MANCHESTER 1824
The University of Manchester

Bio-Sciences International Summer School 2018
The University of Manchester

A Welcome Message from the Academic Lead of Bio-SISS 2018

Manchester Bio-Sciences International Summer School: Bio-SISS

The Faculty of Biology, Medicine and Health at the University of Manchester is delighted to offer a four-week summer school 'Bio-SISS' for undergrad students from our partner universities between Sunday 22nd July 2018 and Friday 17th August 2018.

The purpose of this summer course is to provide self-motivated international students who are studying biology or medicine with first-hand experience of cutting edge bioscience/biomedicine, in a world class learning environment that is enriched with British culture. Ranked 30th in the world, the University of Manchester has a high international standing with 25 Nobel Prize winners. We are particularly proud of our strengths in Life Sciences and Medicine disciplines.

During the 4-week summer school, students will attend science-frontiers seminars from world-leading experts, and perform experiments in our state of the art laboratories. Moreover, students will have the opportunity to improve their English writing skills from language experts, and practice their presentation skills in an academic setting to their peers and Manchester academics. In addition to the academic programme, there will also be plenty of opportunities for social activities. These will include a welcome reception and a farewell celebration (involving Manchester academics and students), and trips to local attractions such as the Tatton Park, Chester and Liverpool.

Based on the success of Bio-SISS in the last few years, we are confident that the summer school programme will give every participant a fantastic experience that will have lasting impact for the rest of their studies and career.

We look forward to welcoming you to Manchester this July.

Qing-Jun Meng

Professor and Senior Research Fellow

Academic Lead of the Bio-SISS

Contents

The Academic Programme*

Week 1: Monday 23rd July - Friday 27th July

Monday 23 July morning:
Registration

Monday 23 July afternoon:
Welcome ceremony
Star Lecture 1 (Prof Richard Grencis)

Tuesday 24 July – Friday 27 July:

Group 1: Clinical Microbiology by Dr Nicky High
(Morning activities approx: 9.30am to 12.30; afternoon activities approx. 1.30pm to 4.30pm)

Description of the practical:
To introduce students to the laboratory techniques used in Microbiology to study bacteria. Students will carry out a synthetic epidemic and learn how to identify the source of the infection. In addition they will learn how to use selective media, biochemical test and API strips to identify enteric pathogens.

Group 2: Developmental Biology by Dr Karel Dorey and Prof Enrique Amaya
(Morning activities approx: 9.30am to 12.30; afternoon activities approx. 1.30pm to 4.30pm)

Description of the practical:
The aim is to introduce students to techniques for investigating the role of growth factor signalling in cell fate decision during early development. A seminar will introduce the main molecular and cellular events leading a single cell (the egg) to become an embryo with three germ layers (ectoderm, mesoderm and endoderm). The students will have the opportunity to work with embryos from the frog *Xenopus*. They will observe their development during the course of the week from a single cell to swimming tadpoles. Using micromanipulation, treatment with chemical inhibitors / growth factors and molecular techniques, the students will ask how cell fate is controlled during early embryonic development.

Wednesday 25 July afternoon:
Social Activity
Afternoon Tea (to be confirmed)

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* The University of Manchester reserve the right to change the content of the Academic programme.

Groups for the Academic Programme will be allocated by staff from The University of Manchester.

Week 2: Monday 30th July - Friday 3rd August

Monday 30 July morning:
Star Lecture 2 (Dr Holly Shiels)

Monday 30 July afternoon – Thursday 2 August:

Group 1: Physiology by Dr Tristan Pocock
(Morning activities approx: 9.30am to 12.30; afternoon activities approx. 1.30pm to 4.30pm)

Description of the practical:
The aim is to introduce students to techniques for investigating exercise efficiency and control of breathing in human subjects.
A seminar will introduce the physiological responses of the human body to exercise and suggest why it might be useful to investigate exercise efficiency.
The students will have the opportunity to work in groups to design their own experiments to investigate differences in efficiency between different exercises. They will then test their hypotheses in the lab over two days and analyse the data obtained. Finally, students will use spirometers to mimic conditions of asphyxia and hypercarbia in order to demonstrate how breathing is controlled.

Group 2: Pharmacology by Dr Richard Prince
(Morning activities approx: 9.30am to 12.30; afternoon activities approx. 1.30pm to 4.30pm)

Description of the practical:
The aim of these activities is to provide students with an overview of some important techniques used in drug discovery and development. All of the sessions will be supported by e-learning material and I will also make available my laboratory simulation software for students to download (radioligand binding, guinea pig ileum, Xenopus oocyte two electrode voltage clamp, wire myograph).

