



UNIVERSITY OF
CAMBRIDGE

EPSRC CCA



CCA Handbook 2014-15

EPSRC Centre for Doctoral Training in Analysis

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1. Welcome to CCA

We take pleasure in welcoming you as a PhD student in Cambridge Centre for Analysis.

This Handbook contains useful information about your course but is not exhaustive. If there is anything you want to know, do ask one of us, or the CCA Secretary, Tessa Blackman cca@maths.cam.ac.uk, or one of the other students in CCA.

We draw your attention particularly to the CMS Health and Safety policy <http://www.cms.cam.ac.uk/safety/safetypolicy> and to the Appendix on the Code of Conduct for Research Students.

Before you arrive in Cambridge, please would you email Tessa with a jpg photo of yourself and brief biography for the CCA website where each of you will have a web page. You might like to include information such as:

- Previous study: where and what you studied
- Mathematical areas of interest
- Links to any publications you have had or blogs that you write

A CCA student webpage will be made for you ahead of your arrival here. You can see current students' webpages on the CCA website: <http://www.maths.cam.ac.uk/postgrad/cca/people/studentprofiles.html>.

We suggest that you plan to arrive in Cambridge anytime from 1st October, and at the Centre for Mathematical Sciences a few days before 8th October for the First Year Briefing. On arrival, ask at Reception for Tessa Blackman in the Graduate Office. We also suggest that you make contact with your First Year Supervisor prior to your arrival. Lecture courses begin on Thursday 9th October.

The First Year Briefing is on **Wednesday 8th October at 10am** in the Pavilion F Common Room, followed by a CCA Photo in the afternoon. We look forward to seeing you then.

Clement Mouhot
James Norris
Nigel Peake

2. Supervision

The role of your Supervisor is set out in the University's 'Code of Practice for Research Students', which applies to CCA. See also the Appendix. This section describes some CCA-specific aspects of your supervision arrangements.

2.1 First Year Supervision

On admission to CCA each student is assigned a First Year Supervisor from the Faculty of Mathematics. Your First Year Supervisor will set you an Initial Research Project, which will run throughout the first year and which will lead to a report (around 30 pages) and presentation at the end of Easter Term. He or she will also direct your studies, including advising on any course choices, and will report to the University and to the CCA Co-Directors on your progress. Your Supervisor may also recommend your attendance at particular research seminars or study groups relevant to your Project. You should make contact with your Supervisor to arrange an initial meeting, ideally before the start of lectures in Michaelmas Term.

It is intended that CCA students can use their first year to explore several options for PhD study. If you are keen to do this, you should discuss it with your First Year Supervisor in your initial meeting. He or she may then be able to adapt your Initial Research Project and choice of Supplementary Courses to give you a broader experience of research in your first year. For some students, the External Project offers a further route towards PhD supervision in another Department of the University or in industry. On the other hand, you may wish to press on in your chosen research area, in which case your Initial Research Project will reflect this.

If, as the first year progresses, your preferred research area moves away from your First Year Supervisor, then it is your responsibility to approach other potential supervisors. The CCA Co-Directors are available for consultation.

2.2 Continuation or Change of Supervisor after First Year

In most cases, your First Year Supervisor will have recommended your admission to CCA. You can expect that, provided your work in the first year is satisfactory, he or she will be willing to act as your PhD Supervisor. While, in many cases, students will continue with their First Year Supervisor for the PhD, it is equally acceptable to move to a new PhD Supervisor, and indeed this is an intended flexibility in CCA, allowing you to choose the area for your PhD thesis on the basis of your experience in the first year. Students who wish to change supervisor should ask potential supervisors about their likely availability early, since all supervisors have a limited capacity and some may not be able to take new students in a given year.

At the end of your third term, following the First Year Review and Registration for the PhD, you will be assigned a PhD Supervisor. Your PhD Supervisor may be from the Faculty of Mathematics, or another Department of the University, or from a CCA Industrial Partner. If your PhD Supervisor is from another Department, you will be assigned a Second Supervisor from the Faculty of Mathematics. If your PhD Supervisor is from industry, you will be assigned a University Supervisor from the Faculty of Mathematics.

From the second year on, your PhD Supervisor will report termly to the University and to the CCA Co-Directors on your progress.

