
Overall, your proposal should include the following points/sections: **1)** background, motivation and novelty/timeliness of the project, **2)** description of the proposed project, **3)** resources requested, **4)** timeline of the project including milestones and **5)** references.

Writing skills workshops (Autumn and Spring Terms)
As you approach the end of your PhD, it becomes increasingly important to ensure that you have the necessary skills to write clear and impactful papers and thesis. Courses are offered at both ICL and UCL to help you prepare for these exercises.
ICL students should enrol for the two ICL courses: http://www.imperial.ac.uk/study/pg/graduate-school/professional-skills/doctoral/shortcourses/writing/ (Select "Writing for success 2: Publications" and "Writing for Success 3: Thesis").
UCL students should enrol for the two UCL courses: https://courses.grad.ucl.ac.uk/course-details.pht?course_ID=2410 and https://courses.grad.ucl.ac.uk/course-details.pht?course_ID=1336.
You are strongly advised to book these courses as early as possible as places are limited. In the event where you cannot have a place, we can suggest other courses (please contact Ed Romans, e.romans@ucl.ac.uk, or Camille Petit, camille.petit@imperial.ac.uk). However, the courses listed here are best suited for your training.

Student-led seminars (Autumn, Spring and Summer Terms)
You will organise four seminars across your third year of study. This activity is intended to be an effective way of increasing your network and directly interact with prospective future employers, colleagues and mentors. It will also be an opportunity to learn of the latest findings on materials characterisation from internationally renowned research groups. This will be increasingly important as you approach the end of your PhD.

You will organise four seminars following an agreed budget. Two of these seminars are to take place in the autumn term and the other two in the spring term and/or summer term. Two seminars should be at UCL and two seminars at ICL.
You will be responsible for:
selecting and inviting the speakers
setting the agenda for the visit,
booking catering and/or restaurant,
communicating regularly with the speakers to plan their visit,
arranging hotel booking/reimbursement, etc…
publicising the seminar to staff and students

When selecting the speakers, the following "Eligibility criteria" should be considered: Professor-level, two speakers from outside ICL and UCL (1 speaker can be international, the other either EU or UK.), one from ICL, one from UCL, expertise in the area of materials characterisation, internationally renowned. As a guidance, it is suggested to follow the following procedure:
1) prepare a shortlist of potential speakers,
2) submit it to the CDT Board for approval,
3) once approved, send the invitation and organise the visit/seminar. It is also advised that one student representative communicates with the speaker on behalf of the team in order to facilitate communication for him/her, while each student takes on a specific role, e.g. booking the room, organising the catering, organising the advertising of the event, etc…

Seminar presentations by students (Summer Term)
You will be required to give an oral presentation on your research project at the CDT summer retreat, which will be held over several days at an external venue (details to be finalised). This will be a way to put into practice any presentation skills you have learned so far. You will need to comply with the deadline and other requirements for abstract submission (to be advised nearer the time). This is particularly important for students working on industrial projects for which the industrial partner may have internal deadlines when approving publications.

Business and innovation-focused module
Details and date to be confirmed

Joint-cohort events

Critical Thinking, Cohorts 1 and 2 (Autumn Term)
This course will establish habits of critical thinking in the conduct of research and stimulate a desire to learn more about critical thinking. It will enable students to engage effectively in scholarly debate - and with greater confidence - in a number of settings including: Presentations and Viva voce examinations!. The course will also develop participants' abilities to critically evaluate both their own research and that presented in the literature and will enabling participants to judge strengths and weaknesses in research methods and defend their own approaches when challenged.

Using the GIT version control system (Autumn term)
A version control system is a file repository capable of tracking versions. There are many benefits to using version control systems. While they are indispensable for collaborative environment, they are more than recommended for individual users too. The version system can track not just code but presentation, documents or manuscripts and their versions. GIT can be used in client-server mode, that means that the file repository on a local computer can be uploaded onto a web server and serve as a shareable backup. The class will cover common GIT workflows and hands-on examples.

