



INSTITUTE OF  
GENETICS & CANCER



Medical  
Research  
Council



THE UNIVERSITY  
of EDINBURGH



CANCER  
RESEARCH  
UK



# GRADUATE RESEARCH & TRAINING

HANDBOOK 2021





# Welcome

Graduate Research and Training Contacts

Staff Student Liaison Committee/Officer



# GRADUATE RESEARCH & TRAINING

HANDBOOK 2021

## Welcome

We are delighted to welcome you to your postgraduate training programme at the Institute of Genetics and Cancer. On the following pages you will find information relating to the different programmes, timetable for the first 6 months, and the assessment timetable for the next 3 or 4 years.

As you probably know, we have a mixture of students on campus, some of whom are following a four year PhD programme with rotations and others who are starting a three year PhD in a specific lab, whilst others are studying for an MSc or MD. There are some teaching elements of the four year taught course that might be of interest to other students, for example covering different technologies, computer programming, aspects of clinical research and research ethics - these are shown in a detailed timetable. This teaching is only compulsory for the 4-year HGU students, but other students (and postdocs) are welcome to sign up and attend any sessions that you find useful; you might want to discuss your choice with your supervisor(s). We hope that the Graduate Research and Training environment will provide a useful framework for your studies. Please feel free to air your views, and to approach us about any issues you have, and help us to make the Institute a huge success!

## Graduate Research and Training contacts

The Institute is made up of three centres, the MRC Human Genetics Unit (HGU), the Centre for Genomics and Experimental Medicine (CGEM) and the Cancer Research UK Edinburgh Centre (ECRC), each with their own Graduate Convenor. The Institute falls within the School of Molecular, Genetic and Population Health Sciences (you will need to know this School affiliation when you apply for Transskills courses amongst other things), and the SMGPHS is within the College of Medicine and Veterinary Medicine or CMVM.

In the first instance you will mainly deal with your supervisors, Graduate Convenor or Nick Gilbert (Director of Graduate Research and Training for the Institute of Genetics and Cancer). You will also have a thesis committee (normally setup about 10 weeks into your PhD) which will be made up of your supervisors, an external advisor and a committee Chair. Formal issues (interruption of studies and so on) are dealt with by the Director of Graduate Research and Training and the College PG Office.

Head of School of MGPHS:  
**Professor Sarah Cunningham-Burley**

Director of Graduate Research and Training,  
Institute of Genetics and Cancer:  
**Professor Nick Gilbert**

Graduate Convenor, CRUK Edinburgh Centre:  
**Professor Val Brunton**

Graduate Convenor, MRC Human Genetics  
Unit: **Professor Nick Gilbert**

Graduate Convenor, Centre for Genomic &  
Experimental Medicine: **Dr Kathy Evans**

Director of PG Studies, College of MVM:  
**Professor Paddy Hadoke**

Staff Student Liaison Officer:  
**Dr Catherine Naughton**  
**Dr Dasa Longman**

Graduate Research and Training  
Administrator:  
**Pauline McDonald**

Graduate Research and Training Assistant:  
**Alana Johnson**

## Staff Student Liaison Committee

At the Institute of Genetics and Cancer we are committed to ensuring a high-quality student experience. To ensure we are able to deliver this, and to “maximise our students’ potential”, we encourage students to communicate their views and suggestions to help influence any required changes to policies and procedures. The Institute Staff Student Liaison Committee (SSLC) meets biannually to discuss matters of mutual concern of staff and students. The SSLC is composed of student and staff representatives, and we strongly encourage students at any stage of their graduate degree to consider joining the SSLC. The current Staff Student Liaison Officers are (SSLO) Dr. Catherine Naughton and Dr. Dasa Longman.



Catherine Naughton

Catherine is a senior research scientist in Professor Nick Gilberts laboratory in the MRC, Human Genetics Unit. She has over 15 years experience as a post-doctoral scientist and has mentored and supervised many PhD students.



Dasa Longman

Dasa is a Senior Scientist in the lab of Professor Javier Caceres, MRC HGU, and has many years experience of formal and informal mentoring of PhD and undergraduate students.

Catherine and Dasa together oversee the POGs induction events held during induction week for new PhD students, coordinate the 1st-year student journal clubs and organise the biannual SSLC meetings.

## What to do if things go wrong

If you have a problem with your project and/or supervisor, you should first try to resolve it between yourselves - it is important to keep lines of communication open where possible and not let things degenerate. If there is still a problem, then please seek advice - you should feel free to speak to your second supervisor, your thesis committee Chair, the Directors of the Graduate School or the PG Convenor for your building.

These conversations will be in confidence and a strategy will be devised to try and address any problems. Additional meetings of thesis committees can be arranged (subject to members’ availability) if the student and/or supervisors feel that this would help. If you are not happy with the outcome of frontline resolution (and on the rare occasions where a local resolution is not an appropriate early step) the University has procedures in place for dealing with complaints and the Institute of Genetics and Cancer adheres to these procedures rigorously. Details of these can be accessed through the CMVM Postgraduate Wiki which is also accessible from the Institute of Genetics and Cancer Graduate Research and Training web pages.

## Meet the Team: PG Directors



Professor Nick Gilbert - Director of Graduate Research & Training HGU/  
Institute of Genetics and Cancer

Email [Nick.Gilbert@ed.ac.uk](mailto:Nick.Gilbert@ed.ac.uk)

Telephone 0131 651 8551 Location: C3.21

Research Group

[www.ed.ac.uk/mrc-human-genetics-unit/research/gilbert-group](http://www.ed.ac.uk/mrc-human-genetics-unit/research/gilbert-group)



Professor Valerie Brunton - Graduate Convenor, CRUK Edinburgh Centre

Email [V.Brunton@ed.ac.uk](mailto:V.Brunton@ed.ac.uk)

Telephone 0131 651 8580 Location: S3.10

Research Group

[www.ed.ac.uk/cancer-centre/research/brunton-group](http://www.ed.ac.uk/cancer-centre/research/brunton-group)



Dr Kathy Evans - Graduate Convenor, CGEM

Email [Kathy.Evans@ed.ac.uk](mailto:Kathy.Evans@ed.ac.uk)

Telephone 0131 651 8747 Location: N2.09

Research Group

[www.ed.ac.uk/centre-genomic-medicine/research-groups/evans-group](http://www.ed.ac.uk/centre-genomic-medicine/research-groups/evans-group)

Students and staff should contact their local Centre PG Director for academic support.

### Administration Team



Pauline McDonald



Alana Johnson

Email [student-admin@jgc.ed.ac.uk](mailto:student-admin@jgc.ed.ac.uk)

Telephone 0131 651 5771 Location: CG.11

Pauline and Alana manage the day-to-day administration of the Graduate Research and Training programme, and are based on the ground floor of the MRC Human Genetics Unit.

For queries related to Postgraduate Research and Training, Pauline and Alana provide support to prospective, on-programme and visiting students, as well as supervisors and academic staff. When appropriate, they will signpost students and staff to key central university services.

Pauline and Alana work closely with Centre PG Directors to enhance the Student Experience and oversee the following areas of work:

- Student Recruitment & Admissions
- Tier 4 Engagement & Monitoring process for international students
- Visiting student admissions
- Manage Graduate Research and Training website in liaison with PG Directors
- Coordinate teaching programme
- Organise student events e.g. Science at the Interface to Industry, Christmas lectures, John Inglis talks etc.
- Organise and minute Staff Student Liaison Committee (SSLC) / Postgraduate Studies Committee (PGSC)
- Manage Student Social Media Platforms

# Induction Week Teaching Timetable



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## Induction Week

Monday 13th September	
10:00 - 10:30	PG Director's Welcome - Nick Gilbert & Val Brunton
10:30 - 11:00	Head of School Welcome - Sarah Cunningham-Burley
11:30 - 12:30	Health & Safety Induction - Eilidh Guild
14:00 - 15:00	Student Health and Wellbeing: Andy Shanks
15:00 - 16:30	Buddy Session - POGS (Postgraduate student society) - NUCLEUS
Tuesday 14th September	
09:00 - 10:00	General IT Familiarisation - IT Team - Online
11:00 - 12:00	College of Medicine and Veterinary Medicine (CMVM) Welcome meeting – at event, or online (information via UoE Events App)
13:00 - 13:30	Introduction to Library Services – Ruth Jenkinson
14:00 - 15:30	Good Practice in PhD Research –Katy Graham & Grace Alston
16:00 - 16:30	Introduction to the HGU 4 year PhD programme (HGU students only) – Nick Gilbert - E4.07
Wednesday 15th September	
09:00 - 10:00	Public Engagement - Dee Davison
10:15 - 10:45	Equality & Diversity - Dee Davison & Peter Tennant
11:00 - 12:00	Institute of Academic Development - Louise McKay - Online
12:00 - 13:00	Student Disability Service - Jan Gardiner
Presentation of HGU rotation projects - HGU Students Only - E4.07	
14:15 - 14:30	Richard Meehan
14:30 - 14:45	Toby Hurd
14:45 - 15:00	Caroline Hayward
15:00 - 15:15	Pleasantine Mill
15:15 - 15:30	Luke Boulter
15:45 - 16:00	Ava Khamseh
16:00 - 16:15	Veronique Vitart
16:15 - 16:30	Grzegorz Kudla
16:30 - 16:45	Yanick Crow

## GRADUATE RESEARCH & TRAINING HANDBOOK 2021

<b>Thursday 16th September</b>	
<b>Presentation of HGU rotation projects - HGU Students Only - E4.07</b>	
11:00 - 11:15	Joe Marsh
11:15 - 11:30	Andrew Wood
11:30 - 11:45	Tamir Chandra
11:45 - 12:00	Ian Adams
14:00 - 14:15	Andrew Jackson
14:15 - 14:30	Duncan Sproul
14:30 - 14:45	Liz Patton
14:45 - 15:00	Simon Biddie
15:00 - 15:15	Ailith Ewing
15:15 - 15:30	Javier Caceres
15:30 - 15:45	Nick Gilbert
<b>Friday 17th September</b>	
<b>Fundamentals of Data Science for Biomedical Research Sessions - Medical Education Centre, WGH, 3rd Floor</b>	
09:00 - 17:00	Introduction to Unix - Ewan MacDowall
<b>Monday 20th September</b>	
09:00 - 17:00	Introduction to Eddie - John Ireland
<b>Tuesday 21st September</b>	
AM	Conda Software package management - Graeme Grimes
PM	Good enough research practices - Elvina Gountouna
<b>Wednesday 22nd September</b>	
09:00 - 17:00	Introduction to GIT Version Control - Mario, Edinburgh Carpentries
<b>Thursday 23rd September</b>	
09:00 - 17:00	Ensembl - EBI Team
<b>Friday 24th September</b>	
09:00 - 17:00	Genome Browsers - Gogo

