Insigneo Newsletter - October 2021

Welcome to our monthly Insigneo newsletter!

Our monthly e-newsletter keeps you up to date with events, funding, success stories and information. We hope you will find it useful! If you would like to add information and/or events to this newsletter please email: news@insigneo.org (the newsletter will be issued during the 2nd week of the month, excluding January and August). Please ensure that you submit news and events with a minimum of one week's notice.

Executive Director of Insigneo

We are very happy to share this recent announcement from **Professor Christopher Newman, Interim Vice President and Head, Faculty of Medicine, Dentistry and Health and Professor Jim Litster, Vice-President & Head of Engineering:**

As you will be aware, Professor Jim Wild has over the last year been Interim Executive Director of Insigneo and has led on a major strategic review of the future direction for the institute. We are very supportive of the academic vision and management structures that are proposed, and are very pleased to announce that Jim will continue to lead Insigneo as substantive Executive Director.

We look forward to Insigneo going from strength to strength under Jim's leadership and thank all those involved in the strategic review process.

Kind regards

Chris Newman and Jim Litster

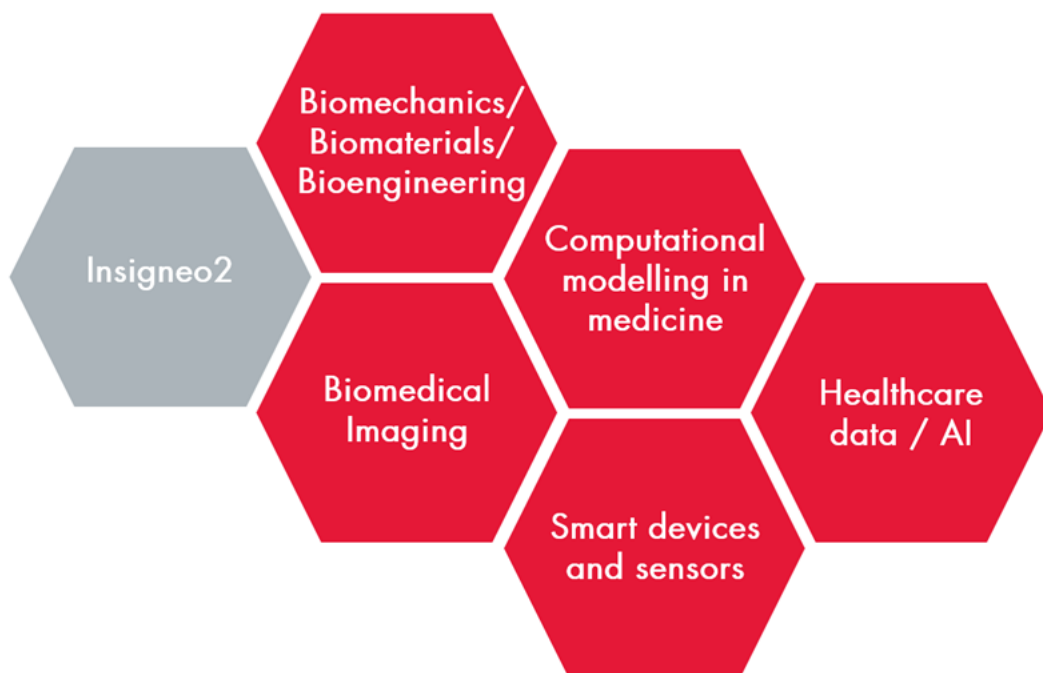## Insigneo General Assembly

General Assembly

The 2021 Insigneo General Assembly took place virtually on 7 October 2021.

Professor Jim Wild provided an update on the conclusion of the review of the Insigneo Institute and confirmed his continued leadership of the Institute and thanked the support of the Insigneo membership, colleagues who had contributed to the review and faculty leadership.

Following discussions with the membership and key internal and external stakeholders the Institute's research focus now expands across five key research themes which bring together computational '*in silico'* and innovative technological approaches to address modern biomedical research and healthcare questions.

