Insigneo Newsletter - September 2021

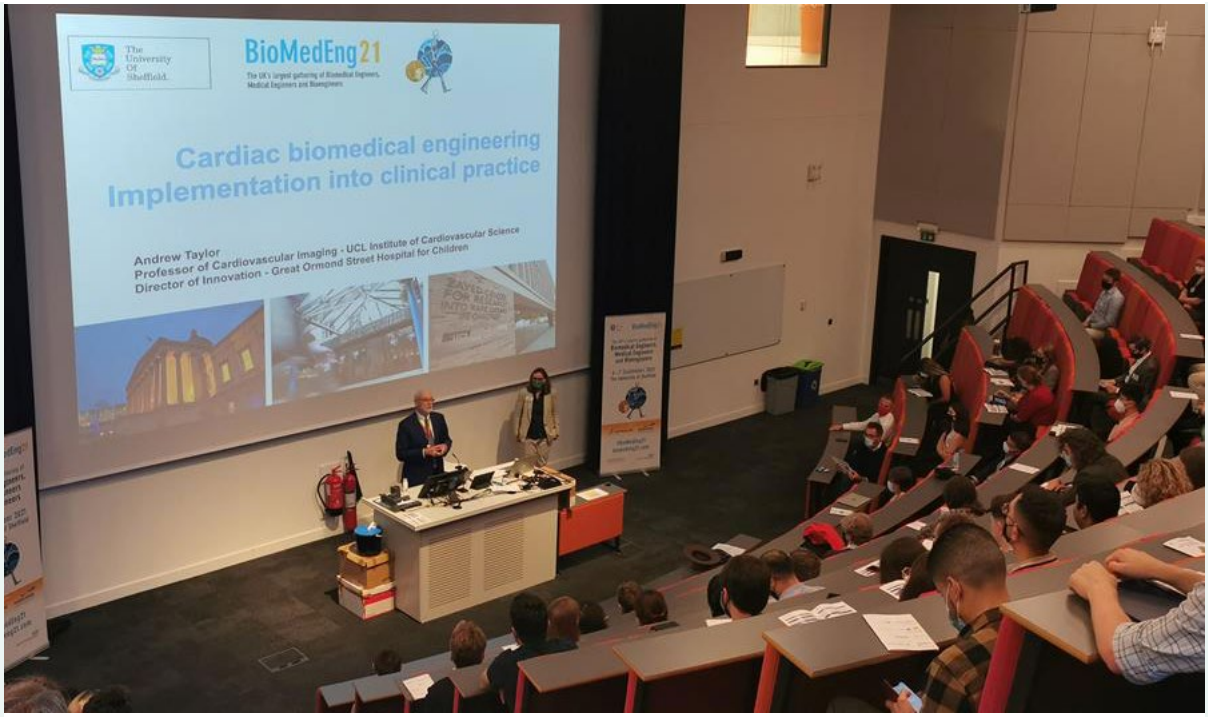
Welcome to our monthly Insigneo newsletter!

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.

Insigneo General Assembly - save the date!

The 2021 Insigneo General Assembly will take place virtually on **7 October 2021 from 3 - 4pm**. Insigneo members please check you calendars for your invitation. Further details to follow.

Insigneo Institute hosts BioMedEng21 conference at the University of Sheffield



BioMedEng21, the UK's largest gathering of Biomedical Engineers, Medical Engineers and Bioengineers was hosted by the Insigneo Institute and the Department of Materials Science and Engineering on 6th – 7th September 2021 in the Diamond Building.

The hybrid conference, chaired by Professor Gwendolen Reilly, brought together over 300 attendees, with 175 delegates travelling to Sheffield to meet in person and 135 joining the conference online. The in-person event witnessed a joyful but cautious return to face-to-face networking, sharing and discussing research, and sparking new ideas. Meanwhile, the hybrid format allowed international speakers from the USA, Uganda, and France, who were not able to travel to the UK, to livestream their talks into the Diamond Building for online and in person delegates.