2.3 Research Diary

Your Supervisor may require you to maintain a Research Diary, as a record of objectives and outcomes in your research. This is regarded as good practice in CCA and may conveniently be combined with keeping a Training Log, as required for your First and Second Year Reviews.

2.4 Advisors

The University requires that you have also an Advisor, who is an alternative point of contact to your Supervisor. Your Advisor will initially be one of the CCA Co-Directors. Depending on the subject of your PhD, you may wish to request a change of Advisor at a later stage to someone whose research area is closer to your own.

3. First Year Programme

The First Year Programme at CCA 2014/15 comprises the following components

- Initial Research Project
- External Research Project
- CCA Core Courses
 - Analysis of Partial Differential Equations
 - From Computation to Information
 - Probability and Statistics
- Two Supplementary Part III Courses
- Industry Briefing and Industry Seminars
- First Year Review

The programme concludes with the first year reviews. It is intensive and demanding. Teamwork within the first year cohort is an intrinsic aspect. You are expected to make CMS your normal place of work during the programme. You are asked to agree any periods of absences, which should be during University vacations, with your supervisor.

First Year CCA students are also expected to attend the CCA 'Cake Meeting' on Thursdays in term, 4-4.30pm. We rely on your attendance to communicate information about upcoming events.

3.1 Initial Research Project

You will work throughout the year under the direction of your First Year Supervisor on an Initial Research Project. The form and the content of this will be determined by your Supervisor. Work on the Project should amount to the equivalent of three months' solid work, but will be spread through the year, taking account of other components of the Programme. This Project will be assessed through a (latex) report by you of about 30 pages to be submitted by 29th May, by a report from your Supervisor, and through a presentation by you on 8th or 9th June, of 30 minutes duration to the first year CCA cohort. A second year CCA student will act as 'rapporteur', giving feedback on your presentation.

3.2 External Research Project

The External Project is undertaken in the Lent Term. A booklet of Project descriptions will be available towards the end of Michaelmas Term. Each Project will come from a CCA partner organisation, either in industry or in another University department. You will have a supervisor in the partner organisation for the duration of the Project, who will provide a short report on the outcome. There will be an internal contact for each Project, from the Faculty of Mathematics, who will also be available for initial discussion as you explore which Project to do.

Usually each single project will only be available to a single student.

You will need to send two choices of Project (first and second in case of clashes) to the CCA Secretary cca@maths.cam.ac.uk by 5th December. You should have initiated the Project, by meeting your external supervisor by 14th January. Your work on the Project should be equivalent to about one month's solid work. You will write a report of around 10 pages on the Project, which must be submitted to cca@maths.cam.ac.uk by 13th March and you will be required to give a 20 minute presentation on the

Project to the cohort on 16th or 17th March. A second year CCA student will act as 'rapporteur' on your presentation.

3.3 CCA Core Courses

There are three Core Courses in 2014/15, to be taken by all students. They each follow a similar pattern of reading assignments and projects done in student teams, leading to write-ups and presentations to the whole cohort. A Subject Coordinator takes overall responsibility for the Course, which will involve also supervision by other teaching officers and post-docs.

Analysis of Partial Differential Equations (Prof C. Mouhot, Michaelmas Term)

The course includes the Part III course on Partial Differential Equations, which all students are expected to attend.

- 9th October 2-3pm, MR14: Briefing meeting
- 3rd November 2-5pm, MR4: 1st project student presentations
- 8th December 2-5pm, MR14: 2nd project student presentations
- 7th-14th January: Oral examinations on Part III Partial Differential Equations (for some students)

From Computation to Information (Dr A. Shadrin, Lent Term)

Students are expected to attend or otherwise be familiar with the content of the Part III course Numerical Solutions of Differential Equations, which runs in Michaelmas Term. It is split in two parts: Part 1 on Image and Signal Processing (supervised by Dr J. Lellmann, Dr J. Lasenby and Prof. N. Kingsbury); Part 2 on Approximation Theory and Compressed Sensing (supervised by Dr A. Shadrin and Dr A. Hansen).

- 7th-14th January: Oral examinations on Numerical Solution of Differential Equations (for some students)
- 15th January 2-3pm, MR14: Briefing meeting
- 16th February 2-5pm, MR4: 1st project student presentations
- 13th March 2-5pm, MR14: 2nd project student presentations

Probability and Statistics (Dr N. Berestycki, Lent Term)

Students expected to attend or otherwise be familiar with the content of the Part III course Advanced Probability, which runs in Michaelmas term.

