



Mathematics for Healthcare Workshop
Wednesday 19th – Friday 21st September 2018
University of Glasgow

Room 311B, Maths and Statistics Building, University of Glasgow, University Place G12 8QQ

Developing novel mathematics and statistics to tackle Healthcare Challenges is of vital importance in personalised healthcare and precision medicine. The EPSRC has funded five Centres for Mathematical Sciences in Healthcare, and this workshop will bring these leading groups and researchers together with clinical and industrial stakeholders to exchange success stories and share experiences, and, to scope the fast changing landscape with a view to preparing large grant proposals that address new Healthcare Challenges and UK needs

DAY 1 -- Wednesday 19th September

12.00 - 13.00 *Networking Lunch*

13.00 – 13.15 Welcome and Introduction: Professor Ke Chen Director of LCMH, University of Liverpool

13.15 – 13.40 Summary of the Mid Term Review Tom Robinson, EPSRC

13.40 – 13.50 Professor Nick Hill & Dr Hao Gao, SoftMech, University of Glasgow

Modelling of the Circulation and Cardiac Function

13.50 – 14.10 Mr Mark Danton M.D FRCS Consultant Adult and Paediatric Cardiac Surgeon Royal Hospital, Sick Children's Hospital Glasgow, SoftMech

Current Clinical Challenges in Structural Heart Disease

14.10– 14.20 Professor Dirk Husmeier, SoftMech, University of Glasgow

Parameter Estimation and Uncertainty Quantification in the Pulmonary Circulation System

14.20– 14.50 *Refreshment Break*

14.50 – 15.20 **Group Discussion Session 1 Chair: Dr Peter Stewart, SoftMech University of Glasgow**

15.20 – 15.40 Professor Mark Chaplain, SoftMech University of St Andrews

Multiscale Cancer Modelling

15.40 – 16.00 Dr. Peter Stewart, SoftMech University of Glasgow

New Upscaling Methods for Soft Tissue Mechanics

16.00 – 16.20 Mr Robbie Brodie, Terumo Aortic (SoftMech)

Terumo Aortic: Understanding the Implant Environment

16.20 – 16.40 Professor Sophia Yaliraki, Imperial College London

Unsupervised Text Analytics for Health Records

16.40 – 17.00 Dr. Nick Jones, Imperial College London

Precision Healthcare with Unobserved Networks

17.00– 17.20 **Day 1 Summary Chair: Ke Chen, LCMH University of Liverpool**

19:00 **Dinner at the Hilton Grosvenor**

1-9 Grosvenor Terrace, Glasgow G12 0TA

Day 2 Thursday 20th September

- 9.00 – 9.25** **Arrival Tea and Coffee**
- 9.25 – 9.35 Welcome and Introduction Day 2: Professor Ke Chen, Director of LCMH University of Liverpool
9.35 – 9.55 Professor Carola Schönlieb, University of Cambridge
Achievements from the CMIH
- 9.55 – 10.15** Professor Ke Chen, LCMH Director University of Liverpool
Overview of Research and Achievements from the LCMH
- 10.15 – 10.35 Dr. Yuan Huang, University of Cambridge
Biomechanical Modelling of Cardiovascular Diseases Based n Multimodal in-vivo Imaging
- 10.35 – 10.55 Professor Ahmed Elsheikh, University of Liverpool
Development and Validation of Biomechanically-corrected Intraocular Pressure Values for the Effective Management of Glaucoma
- 10.55 – 11.10** **Refreshment Break**
- 11.10– 12.00** **Group Discussion Session 1 Chair: Professor Mauricio Barahona, Imperial University**
- 12.00 – 13.10** **Lunch**
- 13.10 – 13.30 Professor Guy Williams CMIH, Co-Investigator and Assistant Director of Information Processing, Wolfson Brain Imaging Centre, University of Cambridge
Open Challenges in Clinical Research Imaging
- 13.30 – 13.50 Marius De Groot, GSK and Jen Cox, GSK
Imaging Endpoints in Drug Development Aims and Challenges
- 13.50 – 14.10 Dr. John Fenwick, LCMH University of Liverpool/Clatterbridge Cancer Centre
Multifaceted Datasets, Integrative Studies and Maths in Oncology
- 14.10 – 14.40** **Group Discussion Session 2 Chair: Professor Ke Chen LCMH University of Liverpool**
14.40 – 15.00 Gennaro Vittuci, Institute of Mechanics, Materials and Civil Engineering
UCLouvain Invited by University of Liverpool
Neglecting the Synovial Fluid Pressure around the Intra-Articular Contact
- 15:50 – 16.10** **Refreshment Break**
- 16.10 – 16.30 Dr. Andrea Parisi, LCMH, University of Lancaster
Influenza Dynamics
- 16.30 – 17.00** **Group Discussion Session 3 and Day 2 Summary Chair: Professor Carola Schönlieb, University of Cambridge**
- 19:00** **Dinner at Balbirs Restaurant**
7 Church Street, Glasgow G11 5JP

Day 3 -- Friday 21st September

9.00 – 9.25 ***Arrival Tea and Coffee***

- 9.25 – 9.35 Welcome and Introduction to Day 3: Professor Ke Chen, University of Liverpool
9.35 – 9.55 Professor John Terry, University of Exeter
Overview of Research and Achievements from the EPSRC Centre for Predictive Modelling in Healthcare
9:55 – 10.15 Professor Mauricio Barahona, Imperial College London
An Overview of Research at the EPSRC Centre for Mathematics of Precision Healthcare
10.15 – 10.35 Jonathan Clarke, Imperial College London
Data-Rich Methods to Define Catchment Areas in Secondary Care
10.35 – 10.55 Dr. Sam Greenbury, Imperial College London
Inferring High-dimensional Pathways of Trait Acquisition in Disease
10.55 – 11.15 ***Refreshment Break***
11.15 – 12.00 **Group Discussion Session 1 Chair: Professor Nick Hill, SoftMech University of Glasgow**

12.00 – 13.00 ***Lunch***

- 13.00– 13.20 Professor John Terry, University of Exeter
Dynamic Network Models for Human EEG: From Research to Reality
13.20 – 13.40 Professor Krasimira Tsaneva-Atanasova, University of Exeter
Control of Pulsatile Secretion of Reproductive Hormones by the KNDy Neuronal Network: from Theory to Experiments'
13.40 – 14.00 Professor Kevin O'Byrne, Kings College London
The GnRH Pulse Generator and Cosmology
14.00 – 14.40 **Group Discussion Session 2 Chair: Professor John Terry University of Exeter**

14.40 – 15.00 ***Refreshment Break***

- 15:00 – 16.00 **Group Discussion 3: Prioritising Healthcare Challenges Chair: Mauricio Barahona**
16.00 – 16:30 Review and Proposal / Pump-priming Ideas for New funding Applications
16:30– 17.00 **Summary, wrapping-up and ways to move forward / Closing Remarks**
Chair: Professor Ke Chen University of Liverpool
17:00 Finish

Organising Committee:

Ozgur Akman (University of Exeter),
Mauricio Barahona (Imperial College, London),
Ke Chen (University of Liverpool),
Xiaoyu Luo (University of Glasgow),
Carola Schoenlieb (University of Cambridge)

Contact email: Louise.Murphy@liverpool.ac.uk