Insigneo2 - technology driven biomedical research themes

The call for expressions of interest for research theme co-directors took place over the summer and will be confirmed in the coming weeks. Jim emphasised the implicit

cross-links between these themes and the vision for cross-faculty shared leadership. A call for expressions of interest for the role of deputy executive director(s) of Insigneo from other faculties will follow.

Going forward the Insigneo Institute's research will focus on:

- An emphasis on **excellent fundamental science and engineering** research with impactful **biomedical research applications** - the new research themes map onto priority UKRI funding areas.
- **Increasing our clinical impact** - building on successful clinical translational impact in specific disease areas the Institute will widen its focus to technological approaches that are relevant to all modern healthcare challenges and sectors in this region and globally.
- **Intersecting with and supporting** key multidisciplinary medical themed research initiatives.
- **Leading and supporting** the **University's** approach **on computational and technological healthcare research** and **infrastructure in partnership** with the **NHS.**
- Maximising **uptake** of **Insigneo's technologies** with **strategic industrial partnerships** and membership of **Insigneo** beyond Sheffield.

Jim concluded with a very positive outlook on future opportunities for the Institute and introduced <u>**Alex Wilkinson, Insigneo's Commercialisation Manager**</u>.

The General Assembly meeting ended with short powerpitch presentations from the following new members:

- **Neil Lawrence** - Clinical Teaching and Research Fellow, Department of Oncology and Metabolism
- **Ashley Cadby** - Professor of Soft Matter Physics, Department of Physics and Astronomy
- **Ali Khurram** - Senior Clinical Lecturer & Honorary Consultant Pathologist, School of Clinical Dentistry
- **Lin Cao** - Lecturer (Assistant Professor), Department of Automatic Control and Systems Engineering
- **Artur Gower** - Lecturer in Dynamics, Department of Mechanical Engineering
- **Neil Stewart** - European Respiratory Society Marie Curie Research Fellow, Department of Infection, Immunity and Cardiovascular Disease

Insigneo Seminar - in-person speaker

Insigneo Seminar: Predicting atrial fibrillation treatment outcomes through computational modelling, signal processing and machine learning

Dr Caroline Roney - Lecturer
Queen Mary University of London

Friday 29 October 2021, 15:00 - 16:00

Through lockdown our online seminars have worked really well and we definitely want to keep the online option but we would now like to offer the option of attending in person to our members.

This will be our first hybrid seminar with an in-person speaker so we are really looking forward to seeing some of our members in person and having a good chat over refreshments afterwards!

Dr Caroline Roney is a lecturer in Computational Medicine and a Medical Research Council Skills Development Fellow in the School of Engineering and Materials Science, Queen Mary University of London. She will present a talk on 'Predicting atrial fibrillation treatment outcomes through computational modelling, signal processing and machine learning'

Insigneo members, please contact Sarah Black sarah.black@sheffield.ac.uk to book an in-person ticket.

Insigneo Summer Research Programme 2021

INSIGNEO

Institute for *in silico* Medicine

Summer Research Programme

The Insigneo Summer Research Programme 2021 took place remotely from June to

September this year. We hosted summer placements for 12 University of Sheffield undergraduates to undertake a research project within the Institute on a topic related to *in silico* medicine.

Under normal circumstances our placement students would have the opportunity to display a poster at the Insigneo General Assembly. As this event took place online we are very proud to present their hard work on our website.

View posters

New members

New members

We would like to introduce Dr Neil Lawrence who has joined the Insigneo Institute recently:

Dr Neil Lawrence
Department of Oncology and Metabolism
Clinical Teaching and Research Fellow

Neil is a clinical research and teaching fellow in paediatrics and child health at Sheffield University in the United Kingdom.

Originally having studied Civil Engineering, Neil completed a degree in medicine and then the NIHR academic foundation programme that lead to an NIHR academic clinical fellowship. He completed the National Medical Director's Clinical Fellow Scheme working for NHS Digital within the Data, Insights & Statistics division, where he developed his interest in data analytics using R.