Seminar: Overview of drug discovery and development.

Seminar: Computer methods in drug discovery

Practical session: Computer methods in drug discovery. Students will use molecular modeling software to generate 3D structures of small molecules. They will then derive a Quantitative Structure Activity Relationship (QSAR) to predict the in vivo activity of a series of hypnotic compounds.

Seminar: Analyzing the functional effects of drug molecules

Practical session: Drug actions at the rat ileum. Students will generate concentration response curves to agonists in the rat ileum organ bath preparation. They will then examine the effects of competitive antagonists on agonist responses.

Seminar: Phase 1 clinical trials and pharmacokinetics.

Practical session: Students will examine the pharmacokinetics of paracetamol in human volunteers. This experiment involves measuring the concentration of paracetamol metabolites in urine samples.

Friday 3 August:

Morning: English Language Writing Workshop 1

Description of the Workshop

This workshop focuses on how to write in a way that will gain a student marks. The workshop includes practical exercises, group activities and focused discussion, the workshop will help students identify common mistakes and enable them to eliminate them from their writing. The objective of the workshop is to help participants avoid common types of grammatical error, read critically and assess objectively, structure correctly and include critical analysis in their work.

Afternoon: English Language Writing Workshop 2

Description of the workshop:

This workshop focuses on editing your own work, enabling a student to view their work with the impartial eye of an editor. The workshop will include practical exercises, group activities and focused discussion in order to help students improve the quality of their writing. The objective of the workshop is to make participants better able to identify what makes writing a pleasure to read, phrase sentences so they are more concise, use punctuation to maximize clarity and present work in an appealing way.

Wednesday 1 August afternoon:

Social Activity

Tatton Park (to be confirmed)

Week 3: Monday 6th August – Friday 10th August

Monday 6 August morning:
Star Lecture 3 (Dr Jason Wong)

Monday 6 August afternoon – Friday 10 August:

Group 1: Genetics by Dr Kathy Hentges
(Monring activities approx: 9.30am to 12.30; afternoon activities approx. 1.30pm to 4.30pm)

Description of the practical:
Genetic linkage and mutation analysis in Retinitis Pigmentosa
The aim is to introduce students to the approaches used by genetics researchers in identifying sequence changes that cause human disease. The practical will focus on the disease retinitis pigmentosa, an adult-onset disease that displays locus heterogeneity. This means that mutations in several different genes can all cause the disease independently. Retinitis pigmentosa has autosomal dominant, autosomal recessive, and X-linked inheritance patterns. There is currently no cure, although researchers are working to develop gene therapy and stem cell therapy Programmes. Identifying the genetic mutations that cause retinitis pigmentosa helps to understand the pathology of the disease and may aid in early diagnosis.

Group 2: Cognitive Neuroscience by Dr Bo Yao and Dr Andrew Stewart
(Morning activities approx: 9.30am to 12.30; afternoon activities approx. 1.30pm to 4.30pm)

The aim is to introduce students to cornerstone techniques in Cognitive Neuroscience – namely manual responses and galvanic skin response (GSR) in adult human participants – to investigate fundamental aspects of cognition (attention and emotion). A seminar will introduce students to research in Cognitive Neuroscience, with a specific focus on perceptual processing, attention, and emotion, and common techniques used to assess these aspects of cognition. Students will then work in small groups to identify a research question of their choosing for an experiment investigating the interaction between processing of emotional socially-relevant stimuli (human faces). Students will modify an existing computer program, collect response-time and accuracy data, and analyse those data over the next few days. Students will also have the opportunity to visit the Galvanic Skin Response (GSR) lab, to measure unconscious emotional arousal. Students will also have the opportunity to observe/participate in existing experiments taking place in the Division of Neuroscience and Experimental Psychology, if they wish.

Wednesday 8 August afternoon:
Social Activity
Chester (to be confirmed)

Week 4: Monday 13th August – Friday 17th August

Monday 13 August morning:
Star Lecture 4 (Prof Keith Brennan)

Monday 13 August afternoon – Thursday 16 August:

Group 1: Biochemistry by Dr Hui Lu
(Morning activities approx: 9.30am to 12.30; afternoon activities approx. 1.30pm to 4.30pm)

Description of the practical:
Enzyme kinetic studies of alcohol dehydrogenase
Students will carry out various experiments to study enzyme kinetic properties of alcohol dehydrogenase using spectroscopic methods. They will learn how to analyze their data and determine the two key enzyme kinetic parameters (V_{max} and K_m); and investigate how various factors affect enzyme kinetics. This unit will help students enhance their experiment skills, data analysis and mini-project design abilities.