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<b>Monday 27th September</b>	
09:00 - 17:00	Introduction to R - Graeme or Mario (Edinburgh Carpentries)
<b>Tuesday 28th September</b>	
09:00 - 17:00	Ed-DaSH - Introduction to Statistics for Biomedical Science (day 1) - Ailith Ewing
<b>Wednesday 29th September</b>	
09:00 - 17:00	Ed-DaSH - Introduction to Statistics for Biomedical Science (day 2) - Ailith Ewing
<b>Thursday 30th September</b>	
09:00 - 17:00	TBC
<b>Monday 4th October HGU Students Start Rotation Project 1</b>	
09:00 - 12:00	Good Research Practice - Helen Nickerson, Pauline Ward & Elvina Gountouna - E4.07
<b>Thursday 7th October</b>	
09:00 - 11:00	Experimental design - Luke Boulter & Kevin Myant - E4.07
<b>Tuesday 12th October</b>	
11:00 - 12:30	Reading and evaluating the scientific literature - Catherine Naughton & Dee Davison - E4.07
<b>Thursday 14th October</b>	
14:00 - 17:00	Next Generation Sequencing Technology - Nick Gilbert & Lee Murphy - E4.07
<b>Monday 18th October</b>	
14:00 - 15:00	<b>Journal Club 1</b> - Andy Badrock & Amina McDiarmid
<b>Thursday 21st October</b>	
11:00 - 12:00	Scientific blogging - Lorna M Campbell - E4.07
<b>Monday 25th October</b>	
09:00 - 11:00	Experimental design - Kevin Myant - E4.07
<b>Thursday 28th October</b>	
09:30 - 11:30	Biological Imaging - Ann Wheeler & Team - E4.07
<b>Monday 1st November</b>	
14:00 - 15:00	<b>Journal Club 2</b> - Craig Anderson & Lucy Martin
<b>Thursday 4th November</b>	
09:00 - 12:00	Advanced Proteomics and Metabolomics - Alex von Kriegsheim - E4.07
<b>Monday 8th November</b>	

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14:00 - 17:00	Experimental Model Systems - Alessandro Brombin, Ian Adams & Malcolm Dunlop - E4.07
<b>Thursday 11th November</b>	
09:30 - 12:30	Translating your research - Andrea Taylor, Helen Nickerson & Sarah Trewick - E4.07
<b>Monday 15th November</b>	
14:00 - 15:00	<b>Journal Club 3</b> - Emily Webb & Giovana Carrasco Gonzalez
<b>Thursday 18th November</b>	
10:00 - 12:30	Analysing Imaging data - Laura Murphy - E4.07
<b>Monday 22nd November</b>	
09:30 - 11:30	Genome Engineering - Pleasantine Mill & Andrew Wood - E4.07
<b>Thursday 25th November</b>	
9:30 - 11:30	Super resolution imaging - Ann Wheeler & Team - E4.07
<b>Monday 29th November</b>	
14:00 - 15:00	<b>Journal Club 4</b> - Gillian Taylor & Mattia Marenda
<b>Thursday 2nd December</b>	
HGU Student Christmas talks (2020 Intake)	
<b>Monday 6th December</b>	
14:00 - 15:00	Drug Development - Stefan Symeonides & Neil Carragher - E4.07
<b>Thursday 9th December</b>	
<b>HGU Rotation 1 talks</b>	
<b>Monday 20th December</b>	
<b>HGU Rotation Student Project Write-Up deadline</b>	
<b>Tuesday 3rd January</b>	
<b>Mini Induction Week</b>	
<b>Monday 10th January</b>	
<b>HGU Students Start Rotation Project 2</b>	
09:00 - 12:00	Molecular ageing and senescence - Tamir Chandra - E4.07
14:00 - 17:00	Computational cancer genomics - Colin Semple - E4.07
<b>Monday 17th January</b>	
09:00 - 12:00	Molecular mechanisms of pathogenic mutations in proteins - Joe Marsh - E4.07

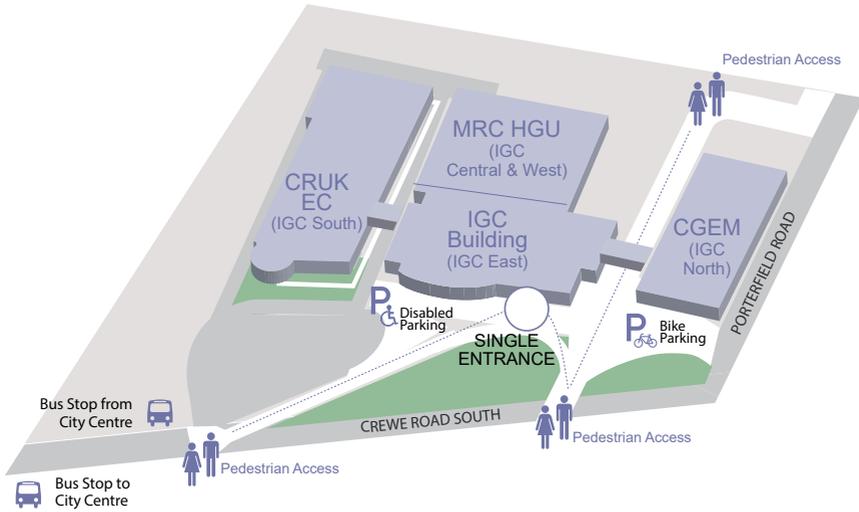
## GRADUATE RESEARCH & TRAINING HANDBOOK 2021

14:00 - 15:00	<b>Journal Club 5</b> - Amy Findlay & Chloe Stanton
<b>Monday 24th January</b>	
09:00 - 12:00	Molecular and Cellular ageing - Tamir Chandra
14:00 - 17:00	Statistical Cancer Genomics - Ailith Ewing - E4.07
<b>Monday 31st January</b>	
09:00 - 12:00	Mutation, selection, disease - Chris Ponting - E4.07
14:00 - 15:00	<b>Journal Club 6</b> - Anabel Martinez Lyons & Fay Newton
<b>Monday 7th February</b>	
09:00 - 12:00	Establishing mechanisms underlying genetic associations with complex traits and diseases - Veronique Vitart, Chloe Stanton & Amy Findlay - E4.07
14:00 - 17:00	Fundamentals of Size - Andrew Jackson - E4.07
<b>Monday 14th February</b>	
09:00 - 12:00	Genome architecture and congenital abnormalities - Bob Hill & Laura Lettice - E4.07
14:00 - 15:00	<b>Journal Club 7</b> - Nele Hug & Dasa Longman
<b>Monday 21st February</b>	
09:00 - 12:00	Using zebrafish models to study melanocyte stem cells and melanoma - Liz Patton - E4.07
14:00 - 17:00	Innate immune signalling of self-nucleic acid in human disease - Yanick Crow - E4.07
<b>Monday 28th February</b>	
09:00 - 12:00	Transcriptional enhancer function in development and disease - Hannah Katherine Long - E4.07

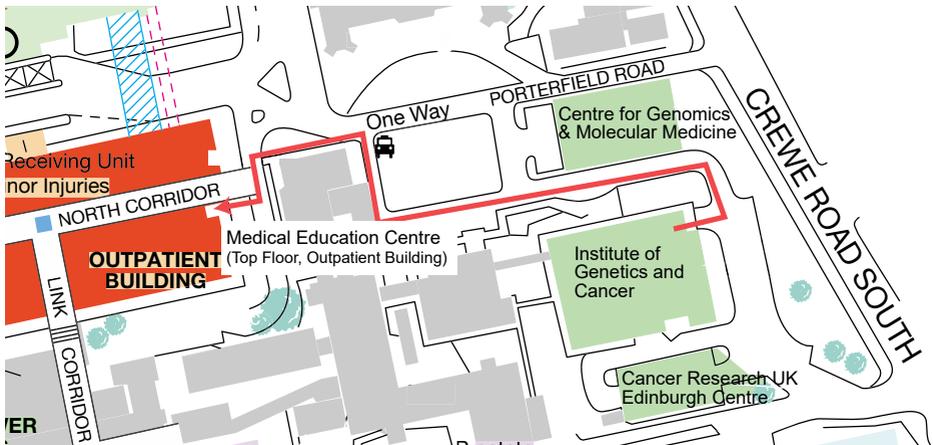
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14:00 - 15:00	<b>Journal Club 8</b> - Laura Murphy & Carlos Martinez- Perez
<b>Monday 7th March</b>	
09:30 - 12:00	The 3D genome and gene regulation. - Wendy Bickmore - E4.07
14:00 - 17:00	Post-transcriptional regulation of gene expression: From splicing to RNA quality control mechanisms - Javier Caceres - E4.07
<b>Monday 14th March</b>	
09:00 - 12:00	Meiosis and Meiotic Chromosomes in the Mammalian Germline - Ian Adams - E4.07
14:00 - 15:00	<b>Journal Club 9</b> - James Ding & James Crichton
<b>Monday 21st March</b>	
09:00 - 12:00	Saturation mutagenesis - Grzegorz Kudla - E4.07
14:00 - 17:00	Degron technologies: engineering genomes, proteins and small molecules to make better models of human disease - Andrew Wood - E4.07
<b>Monday 28th March</b>	
09:00 - 12:00	What role might epigenetics play in human disease? - Duncan Sproul - E4.07
<b>Thursday 31st March HGU Rotation 2 talks</b>	
HGU Rotation Student Project Write-Up deadline	
<b>Monday 4th April</b>	
HGU PhD Starts	

Institute of Genetics and Cancer

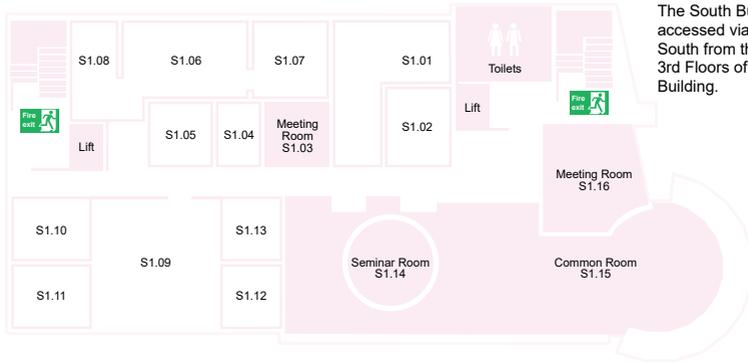


NHS Outpatients Building Computing Suite 1  
Medical Education Centre, 3rd Floor



**Institute of Genetics and Cancer  
Cancer Research UK Edinburgh Centre South Seminar Room S1.14**

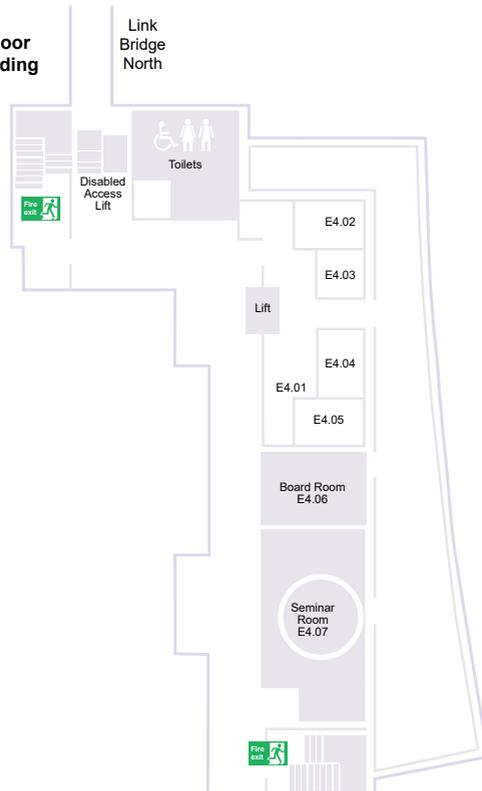
**First Floor  
South Building**



The South Building can be accessed via Link Bridge South from the 2nd and 3rd Floors of the Central Building.

**Institute of Genetics and Cancer**

**Fourth Floor  
East Building**





# Assessment Guidelines for all students



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## Assessment Guidelines

### PhD, MD, MScR assessment guidelines

During the course of your studies you will regularly be assessed. This will comprise writing reports, attending and presenting at thesis committee meetings and completing an annual review on EUCLID. For part time students assessments should happen every year and follow this format.