- 7th-14th January: Oral examinations on Advanced Probability (for some students)
- 16th January 2-3pm, MR14: Briefing meeting
- 9th February 2-5pm, MR4: 1st project student presentations
- 12th March 2-5pm, MR14: 2nd project student presentations

The Subject Coordinators may offer feedback on the assignment write-ups and presentations, including the success of team-working, to be considered in the First Year Reviews.

3.4 Supplementary Part III Courses

You must offer for oral examination (of approximately one hour) two courses from Part III. Where you have not been examined on a sufficiently closely related course already, it is expected that you will give priority to the courses Partial Differential Equations, Numerical Solution of Differential Equations and Advanced Probability (up to a maximum of two courses). Here, sufficient means that you should be able to take a full part in the associated CCA Core Course. You should discuss and agree your choice of Supplementary Part III Courses for oral examination with your First Year Supervisor, who will advise

whether you should take any of the priority courses and will guide your choice of any further courses. Please inform the CCA Secretary cca@maths.cam.ac.uk of your choices by 21st October.

3.5 Industry Briefing and Industry Seminars

CCA hosts an Industry Briefing or Workshop in Easter Term, which all CCA first and second year students are expected to attend, and which all other CCA students are encouraged to attend. The Industry Briefing is run by the Smith Institute for Industrial Mathematics.

DAMTP and DPMMS run a joint programme of Industry Seminars, some of which are given by CCA Industry Partners. You are strongly encouraged to attend and will be expected to state which Industry Seminars you have attended in your Training Log.

3.6 First Year Review

You will have a First Year Review with the Co-Directors of CCA on 10th June. The Co-Directors will consider

- reports from your First Year Supervisor on your Initial Research Project and from the supervisor of your External Project
- reports from Subject Coordinators on the First Year Core Courses
- reports of your oral examinations on two Part III courses.
- your Training Log.

You should submit your Training Log and a statement on what has been agreed regarding your PhD supervision to cca@maths.cam.ac.uk by 8th June. The training log should be a short factual statement prepared by you of your training and research activities since admission.

If all aspects of your progress are satisfactory, the Co-Directors will recommend your Registration as a PhD student, and will arrange, where necessary, your transfer to your PhD Supervisor. Please see the [Appendix](#) for cases where progress is unsatisfactory.

4. Years Two to Four

As CCA students, you have a unique opportunity through your broad education in Analysis and the network of the CCA cohorts to bring ideas from one area of Analysis into another, and into applications. We strongly approve of collaborative research spanning different branches of Analysis, involving CCA students with different areas of expertise.

You are expected to work under the direction of your PhD supervisor. In particular, you should discuss with your supervisor expectations concerning place of work and periods of absence. While your main focus is on work towards your PhD, you are expected to take advantage of and contribute to wider CCA activities.

CCA-specific activities in years two to four include:

- mentoring of CCA first year students (by second years)
- Cambridge Analysts Knowledge Exchange (CAKE) Seminar -- a graduate student seminar run by CCA second years
- CCA Industry Briefing or Workshop in Easter Term -- all second years attend, third and fourth years are also encouraged to attend
- occasional CCA-sponsored Short Courses on topics in Analysis
- an annual UK research student conference in Analysis with other Centres for Doctoral Training
- a Careers Briefing for third year students in Easter Term run by the co-Directors.

There are further training opportunities, run by DPMMS, DAMTP and others, which you are encouraged to take up as appropriate, including:

- training for undergraduate supervisors
- Smith / Knight / Rayleigh Prize Essay competition
- training in public engagement and outreach.

Second Year CCA students have a Second Year Review with their PhD Supervisor and a CCA Co-Director in June. For this you will need to send to cca@maths.cam.ac.uk before the Review

- your Training Log, covering the period since your First Year Review
- copies of research papers completed while a CCA student and / or work in progress.

The purpose of the Review is to reflect on your progress in your first full year of research. This would not form part of any process specifically to address unsatisfactory progress, which would be a separate matter, following the University's code of conduct.