CDT-ACM Seminar series
Seminars will take place at UCL and Imperial each term. Speakers are invited from industry and other academic institutions. The CDT welcomes any suggestions that you may have for external speakers; please contact your Research Co-ordinator if you would like to suggest a speaker.

Coffee mornings
Coffee mornings take place at UCL and Imperial College each term, and will give you the opportunity to meet students, the CDT management team and the PHD project supervisors in an informal environment to discuss ideas and create a network of academics and students associated with the CDT-ACM.

Assessment

Progression Reports

All students in their first year of study will be required to pass an assessment process after nine months, consisting of a report and viva. At Imperial this is called the Early Stage Assessment, and at UCL the Upgrade Process or Transfer Process.

For Imperial College Students: The Early Stage Assessment (ESA) takes place in the ninth month (normally June). The possible outcomes of this formal examination are that
(i) the student continues on the PhD programme; or
(ii) the student is transferred onto an MPhil registration; or
(iii) that the student is withdrawn. The student has the right to appeal against these decisions.
The ESA is to confirm that the student
(i) understands the research problem;
(ii) is aware of the associated literature;
(iii) has demonstrated a capability to conduct the research;
(iv) has a realistic research plan and schedule; and
(v) is of PhD calibre.
The student will write a report and will be given an oral exam. The report will typically be between 20 and 30 pages long and will include a literature review, results to date and, most importantly, a plan for future work. The viva will normally involve the supervisor(s) and two assessors not associated directly with the project. One of the assessors will be a senior member of the departmental academic staff. In the oral exam the student will be questioned on his or her work and research plans. Then the examiner(s) will discuss the written report and any appropriate background knowledge.
Following the ESA the student receives written feedback from the examiner(s) which is discussed with the supervisor(s) within 2 weeks at a feedback meeting. There is a further Late Stage Review at 18-24 months and more information on this can be found in the individual departments PhD Handbook.

For UCL Students: An upgrade (transfer) report, which is typically around 30 pages long, should be submitted to the examiners at least two weeks before the viva. The upgrade viva should take place during the first two weeks of July 2017. The supervisor and student should arrange the viva with the UCL CDT-ACM Director (Neil Curson) and two other examiners, one of which should be the student's second supervisor. The primary purpose of the report and viva is to convince the examiners that the student
(i) has a reasonable knowledge of the advanced characterisation of materials in general and their specific research background in particular,
(ii) is competent enough to successfully complete a PhD and
(iii) has a clearly defined plan for their PhD, often represented by a Gantt chart or something similar.

It is understood that the direction of the thesis work may change as the work progresses, but it is very important to have clearly established goals at this stage. The Upgrade Process is marked as either pass or fail. In the rare case that the student should fail the upgrade, they will be given a second opportunity. If they fail again they will not be permitted to continue with their PhD but will have the option to progress to an MPhil.

continued overleaf...

Please note: the paperwork for the upgrade process should be submitted through your academic departments. Please arrange the date of your viva with the examiners at least two months in advance as the schedules of three academics are often hard to reconcile at shorter notice.

Cohort 3 Assessment

Safety and Risk Assessment - Essay

One of the most important aspects you will learn as a researcher is the ability to assess and minimise the risks involved in performing your work. As part of your assessment you will be asked to write an essay on the safety of your own PhD research project, to be submitted one month into the second term of your first year of study. In this essay you should consider the physical environment that you work in, the procedures you follow when performing your experiments and the risks you are being exposed to. You should then describe how you and your colleagues minimise these risks. Additionally, you should explain how Risk Assessment forms are used in your department and the use of material safety data sheet (MSDS) forms. Details of legislation relevant to your project should also be discussed. Anyone working on a theory based project will have different considerations and will be asked to consider different issues in addition to basic safety in the workplace.

Optics Lab and Scanning Probe Microscopy

Assessments, one for each of these lab courses, will take the form of the submission of a one page technical document describing how the technique could be useful for your own PhD research project. The assessments will be marked by two of the CDT academic management board and should reflect a detailed understanding of the techniques you have learned and a scientifically insightful consideration of their application to your research. The projects are marked as pass or fail and failure will require retaking the practice in the following academic year.