In the Institute our assessments are based on the CMVM guidelines and further information can be found on the CMVM wiki (<http://edin.ac/2crLMTx>)

### Annual reviews on EUCLID

All students need to complete an annual review on EUCLID which will be signed off by you, your supervisors and postgraduate director. Over the course of your project you will complete an annual review to coincide with your 10-week, first year, second year and every subsequent year until you finish your studies. In some cases your thesis committee will decide that an interim meeting (e.g., half way through your second) or an additional meeting (e.g., at the end of the third year of a three year funded PhD) would be helpful. Please ensure your reports and feedback are uploaded onto EUCLID for sign-off. The online student portal (EUCLID) can also be used to record other important milestones in your training in Edinburgh and your supervisor may log individual meetings with you on this system.

### Student reports

As a guide these are the reports required for different programmes

	MSc by Research	3 year PhD	4 year PhD	MD
10 week report	✓	✓	✓	✓
6 month report	✓			
1st year report		✓	✓	✓
2nd year report		✓	✓	
3rd year report			✓	

### 10 week report

This report should be concise (1000 words excluding title, references, abstract or figure legends). As this report is being written at the beginning of your studies, we are most interested in what you plan to investigate over the next year. The report should include:

- Title, and the names of you and your supervisor.
- An abstract of less than 100 words.
- Introduction that provides sufficient background information for the reader to understand the proposal and that puts the scientific question(s) into context.
- A section that states the scientific question(s) that are being asked and the aims of the project.
- A short section on any progress made to date.
- A section describing your proposal for the next year's work.

- Figures can be added in any section to help describe the project or to show any data that you have obtained in the first few weeks of your project. Figure legends should provide succinct description of the figure.
- Reference List.

On completion, the report should be uploaded onto EUCLID and submitted to the Graduate Research and Training team: student-admin@igc.ed.ac.uk. Following submission you will be given feedback in the form of an email and/or meeting (depends on programme). This is also a good time to plan the composition of your thesis committee (see below).

### First Year Review (6 months for MScR)

The next assessment stage is the first-year review. This rigorous review is your opportunity to demonstrate your suitability to progress and will consist of three elements:

- a written report from the student
- a meeting with the student and thesis committee
- a written report by the thesis committee

**Student's written report:** The report should adopt a logical format and be of a high standard. It should be typed and free of typographical and grammatical errors. A clear statement of the aims of the project should be included in addition to a brief account of methods and their validation. Whilst it is recognised that at this stage students may not have substantial data, preliminary results should be documented and interpreted with a clear statement of intent as to immediate future studies (these might be expected to form the basis of discussion at interview). The text should be referenced as for a scientific paper and references listed at the end of the report. It is expected that the report should be around 5000 words. It should incorporate diagrams, figures and tables as necessary. Preliminary drafts of the report should be discussed with supervisors. It is often useful to ask your supervisor for an example report from a previous student. The student's report should be available to members of the thesis committee at least one week before the thesis committee meeting, allowing time for adequate consideration of the reports, and reports should be uploaded onto EUCLID.

**Thesis Committee Meeting:** This meeting will involve the student and thesis committee. The meeting is normally expected to include a short (10-15 minute) presentation by the student introducing the project, describing methodology and any preliminary results and identifying future studies. Students are strongly encouraged to rehearse with supervisors before the interview. You should expect the thesis committee to discuss specific points of content and organisation arising from the written report during the course of interview. You will have an opportunity to initiate a dialogue and, if necessary, raise matters of concern with the committee.

**Feedback:** The thesis committee should make an assessment of the student's written report, performance at interview and overall progress. The student should be informed of the committee's opinion during the meeting, they will then write a report normally within 1 week of the interview summarising the assessment. Good and very good progress should be credited; any unsatisfactory aspects of performance should be clearly defined with an attempt to identify underlying reasons. It should make clear recommendations as to subsequent progress and action and be signed by all members of the committee. The student will have an opportunity to see the report, and be able to discuss strengths, weaknesses and any issues of concern with the chair in the absence of his/her supervisor(s). The student can also add comments before signing the report. An unsatisfactory report may be used for future discussions or as the basis for re-registering students for a different degree or in very rare cases discontinuing studies (see outcomes). It is therefore essential that clear details of remedial action or the reasons for change in registration are documented. The signed thesis committee assessment should be uploaded onto EUCLID.

**Outcomes:** An initial recommendation will be made as to whether student progress is satisfactory or is inadequate in one or more aspects. In the case of inadequate performances a further recommendation from the thesis committee will be needed in terms of whether the student is (i) re-assessed or (ii) re-registered for a different degree, change in period of study or discontinued. In these cases it would be expected that students are totally unsatisfactory or severely deficient in several areas of their study.

### Second Year Review

The second-year report does not need to be as long as the first year report but should contain a clear indication of achievable plans for the following year and an outline plan for the thesis. As for the first year review the student should organise a meeting with the thesis committee who will also write a report. Your second-year report and assessment from the thesis committee should be uploaded onto EUCLID.

### Subsequent Reviews

For four year and continuing students there will be reviews every year until submission. Sometimes these will require a thesis committee meeting and this should be discussed with your supervisor.

### Final Year Talk

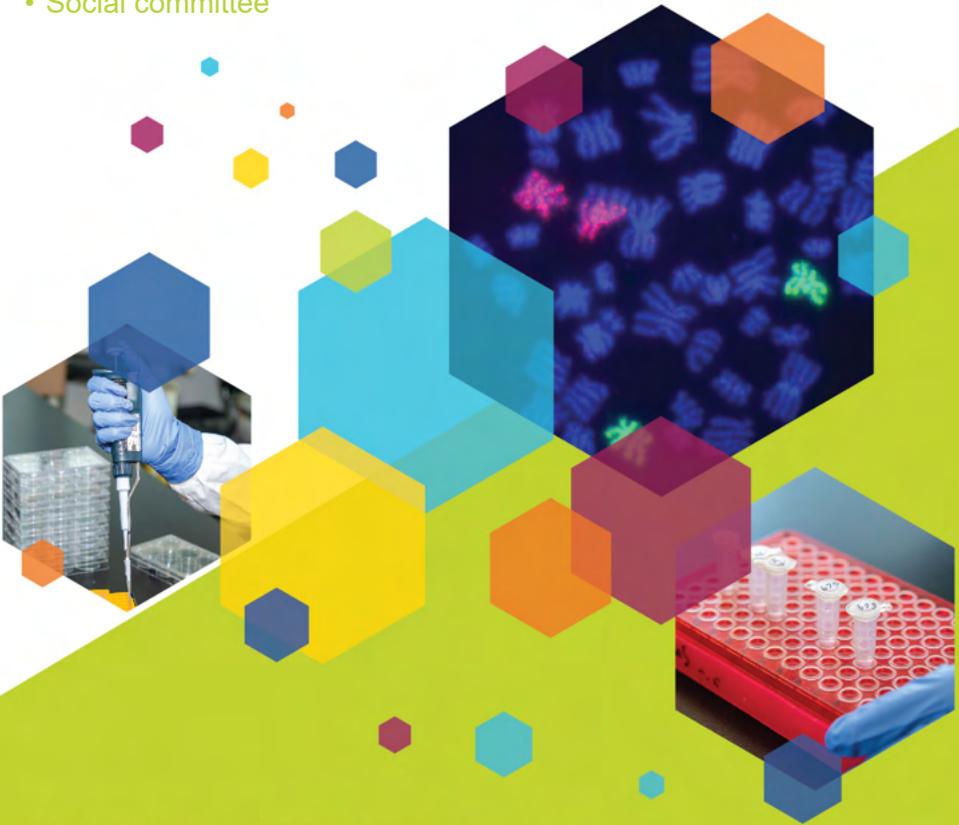
Students in their final year will be scheduled to give a talk to their centre. These are a fun opportunity to present to your friends and colleagues and should be seen as an opportunity to showcase your work. These will be organised by student admin and your graduate director.

### Thesis committee

The composition of the thesis committee will vary depending on your programme of study. It will comprise of your supervisors including a day to-day lab supervisor where appropriate, an external committee member and a Chair. The external may be from the same building, but should be independent of the supervisors. The Chair should be someone with experience of student supervision of at least Senior Lecturer level. For MScR and MD the roles of the chair and external are often combined.

# General Information

- Postgraduate transferable skills programme
- Social media
- POGS
- Social committee



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## Postgraduate transferable skills programme - Institute of Academic Development (IAD)

[www.ed.ac.uk/institute-academic-development](http://www.ed.ac.uk/institute-academic-development)

The acquisition and development of generic research and transferable skills is an important part of postgraduate training. Courses covering a wide range of skills are available to postgraduate research students in the Graduate School of Medicine & Veterinary Medicine through the transferable skills programme. This programme concentrates on the professional development of postgraduates, providing courses directly linked to postgraduate study (e.g. Thesis Workshop, Good Practice and Academic Paper Writing) and future careers (e.g. Successful Career Strategies for PhD Students, Local GRADschools). The programme also provides information on other training opportunities for postgraduates.

Courses are free of charge to postgraduate students in the College of Medicine and Veterinary Medicine. The programme has been designed to be as flexible as possible so that each student can tailor the content and timing of the programme to their own requirements. Most courses are run several times each year and last for between half a day and a day.

## Workshops for postgraduate researchers by theme

The following workshops make up the core programme open to all postgraduate researchers, and are displayed by theme.

## Research Planning and Management

- Managing your Research Project
- Practical Project Management for Research Students
- Viva Survivor
- Innovation School
- Managing your Research Data

## Communication and Impact

- Designing Effective Slides
- Public Speaking, Networking and Engaging
- Poster Production
- Presenting made Easy – Presentation Techniques
- Presenting Made Easy – Delivering Presentations
- Presenting your Poster Pitch
- Research, Researchers and the Media, a hands on approach to communicating your research

## Writing and Publishing

- Academic writing peer review
- Beating Writers Block
- Developing a Writing and Publishing Strategy in the Internet Age
- Effective Writing: Grammar
- How to be your own best editor
- Is my writing 'Academic' Enough?
- Just Write
- Proof Reading
- Text, Coherence, Structure and Argumentation
- The Writing Process: Getting Started
- Writing a Literature Review
- Writing Abstracts
- Writing Clinic
- Writing for Publication
- Writing Retreat
- Writing Well: Language and Style
- Academic Writer – Creative Writer
- An Introduction to Copyright and Publishing
- This is what I do... and this is why it matters

## Digital and Library Skills

- Beginners Guide to Imaging
- Searching Literature and Managing Bibliographies
- Managing a Bibliography in Endnote
- Finding Academic Literature
- Social media for impact: strategy, connecting & metrics

## Statistics

- Statistical Consultancy 1:1 Session
- Introductory Statistics for Life Scientists

## Personal Effectiveness

- Conference and Events Organising
- Creating Effective Collaboration
- Creative Problem Solving for Researchers
- Imposter Syndrome: Why Successful people often feel like frauds
- Ease the Load – Feel good about your busy life
- How to be an Effective Researcher
- Mapping your Mind
- Seven Secrets of a Highly Successful Research Student
- Simply Assertive
- Speed Reading
- Teambuilding and Leadership Fundamentals
- Think Strategically Respond Rapidly
- Managing your Work, your Goals and Yourself

## Public Engagement

- Communications Toolkit for a Public Audience
- Dialogue: Public Engagement Beyond Public Lectures!
- Storytelling Techniques for Effective Communication
- Voice and Presentation Skills Workshop
- How to Design a Public Engagement Process
- Facilitation skills for public engagement
- An Introduction to Public Engagement

## Online learning

PhD student online training courses (topics include statistics; imaging; academic writing; and data management). Some you can do any time, and others run at specific times of the year.