Group 2: Clinical Sciences by Dr Tracey Speake
(Morning activities approx: 9.30am to 12.30; afternoon activities approx. 1.30pm to 4.30pm)

Description of the practical:
The aim is to introduce students to different techniques used to examine the expression of specific proteins in tissue samples. Students will also have the opportunity to research the experimental protocols to be used during the week and design the experimental protocol. Techniques include preparation of experimental solutions and tissue sections, microscopic organization of the tissue, immunohistochemistry and Western analysis. Having completed the experimental protocols, students will have the opportunity to analyse and interpret the data obtained.

Friday 17 August:
(9am-1 pm)

Poster presentation/ competition!
Award of completion certificate
Wrap up – social event, farewell lunch/drinks with Bio-SISS teachers and Manchester students

Group Work on poster presentation:

- Students will be divided into groups of 5-6.
- Whenever possible, we will allocate students from the same University into a group because they have shared lab modules.
- Two optional poster topics: 1) An academic poster on a selected lab module or Star Lecture at students' choice; 2) A poster that highlights some aspects of students' UK experience.
- Each group is required to nominate a chair, who will be a main point of contact, and will be overall responsible for assembling the group, leading discussion within the group, and ensuring timely completion of the poster.
- You are expected to make your poster at your own time.
- Requirement: please make your posters using powerpoint, portrait style.

- Further advice on how to make a good poster will be given during Dr. Holly Shiels' star lecture session (Monday of week 2).
- We sponsor each participating group the printing cost of ONE A0 size poster.
- Group presentation will be on 17th Aug (provisionally 9-11 am). All students are expected to participate and present their posters, addressing questions from poster judges and their peers.
- All posters will be judged and scored, with a small number of posters chosen for Best Poster Prizes.

Wednesday 15 August afternoon:
Social Activity
(to be confirmed)

Bio-SISS Teaching Staff

Professor Qing-Jun Meng: Academic Lead for Bio-SISS 2018 and Arthritis Research UK Senior Research Fellow
Profile: https://www.research.manchester.ac.uk/portal/qing-jun.meng.html

Professor Qing-Jun Meng completed his MD and PhD in China, followed by post-doctoral training (at the University of Manchester) on biological clocks. In 2009, Qing-Jun was awarded a MRC Career Development Award Fellowship and started his own research group, focusing on circadian clocks, ageing and age-associated diseases. In 2015, Qing-Jun was awarded the Arthritis Research UK Senior Research Fellowship to continue his work into the roles of circadian clocks in health and disease of the musculoskeletal system.

Professor Keith Brennan: Professor of Developmental Signaling and Associate Dean for Internationalisation
Profile: https://www.research.manchester.ac.uk/portal/Keith.Brennan.html
(Star Lecturer 4)

Professor Keith Brennan works within the Division of Cancer Sciences within the Faculty of Biology, Medicine and Health. After completing postdoctoral research at the University of Cambridge and Cornell University Professor Brennan returned to the University of Manchester to establish his own laboratory and take up a Welcome Trust Research Career Development Fellowship. Professor Brennan's research focuses on the role Notch signaling plays in cancer and how the signaling pathway controls cellular behaviors.

Professor Robert (Bob) Ford: Chair in Structural Biology, Founder and Academic Co-Lead for Bio-SISS 2018
Profile: http://www.manchester.ac.uk/research/robert.ford

Professor Ford's research centres on the understanding of the structure of a class of proteins that are found in biological membranes. We have studied a variety of different proteins. The most recent developments in our research have involved the application of new methodology for cryo-electron microscopy of in-situ crystalline arrays to large membrane protein complexes. These have been used to obtain medium resolution structures for this class of proteins. Over the past 10 years our research interests have extended to membrane proteins that are involved in pumping drugs out of cells (multi-drug resistance proteins). Professor Ford's project work involves the use of Biochemical and Biophysical approaches in order to better understand Biological Structures.

Professor Richard Grencis

Profile: http://www.mig.ls.manchester.ac.uk/people/richardgrencis/

(Star Lecturer 1)

Professor Grencis gained his Batchelor's degree in Zoology at the Univeristy of Nottingham in 1979. He then moved to the University of Glasgow to study for his Ph.D at the Wellcome Laboratories for Experimental Parasitology. He moved to the MRC Experimental Parasitology Group, Dept of Zoology,University of Nottingham in 1982 where he undertook postdoctoral research until 1987. In 1987 he was appointed Lecturer in Immunology in the School of Biological Sciences at the University of Manchester and following promotion to Senior Lecturer and Reader, became Professor of Immunology in 1998.