He is combining his interest in health technology and computing with an interest in paediatric endocrinology, working to create a clinical decision support tool that will help clinicians manage Congenital Adrenal Hyperplasia in the future. A keen interest in medical statistics is supporting this work – aiming to harness the power of real world data through advanced statistical modelling to improve outcomes for patients and better support clinicians in the future.

Full profile

Supporting the future of cardiovascular science: University of Sheffield Professor honoured for outstanding achievement

Insigneo member, Professor Paul Evans, from the Department of Infection, Immunity and Cardiovascular Disease, has been honoured for his discovery of the causes and potential treatment for atherosclerosis, a major reason for cardiovascular disease, disability, and death.

The award, issued by the world-leading European Society of Cardiology (ESC), is dedicated to honouring researchers with outstanding productivity and contribution to their chosen field to support the future of cardiovascular medicine.

The award recognises the 15 years that Professor Evans has spent researching the disease.

Read more

MRC success for Paul Evans

Congratulations also to Paul Evans and his research group on the recent award of a MRC project grant from the Population and Systems Medicine Board: "Endothelial Gata4 in Atherosclerosis Progression". This is a great achievement and builds on his collaborations both within Sheffield and internationally.
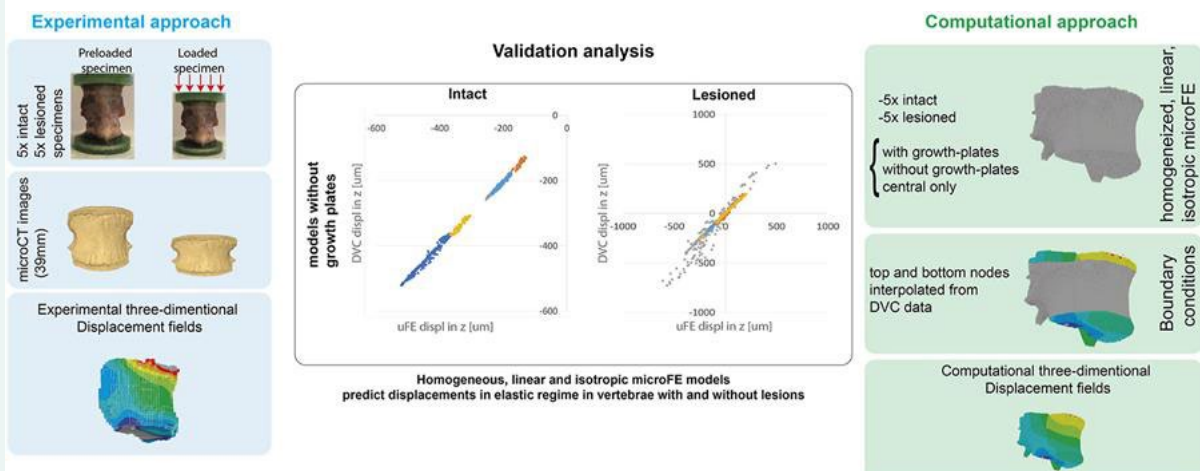
Radiological Society of North America Prize for Samer Alabed

Congratulations Insigneo Member Samer Alabed who has been awarded a prestigious prize by the Radiological Society of North America.

Dr Samer Alabed was awarded the trainee cardiac research prize for "AI Vs Manual Cardiac MRI Measurements - Clinical Benchmarking Using Heart Catheterization And Mortality Prediction"

MultiSim: MicroFE models of porcine vertebrae with induced bone focal lesions

MultiSim researchers have had a paper on 'MicroFE models of porcine vertebrae with induced bone focal lesions: Validation of predicted displacements with digital volume correlation' published in the Journal of the Mechanical Behavior of Biomedical Materials.

Micro Finite Element models have the potential of predicting the mechanical behavior of vertebrae with metastatic lesions at tissue level through laboratory studies, but their predictions must be validated against experimental measurements.

In this study, porcine vertebrae (with and without artificial lesions) were mechanically tested within a microCT scanner, and the displacement field was measured though a global Digital Volume Correlation approach.

Simplified linear microFE models of the vertebrae, based on microCT images, were developed.

Boundary conditions were imposed from DVC data, and the displacement field was predicted.