Read more

New members

We would like to introduce Dr Lin Cao who has joined the Insigneo Institute recently:

Dr Lin Cao
Department of Automatic Control and Systems Engineering
Lecturer (Assistant Professor)

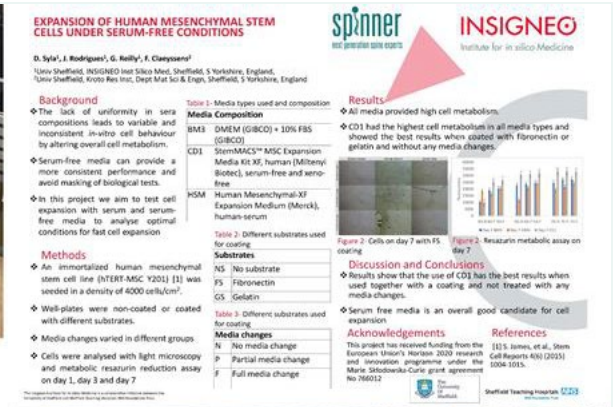
Dr. Lin Cao received his Ph.D. degree in Mechanical Engineering in 2015 from the University of Saskatchewan, Canada, with research on compliant robotic systems and soft robotics. He was a visiting scholar in the Interactive Mechanisms and Mechatronics lab, Delft University of Technology, the Netherlands, in 2013. He joined the medical robotics research group at Nanyang Technological University, Singapore, as a Research Fellow and a team leader in 2016. In June 2021, Dr. Cao joined the University of Sheffield as a Lecturer in Medical Robotics.

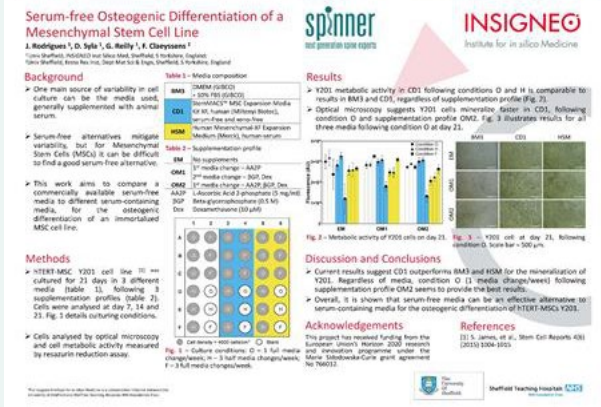
Dr. Cao's main research interests include flexible endoscopic surgical robots, soft robots, and compliant robotic systems. Collaborating with clinicians and industrial collaborators, he strives to develop flexible/soft robotics technologies that enable medical diagnosis and treatment with minimal invasiveness. These technologies are rigorously developed and tested, in both in-vivo animal trials and human trials, with the ultimate goal of making a real difference for the healthcare of patients.

Dr. Cao is interested in both theoretical and applied research, ranging from modeling the friction in medical tools to developing robots that remove cancer tumors or repair perforations in the digestive tract. His theoretical work on the design theory of compliant robotic systems was featured by ASME Journal of Mechanical design; an applied work on the flexible endoscopic robotic suturing system was a finalist of the "Surgical Robot Challenge" at Imperial College London, and he also won the 'Best Presentation Award' on the Congress of European Association for Endoscopic Surgery at the Amazing Technologies session. In Jan. 2021, he was nominated and invited to attend the Global Young Scientists Summit in Singapore. He also holds a few intellectual properties.

Full profile

Spinner Fellows present posters at the Tissue & Cell Engineering Society (TCES) 2021 virtual conference





Spinner Fellows, Denata Syla and José Rodrigues attended the Tissue & Cell Engineering Society (TCES 2021) Virtual Conference, on Tuesday and Wednesday, 6th and 7th July. They presented virtual posters on their research work developing a protocol or Standard Operating Procedure (SOP) to optimise the expansion and osteogenic differentiation of human Mesenchymal stem cells and thus reduce the variability of their in vitro experiments.

Read more

Spinner Fellows outreach video.