Dr Holly Shiels

Profile: https://www.research.manchester.ac.uk/portal/Holly.Shiels.html

(Star Lecturer 2)

Dr Shiels completed her PhD in Physiology in Canada before completing postdoctoral studies at Stanford University and the University of Leeds. In 2004 Dr Shiels joined the University of Manchester as a Lecturer. Dr Shiels is now a senior Lecturer in the Division of Cardiovascular Sciences and focuses her research on cardiac physiology. Dr Shiels employs a range of techniques to understand cardiac function from molecular biology to cellular cardiology to in vivo and in vitro indices of contractility. Techniques currently being used include electrophysiology; confocal and epi-florescence microscopy; gene cloning; Western Blot; immunocytochemistry and immunohistochemistry and tension measurements in single myocytes in response to both mechanical (stretch) and chemical (physiological ligands) perturbation.

Dr Jason Wong

Profile: https://www.research.manchester.ac.uk/portal/jason.k.wong.html

(Star Lecturer 3)

Dr Wong is an Academic Consultant in Plastic Surgery at the University Hospital of South Manchester and Honorary Senior Lecturer at the University of Manchester. He has been involved in studying the biology of injury, tissue regeneration, biomaterials and tissue engineering in the limb for the last 12 years. His subspecialty interest is Reconstructive Microsurgery specifically managing complex wounds, major limb trauma and limb salvage. His current work involves development of a vascularised tissue and skin engineering platform for the treatment of chronic wounds. He was awarded one of the first Walport/NIHR Clinical Lecturer posts in Plastic Surgery and was supported by an Academy of Medical Sciences/ Wellcome Trust Starter Grant. He is currently funded by the Royal College of Surgeons, Federation of Societies for Surgery of the Hand and is Co Investigator on an MRC Grant for Novel Tendon attachments. Jason currently co-leads the Trauma domain for Experimental Medicine and Discovery with the Manchester Academic Health Science Centre (MAHSC) and is a founding member of the Innovations Group in the British Association of Plastic and Reconstructive and Aesthetic Surgeons (BAPRAS). He also is on their lead panel for the Delphi Process defining research needs in Plastic Surgery in the UK.

Lead academics for lab work:

Week 1
Group 1: Clinical Microbiology
Dr Nicky High
Profile: http://www.manchester.ac.uk/research/nicky.high/

Dr High is a leading scientist in the area of microbiology in relation to medicine and disease. Her particular interests focus on Haemophilus influenzae (one of the etiological agents of bacterial meningitis) and Helicobacter pylori (which causes gastric ulcers). Funded by the Wellcome Trust, her group use molecular genetic techniques to understand the key factors determining the virulence of the above microorganisms.

Week 1
Group 2: Developmental Biology
Dr Karel Dorey
Profile: https://www.research.manchester.ac.uk/portal/Karel.Dorey.html

Dr Karel Dorey gained his PhD at the European Molecular Biology Laboratory in Heidelberg, Germany before completing Post- doctoral Fellowships at Lincolns Inn Fields laboratories in London, The University of Cambridge and The University of Manchester before becoming a senior lecturer in the School of Biological Sciences. In Karel's laboratory they investigate how molecular mechanisms control the activity of intracellular signalling pathways downstream of RTKs during Xenopus development. This work places us in a unique position to elicidate how RTK signalling controls cell shape (or "unicellular morphogenesis"). In the longer term, we aim to use this knowledge to improve spinal cord repair and regeneration following injury.

Professor Enrique Amaya
Profile: https://www.research.manchester.ac.uk/portal/Enrique.Amaya.html

Profesor Amaya completed his PhD at the University of California before completing a Postdoctoral fellowship in the Department of Molecular and Cellular Biology at the same institution. Dr Amaya completed further Fellowships at the Salk Institute for Biomedical Research in La Jolla USA and at The University of Cambridge. Since 2005 Enrique has worked for The University of Manchester as the Healing Foundation Professor within the Faculty of Biology, Medicine and Health.

Week 2
Group 1: Physiology
Dr Tristan Pocock
Profile: http://www.manchester.ac.uk/research/Tristan.Pocock/

Dr Pocock completed his PhD in Manchester in 1998. He then spent some time as a Post-doc, studying the effects of VEGF on microvascular permeability before returning to Manchester in 2004. Since then he has been a Teaching-Focused Lecturer in Physiology and Pharmacology. He is a Programme Director for the Biomedical Sciences course and lead for both medical OSCEs and the Year 1 Student-selected Component (SSC). He teaches extensively on the medical programme and also on the pharmacy, nursing and Life Science programmes. He coordinates Human Biology practical units for 1st and 2nd level students. He is a Problem-Based Learning tutor to medical students and an academic advisor.