Cohort 2 Assessment

Identification exercise (Autumn Term)

Your first year of training for this CDT should have provided you with most of the foundational skills required for the advanced characterisation of materials. In this exercise, the cohort will be divided into three teams, who will all compete to produce the best 'publication' on the identification of a 'mystery sample'. In the third week of term, each team will be be given one of three very different samples and be asked to fully characterise that sample in terms of its physical, structural, optical and electronic properties. You should use any appropriate facilities available at the two institutions and should suggest experiments that could be performed elsewhere (at large scale facilities for example) that are not available to you. Thorough records will need to be kept of the experiments undertaken, results obtained and analysis performed. You may start investigating your sample as soon as you like but there will be a specific time period set aside later in the term (dates to be confirmed) when equipment, such as that in the 9th floor lab in EE in UCL, will be pre-booked for you. You will then write up your work in the format of a high-impact journal article (template to be provided). The paper should be written to a standard expected for such an article, including data analysis, formatting, writing style, figure quality and referencing. The conclusion of your paper should reveal the nature of the sample you were initially given. While the records of your experiments should not be included in the paper, we will consider it as supporting information and may ask to see any aspect of it. The date for submission of this paper will be on January 8th 2016. Your paper will then be refereed (as if a real journal paper) by the 3 members of one of the other teams. It will also be marked on the quality of the publication (as well as the ability to identify the 'mystery sample') and you will individually be marked on your referee report of one of the other papers.

General Information

Please note that this handbook only includes information about the CDT-ACM. For more detailed information about your host department and institution, you should refer to information provided by your department

Pastoral Support

It is not uncommon for research students to experience "bumps in the road" at some stage. We are here to help and when problems cannot be resolved by your supervisory team the departmental and college support structures are available. Details of the support structure will be in your home department's main handbook and often the first port of call will be the PG Tutor.

Within the CDT-ACM, Neil Curson and Stephen Skinner will be responsible for pastoral support for cohort 2014/15, Ed Romans and Jason Riley will be responsible for cohort 2015/16 and Geoff Thornton and Alex Porter will be responsible for cohort 2016/17. They will be meeting all of you soon for a chat and thereafter at regular intervals to see how things are going. Usually they will meet you each once during the autumn and spring term, and organise a group pastoral event in the summer term. However, do not wait for one of the fixed appointments if you have something you wish to discuss; send an e-mail or knock on their door and they will see you as soon as they can.

The key to resolving any issue is communication and to identify and resolve problems as soon as possible, so please, if you have a developing problem do not keep it to yourself, let someone know and let us help you to sort it out.

Student Expenses

Students who are fully-funded by CDT studentships will receive a personal budget each year to spend on travel and consumables. These budgets are managed by the CDT-ACM Research Co-ordinators. Students who are not funded by the CDT, or who are receiving joint studentships will be awarded alternative budgets, which may be managed by your host department. If you are unsure about how much you will receive, and who will manage your budget, please speak to one of the Research Co-ordinators.

Please note that when you are purchasing consumables, you are expected to use one of the Universities' approved suppliers. The Research Co-ordinators will raise purchase orders on your behalf. If an item is not available through the University finance system, you will be expected to purchase the item yourself and claim expenses. You will find expenses forms and instructions about claiming on the CDT intranet.

When arranging travel you will be expected to make the booking yourself in accordance with university guidelines. The CDT is unable to book travel on your behalf.

CDT-ACM Desk Space and Seminar Rooms

All new students will have a designated desk space at their host university.
The Imperial CDT-ACM is located on the fourth floor of the central library (entrance via the Sherfield Building), which has break-out areas, seminar rooms and hot desks for UCL and continuing students. The UCL CDT-ACM area is located in CoMPLEX on the ground floor of the Physics building. There is a kitchen, hot desks for Imperial and continuing students and meeting rooms.

Meeting and seminar rooms can be booked through the Research Co-ordinators.