In this video Spinnner Fellows introduce the motivation and background of their

research and the Spinner project which is developing and applying biomaterials, biomechanics and *in silico* modelling for spine surgery.

Watch

STriTuVaD: how augmented clinical trials are accelerating a vaccine for tuberculosis

Tuberculosis is an endemic infectious disease that affects many of the world's poorest populations. By using the latest techniques in mathematical modelling, augmented clinical trials could help researchers develop an affordable vaccine.

Clinical trials are needed to ensure medical treatments available to the public are effective and safe, but it is a lengthy and expensive process. It can take up to ten years and cost around $1.3 billion to bring a new drug to market.

Researchers at the University of Sheffield are trying to find another way – through augmented clinical trials. This is where computer simulations are used alongside physical trials to reduce the amount of time spent testing treatments, the number of patients involved and, ultimately, the cost.

This work is a major pillar of STriTuVaD, a consortium coordinated by the pharmaceutical company Etna Biotech and focussed on developing vaccines for tuberculosis. The project includes collaborators from across Europe, including the University of Sheffield, where the principal investigator is Insigneo member Dr Miguel Juárez from the School of Mathematics and Statistics.

Read more

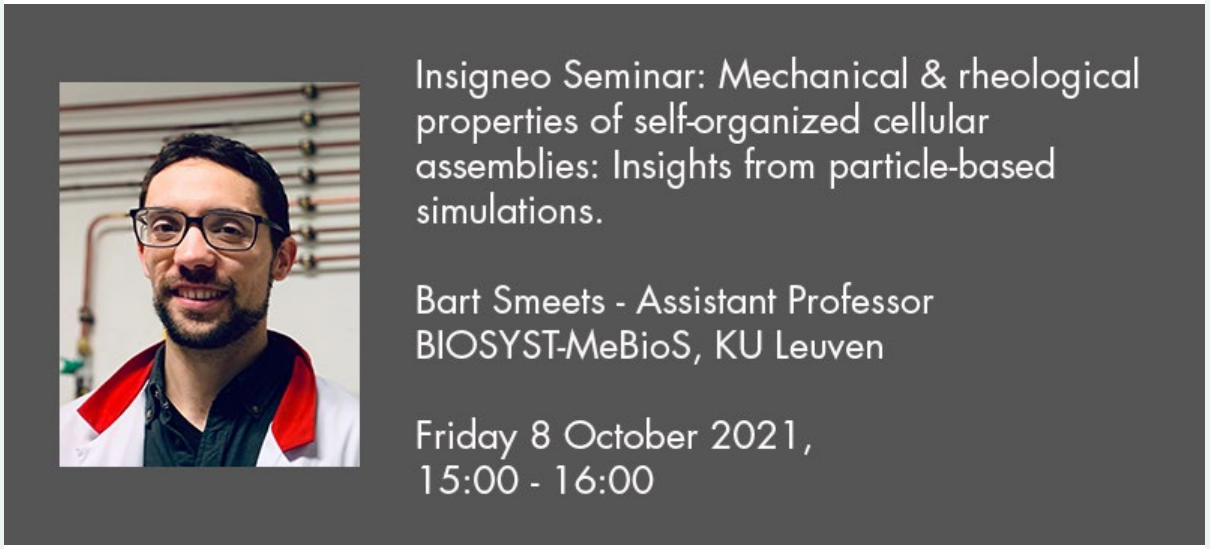
Biotechnology and Biological Sciences Research Council (BBSRC) award for Dr Alexander Fletcher

Congratulations to Insigneo member Dr Alexander Fletcher from the School of Mathematics and Statistics (SoMaS) who has been awarded £413,182 for the project **'Chaste: developing sustainable software for computational biology'**, from the Biotechnology and Biological Sciences Research Council (BBSRC). Alongside experimental studies, computational modelling plays an increasing role in helping to understand biological processes ranging from embryonic development to tumour growth. Yet computational models and methods are often not re-used effectively and suffer from a lack of reproducibility. The open-source software library Chaste (Cancer, Heart and Soft Tissue Environment) has been developed to overcome these problems. This five-year project, supporting Research Software Engineers at the Universities of Sheffield, Nottingham and Oxford, will fulfil Chaste's potential for the benefit of the UK biology research community. Researchers will enable a richer variety of computational models to be simulated, make use of the latest advances in computing and hardware, and introduce new ways that users can interact and interface with the software without expert programming knowledge.

