

Virtual Inauguration Event for SoftMech^{SET}: EPSRC-funded Research Hub on Statistical Emulation and Uncertainty Quantification in Cardiac Mechanics

21st May, 2021 3-5pm

Registered and Invited delegates: Nishtha Agarwal, Simon Arridge, John Aston, Masoud Babaei, Boris Behnisch, Melanie Brewis, Gillian Brown, Patrick Calvert, Peter Challenor, Richard Clayton, Mitchel Colebank, Jennifer Cox, David Dalton, Mark Danton, Clint Davies-Taylor, Luca Dede, Alejandro Diaz, Ewan Dougall, Liuyang Feng, Hao Gao, Michael Hendricks, Nicholas Hill, Dirk Husmeier, Robert Insall, Roger Kamm, Stephen Kelly, Alan Lazarus, Zishun Liu, Benn MacDonald, Keith M^cCormack, Sean M^cGinty, Gary Mirams, David Nisbet, Mohamad Hifzhudin Noor Aziz, Mette Olufsen, Tony O'Hagen, Michael Onoja, Stefano Pagani, Anna Pandolfi, Mihaela Paun, Arash Rabbani, Francesco Regazzoni, Carola Schönlieb, Timothy Secomb, Rebecca Shipley, Catherine Sinclair, Radostin Simitev, Simone Stella, Peter Stewart, Krasmira Tsaneva, Paul Watton, David Woods, Yalei Yang

Minutes

Part 1 of the programme (15.00-16.00) consisted of a current review of the research projects:

[Programme](#)

Part 2: Open discussion about engagement and collaborations, 16:15 – 17:00

The aim of the discussion was to explore opportunities for collaborations and to identify practical first steps to initiate them. The partnership resource fund within the grant was highlighted as a potential route for any promising ideas emerging from the discussion.

The majority of delegates were initially allocated to one of the following three breakout rooms as described below. EPSRC delegates were left to visit the room/s of their choice. The Advisory board were asked to visit room 3 where numbers were low. All delegates were also able to move between rooms and request individual delegates to a particular room. There were some difficulties with some delegates being unable to move to a breakout room and future events will include familiarisation with Zoom breakout rooms.

Breakout room 1: Collaboration with other Research Hubs

Members of other research hubs

Breakout room 2: Engagement with industry and clinical partners

POLIMI and MIT delegates, NHS Scotland

Breakout room 3: Getting involved and establish new collaboration

Advisory Board where low numbers in room 3

30 minute discussions were held in the breakout rooms. On return to the main room each group then reported back.

Breakout room 1 Notes: Collaboration with other Research Hubs

1. Encourage PhD/Postdoctoral researcher to work together, through seminar/information meetings, and journal clubs. A common email list or a webpage can be used for disseminating those events. A good example is ICMS, which lists all seminars.
2. Funds available for collaboration. The Cambridge centre has partnership funds for collaboration, and Huang Yuan is the researcher in Cambridge centre who can be contacted for potential collaborations.
3. Sharing expertise across different centres, i.e. gradient matching, time series/message passing, dynamic emulation which is difficult to be applied to a large system, multi-fidelity approach, etc.
4. There are overlaps among different hubs in terms of methodologies, it is helpful to share the codes, such as through Github
5. Working group aiming high impact journal, and potentially to invite experts to the meetings for specific questions. Another type of group is the reading group or the journal club
6. Sharing the training events, which can be either online or hybrid

Breakout Room 2 Notes: Engagement with industry and clinical partners

Stephen Kelly from NHS Research Scotland – Central Management Team (NRS-CMT) outlined routes of engagement through the NHS. Identification of clinicians that might have an interest in the potential application of SoftMech's work was advantageous; it was highlighted that Colin Berry was an excellent example. Funding applications could be supported through the NRS-CMT and/or Scottish Health Innovation Ltd (SHIL).

Details of the Innovative Licensing and Access Pathway (ILAP) was highlighted as it may become highly relevant:

<https://www.gov.uk/guidance/innovative-licensing-and-access-pathway>

The CSO Stakeholder Board was mentioned as NHS and Academic Institutions are represented on there and it is focussed on clinical research. The NHS R&D Office system was described. The potential for trials involving software was discussed; it was not known how many such trials were being carried out.

Other topics covered were:

- iCAIRD (The Industrial Centre for Artificial Intelligence Research) <https://icaird.com/>
Cannon Medical Imaging is an industrial partner in this, machine learning involved.
- Clinical Trials software through Simon Rogers.
- Bowel Cancer INCISE project (**IN**tegrated **Te**chnologies for **Im**proved **Polyp** **S**urveillanc**E**)
<https://www.gla.ac.uk/research/az/incise/aboutincise/>

Michael Onoja, the EPSRC portfolio Manager informed the group of:

the Sandpit on Digital Healthcare Technologies deadline 21st July.

<https://www.ukri.org/opportunity/digital-technologies-for-health-and-care/>

Breakout Room 3 Notes: Getting involved and establish new collaboration

- Room started about why using MRI since ECG data is cheaper. The reason is mainly the MRI resolution.
- The difference between real and research data was emphasized, and that real data might be of low quality.
- There was a suggestion that we could use have very powerful GPUs from the Beatson institute for cancer research for our model training.
- The importance of accounting for model mismatch was explained, and ways to model this, e.g. using Gaussian Processes.
- We discussed about model parameter dimension and ways to reduce that, e.g. sensitivity analysis.
- We talked about how expensive the models we work with are, showing the benefit of using emulators.
- We talked about other potential surrogate models, e.g. surrogate response surfaces.
- Finished at 17:12