- Statistics courses
- Imaging for scientists
- Academic writing
- Research Ethics and Integrity - an introduction
- Data management training
- Ready to research

The Edinburgh Local GRADschool is open to all PhD students in their final or penultimate year of study:

[www.ed.ac.uk/institute-academic-development/postgraduate/doctoral](http://www.ed.ac.uk/institute-academic-development/postgraduate/doctoral)

## Advice on using social media networks & confidentiality of information

Facebook, Twitter and other social media networks have changed the way we interact with each other and like them or not, they are a part of our society.

As some of you will carry out research where animals are involved, please ensure that you follow procedures to ensure our work continues to be ethical, credible and professional. Sharing images/discussions of animal work outside of the context of academic discourse is not appropriate. This not only applies to posts on social network sites but to informal discussions in the pub or on the bus.

## Please remember you must not post the following information:

- Scientific research information, analysis, results or any other information and /or images relating to your work.
- Location details of research buildings where animal work is carried out.

## Be mindful of your responsibilities

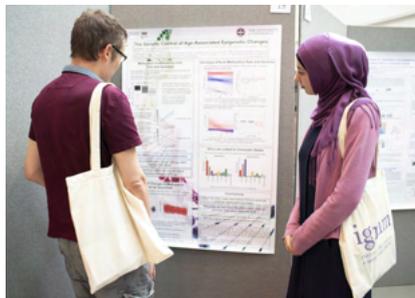
- Data Protection legislation - do not disclose other people's personal information without prior permission.
- Be aware that any posts you make in a professional capacity (even private posts) are subject to data protection and freedom of information and may need to be disclosed.
- University policies apply: Students must not post materials about their work and locations if doing so would carry a risk to themselves and especially to others, including the University as an organisation (see section 5 University policies).

[www.ed.ac.uk/website-programme/training-support/guidelines/social-media](http://www.ed.ac.uk/website-programme/training-support/guidelines/social-media)



## POGS

The Postgraduate Society (POGS) is a student-run committee open to the Institute students from all years and centres. Our aim is to improve the student experience, promote collaboration, provide support and have fun! By organising events throughout the year we bring students together, helping them develop skills and career perspectives. Our most popular events include the annual student retreat, Burns Night ceilidh, pub quiz, poster evening, and careers event. All students are welcome to take part so don't hesitate to come say hi!



POGS is jointly funded by the Institute and the Deanery, which means (almost) all of our events are completely free! Joining the POGS committee is a great way to get involved with the Institute community, and have your say on how events are run. Meetings are held approximately once a month, and we are always looking for new committee members. To get involved, contact us at: [pogs@igc.ed.ac.uk](mailto:pogs@igc.ed.ac.uk).



## Buddy Session by POGs

The buddy session is to provide new students with a pair of buddies who are in the final years of their PhD. The buddies are there to answer any Institute-related questions the new students have and provide help with any problems that might arise. At the buddy session small groups of students will be assigned to two buddies who will have your academic email address. The buddies will introduce themselves and get to know their students, share with them their email address and their offices so you will be able to find them anytime you want to speak to them. Follow up sessions will be organised by the buddies later in the year to catch up on students progress settling into the Institute.



**Best wishes, POGS**

## The Institute Social Committee

We are a group of students, research assistants and post-docs from across the Institute of Genetics and Cancer who enjoy organising social events that are open to all at the institute. Our aim is to get everyone from the community together to unwind and have fun after work. We run many events, including the monthly TGIFs where we provide snacks and drinks in the nucleus on the last Friday of every month. Other highlights of the year include the Institute Quiz, Christmas Party, Burns Night Ceilidh, and many more... We meet roughly once a month on an informal basis and you can be flexible with which events you help with. We are always looking for new members and being on the committee gives you an opportunity to work on your organisational and volunteering skills. Great for your CV!

If you have an idea for an event or you just want to help run our calendar, look out for our Join Social Committee meeting coming soon. Alternatively, you could send us an email at [social-comm@igc.ed.ac.uk](mailto:social-comm@igc.ed.ac.uk), or get in touch with one of our members.

You can find us and our current events schedule on the Institute of Genetics and Cancer intranet.

**We look forward to hearing from you!**



## Useful Links



# GRADUATE RESEARCH & TRAINING

HANDBOOK 2021

## Useful links

### General

College PG Office contacts

<https://www.ed.ac.uk/medicine-vet-medicine/postgraduate/contact-us/>

College PG research wiki (includes PG handbook, software available to students etc.)

<http://edin.ac/2crLMTx>

Code of Practice

<https://www.ed.ac.uk/institute-academic-development/postgraduate/doctoral/advice-support/regulations>

Assessment regulations

<https://www.ed.ac.uk/files/atoms/files/2019-postgraduateresearch.pdf>

Transferable skills training and support

[www.ed.ac.uk/schools-departments/institute-academic-development/postgraduate/doctoral](https://www.ed.ac.uk/schools-departments/institute-academic-development/postgraduate/doctoral)

### Searching the literature/ bibliographic management

A tool for running daily searches

<http://pubcrawler.gen.tcd.ie/>

A free online alternative to Endnote and Reference Manager

[www.zotero.org/](http://www.zotero.org/)

(note also that many journals have free apps for browsing abstracts).

### Research Ethics

General

[www.pnas.org/content/86/23/9053.full.pdf](http://www.pnas.org/content/86/23/9053.full.pdf)

Image manipulation

[www.jci.org/articles/view/21717/pdf](http://www.jci.org/articles/view/21717/pdf)

[www.cell.com/abstract/S0092-8674\(06\)00676-3](http://www.cell.com/abstract/S0092-8674(06)00676-3)

<http://jcb.rupress.org/content/166/1/11.full>

### Writing papers, giving talks

Advice on writing papers

[www.nature.com/nature/journal/v467/n7317/full/nj7317-873a](http://www.nature.com/nature/journal/v467/n7317/full/nj7317-873a)

How to give a good talk

[www.sciencedirect.com/science/article/pii/S1097276509007424](http://www.sciencedirect.com/science/article/pii/S1097276509007424)

How to give a bad talk

[www.sciencedirect.com/science/article/pii/S0960982299802929](http://www.sciencedirect.com/science/article/pii/S0960982299802929)

Useful advice ranging from lab techniques to giving talks and posters

<http://bitesizebio.com>

The Advice Place, Potterrow Reception, EUSA  
5/2 Bristo Square, Edinburgh EH8 9AJ

Tel: 0131 650 2656

<https://www.eusa.ed.ac.uk/>

### Advice Guides and Resources

Here you can read all of our advice guides. If you would like them in an alternative format, please contact us and we will do our utmost to accommodate this.

# MRC Human Genetics Unit 4 Year Programme

- Introduction to programme
- Projects available
- Rotation timeline



**GRADUATE  
RESEARCH  
& TRAINING**  
HANDBOOK 2021

## The first six months

The HGU PhD program is following an exciting and innovative format. You will spend the first 6 months on an intensive training period leading up to your final choice of PhD project. This period comprises taught courses, talks from individual group leaders about their work, teaching sessions on a variety of topics from technology to clinical research, journal club sessions which will give you a chance to hone your analytic and presentation skills, and 2 rotation projects. The detailed timetable can be found in the handbook.

The choice of rotation projects is up to you (available projects are listed at the end of this section) and you can approach any relevant group leader to discuss the projects. You will see that there is some time between rotations, giving you a chance to look around and choose a new lab. The only formal constraint is that you must spend time in 2 different labs. You may find, of course, that another student has already been accepted and that the PI is only willing to take on one student (as is normally expected of PIs). If this happens then try again in the next rotation period; if there is a real clash then Nick Gilbert will help but do please try and resolve things between yourselves in the first instance. Bear in mind that there is no formal requirement for you to choose a PhD project in a lab in which you have done a rotation project, the rotations are just a chance for you to try different labs and projects out.

Many of the group leaders welcome students coming to their lab meetings which is a good way of seeing life in labs other than the ones where you are doing rotation projects, but please be sure to make contact with the appropriate PI in advance.

## The PhD

After 2 rotations you will choose a PhD project. We will have individual meetings with you to discuss your choices in the event of any clashes. No supervisor will be able to take on more than one student, HGU students must choose projects within the HGU, but apart from this you can go to any lab within the available project section. It is up to you to discuss possible projects with PIs you are interested in; this is a dynamic process in which you should be fully engaged. Note that supervisors are not obliged to take you on, you need to ask whether they are willing, or whether they have other interested students and so on. If your research project involves the use of animals or human participants, work must not commence until the relevant Home Office project and personal licences have been awarded, and appropriate Local Ethical Approval Committee has been granted. We will not be producing PhD project outlines from supervisors. Rather, at the PhD 10 week stage (June) you will have to produce a short report that outlines the project that you will pursue. This will then be discussed and refined if necessary by your supervisors (more detailed guidelines are given under Assessment Procedures). You will then spend 3 years in the lab, winding up by April of your final year. You will then have a further 6 months to write up your thesis but remember it is imperative that you submit your thesis by the final university deadline of September of year 4!

We hope that this novel structure for PhD study will be as exciting for you as it has been for us to develop it. We will be asking for your feedback at several stages of the course - please feel free to air your views, and approach us about any issues you have, and help us to make the HGU PhD programme a huge success!

**Nick Gilbert**

## Lab Rotations

Each student will do 2 rotation projects of around 3 months. Contact details and summaries of research interests of eligible supervisors are all given in this booklet (note there are some people unable to take students for rotations, please check), and during the first week you will be hearing research talks by some of these PIs.

The choice of rotation projects is up to you - you are responsible for approaching potential supervisors to discuss their willingness to take you on and to jointly come up with a plan of work. Remember the project won't be formally assessed as part of your PhD, so make the most of your time to experience different techniques, and get a feel for life in different labs.

The only formal constraint is that you must spend time in 2 different labs. You may find, of course, that another student has already been accepted and that the PI is only willing to take on one student (as is normally expected of PIs). If this happens then try again in the next rotation period; if there is a real clash then one of us will intervene but do please try and resolve things between yourselves in the first instance. Bear in mind that there is no formal requirement for you to choose a PhD project in a lab in which you have done a rotation project, the rotations are just a chance for you to try labs out.

At the end of each rotation you have to write a report about your project, to be handed in by the end of the week after you finish in that lab. This should be in the format used by journals such as those on Biomedcentral, i.e. divided up into brief sections of background, results and conclusions and no longer than two sides of A4 (excluding figures).

This abstract should be submitted to the Institute of Genetics and Cancer PGSC by emailing:

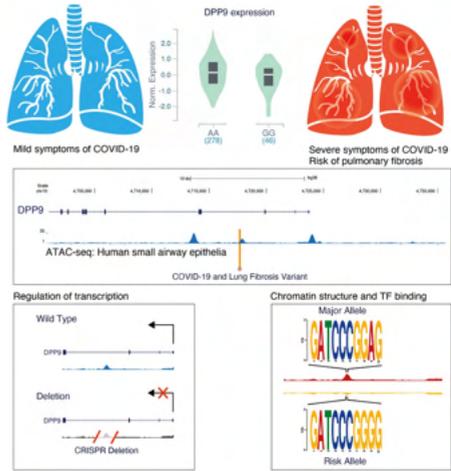
[student.admin@igc.ed.ac.uk](mailto:student.admin@igc.ed.ac.uk)

Supervisors will be asked for feedback on your performance in the lab and we will ask to meet up with you if there are any concerns. Towards the end of each rotation you will give a short assessed talk about your mini-project.

