MAHSE

Manchester Academy for Healthcare Scientist Education

STP Open Day 2017
Clinical Bioinformatics

Dr Angela Davies

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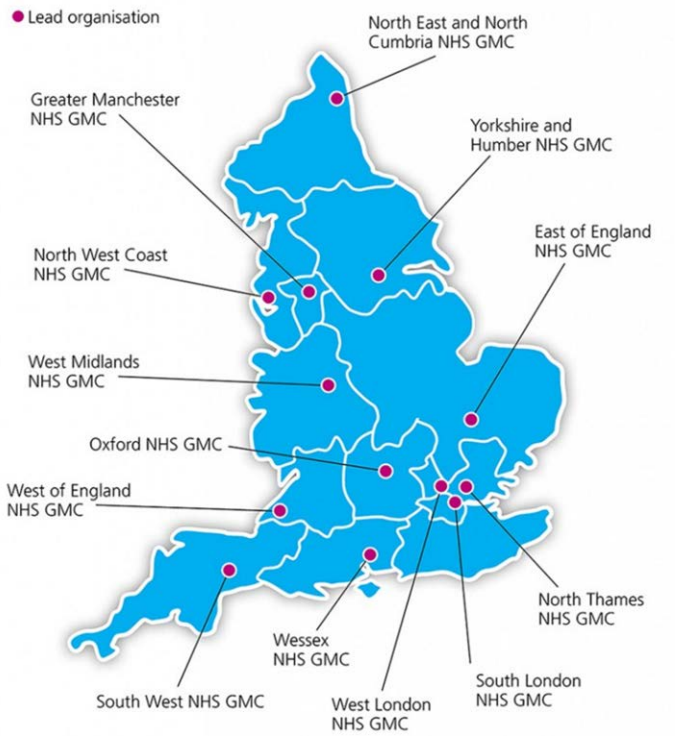
The University of Manchester

Manchester Metropolitan University

University of Liverpool

University of Salford Manchester

Genomics – Healthcare Transformation



Genomics england

Big Data Climate for Healthcare

DATA

Vast data volume, velocity, variety

TSUNAMI

METHODS & MODELS

Supra-linear growth in papers & tools

BLIZZARD

EXPERTISE

Similar number of analysts

DROUGHT

We will develop the **next generation** of **health informaticians** who will possess the **technical skills** to design and perform complex analyses and the **business** and **informatics skills** to translate the information into business intelligence.

Clinical Bioinformatician (Genomics)

- Responsible for **analysing and interpreting genomic data** and advising other scientists and clinicians to best inform patient care.
- Involved in **building the IT infrastructure** including appropriate servers, databases and pipelines to analyse the data.
- **Leadership** role in establishing best-practice for data analysis and interpretation, data storage and governance within their laboratory.
- **Communication** with **multidisciplinary teams** including clinical scientists, clinical geneticists, other specialty clinicians and genetic counsellors, and advise colleagues with respect to interpretation of genetic data that will inform patient care also **external solution providers** and training of other **staff** and **informing the public**

Clinical Bioinformatician (Health Informatics)

- You will **advise other healthcare professionals**, and **lead and develop strategies** in the following areas:
  - **Data management** - collection, quality, representation
  - **Governance** - security, patient confidentiality
  - **Systems** design and development, and technologies
  - **Data analysis**, interpretation and reporting
- Work as a **multi-disciplinary team**
- **Strong communication skills** to influence decision-making to ultimately improve the delivery of healthcare

Bioinformatician (Physical Sciences)

- Combines **computer science, statistics, mathematics**, and engineering to study and process biological data.
  - creating **computer-related interfaces** to control specialist medical equipment
  - **commissioning** (and approving) computer-related interfaces for clinical use
  - ensuring that the equipment and computer-related interfaces are continually fit for purpose
  - **constructing software**, either to model biological processes, investigations and treatments or to investigate and manipulate data produced by medical devices