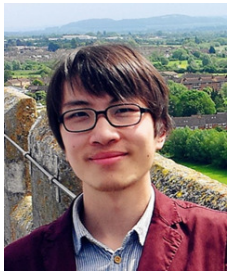
Week 2
Group 2: Pharmacology
Dr Richard Prince
Profile: http://www.manchester.ac.uk/research/richard.prince/

Dr Prince is a Senior Lecturer at the University. After a first degree in biochemistry, he completed his Ph.D. in pharmacology at the University of London. He followed this with a post-doctoral fellowship in toxicology at Duke University, USA and a Senior Research Fellowship in Physiology and Biophysics at Mayo Clinic, USA. He joined the University of Manchester in 1998 as a lecturer in pharmacology. Dr. Prince is one of the principal teachers of pharmacology theory in the Faculty and is a former Programme Director for the B.Sc. Pharmacology degree. His expertise is in the field of receptor biology and he has a strong interest in ligand-gated ion channel structure and function.

Week 3
Group 1: Dr Kathy Hentges
Profile: https://www.research.manchester.ac.uk/portal/Kathryn.Hentges.html

Dr Hentges is a Senior Lecturer at the University. She obtained her PhD at Duke University USA and joined the University of Manchester in 2004. Her research examines the causes of congenital heart defects including projects to determine how the cells of the heart form a complete coronary vascular network during embryonic development. Understanding the process of coronary vessel formation will promote the discovery of treatments for heart disease. Dr Hentges also coordinates all undergraduate tutorials and specializes in the teaching of genetics for undergraduate students.

Week 3
Group 2: Cognitive Neuroscience
Dr Bo Yao
Profile: **https://epiclab.weebly.com/**



Dr Yao is a Lecture at the University of Manchester. He obtained his PhD in Psychology from University of Glasgow. Research in the Yao Lab explores how the brain and the body interactively contribute to social communication. Dr. Yao's research broadly falls within the domains of Cognitive Neuroscience, Cognition and Social Neuroscience. His current research is funded by the Economic and Social Research Council. His focus is to understand the neural mechanisms and the emotional consequences of hearing inner voices during silent reading of speech quotes. By studying inner voice experience in healthy adults, his group hope to also gain insights into auditory verbal hallucinations in schizophrenic patients. Dr Yao's other interests include conceptual processing and indirect language communication.

Dr Andrew Stewart
Profile: https://www.research.manchester.ac.uk/portal/Andrew.J.Stewart.html

Dr Stewart is an experimental psychologist with a focus on experimental pragmatics. Dr Stewart's current research projects include how readers understand meaning that is implied by a linguistic utterance (rather than that which is conveyed explicitly), the mechanisms by which conditional information is processed and mentally represented, and (more generally) how implied meaning is integrated across sentences. Dr Stewart's research involves the use of eye-tracking to examine moment by moment processing.

Week 4
Group 1: Biochemistry
Dr Hui Lu
Profile: https://www.research.manchester.ac.uk/portal/Hui.Lu.html

Dr Lu obtained her PhD in Oxford University and held a prestigious Royal Society Research Fellowship. She is a Lecturer at the University. Her research interest is to understand the process of the mitochondrial protein biogenesis, and functional mechanisms of some key enzymes or proteins involved in this process in health and disease.

Week 4
Group 2: Clinical Sciences
Dr Tracey Speake
Profile: http://www.manchester.ac.uk/research/tracey.speake/

Dr Tracey Speake graduated from the University of Southampton, UK in 1993 with a B.Sc. (Hons.) degree in Physiology and Pharmacology. She then completed her Ph.D. in Physiology (1997) at the University of Manchester, UK. During her Ph.D. studies and postdoctoral work her involvement in undergraduate education began and sparked an interest in teaching. Combining postdoctoral studies and teaching, Dr. Speake completed a Certificate in Education at Warrington Collegiate Institute in 2001. Since 2001 she has worked as a full-time Teaching Fellow in the Faculty of Life Sciences, University of Manchester, UK. Dr. Speake is extensively involved in the delivery and design of undergraduate courses for medical, dental, nursing and life science students. Her main educational interests lie in developing students' team working and reflective skills.

Chris Simms
English Writing Lead for Bio-SISS 2017 and Consultant Fellow for The Royal Literary Fund
Profile: **http://chrissimms.info/**

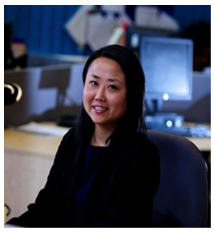
Chris Simms is a professional author based in Manchester. Chris will be available during the Summer School to provide advice on academic writing, including references, quotations and grammar. Alongside helping students, postgraduates and staff at the University of Manchester with their writing skills, Chris Simms has worked as a freelance copywriter in advertising agencies around Manchester since the early 2000s. He is also the award-winning author of a dozen compelling thrillers.