The comparison between the predicted displacements and the measured displacements showed an excellent agreement in the middle portion of the vertebral body, both with and without lesions. By contrast, poor correlation was found in the closeness of the growth plates.

In conclusion, these simplified models can predict how close to failure a bone is. More complex models instead are required to predict regions with high deformation.

Read more

Guest Lectures, Conferences & Seminars

Insigneo events

Insigneo Seminar: Predicting atrial fibrillation treatment outcomes through computational modelling, signal processing and machine learning

Dr Caroline Roney - Lecturer
Queen Mary University of London

Friday 29 October 2021, 15:00 - 16:00

29 October 2021
Insigneo Seminar: Predicting atrial fibrillation treatment outcomes through

computational modelling, signal processing and machine learning

Insigneo Seminar: Relaxin-2 for the treatment of Arthrofibrosis

Dr Nazarian - Associate Professor Harvard Medical School

Friday 19 November 2021, 15:00 - 16:00

19 November 2021
Insigneo Seminar: Relaxin-2 for the treatment of Arthrofibrosis

10 December 2021
Insigneo Seminar: Nele Famaey, KU Leuven

28 January 2022
Insigneo Seminar: Jordi Alastruey-Arimon, King's College London

Other events

19 October
Yorkshire Cancer Research More Life To Live Fund – 2022 Funding Round

21 October
JMBBM Frontiers Webinar: Guilding in vitro bone growth for 3D mechanobiology (Prof Gwen Reilly) noon Eastern/5pm London Zoom link: https://mit.zoom.us/j/92024 888844

21-22 October
Neuroscience Institute - Autumn Conference 2021

22 October
10:00 IICD Department Research in Progress Meeting: '1H and 129Xe lung MRI in post-covid patients: initial results' - Laura Saunders, (Title TBC) - Oliver Rodgers. **Insigneo members contact sarah.black@sheffield.ac.uk to arrange access.**

22 October
HELSI Bites: Tackling unequal healthy ageing: the promise of intersectionality

25 October

#SanoSeminars: Rod Hose, The University of Sheffield

28 October
N8 CIR Ethics in Computational Research - Introduction

29 October
10:00 IICD Department Research in Progress Meeting: 'Unravelling NETosis in COVID-19' - Rebecca Dowey, (Title TBC) - Anupam
Rej. **Insigneo members contact sarah.black@sheffield.ac.uk to arrange access.**

4 November
N8 CIR Ethics in Computational Research - NHS and Health Data

5 November
10:00 IICD Department Research in Progress Meeting: 'Examining the cryptococcal meningitis pathophysiology in zebrafish' - Jacqui Chalakova , (Title TBC) - Christopher Donaldson. **Insigneo members contact sarah.black@sheffield.ac.uk to arrange access.**

8 November
#SanoSeminars: Alessandro Crimi, Sano Centre, will talk about future trends of neuroimaging: gradients, oscillators, attractors and fractals

11 November
N8 CIR Ethics in Computational Research - AI and Machine Learning

22 - 25 November
Klaster LifeScience Kraków (KLSK) Life Science Open Space 2021

For a full list of upcoming events visit: http://insigneo.org/events/

Publications

Research output affiliated to Insigneo in Scopus (please ensure papers are affiliated to the Insigneo Institute by including the words "Insigneo Institute for *in silico* Medicine"):

Progress in cardiac research: from rebooting cardiac regeneration to a complete cell atlas of the heart (Cardiovascular Research) S. M. Davidson, T. Padró, S. Bollini, G. Vilahur, D. J. Duncker, P. C. Evans, T. Guzik, I. E. Hoefer, J. Waltenberger, J. Wojta, C. Weber

Modeling musculoskeletal dynamics during gait: Evaluating the best

personalization strategy through model anatomical consistency (Applied Sciences (Switzerland)) M. Conconi, E. Montefiori, N. Sancisi, C. Mazzà

MicroFE models of porcine vertebrae with induced bone focal lesions: Validation of predicted displacements with digital volume correlation (Journal of the Mechanical Behavior of Biomedical Materials) M. Palanca, S. Oliviero, E. Dall'Ara

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