Programme Staff

University of Manchester

- **Andy Brass** – *Programme Co-Director of Clinical Bioinformatics*
- **Ang Davies** – *Programme Co-Director of Clinical Bioinformatics*
- **Andrew Devereau** – *Clinical Lead of Clinical Bioinformatics*
- **Georgina Moulton** – *Pathway Lead Health Informatics*
- **Manoj Mistry & Dawn Cooper** – *Lay representatives*
- **Natalie Groves, Iain McDonald, Rosie Coates-Brown, Adam Partlow, Tim Howcroft** – *Student representatives*

University of Liverpool

- **Helen Boston** – *Pathway Lead Medical Physics*
- **Azzam Taktak**
- **Tony Fisher** – *Clinical Lead Medical Physics*

Administrators

- **Lisa McAuliffe**– *Clinical Bioinformatics*
- **Sarah Williams & Kate Evans** - *MAHSE*

Programme Structure

MSc Clinical Sciences (Clinical Bioinformatics)

MSc Clinical Sciences (Clinical Bioinformatics)			
	Year 1	Year 2	Year 3
	Introduction to Healthcare Science, Professional Practice and Clinical Leadership [20]	Research Methods [10]	
	Clinical Bioinformatics: underpinning knowledge for rotational work based training [40]		
		Genomics	
		Programming [10]	Next Generation Sequencing [10]
		Advanced Clinical Bioinformatics [10]	Information Technology for Advanced Bioinformatics Applications [10]
		Research Project in Clinical Bioinformatics [30]	Whole Systems Molecular Medicine [10]
			Research Project in Clinical Bioinformatics [30]
		Clinical & Scientific Computing	
		Clinical & Scientific Computing for the Physical Sciences 1 [20]	Clinical & Scientific Computing for the Physical Sciences 2 [30]
		Research Project in Clinical Bioinformatics [30]	Research Project in Clinical Bioinformatics [30]
		Health Informatics Science	
		Policy, Strategy and Operational Management [10]	Systems Development and Design [10]
		Co-Production of Health [10]	Information Knowledge Management [20]
		Research Project in Clinical Bioinformatics [30]	Research Project in Clinical Bioinformatics [30]
Credits			
Generic	**20**	**10**	**0**
Division/Theme	**40**	**0**	**0**
Specialism		**50**	**60**
Total	**60**	**60**	**60**

Route Map: MSc Clinical Science (Clinical Bioinformatics)

MSc trainees begin by following the generic curriculum, which spans all divisions (blue), together with some theme-specific modules (yellow). In Year 2 of the MSc, trainees specialise (orange) in genomics

http://www.networks.nhs.uk/nhs-networks/msc-framework-curricula

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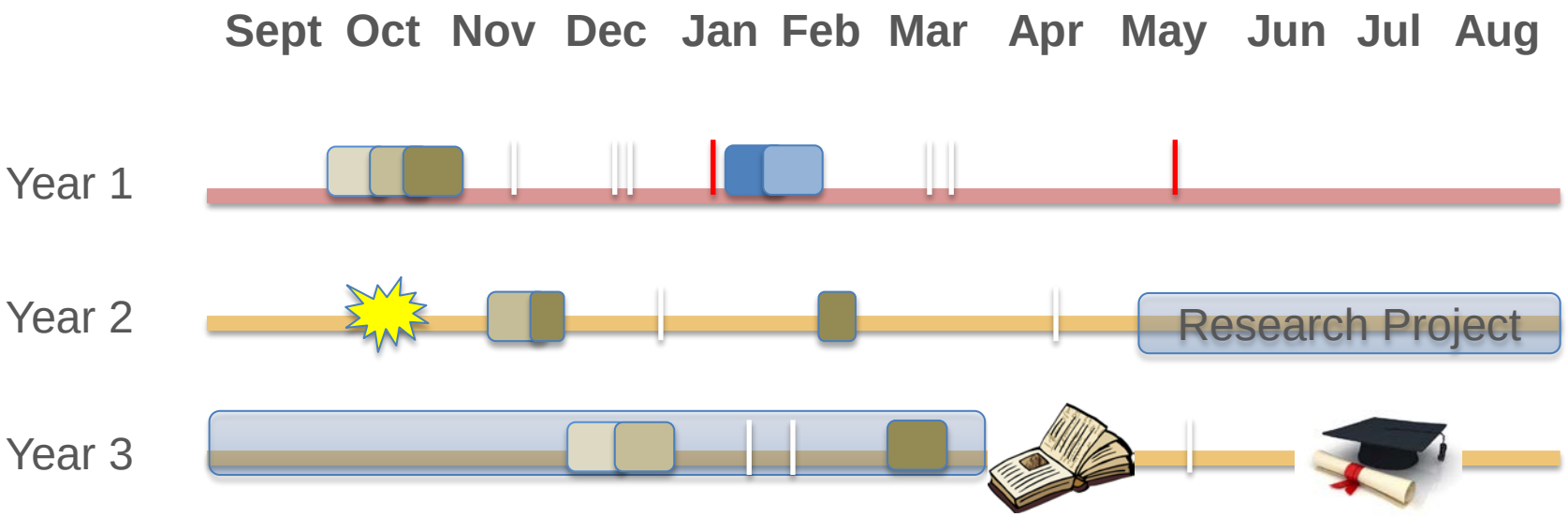
Timelines