Bio-SISS Support Staff

Ben Goldblum - Faculty Student Recruitment & Marketing Manager

Ben Goldblum is the Lead for Faculty Summer Schools 2018 and is responsible for student recruitment for the Faculty of Biology, Medicine and Health.

Moyin Kwok – Senior International Recruitment and Development Officer



Moyin Kwok is the co-project manager for Bio-SISS 2018 and is responsible for international recruitment for the Faculty of Biology, Medicine and Health. Moyin is the Faculty's external liaison officer for our university partners.

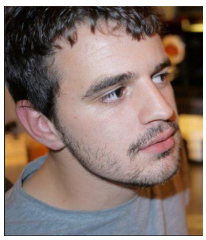
Bridget Horne – Divisional Administrator

Bridget is the co-project manager for Bio-SISS 2018 and works in the School of Medical Sciences Divisions of Cancer Sciences and Developmental Biology and Medicine.

Hannah Jordan – International Student Recruitment

Hannah is the Bio-SISS 2018 administrator. Hannah organises the work between the academic and the administrative teams, co-ordinates the pre arrival information, and arranges the invitation letters for our guests.

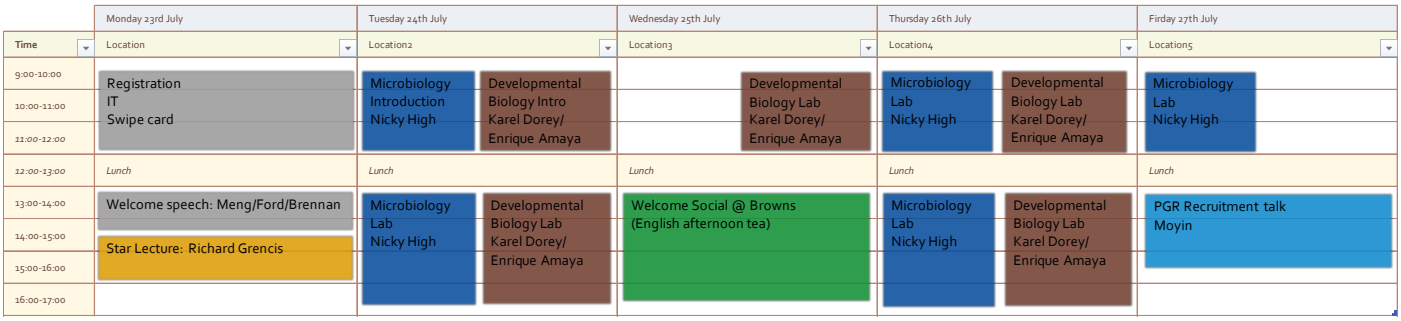
Edward Pitchford – International Recruitment Coordinator



Ed is responsible for organizing the social activities for Bio-SISS 2018. Ed Pitchford works with Moyin in the Faculty of Biology, Medicine and Health.