Continuing students will move to designated desk spaces in their host departments in the second year of their PhD.

Swipe cards and email addresses

As a student in the CDT-ACM you will have access to facilities at both UCL and Imperial.

If you are registered at UCL you need to complete an occasional student application on Imperial's website. You will need to upload a copy of your CV to the application and also a blank document stating that you are registered on the CDT-ACM 4 year programme (with programme code JCXX) at the university and that as this is a joint programme with Imperial college London you require access to the facilities at Imperial.

If you are registered at Imperial you will be asked to supply your name, date of birth and Imperial email address to the UCL Research co-ordinator who will organise your UCL email and student card.

Resources

You can access CDT-ACM resources via the CDT Intranet which is located on our website **http://cdt-acm.org/**. Here you will find updated versions of the CDT timetables and calendar, a copy of our handbook and also copies of the expenses forms which you will need to complete when you are claiming from your travel and consumables budgets. The username and password to access the Intranet is **cdtacm.**

We also encourage you to follow the CDT on Twitter. The CDT handle is @CDT_ACM. We will post information about forthcoming events, competitions and interesting stories relating to the CDT. If you have anything that you would like us to share on Twitter, please email details to Claire Smithson, the UCL research co-ordinator.

Note on Publications

It is important for the CDT, and for the EPSRC who fund us, that you acknowledge the CDT when you publish your work. We ask that for any publications, including journal papers, conference proceedings and posters, you include the following line of text in your acknowledgements section:
"XX (your initials) was supported by the EPSRC Centre for Doctoral Training in Advanced Characterisation of Materials (grant number EP/L015277/1)."

Doctoral Skills Training

As a PhD student at UCL and Imperial you will be required to supplement your studies by taking additional courses and training offered by your university's Doctoral or Graduate school. These courses are intended to enhance the quality of your work by progressing your project and developing transferable skills. All Research Council funded research students are required by their funding bodies to participate in transferable skills development training. Your host department will provide more information about how to take these courses and the credits you will receive.

At **UCL** there will be three induction sessions to introduce the Doctoral Skills Development Programme, the Research Student Log and the national Researcher Development Framework that informs this programme. Sessions take place on the following days:
• Monday 10 October 2016, 2:00–4:00pm Venue TBC
• Tuesday 8 November 2016, 2:00–4:00pm Venue TBC
• Wednesday 25 January 2017, 2:00–4:00pm Venue TBC
UCL students should to register for one of the Induction sessions:
http://www.grad.ucl.ac.uk/events/induction.html
You can find out more about the **Imperial** Graduate School from their website http:/www imperial.ac.uk/study/pg/graduate-school/professional-skills/research/.
The Graduate School will be holding an introductory event on Monday 24 October from 4-7pm in the marquee in the quad at Imperial where you can find out about the professional skills programme and also other useful resources for Imperial research students..

As each Doctoral/Graduate School offers a very wide selection of courses, we have produced a list of the courses which we think will be most useful to you as students in the CDT-ACM. You will find this list on our intranet website http://cdt-acm.org/. You should also check and see what is offered by your host department as they will organise courses which may be appropriate to your research development.

The Joint Electronic System (Je-S)

As part of the Terms & Conditions of your EPSRC funded award, UCLand Imperial are required to complete a Je-S record for you within 1 month of you commencing your programme. The information provided to EPSRC includes:

- Personal details (i.e. name, contact email, nationality etc.)
- Project information (project titles; summaries);
- Funding (training grant the funding is drawn from; stipend; fees; any co-funding; dates for start, end and expected submission);
- Where the student is being trained (university, department, supervisor name);
- Project partners (i.e. industrial sponsors)

The accuracy of the information in Je-S is extremely important as it is used by the Research Councils to gather information about the studentships funded by their training grants, in addition to populating your Researchfish account (where you will be asked to report your research outputs).
As part of your award your department/Centre for Doctoral Training will therefore ask you to review your Je-S Record to ensure that the information submitted is accurate; records must be updated annually to reflect any changes or updates. Further information on Je-S and the data collected by EPSRC can be found on their website (https://je-s.rcuk.ac.uk/).