MSc Clinical Sciences (Clinical Bioinformatics)



Teaching block in Manchester

Assignment deadline

Exam

Teaching block in Manchester/Liverpool

Project idea / research proposal submitted

Dissertation deadline

Credit weightings

- **180 credits in total**
  - 120 credits taught
  - 60 credits research project
  - 1 credit = 10 hours study
- **National School stipulates 1 day/week academic work**
  - **Does not** include completion of Online Learning & Assessment tool
  - **Does not** include time in Manchester

Flipped, Problem-based Learning

- What is it?
  - It's a way of combining online learning with case-based scenarios studied in small groups
- What are the benefits?
  - To teach students how to work in groups and manage group projects
  - To improve and develop transferable skills of students
  - To develop problem solving skills of students
  - To encourage self-motivation, curiosity and thinking
  - **Creation of communities of practice**

Research Project examples

Genomics Projects

- **Implementation of ISO Standard** 15189: 2012, quality control procedures and software management systems in a Clinical Bioinformatic analysis pipeline
- Development of a Clinical Next Generation Sequencing (NGS) **variant database**
- Next Generation **Copy Number Variation (CNV) Analysis**: Using whole genome sequencing to develop a sensitive diagnostic test for structural variants

Health Informatics Projects

- iMerseySide – I'M MOBILE
  - Delivers bespoke apps, developed in-house to community-based clinicians with access to clinical/patient data from a tablet device
- Salford Lung Study – pragmatic clinical trial
  - Focuses on COPD and Asthma patients in Salford GP practices
  - Uses EHR to monitor patients in the trial in real-time with minimal intrusion
- WW&L Trust - Linking Health and Social care records
- Bibhas Roy - Shoulder Surgeon and PROMs
  - Design an interface/system to ensure patients are monitored after surgery via online questionnaires
  - ACTION can link to other technologies

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First cohort to graduate

- 13 students: 10 distinctions and 3 merits
- All secured band 7 clinical scientist roles/other NHS roles/HSST posts

Further Information

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- a.c.fisher@liv.ac.uk **(Physical Sciences)**
- Georgina.moulton@manchester.ac.uk **(Health Informatics)**
- https://www.healthcareers.nhs.uk/explore-roles/clinical-bioinformatics
- Twitter - @MSCclinbioinf
- Twitter - @HI_Education @HeRC_Farr #datasaveslives
- **MOOC (FutureLearn)**: Clinical Bioinformatics: unlocking genomics in healthcare: https://www.futurelearn.com/courses/bioinformatics
- Article: http://www.frontlinegenomics.com/983/front-line-genomics-magazine-issue-three/