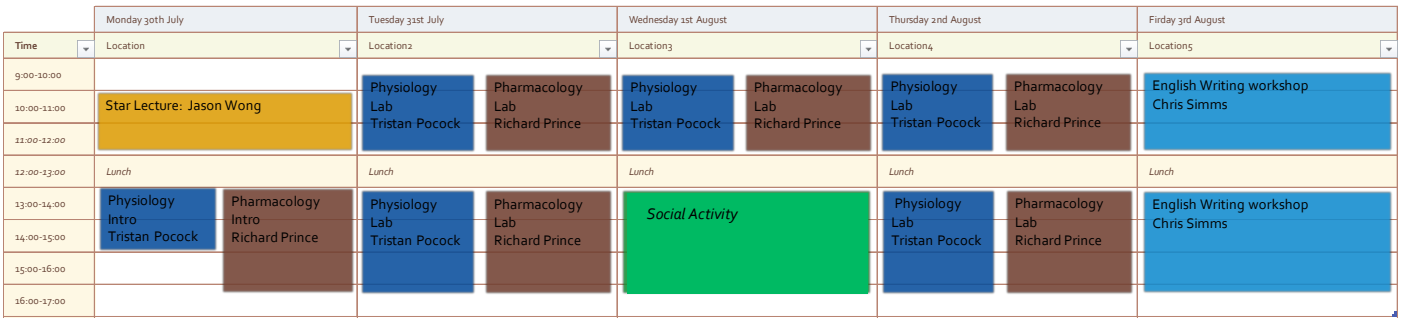
Timetable

Bio-SISS 2018, week 1



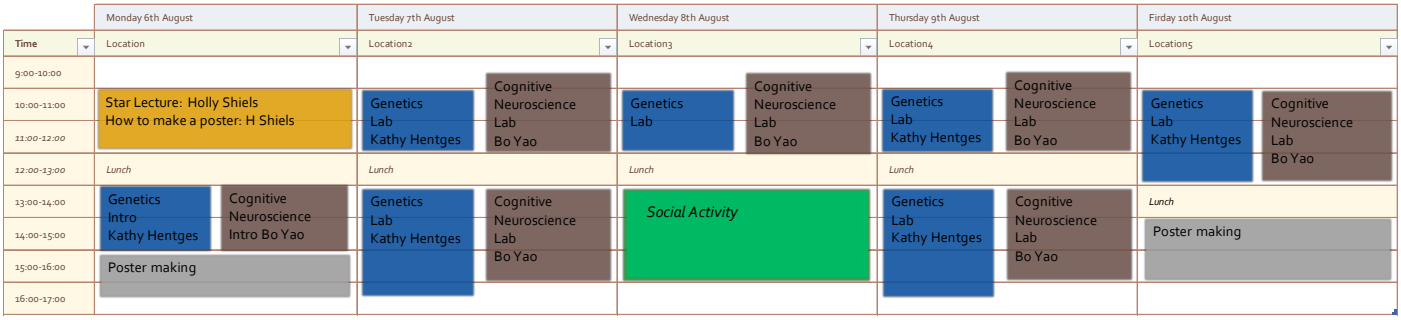
Time	Monday 23rd July Location	Tuesday 24th July Location2	Wednesday 25th July Location3	Thursday 26th July Location4	Firday 27th July Location5
9:00-10:00	Registration IT Swipe card	Microbiology Introduction Nicky High	Developmental Biology Intro Karel Dorey/ Enrique Amaya	Microbiology Lab Nicky High	Developmental Biology Lab Karel Dorey/ Enrique Amaya	Microbiology Lab Nicky High
10:00-11:00			Developmental Biology Lab Karel Dorey/ Enrique Amaya			
11:00-12:00						
12:00-13:00	*Lunch*	*Lunch*	*Lunch*	*Lunch*	*Lunch*
13:00-14:00	Welcome speech: Meng/Ford/Brennan	Microbiology Lab Nicky High	Developmental Biology Lab Karel Dorey/ Enrique Amaya	Welcome Social @ Browns (English afternoon tea)	Microbiology Lab Nicky High	Developmental Biology Lab Karel Dorey/ Enrique Amaya	PGR Recruitment talk Moyin
14:00-15:00	Star Lecture: Richard Grencis					
15:00-16:00						
16:00-17:00						

Bio-SISS 2018, week 2



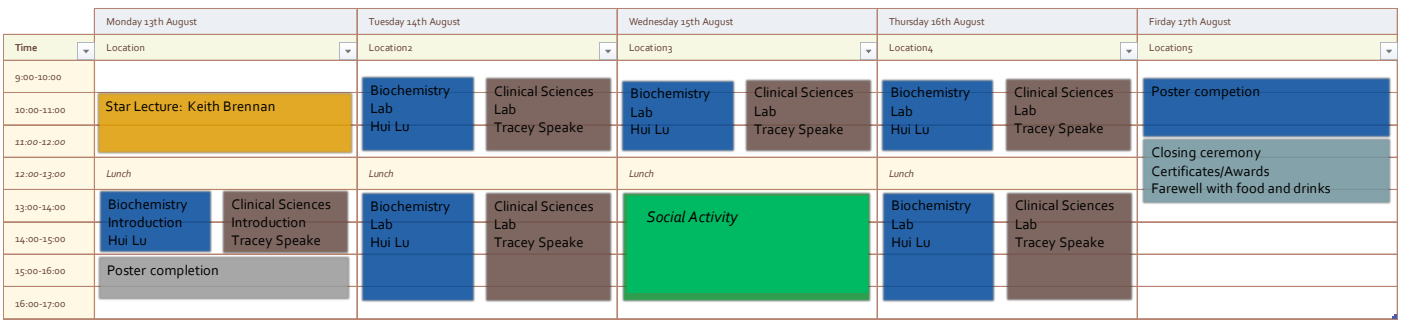
Time	Monday 30th July Location	Tuesday 31st July Location2	Wednesday 1st August Location3	Thursday 2nd August Location4	Firday 3rd August Location5
9:00-10:00		Physiology Lab Tristan Pocock	Pharmacology Lab Richard Prince	Physiology Lab Tristan Pocock	Pharmacology Lab Richard Prince	Physiology Lab Tristan Pocock	Pharmacology Lab Richard Prince	English Writing workshop Chris Simms
10:00-11:00	Star Lecture: Jason Wong					
11:00-12:00						
12:00-13:00	*Lunch*	*Lunch*	*Lunch*	*Lunch*	*Lunch*
13:00-14:00	Physiology Intro Tristan Pocock	Pharmacology Intro Richard Prince	Physiology Lab Tristan Pocock	Pharmacology Lab Richard Prince	*Social Activity*	Physiology Lab Tristan Pocock	Pharmacology Lab Richard Prince	English Writing workshop Chris Simms
14:00-15:00						
15:00-16:00						
16:00-17:00						