**Functional genomics in lung disease**

**Supervisor: Dr Simon Biddie**

Common genetic variation between people has been linked to risk of many diseases by genome-wide association studies (GWAS). However, identifying the causal mechanisms has been challenging because most variants lie in the non-coding genome, and the relevant cell type for functional analysis is not often clear. These rotational projects will focus on non-coding variants in DPP9 (Dipeptidyl Peptidase 9) which have been shown by GWAS to increase risk of severe COVID-19 and lung fibrosis. The projects will utilise human small airway epithelial cells to understand the regulatory control of DPP9 expression and the contribution of genetic variants to chromatin structure and transcription factor binding. Such variant-to-function analyses will help understand disease mechanisms and drive novel therapeutic developments.



**Project 1: Wet-lab Project**

**Rotation Oct-Dec**

We will determine how a regulatory element, containing the genetic variant associated with COVID-19 and lung fibrosis, controls DPP9 gene expression – a critical step to deciphering the functional role of the genetic variant. We will use CRISPR-mediated genome engineering to delete DPP9 regulatory elements in human small airway epithelial cells and analyse the effect on transcription.

**Project 2: Wet-lab project**

**Rotation Jan-March**

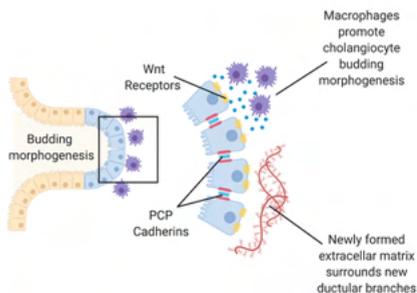
We will assess the functional impact of genetic variants in DPP9 on chromatin structure and transcription factor binding at regulatory elements. Using chromatin immunoprecipitation in human small airway epithelial cells, which are heterozygous for the DPP9 major and risk alleles, we will analyse allelic imbalance, using histone marks for active regulatory elements and transcription factor binding.

## Functionally defining the extracellular signals that regulate bile duct morphogenesis and cancer

**Supervisor: Dr Luke Boulter**

**Rotation Jan-March**

The bile duct is a complex network of tubes in the mammalian liver. Following injury, the bile duct can regenerate, but how it does this is poorly understood. Our lab is interested in how tubular structures grow in the mammalian adult in response to injury and how, if left unchecked, these tubular (re)growths develop into aggressive and often lethal cancers. This PhD project will use a combination of 3D cell culture, mouse models and human patient tissue to functionally investigate the changes that occur in the extracellular matrix during bile duct injury. We will ask how these changes promote ductular regeneration and branching during repair and then determine whether these processes are deregulated to promote tumour growth.



## RNA quality control at the endoplasmic reticulum

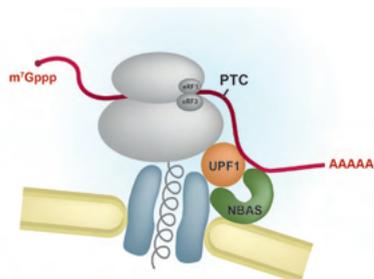
**Supervisor: Prof Javier Caceres**

**Day to Day Supervisor: Dasa Longman**

**Rotation Oct - Dec**

**Rotation Jan-March**

Nonsense-mediated decay (NMD) is a translation-dependent RNA quality control mechanism that occurs in the cytoplasm. We have recently identified an NMD pathway at the endoplasmic reticulum (ER) that provides quality control of ER-translated mRNAs (1). We propose that this ER-NMD pathway is instrumental to control the cellular stress response that is misregulated during ageing and neurodegeneration. We will focus on the mechanism and physiological role of this novel ER-NMD pathway, as well as on the biological consequences of manipulating its activity.



**Figure legend.** The ER-localized NMD factor NBAS recruits the core NMD factor UPF1 to the membrane of the ER and activates an ER-dedicated NMD

Professor Javier F. Caceres Research Group  
www.ed.ac.uk/mrc-human-genetics-unit

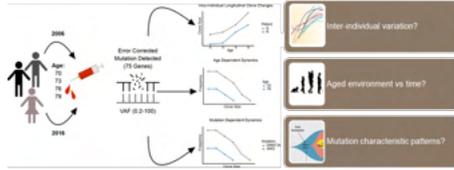
1- Longman et al. (2020) Identification of a localized nonsense-mediated decay pathway at the endoplasmic reticulum. *Genes Dev* 34: 1075-1088

**Molecular assessment of clonal haematopoiesis and the risk of blood cancer**

**Supervisor: Dr Tamir Chandra**

**Rotation Oct-Dec**

**Rotation Jan-March**



No prior experience needed. This project is pure dry lab or a mix between dry (2/3) and wet lab (1/3).

This multidisciplinary project will allow the student to interact with a number of collaborating labs: Marsh lab (Functional annotation of new mutations), Schumacher lab (Modelling), Kirschner lab (Glasgow, Stem cell assays), Marioni lab (Phenomics).

Age is the single biggest factor underlying the onset of many haematological malignancies. Age-dependent myeloid bias and the onset of clonal haematopoiesis (CHIP) predispose to leukemias. CHIP is apparent in the general population from age 60 with a steady increase in prevalence to 18-20% (2% variant allele frequency (VAF)). CHIP is driven by somatic mutations in leukemic driver genes.

Our group has previously studied CHIP in the Lothian Birth Cohort, and shown that the affected participants exhibited significantly accelerated ageing characterised by several published human epigenetic clocks (Robertson et al, 2019).

Whilst some of the key genetic drivers of CHIP have been well characterised, we still lack a comprehensive understanding of its pathogenesis: including understanding the co-drivers and subsequent biological contexts that allow its development; to the mechanisms that allow it to confound distal disease pathologies. The student will work on newly described mutations and their consequences as well as extending our analysis to the Generation Scotland dataset – containing the genotypes and phenotypes of thousands of Scots - to improve our understanding of CHIP in this large prospective cohort.

The Marsh lab will guide the student with annotating the effects of unknown/newly discovered mutations. Functional follow-up with the help of modelling stem cell kinetics (Schumacher) and in vitro stem cell assays (Kirschner). The student will use the breadth of available phenotypic data to conduct a comprehensive understanding of the drivers of CHIP. The correlation to phenomics data will be in collaboration with the Marioni lab.

## How does cellular senescence contribute to human ageing and disease?

**Supervisor: Dr Tamir Chandra**

**Rotation Oct-Dec**

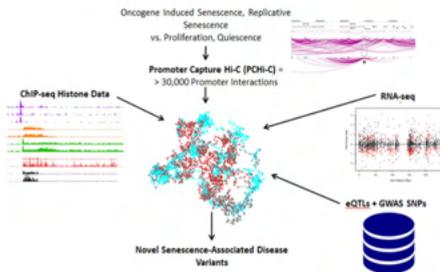
**Rotation Jan-March**

Some prior experience in data analysis is an advantage here. This project is pure dry lab or a mix between dry (1/2) and wet lab (1/2), and will allow the student to interact with collaborating labs: Vallejos lab (Bayesian approaches, statistical learning), Marioni lab (Epi-/Genetic epidemiology), Crow (Translational medicine).

Replicative senescence is the finite capability of cells to proliferate and offers a cellular model with which to study organismal ageing. Additional cellular models of ageing exist, such as cells from either progeroid syndromes or old individuals, and cells in which senescence has been induced by oncogene activation or high levels of DNA damage.

The area of senescence has recently been energised by observations, in mouse, that clearance of senescent cells (senolysis) leads to improved health outcomes and an extension of healthy lifespan. Early results of senolytic studies of premature ageing phenotypes were promising, leading to investigations of acute pancreatitis, lung fibrosis and type-2 diabetes.

Nevertheless, directly implicating senescence in human disease has proved a major challenge, because to date most evidence



has emerged from cell culture or mouse models. As a dry-lab project, the student will use in-lab generated senescence-specific signatures to identify senescence driven human traits by integrating large cohort and molecular data. As a wet-lab project the student will investigate the functional role in senescence of mutated genes discovered by the Crow lab in the clinic.

### Aims

**Dry:** A) Determining the contribution of senescence to human diseases so as to prioritise those for further research and senolytic intervention. B) Estimating the senescence burden across human tissues and ageing, and assessing its associations with predispositions, risk factors and human phenotypes (PheWAS).

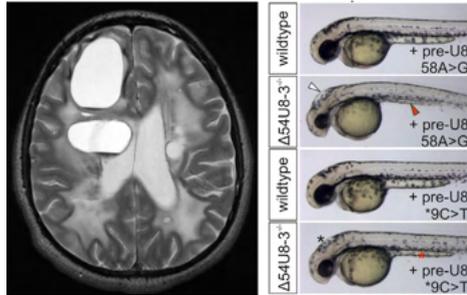
**Wet:** A) Why and how do gene mutations disorders associated leading to enhanced type I interferon signalling modulate the senescence response?

**Exploring the role of the snoRNA U8 in human health and disease**

**Supervisor: Prof Yanick Crow**

**Rotation Oct-Dec  
Rotation Jan-March**

Evolutionarily conserved, ribosome biogenesis is required for protein production in all cells. Transcribed as a precursor, ribosomal RNA is processed and modified by small nucleolar RNAs (snoRNAs). This project will explore the role of snoRNAs in health and disease through a focus on the box C/D snoRNA U8, informed by our identification (Nat Genet 2016;48:1185-92) and characterisation (Am J Hum Genet 2020;106:694-706) of mutations in SNORD118, encoding U8, as the cause of a devastating Mendelian neurological disease. With an eye to translation, you will use both wet-lab and bioinformatic approaches to define the molecular and cellular biology of U8.

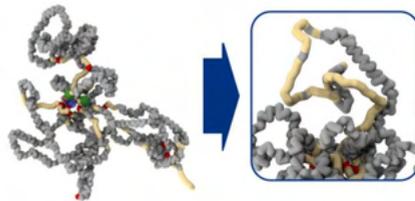


**How does DNA supercoiling regulate gene-gene communication?**

**Supervisor: Prof Nick Gilbert**

**Rotation Oct-Dec  
Rotation Jan-March**

In mammalian cells motors that act on DNA, such as RNA polymerase, overwind the DNA in front of the polymerase (positive supercoiling) and underwind the DNA behind (negative supercoiling) (Gilbert & Allan, 2014). Previously we have shown that there is a close relationship between transcription and topoisomerase activity regulating DNA supercoiling (Naughton et al., 2013) and we hypothesised using simulations that DNA supercoiling can propagate from one gene to neighbouring genes and activate transcription (Brackley et al., 2016). In this project we will test this hypothesis in mammalian cells by activating gene expression and examining the properties of nearby genes. This will address a fundamental question in molecular biology and indicate whether genes can communicate with each other through supercoiling Naughton C, Avlonitis



N, Corless S, Prendergast JG, Mati IK, Eijk PP, Cockroft SL, Bradley M, Ylstra B, Gilbert N. Transcription forms and remodels supercoiling domains unfolding large-scale chromatin structures. Nat Struct Mol Biol. 2013 Mar;20(3):387-95. PMID: 23416946.

Gilbert N, Allan J. Supercoiling in DNA and chromatin. Curr Opin Genet Dev. 2014 Apr;25(100):15-21. PMID: 24584092.

