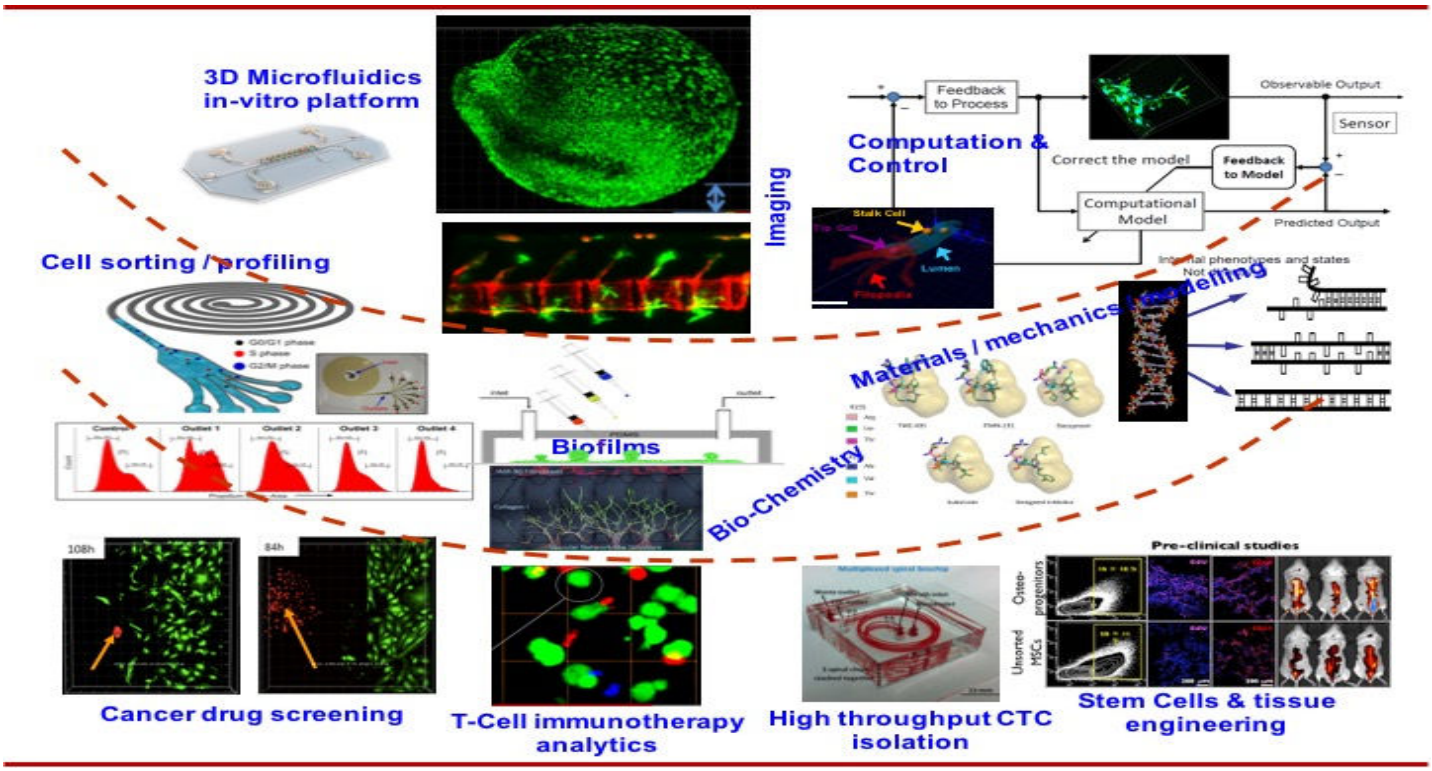
SMART Biosystems and Micromechanics (SMART BioSyM)



Programme Leader

Prof Krystyn Van Vliet, Massachusetts Institute of Technology

Prof Van Vliet joined the faculty of the MIT Department of Materials Science & Engineering in 2004, and leads the Laboratory for Material Chemomechanics. She also joined the faculty of Biological Engineering, MIT in 2011.

BioSyM IRG is one of the five IRGs in the Singapore-MIT Alliance for Research and Technology (SMART) Centre. BioSyM IRG started in Jan 2009 and continued into Phase II since Jan 2014 and is a research programme funded by the National Research Foundation (NRF), under its Campus for Research Excellence and Technological Enterprise (CREATE) programme.