Joining the Institute of Making

We ask all new students to join the Institute of Making, which is based at UCL, so that you can complete the Institute of Making task that we have organised in the Autumn Term.

The Institute of Making is a multidisciplinary research club for those interested in the made world. In order to use the Institute of Making you will need to register as a member https://members.instituteofmaking.org.uk/, and then sign up for an induction session. Induction sessions are running from **10-21 October**.

Booking opens on Friday 30 September for the week beginning 10 October, and then on Friday 7 October for induction sessions running during the week beginning 17 October. You must use your UCL email address to become a member.

Student Cohort 1 (enrolled 2014/15)

UCL Registered Students

Student	UCL Supervisor	ICL Supervisor	Project Title	Industrial Partner
Josh Bailey	Paul Shearing	Luc Vandeperre	Characterisation of microstructure evolution in solid oxide fuel cell anodes	Ceres Power
Nadir Basma	Chris Howard	Milo Shaffer	Ordering in 'giant' nanocarbon polyelectrolytes and nanocomposites	ISIS Neutron Source
Martin Hart	Christoph Salzmann	Milo Shaffer	Single-walled Carbon Nanotubes as Containers for Reactive Materials	TBC
Shiny Matthew	Robert Palgrave	David McPhail	Defect diffusion in photocatalytic titanium dioxide	NUS Singapore

Imperial Registered Students

Student	UCL Supervisor	ICL Supervisor	Project Title	Industrial Partner
Tim Ellis	Rachel McKendry	Alex Porter	Pulmonary metallic therapeutics for the treatment of tuberculosis	Rutgers University
Mohamed Koronfel	Alister Hart	Mary Ryan	Understanding the in-vivo reactivity of orthopaedic implants	Deloro Stellite
Sofia Marchesini	Matthew Blunt	Camille Petit	2D non-carbonaceous materials for chemical separations	BP-ICAM
Lizzie Norris	Sandro Olivo	Julian Jones	Multi-scale imaging of advanced materials for regenerative medicine	ESRF Grenoble
Jon Rackham	David Scanlon	Shelly Moran	Polar / non-polar oxide heterostructures	SuperSTEM

Jon Lizzie Tim Shiny Nadir Sofia Martin Josh Mohamed

Student Cohort 2 (enrolled 2015/16)

UCL Registered Students

Student	UCL Supervisor	ICL Supervisor	Project Title	Industrial Partner
Dario Volta Conca	Isobel Llorente Garcia	Andrew Shevchuk	Study of the physical properties of cell-surface receptors in live cells via combined fluorescence microscopy and force sensing to improve our understanding of receptor-medical virus entry	TBC
Roland Leber	Cyrus Hirjibehedin	Sandrine Heutz	Molecular Nanospintronics: Fundamental magnetic properties and novel device applications	Advanced Microscopy Laboratory, Zaragoza,
Andreas Sergides	Nguyen Thanh	Alex Porter	Magnetic nanoparticles for biomedical applications	TBC
Thomas Siday	Oleg Mitrofanov	Cecilia Mattevi	Non-contact characterisation of electronic transport of properties of graphene-like materials	TBC
Mark Wentink	Tony Kenyon	TBC	Characterisation and device studies of phosphorene	TBC
Robert Westbrook	Hugo Bronstein	Saif Haque	Functional characterisation of hybrid inorganic-organic solar cells	TBC
Oscar Williams	Geoff Thornton/ Matt Blunt	David Payne	Solar power hydrogen production with a Au/ceria catalyst	SABIC, Saudi Arabia