Brackley CA, Johnson J, Bentivoglio A, Corless S, Gilbert N, Gonnella G, Marenduzzo D. Stochastic Model of Supercoiling-Dependent Transcription. Phys Rev Lett. 2016 Jul 1;117(1):018101. PMID: 27419594.

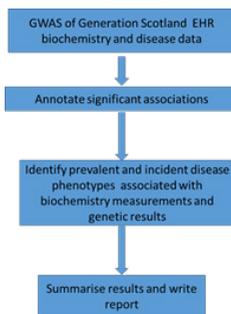
## Analysis of Electronic health record data in Generation Scotland

**Supervisor: Prof Caroline Hayward**

**Rotation Oct-Dec**

**Rotation Jan-March**

This project involves the analysis of data extracted from Electronic Health Records (EHRs) available for the Generation Scotland Biobank. The data is ready for analysis. The project will initially require a genome-wide association (GWAS) of up to 50 clinically important biochemical measurements and diseases using imputed genotype data. Annotation of the significant results will use FUMA and several other appropriate data interpretation platforms. The impact of any significant findings on prevalent and/or incident disease will be explored in phenotypes derived from the extensive



health related data available for Generation Scotland. This project will enable the development of skills in the use of various analysis pipelines and R packages as well as use of several bioinformatics databases.

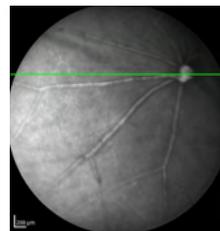
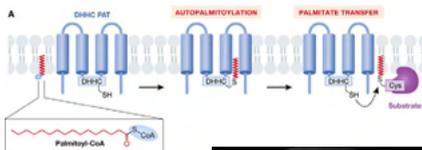
## Protein Palmitoylation in Development and Disease: Regulation of the epigenome, protein trafficking and cell death in the retina

**Supervisor: Dr Toby Hurd**

**Rotation Jan-March**

Protein acylation, covalent attachment of fatty acids to proteins, is a fundamental post-translational modification (PTM) impacting protein function, regulating protein stability, enzymatic activity, protein-protein interactions and protein trafficking. One such acylation event, protein palmitoylation, is emerging as a dynamic signalling PTM fundamental to development, homeostasis and disease.

We have identified the palmitoyl transferase ZDHHC5 as playing an essential role in the retina. Little is known about the function of ZDHHC5, including its substrates, but it has been implicated in regulating necroptosis and histone methylation, two processes identified as being dysregulated in inherited



retinal dystrophies. This PhD project will use a combination of cell culture and mouse models to investigate the function of ZDHHC5 in the retina and beyond, with the goal of understanding the role palmitoylation plays in both homeostasis and disease and whether the pathway can be targeted for therapeutic intervention.

**How is cell number controlled during development to determine size?**

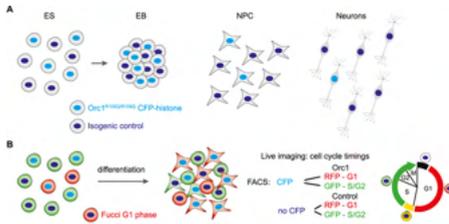
**Supervisor: Prof Andrew Jackson**

**Rotation Oct - Dec**

1. The greatest difference between mammals is size, determined by cell number. Underlying this are decisions to proliferate or differentiate and exit cell cycle, with mammals intermingling proliferation and differentiation(1). We have identified many genes that cause extreme growth failure in humans(2) and we want to understand how they determine size. The project will investigate the effect of mitotic and DNA replication proteins on cell fate decisions using both cell and developmental biology approaches.

2.1.M. N. Hall, M. Raff, G. Thomas, Cell growth: control of cell size. (Cold Spring Harbor Laboratory Press, 2004), vol. 42.

3.2.A. Klingseisen, A. P. Jackson,



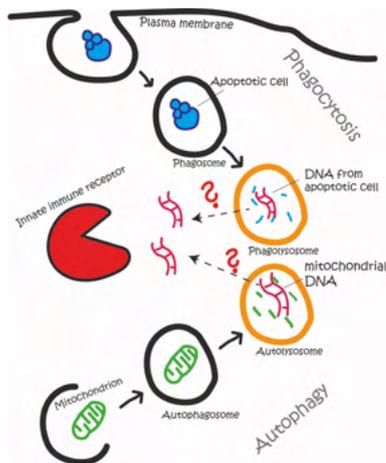
Mechanisms and pathways of growth failure in primordial dwarfism. Genes & development 25, 2011-2024 (2011).

**DNA leaks as a source of inflammation**

**Supervisor: Prof Andrew Jackson**

**Rotation Jan-March**

As a first line of immune defence, cells contain sensors recognizing pathogen-derived nucleic acids. Such pattern recognition receptors are also triggered by our own DNA inadvertently leaking into the cytoplasm. We have found ruptured micronuclei to be an important source of such DNA (Mackenzie et al., Nature, 2017). Investigating other self-sources for these immuno-stimulatory nucleic acids would form the basis of a PhD employing cell biology approaches, alongside immunological techniques. For the miniproject you would investigate DNA leakage from endolysosomes arising from phagocytosis, using co-culture, live cell microscopy, RT-PCR and ELISA assays.



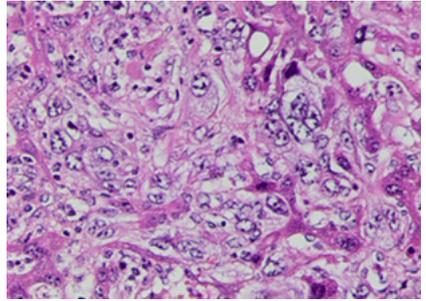
**Detecting early oncogenesis and mutational landscapes from temporal H&E and IHC slides from an in vivo model of liver cancer**

**Supervisor: Dr Ava Khamseh**

**Rotation Oct-Dec**

**Rotation Jan-March**

In recent years, neural network and in particular deep learning techniques have been developed for histopathological diagnosis and prognosis of cancer. State-of-the-art techniques in the field are now attempting to move beyond classification of stage of cancer but also towards detection of the mutational landscapes underlying the tissues and cells of interests. In this project, starting with such techniques, we wish to further determine how early these mutations



can be detected in neoplastic/pre-cancerous tissues and if the various mutations can be distinguished at such an early stage.

This cross-disciplinary project is done in close collaboration with Luke Boulter and Peter Bankhead.

**Evolutionary trajectories of mutation as biomarkers for patient stratification in high grade serous ovarian cancer**

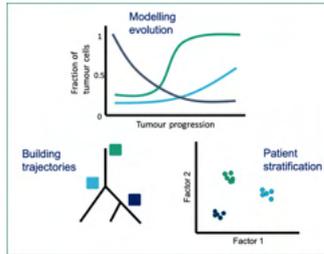
**Supervisor: Dr Ailith Ewing**

**Rotation Oct-Dec**

**Rotation Jan-March**

This is a computational project exploiting and developing methods combining bioinformatics and statistical modelling to interrogate whole genome sequencing (WGS) data from high grade serous ovarian cancer, generated in collaboration with the Gourley lab (gynae-oncology) and the Semple lab (bioinformatics). The student will join an exciting collaboration at the IGC with close links with AstraZeneca and the NHS. A major source of variation between tumours is the order of mutation accumulation throughout tumour progression. Interrogating tumour genomes that harbour many DNA rearrangements is computationally challenging and modelling mutational evolution requires statistical methodology.

High grade serous ovarian cancer (HGSOC) constitutes 75% of over 600 ovarian cancer diagnoses in Scotland annually and is usually diagnosed at an advanced stage. Although HGSOC is often initially responsive to platinum-based chemotherapy the majority



of patients relapse with platinum resistant disease. This is a major clinical challenge for treatment of this disease. The goal of this project is to stratify patients according to disease progression, treatment response and prognosis by the evolution of the mutational landscape in their tumour genomes. The student will cluster somatic mutations by their frequencies to identify possible orderings of mutation throughout tumour development. We can combine these orderings from across our existing large combined cohort of 324 tumours to understand which orderings are more or less likely and crucially to identify subgroups of tumours who develop similar patterns of mutation. These subgroups can then be related the clinical data available for these individuals to investigate potential links with clinical outcome.

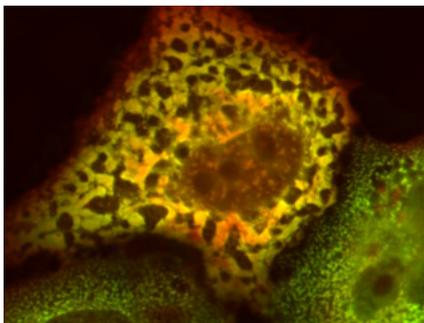
### High-throughput discovery of disease mutations by in vivo deep mutational scanning

**Supervisor: Dr Grzegorz Kudla**

**Rotation Oct-Dec**

**Rotation Jan-March**

Understanding which mutations lead to disease is a central goal of modern biology and medicine. Deep mutational scanning is a new approach that combines synthetic biology, next generation sequencing and computational analysis to systematically measure the effects of all possible mutations in a selected gene. So far, deep mutational scanning experiments were typically conducted in tissue culture. In collaboration with the Boulter and Khamseh labs, we will



perform deep mutational scanning of tumour suppressor genes in an animal model of carcinogenesis, to explore the mechanisms of cancer formation in a physiological setting.

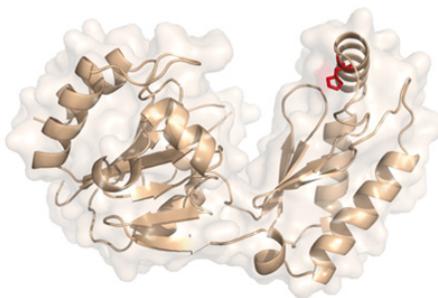
### How do mutations in proteins cause genetic disease?

**Supervisor: Dr Joe Marsh**

**Rotation Oct-Dec**

**Rotation Jan-March**

This project will use computational techniques to study how mutations in a specific protein or protein family can be associated with different disease phenotypes. Specifically, the student will use structural bioinformatics and molecular modelling in order to understand the effects of mutations at a molecular level, and computational variant effect predictors to assess mutations for their likely severity. Ultimately, the goal is to determine the best tools and strategies for identifying novel pathogenic mutations in the protein of interest. Note that this project can be tailored to the student's level of computational experience.



### Developmental pathways in melanoma

**Supervisor: Prof Liz Patton**

**Rotation Oct-Dec**

**Rotation Jan-March**

Melanoma is the most lethal form of skin cancer, yet despite progress for melanoma therapy in the past decade, most patients with metastatic melanoma still die from the disease. Using zebrafish models of melanoma, our lab has recently discovered that melanocyte developmental pathways are critical for melanoma progression and survival, and that sub-populations of cells exist in melanoma that are characterised by expression of early neural crest genes (Travnickova, Wojciechowska et al., Cancer Research 2019; Johansson, Marie et al., Dev Cell 2020). PhD projects in our lab will use



zebrafish genetics, live imaging and single-cell RNA-sequencing to identify and target novel cell populations in development and in melanoma models, and directly relate these to human melanoma datasets and tissues. Rotation projects are available for dry-lab (e.g. analysis of new scRNA-seq datasets) and for wet-lab science.