Guest Lectures, Conferences & Seminars

Insigneo events

7 October 2021
Insigneo General Assembly



8 October 2021
Insigneo Seminar: Mechanical and rheological properties of self-organized cellular assemblies: Insights from particle-based simulations

19 November 2021
Insigneo Seminar: Ara Nazarian, Associate Professor of Orthopaedic Surgery, Harvard Medical School

Other events

6 October 2021
CompBioMed E-seminar #18: High Performance Containers

21 - 22 September 2021
KKIO 2021 - prime software engineering conference

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"):

A combined modelling and experimental study of heat shock factor SUMOylation in response to heat shock (Journal of Theoretical Biology) M. Zhanga, A. Zhao, C. Guo, L. Guo

A method for gait events detection based on low spatial resolution pressure insoles data (Journal of Biomechanics) F. Salis, S. Bertuletti, T. Bonci, U. Della Croce, C. Mazzà, A. Cereatti

MA-SOCRATIS: An automatic pipeline for robust segmentation of the left ventricle and scar (Computerized Medical Imaging and Graphics) M. Mamalakis, P. Garg, T. Nelson, J. Lee, J. M.Wild, R. H.Clayton

A proposal for a linear calculation of gait asymmetry (Symmetry) L. M. A. van Gelder, L.Angelini, E. E. Buckley, C. Mazzà

Tibial cartilage, subchondral bone plate and trabecular bone microarchitecture in varus- and valgus-osteoarthritis versus controls (Journal of Orthopaedic Research) S. Rapagna, B. C. Roberts, L. B. Solomon, K. J. Reynolds, D. Thewlis, E. Perilli

Consensus based framework for digital mobility monitoring (PLoS ONE) F.

Kluge, S. Del Din, A. Cereatti, H. Gaßner, C. Hansen, J. L. Helbostad, J. Klucken, A. Küderle, A. Müller, L. Rochester, M. Ullrich, B. M. Eskofier, C. Mazzà

A multi-approach and multi-scale platform to model CD4+ T cells responding to infections (PLoS Computational Biology) K. Y. Wertheim, B. L.Puniya, A. La Fleur, R. Shah, M. Barberis,T. Helikar

Protective treatments against endothelial glycocalyx degradation in surgery: A systematic review and meta-analysis (Applied Sciences (Switzerland)) H. Q. R. B. Khan, G. C. Reilly

Scientific and regulatory evaluation of mechanistic in silico drug and disease models in drug development: Building model credibility (CPT: Pharmacometrics and Systems Pharmacology) F. T. Musuamba, I. Skottheim Rusten, R. Lesage, G. Russo, R. Bursi, L. Emili, G. Wangorsch, E. Manolis, K. E. Karlsson, A. Kulesza, E.Courcelles, J.-P. Boissel, C. F. Rousseau, E. M. Voisin, R. Alessandrello, N. Curado, E. Dall'ara, B. Rodriguez, F. Pappalardo, L. Geris

Bayesian Calibration of Electrophysiology Models Using Restitution Curve Emulators (Frontiers in Physiology) S. Coveney, C. Corrado, J. E. Oakley, R. D. Wilkinson, S.A. Niederer, R. H. Clayton

Automatic methods of hoof-on and -off detection in horses using wearable inertial sensors during walk and trot on asphalt, sand and grass (PLoS ONE) E. V. Briggs, C. Mazzà

Investigation of Coatings, Corrosion and Wear Characteristics of Machined Biomaterials through Hydroxyapatite Mixed-EDM Process: A Review (Materials) M. Al-Amin, A. M. Abdul-Rani,M. Danish, S. Rubaiee, A. B. Mahfouz, H. M. Thompson, S. Ali, D. R. Unune, M. H. Sulaiman

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