Bio-SISS 2018, week 3



Time	Monday 6th August Location	Tuesday 7th August Location2	Wednesday 8th August Location3	Thursday 9th August Location4	Firday 10th August Location5
9:00-10:00		Genetics Lab Kathy Hentges	Cognitive Neuroscience Lab Bo Yao	Genetics Lab	Cognitive Neuroscience Lab Bo Yao	Genetics Lab Kathy Hentges	Cognitive Neuroscience Lab Bo Yao	Genetics Lab Kathy Hentges	Cognitive Neuroscience Lab Bo Yao
10:00-11:00	Star Lecture: Holly Shiels How to make a poster: H Shiels					
11:00-12:00						
12:00-13:00	*Lunch*	*Lunch*	*Lunch*	*Lunch*	*Lunch*
13:00-14:00	Genetics Intro Kathy Hentges	Cognitive Neuroscience Intro Bo Yao	Genetics Lab Kathy Hentges	Cognitive Neuroscience Lab Bo Yao	*Social Activity*	Genetics Lab Kathy Hentges	Cognitive Neuroscience Lab Bo Yao	Poster making
14:00-15:00						
15:00-16:00	Poster making					
16:00-17:00						

Bio-SISS 2018, week 4



Time	Monday 13th August Location	Tuesday 14th August Location2	Wednesday 15th August Location3	Thursday 16th August Location4	Firday 17th August Location5
9:00-10:00		Biochemistry Lab Hui Lu	Clinical Sciences Lab Tracey Speake	Biochemistry Lab Hui Lu	Clinical Sciences Lab Tracey Speake	Biochemistry Lab Hui Lu	Clinical Sciences Lab Tracey Speake	Poster competion
10:00-11:00	Star Lecture: Keith Brennan					
11:00-12:00						Closing ceremony Certificates/Awards Farewell with food and drinks
12:00-13:00	*Lunch*	*Lunch*	*Lunch*	*Lunch*	
13:00-14:00	Biochemistry Introduction Hui Lu	Clinical Sciences Introduction Tracey Speake	Biochemistry Lab Hui Lu	Clinical Sciences Lab Tracey Speake	*Social Activity*	Biochemistry Lab Hui Lu	Clinical Sciences Lab Tracey Speake	
14:00-15:00						
15:00-16:00	Poster completion					
16:00-17:00						

Further Information

Please visit our website for further information:
https://www.bmh.manchester.ac.uk/biosiss/

Fees for four weeks
£3,200 for each participating student, which includes:

- Programme fee for academic and laboratory activities, course materials;
- 4 week, on-campus accommodation:
    - Approx. 29 nights, date to be confirmed by Unviersity of Manchester
    - Single room, shared kitchen, self catered, linen and WiFi included
    - Accommodation location and facilities to be confirmed by The University of Manchester
- Group airport transfers from Manchseter International Airport (two trips, arrival, and departure);
- Orientation and farewell events & selected social activities
- Any fees/ expenses outside the abovementioned items are not included in the fee of £3,200 per student. For example meals, pocket expenses and weekend optional sightseeing activites

Deadline date for application: Saturday 31 March 2018

Eligibility
To apply to the Manchester Summer School, we expect the following:

- You will be 18 or over on the first day of the course;
- You will be a registered undergraduate student at a tertiary institution such as a university or college. Mature students, postgraduates and recent graduates are also welcome to apply;
- You will have achieved good academic grades equivalent to GPA 3.0/4.0 (An average score of 75, or above, out of 100). Please contact us if you are not sure what the equivalent grade would be for your home institution.

English Language
If English is your second language, you should fulfil one of the following English language requirements:

- IELTS overall 6.0 with each component not less than 5.5, or its equivalent in TOEFL;
- CET-4 (minimum score of 493);
- CET-6 (minimum score of 400).