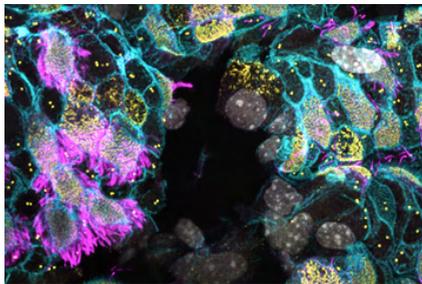
### Investigating centriole-specific proteostasis by centriolar satellites

**Supervisor: Dr Pleasantine Mill**

**Rotation Oct-Dec**

**Rotation Jan-March**

Centrioles are small barrel-like microtubule-based structures, which function as key microtubule organizing centres of the cells and are dynamically regulated with cell cycle. They play dual roles in (i) stabilising mitotic spindles during cell division and (ii) templating cilia, which protrude from the cell membrane and act as signaling antennae. Cilia and centrioles are highly modified in different cell types with diverse tissue-specific structures and functions. Mutations leading to dysfunction of this ciliogenesis program underlie a group of human genetic disorders termed the ciliopathies.



unclear, especially given the relatively tiny size of the centrioles within the massive volume of the cell. This project will look at the in vivo role of membraneless organelles called centriolar satellites in the timely delivery and removal of key molecular regulators using live cell and quantitative imaging as well as proteomics in a mouse model with key ciliopathy features.

How levels and localisation of key players involved in controlling these dual roles of centrioles in cell division and ciliogenesis is

## Transcriptional States during early tumourigenesis

Supervisor: Prof Colin Semple

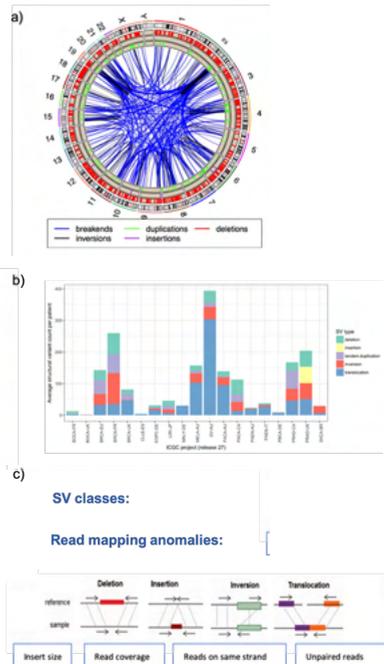
Rotation Oct-Dec

Rotation Jan-March

As members of the Liver Cancer Evolution (LCE) consortium we have studied early tumourigenesis in four murine strains (N~800), the combination of these in vivo models has proved to be a well controlled and powered system providing fundamental insights into tumour biology (Aitken et al, 2020). Unpublished LCE data suggest that malignant transformation results from a combination of MAPK activating driver variants (as in human HCC) at the proteomic level, combined with distinct states of dysregulated expression, involving widespread promoter activations and alterations to splicing. Preliminary analysis (Figure 1) indicates that consistent alterations to transposable element activation may drive these effects. However, these unusual phenomena remain under-studied.

This computational project aims to characterise the extent of transposable element activation in early tumours, and study how this contributes to transcriptional and splicing variation in genes of interest. These expression features may then be related to particular driver variants carried by tumours to discover novel patterns of co-occurrence or mutual exclusivity, shedding new light on the interactions between driver variants and expression states during tumour formation.

Aitken SA, Anderson CJ, Connor F, Pich O, Sundaram V, Feig C, Rayner TF, Lukk M, Aitken S, Luft J, Kentepozidou E, Arnedo-Pac C, Beentjes S, Davies SE, Drews RM, Ewing A, Kaiser VB, Khamseh A, López-Arribillaga E, Redmond AM, Santoyo-Lopez J, Sentís I, Talmanc L, Yates AD, Semple CA, López-



Bigas N, Fliceck P, Odom DT, Taylor MS. 2020. Pervasive lesion segregation shapes cancer genome evolution. Nature 583: 265-270.

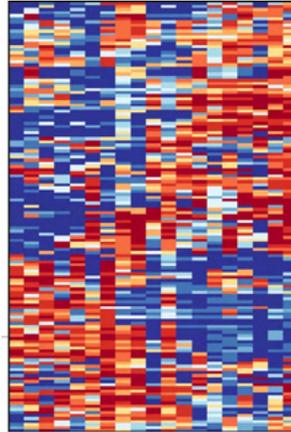
Figure 1: Transposon activation in early liver tumourigenesis. Differential expressed (DE) repeat element families are seen between early (dysplastic nodule) liver tumours carrying driver mutations in the Braf gene and matched normal samples. Repeat families including virus-like 30 (MMVL30) and the MMVL30 flanking sequence RLTR6 are upregulated, while SINE elements B3 and B4A, many of which are intronic, are downregulated.

### Determining the frequency and causes of human epimutations

Supervisor: Dr Duncan Sproul

Rotation Oct-Dec  
Rotation Jan-March

The sequencing of human genomes has revealed that a surprising number of inactivating mutations occur in apparently healthy people. Rare cases of disease-associated epimutations have also been described at tumour suppressor genes such as MLH1, MSH2 and BRCA1. These apparent epimutations are frequently associated with rare genetic changes but their causative mechanisms are unknown, and their frequency in the general population is unclear. We will use data from locally available cohorts to understand the frequency and stability of rare epimutations in human populations. These will be followed up using genome editing approaches to dissect the mechanisms responsible for their occurrence.



### Understanding gene expression in the human cortex

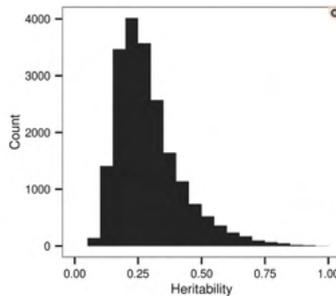
Supervisor: Prof Albert Tenesa

Rotation Oct-Dec  
Rotation Jan-March

**Summary:** DNA methylation levels is tissue-specific and determined by genetic and environmental factors. We have collected 120 human cortex and measured methylation levels at over 500,000 CpG sites as well as genotyped the samples at over 500,000 SNPs.

**Aims:** The project will identify cis eQTLs and perform TWAS on brain related conditions in UK Biobank.

Learning outcomes: Processing big data, basics of quantitative genetics, in silico identification of putative causal genetic variants.



Distribution of the estimated heritability for DNAm sites significantly associated with local genetic variation. Each bar represents a range of 0.05.

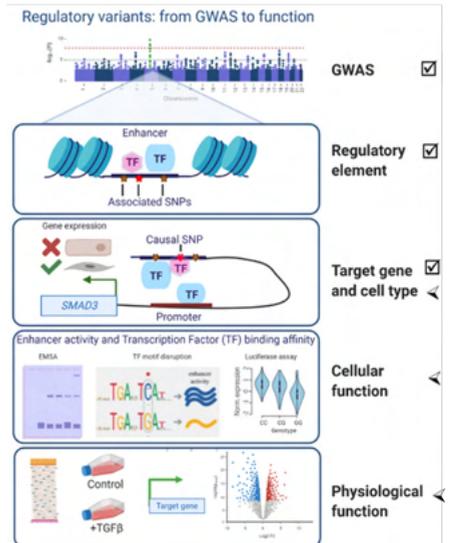
## Functional analysis of GWAS region associated with keratoconus

Supervisor: Dr Veronique Vitart

Rotation Oct-Dec

Rotation Jan-March

You will characterise a genomic regulatory region associated with corneal thickness and keratoconus, a progressive disease affecting young adults. We think the causal variant modulates SMAD3 via a mechanism resembling that published for another locus affecting SMAD3, associated with coronary artery disease. Using cell-type and allele-specific assays you will assess how candidate causal variants may exert their effect. Spatio-temporal function for the regulatory region implicated could be further examined using animal models. This project inserts itself in the larger thematic research the lab is interested in, namely establishing functional link between GWAS implicated loci within and across medically-relevant traits.



## Chromosome condensation proteins in development and disease

Supervisor: Dr Andrew Wood

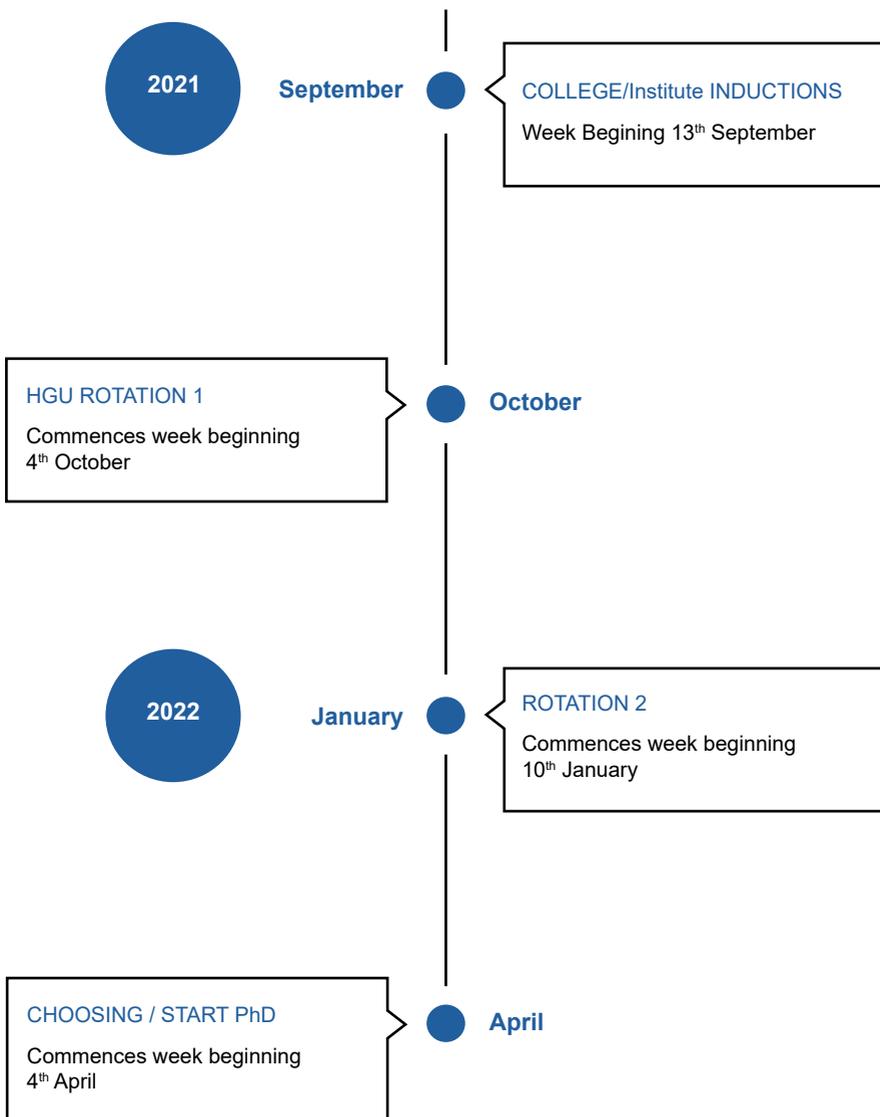
Rotation Oct-Dec

Rotation Jan-March

As cells prepare to divide, the genome undergoes dramatic changes in structure that are driven by DNA-dependent motor-proteins called condensins. We showed that incorrect execution of this process can cause genomic rearrangements and cancer. You will work with CRISPR-engineered cells and transgenic mice that were developed in our laboratory, which allow condensin functions to be visualised and disrupted during normal tissue development. Our goal will be to understand how abnormal chromosome structure affects development and disease in different tissue environments.