Research

SMART BioSyM IRG has three major areas of focus. First and foremost is the development of new technologies to address critical Medical and biological questions applicable to a variety of diseases. Second is the further development of these technologies to provide novel solutions for the healthcare industry. Third is to provide a constant source of new technologies to the broader Singapore research infrastructure. The guiding tenet of BioSyM is that accelerated progress in biology and medicine will critically depend upon the development of modern analytical methods and tools that provide a deep understanding of the interactions between mechanics and biology at multiple length scales from molecules to cells to tissues that impact maintenance or disruption of human health.

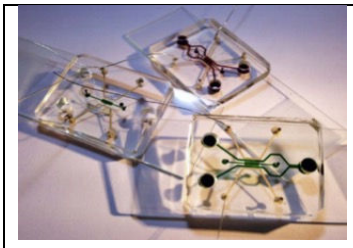
Researchers

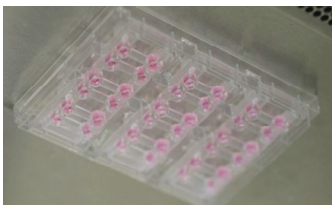
There are a total of 50 researchers in SMART BioSyM IRG, consisting of post-doctoral fellows, research associates and PhD students. Leading the research teams are a total of 16 Principal Investigators (PIs), nine of whom hold faculty appointments at MIT, one at NTU, four at NUS, and two at Duke-NUS There are about 35 collaborators from local institutions and research organizations.

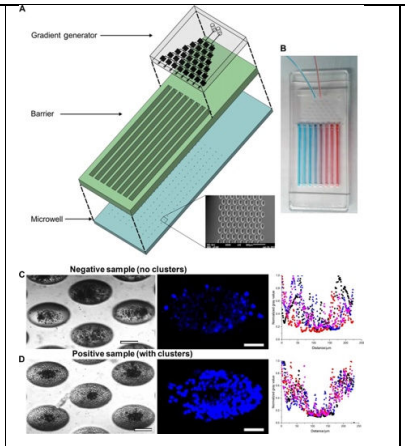
Highlights

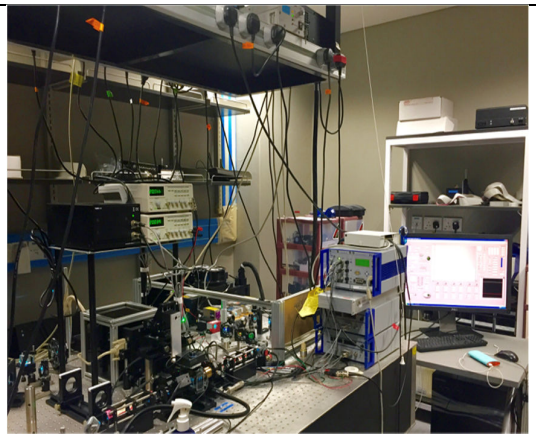
SMART BioSyM IRG's research thus far has resulted in over 200 publications and over 30 patents, including licensed patents to Singapore-based start-up companies (Clearbridge Biomedics, WhirlCell, AIMBiotech). BioSyM has established robust collaborations with researchers in hospitals (SGH, KKH, NUH) through which BioSyM developed technologies are put to use for pre-clinical and clinical applications. The cell-sorting microfluidics technology and its variants developed at BioSyM are now being used in commercial CTC isolation systems, clinical and pre-clinical trials in the stem cell therapy and tissue engineering. BioSyM's 3D microfluidics platform has been commercialized through the startup company, AIM Biotech, in Singapore and is being widely used among the research community around the world. Several BioSyM alumni are now staff of Singapore Universities, Research Institutes, Government agencies and Singapore based companies

New bio-imaging technologies developed at BioSyM such as Digital Scanned Light Sheet Microscope (DSLM) and Multiphoton Multi focal Microscope (MMM) have been translated to applications development at NUS Centre for Bio-Imaging Sciences and A*STAR IBN, respectively. These imaging systems offer unique capabilities for Singapore-led research into developmental biology and liver physiology & pathology.









For more information about the SMART BioSyM IRG, please contact:
Dr Balasubramanian Narayanan (bala@smart.mit.edu) Website: http://smart.mit.edu/research/biosym/biosym.html

Updated: March 2018

CREATE
Campus for Research Excellence And Technological Enterprise

NATIONAL RESEARCH FOUNDATION
PRIME MINISTER'S OFFICE
SINGAPORE

1 CREATE Way, #12-02
CREATE Tower
Singapore 138602
Tel: (+65) 6684 2900
Fax: (+65) 6684 0384
Website: www.nrf.gov.sg
Email: communications@nrf.gov.sg