5. Conference Travel and Research Visits

CCA students are encouraged to participate in Conferences, Workshops and Research Schools, where these are relevant to their intended research projects. On the recommendation of your Supervisor, funds are available from CCA to meet expenses. You are expected to use economical modes of travel and to seek alternative sources of financial support where available. You must apply and secure approval for CCA support in advance, using the application form available at <http://www.statslab.cam.ac.uk/Forms/910.pdf>. Expenses can only be reimbursed against receipts, which you should submit with the completed claim form <http://www.maths.cam.ac.uk/postgrad/cca/files/expenses.pdf>. Completed forms applying to spend funds or expenses forms for reclaiming costs can be submitted to the Graduate Office or electronically to cca@maths.cam.ac.uk. The University provides free travel insurance for academic travel, which you can apply for online via www.admin.cam.ac.uk/offices/insurance/travel/students/bgs. A rough guide is that £500 per year may be available to each student, which can be carried forward if unspent in any given year. Longer research visits may be recommended by your supervisor towards the end of your course, so you should consider keeping funds in reserve for this.

Appendix: Code of Practice for Research Students

CCA follows the University of Cambridge Code of Practice for Research Students, available online at <http://www.admin.cam.ac.uk/students/studentregistry/current/graduate/policy/quality/cop>. This Appendix sets out details of the implementation of the Code of Practice specific to CCA. It should be read in conjunction with the Code of Practice.

As a CCA student, you are either a member of the Department of Applied Mathematics and Theoretical Physics (DAMTP) or of the Department of Pure Mathematics and Mathematical Statistics (DPMMS). The two Departments together form the Faculty of Mathematics. The Director of Graduate Education for your Department has delegated responsibility for the oversight of your course to the Co-Directors of CCA.

On admission to CCA, you are assigned either to DAMTP or to DPMMS, and to a First Year Supervisor in the same Department. The course is identical for students assigned to DAMTP and DPMMS. At the end of the First Year, you are assigned a PhD Supervisor, who may or may not be the same person as your First Year Supervisor. If your PhD Supervisor is from the other Department, you normally also change Department. If your Supervisor is from another Faculty or from industry, you also have a Second Supervisor or University Supervisor, either from DAMTP or DPMMS, and you are a member of that Department. Your First Year and PhD Supervisors are responsible for setting the scientific direction of your studies and for advising you on academic good practice and presentation of your work. In the first and second years, the normal expectation is that you meet your Supervisor at least once per week and that your Supervisor gives you regular feedback based on the progress of your work. The nature of the meetings will vary, from a brief report by you that work is proceeding as planned, to longer sessions of agenda setting and reviews of what you have achieved. After that, you meet your Supervisor as often as needed for good progress.

In the event that your Supervisor finds your work or progress to be unsatisfactory at any stage, he or she would in the first instance warn you, at the same time notifying the CCA Co-Directors. If the problem persists, your Supervisor would follow the process described in the University Code of Conduct.

You are also assigned an Advisor. Initially, this is the CCA Co-Director from your Department, unless that person is your First Year Supervisor, in which case it is the other Co-Director. At a later stage, you may switch Advisor to someone closer to your subject area. For the sake of proper expertise, your Advisor may in some cases also be the Internal Examiner for your PhD -- to avoid possible conflict of interest, you should not normally conduct joint research with your Advisor.

Article 49 in the University Code of Practice applies to you with the following modification. You are expected to complete the research for your degree within four years of admission and to submit your dissertation also within four years.

There is no qualification resulting from the CCA First Year.

The form of the progress examination leading to registration for the PhD at the end of the First Year is specific to CCA. You have a First Year Review with the Co-Directors of CCA at the end of the third term. The Co-Directors consider

- reports from your First Year Supervisor on your Initial Research Project and from the supervisor of your External Project
- reports from Subject Coordinators on the First Year Core Courses

- reports of your oral examinations on two Part III courses
- your Training Log.

In the event that progress in any aspect is unsatisfactory, the grounds for this would be explained, Registration and assignment of your PhD supervisor would be deferred, and a remedial target would be set to be achieved by the beginning of the fourth term. Where a further Review by the Co-Directors determined that the target had not been met, they would normally recommend to the Degree Committee that you leave the course.

Visit our webpage at:

<http://www.maths.cam.ac.uk/postgrad/cca/>

Email:

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