Training Timeline 2020 - 2021



## Vacation Leave

Students can take up to eight weeks' vacation time in a year, with agreement from their supervisor. There is no need to apply for an interruption of study when taking vacation leave.

## Sick Leave

The policies on sick leave are evolving and depend on your funder. Please check information from your funding organisation or contact your programme director or Student Admin for advice.

## Pastoral Support Committees

From September 2021 all students will be assigned a Pastoral Support Committee. This is completely independent of your thesis committee and will comprise two postdoctoral 'mentors' who will be based in different research teams and centres from you. The Pastoral Support Committee is there for to ask for advice, help, anything that you feel is not best addressed to your supervisor or thesis committee. The committee can meet as often as you like but at least once per year. Minutes won't be taken from the meetings but we will ask the committee to let us know when they have met.

Further information can be found on the IGC Graduate Research and Training website: <https://www.ed.ac.uk/institute-genetics-cancer/igc-graduate-research-and-training/information/student-pastoral-support-committees>

## Student Support

The Institute of Genetics and Cancer is a family, looking out for each other. We are excited that you are becoming part of our family. If you need any local support a good place to start is with you supervisor. They will understand your situation and will want to look out for you. Alternatively please contact student admin ([student-admin@igc.ed.ac.uk](mailto:student-admin@igc.ed.ac.uk)) or one of the postgraduate directors (Nick Gilbert, Val Brunton, Kathy Evans) and more information about different types of support is available at the back of this handbook.

Edinburgh university has lots of expertise in looking after students and a good place to start is the student Health and Wellbeing webpage: [www.ed.ac.uk/students/health-wellbeing](http://www.ed.ac.uk/students/health-wellbeing).

# Student Health and Wellbeing

## Feeling Good App



The Foundation for Positive Mental Health is Working with the University of Edinburgh to provide free access to the Feeling Good App.  
[www.ed.ac.uk/student-counselling/self-help/apps](http://www.ed.ac.uk/student-counselling/self-help/apps)  
-podcasts-ted-talks-relaxation-recordings/feeling-good-app

## Membership to the Consent Collective



Online support materials on consent, sex, gender, sexual harassment and relationships.  
[www.consentcollective.com/edinburgh](http://www.consentcollective.com/edinburgh)

## Student Disability Service



Supports students with a range of health conditions, learning differences, disabilities and some temporary injuries.  
[www.ed.ac.uk/student-disability-service](http://www.ed.ac.uk/student-disability-service)

## Student Counselling Service



Supports the mental health of all students at the University through short term counselling and referral to other support.  
[www.ed.ac.uk/student-counselling](http://www.ed.ac.uk/student-counselling)

## Advice Place



Professional, impartial and inclusive service for all students at the University of Edinburgh.  
[www.eusa.ed.ac.uk/support\\_and\\_advice/the\\_advice\\_place/](http://www.eusa.ed.ac.uk/support_and_advice/the_advice_place/)

## University Health Centre



NHS General Practitioners who rent premises from the University and offer full G.P. services to patients.  
[www.health-service.ed.ac.uk](http://www.health-service.ed.ac.uk)

## Chaplaincy



The Chaplaincy is a safe and welcoming space for people of all faiths and none. Chaplaincy offers a range of support including Mindfulness, Yoga and the Listening Service.  
[www.ed.ac.uk/chaplaincy](http://www.ed.ac.uk/chaplaincy)

## EUSA Mental Health and Wellbeing Society



Provides an informal and friendly space where students can learn more about the importance of mental wellbeing.  
<https://www.eusa.ed.ac.uk/>

## SilverCloud



Online cognitive behavioural therapy.  
[www.ed.ac.uk/student-counselling/what-is-silvercloud](http://www.ed.ac.uk/student-counselling/what-is-silvercloud)

## Togetherall



An online service offering self-help programmes, creative outlets and a peer support community monitored by mental health professionals.  
[www.togetherall.com/en-gb/](http://www.togetherall.com/en-gb/)

If you would like to discuss student health and wellbeing or any of the resources above, please contact: [student-admin@igc.ed.ac.uk](mailto:student-admin@igc.ed.ac.uk)



WELLBEING  
AT IGC

# MENTAL HEALTH DURING YOUR PhD

AN OPINION PIECE BASED ON SOME RESEARCH I DID IN MY LUNCH HOURS AND MY ENTIRELY UNQUALIFIED EXPERIENCE\*

47%

A study by the University of California, Berkeley, found nearly half of postgraduate students met criteria to classify them as depressed.<sup>1</sup>

## WHAT YOU MAY BE EXPERIENCING/FEELING (YOU ARE NOT ALONE, I PROMISE)

### IMPOSTER SYNDROME



Someone is going to figure out you don't belong here soon. You look good on paper, but passing that exam was a fluke. I don't have what it takes to [do these experiments, write a thesis, succeed in academia]. These are all classic signs of imposter syndrome. **Tip:** reframe your thinking. Aim for progress not perfection.

### NO MORE TICK BOXES



You got pretty good at doing essay and lab reports - they were all short term tasks. You also got good at figuring out what questions might be asked in exams. Now you have an open ended project, with the end nowhere in sight. You no longer have grades to tell you if you are doing a good job. Transitioning from this undergraduate mentality can be particularly tough. **Tip:** break down your research into small, manageable goals.

### FIRST TIME FAILING

You've always been the best student at school, and you did pretty well at university too. Now your science isn't working and everyone around you seems to be getting on just fine. These feelings can come about as at undergraduate level, experiments (believe it or not) are designed to work. **Tip:** remember, you are at the forefront of scientific research - if it was easy it would already have been done!



### ISOLATION / GUILT

Writing your thesis can be a particularly lonely, isolating task. This can also be coupled with feelings of guilt when going about your daily life as "you should be writing". Tips to manage this include still attending research group meetings/departamental seminars whilst writing. This can also be coupled with "writer's block". **Tip:** when writing, start by making figures - it is far easier to write about what a figure means.



### COMPETITIVE LANDSCAPE

Unfortunately, academia often fosters competition over collaboration, when it should be the other way around. This is made worse by the fact that often the only way to gauge how well you are doing is to compare yourself against others. **Tip:** no two PhD projects are the same, so avoid comparing them.



### THE WORK | LIFE STRUGGLE

There is an inherent culture of acceptance in academia of long work hours. In fact, 40% of academics report working more than 50 hours a week.<sup>4</sup> This is a fault with the system. Presenteeism is a common trait observed in academia, where people work long hours due to anxiety/stress, but are not being efficient in these long hours. **Tip:** aim to be efficient inside normal working hours then focus on "you" time.



A hard truth is only 7 in 200 PhD graduates become full professors.<sup>5</sup> During your PhD, make sure to work on other "soft skills" as well as doing your research. Like making a poster for an online Twitter competition for example...

## ARE THOSE AROUND YOU STRUGGLING? HERE ARE SOME POSSIBLE WARNING SIGNS



INCREASED DRINKING



INCREASED EATING



DECREASED EATING



WORKING LONG HOURS



BEING ABSENT



JOKING ABOUT SUICIDE



LOOKING DISHEVELLED

SELF-HARMING?  
SUICIDAL THOUGHTS?  
CALL SAMARITANS NOW

ON 116-123

OR EMAIL JD@SAMARITANS.ORG

## SOME WAYS TO HELP MANAGE YOUR MENTAL HEALTH AND WELLBEING



### SEEK MEDICAL ADVICE

Speak to a medical professional about how you are feeling. This may lead to intervention such as medication or counselling to help you manage your mental health.



### TAKE SOME TIME OUT

Being a PhD can actually improve efficiency when you return to work. If you cannot justify taking a couple of weeks off, take a series of long weekends to get some time away.



### FOCUS ON YOU

It is a proven fact that lack of sleep can add to feelings of stress. Exercise can also work to alleviate stress. It may be like you don't have time, but going for a walk at lunchtime (if accepted) may be a positive change you can make.



### REQUEST COUNSELLING

Universities have counselling services that are available for you to use. This can be useful to talk back through your problems and also make sure appropriate coping strategies are in place.



### TALK TO YOUR SUPERVISOR

It is not always possible, but if it is best you can approach your supervisor, discuss your mental health concerns with them. Other options include discussions to reduce workload temporarily or take time out.



### TALK TO YOUR PEERS / POSTDOCS

It is highly likely that people around you have also experienced the stressful nature of a PhD. Reach out, if you feel able. Remember, academics have survived their PhD to not have some awful life coping strategies.



### CREATE MANAGEABLE CHUNKS

If something is overwhelming, try to break down your research into manageable tasks. It may help to talk this in consultation with your supervisor. A good tip is to aim to get into the lab first thing on any day, before looking at other tasks like research.



### READ LITERATURE

There are a large amount of online resources available to help manage mental health and wellbeing. For example, the Health Matters, has a range of booklets available, from how to manage stress, to how to support others with mental health problems.

As that 4th, I fear PhD is heavily affecting your mental health and wellbeing, there is absolutely no shame in quitting and starting a new chapter in your life. There are plenty of successful people that left their PhD for this reason, you might just get well with it being a while, but you wouldn't have to for 1 year!

### REFERENCES

1. Graduate Student Happiness & Well-Being Report, 2014, University of California, Berkeley
2. Sakulku, J. The Impostor Phenomenon. The Journal of Behavioral Science, 6(1), 75-97
3. Graduate survey: A love-hate relationship. Nature 500, 546-552
4. Guthrie, Susan, et al. Understanding mental health in the research environment: A Rapid Evidence Assessment. Santa Monica, CA: RAND Corporation, 2017.
5. The Scientific Century: Securing our future prosperity. The Royal Society, 2000.

A poster by Dr Zae Ayres (not a medical professional). Free to distribute.



#TIMETOTALK  
#RSCPOSTER

\*ALTHOUGH I DID SURVIVE A PhD

# Student at the Institute?

## You have a new Facebook Group!

A closed group for announcements, course materials, discussions and a place to get to know your friends and colleagues.

Join by searching Facebook for OFFICIAL IGC Students or scan the QR code.



student-admin@igc.ed.ac.uk  
[www.facebook.com/groups/OFFICIALIGCStudents](https://www.facebook.com/groups/OFFICIALIGCStudents)

Find us on 



A new Facebook Group has been created for current on-programme students at the institute. This online space is a closed group and has been created specifically for students (not staff) for announcements, course materials, discussions and a place to get to know each other.

Join by searching Facebook for OFFICIAL IGC Students or visiting: [www.facebook.com/groups/OFFICIALIGCStudents](https://www.facebook.com/groups/OFFICIALIGCStudents)

### Do I have to join the group?

Yes. We hope the group will make life easier for everyone by having all the right information and people in the same place, reducing email traffic and providing a place for resources, questions and answers.

### What if I'm not on Facebook or don't want to use my personal profile to join?

That's ok – contact us and we can help you set up a new profile, just for life at the Institute.

### What is a closed group?

Only approved members of the group can see who the current members are and view posts in the group.

Anyone on Facebook can see the group's name and description, find it through search and request to join (requests are approved or declined by Administrators), but they can't see any of the content or members.

### Who will be in the group and who moderates it?

All postgraduate students on programme at the Institute.

Pauline and Alana are the Group Administrators with the Communications Manager as Moderator. Look out for group announcements from the Administrators – these flag key information. Join requests are approved by the Administrators, so no 'outsiders' will be able to join the group.

### Can we say what we want?

Although this is your group, remember that the group represents the Institute and we expect members to behave as professionally as they would in person on campus. Inappropriate posts will be moderated and removed.