Imperial Registered Students

Student	UCL Supervisor	ICL Supervisor	Project Title	Industrial Partner
Bernice Akpinar	Bart Hoogenboom	Joshua Edel	Manufacturing and characterising biomimetic nanopores	Cambridge University
Jingyi Chen	Alan Atkinson	Nigel Brandon	Microstructural design of solid oxide fuel cell electrodes	TBC
Jekaterina Fomcenkova	Neil Curson	Mary Ryan/ Stephen SKinner	Characterisation of FeS Scales formed in High Temperature Sulfidation Conditions	TBC
Daphne Lubert-Perquel	Chris Kay	Sandrine Heutz	Spin based characterisation of molecular solar cells	TBC
Aysha Rafique	Neil Curson	Joao P Cabral	Transformations in surfactant slurries under flow during drying and spraying on particles	TBC
Weixin Song	TBC	Jason Riley/ Fang Xie	Electrochemical understanding of graphene/metal oxide composites	TBC
Mudasir Yatoo	Neil Curson	Stephen Skinner/ Ainara Aguadero	Development of layered oxides for electrochemical devices	University of Science & Technology Beijing
Qunli Zhang	TBC	Lilang Wang/ Jianguo Lin	Investigating the microstructure and forming of Aluminium Alloy	TBC
Wenbin Zhao	Neil Curson	Jianguo Lin	Investigation of a New Forming Process for Energy Efficiency	

Andreas, Dario, Daphne, Rob, Aysha, Tom, Bernice, Roland, Kate, Oscar, Zhao, Mark

Student Cohort 3 (enrolled 2016/17)

UCL Registered Students

Student	UCL Supervisor	ICL Supervisor	Project Title	Industrial Partner
Procopios Constantinou	Steven Schofield	Gabriel Aeppli (PSI)	Studying and manipulating the quantum properties of atomic-scale defects in silicon for future device applications	Paul Scherrer Institute, Zurich
Eleanor Crane	Neil Curson	Steven Schofield (UCL)	Single Atom Devices with Controllable Electrical and Optical Properties	
Troy Dion	Hidekazu Kurebayashi	Will Branford	GHz spin excitation and detection of artifical nano-magnets	APC
Jennifer Hack	Dan Brett/ Paul Shearing	Nigel Brandon	Multi-scale characterisations of polymer electrolyte fuel cells	
Philip Haynes	Bart Hoogenboom	Ramon Vilar Compte	Advanced atomic force microscopy of DNA minicircles	Bruker
Emily Hofmann	Neil Curson	Thomas Schroeder (IHP)	Electronic and structural properties of germanium-tin nanostructures for future optoelectronics	IHP Microelectronics GmbH
Natalie Partridge	Geoff Thornton	David Payne	Electronic structure of light harvesting semiconducting oxide photoelectrocatalysts under realistic conditions	Diamond/ISIS

Imperial Registered Students

Student	UCL Supervisor	ICL Supervisor	Project Title	Industrial Partner
Alexis Belessiotis	Giuseppe Battaglia	Molly Stevens/ David Payne	State of the art characterisation of tissue engineering constructs	GSK & Smith-Nephew
Ryan Bower	Ed Romans	Peter Petrov	Growth, characterisation and nanolithography of alternative plasmonic materials	Witek & Korvus Technology Ltd
Jay Bullen	Ramon Vilar (Imperial)	Dominik Weiss	The removal of arsenic from groundwater	
Felicity Dear	Vassili Vorontsov (Imperial)	David Dye	Fundamental mechanisms in titanium	Rolls Royce
Epameinon-das Skountzos	Kyra Sedransk-Campbell	Mary Ryan (Imperial)	Understanding the Electrochemical behaviour of stainless steels in bromide containing solutions	
Jamie Thompson	Bin Chen (NASA)	James Durrant	Development and characterisation of photoelectrocatalytic devices for artificial photosynthesis and solar fuel production	NASA
Chen-yu Tsai	Ainara Aguadero (Imperial)	Stephen Skinner	Evaluation of layered oxide composites as co-electrolysis anodes	
Elena Watts	TBC	Jason Reilly	Flexible nanomaterials for pressure sensing at the screen/human interface	ROLI

Jamie, Procopios, Troy, Jennifer, Ryan, Emily, Natalie, Epameinondas, Elena, Alexis, Eleanor, Philip