

IMAG/MSM Consortium Workshop
BDT Ideas

Title	Problem to Solve	BDT Champion
0 Biomaterial Interfaces	How the body responds to various implanted materials and devices	Jonathon Kowatonaw / Grace Peng
1 Biomedical Digital Twin to Prevent Surgical Errors	To create a BDT of the surgeon so that they can flagged for fatigue in real time before they are too tired to perform surgery.	Gary An
2 Surgical Menopause	Prevent/Reduce/Eliminate the many complications of surgical menopause.	Stephanie George
3 BDTs for Improved Diagnosis and Treatment of Eczema and Skin Inflammation	<p>Problem: Current diagnosis of skin irritation is generally done without medical intervention. There are a large range of both over the counter and prescription topical medications which may be beneficial for some conditions but have adverse outcomes for other conditions with superficially similar symptoms. Responses to treatment may be ambiguous and slow, so patients may not know whether treatments are effective. Our goal is to develop patient-specific BDTs to enable improved and earlier diagnoses and improved personalized therapy optimization and prognosis.</p> <p>Current state and practicality: Skin is easy to observe non-invasively. There are existing computational models of skin homeostasis and of melanoma. However, there is no developed DT for skin irritation and inflammation. Because it is not a life-critical application, the development and approval of DTs as decision support tools to improve diagnosis and therapy may be more rapidly implementable than for other conditions.</p>	James Glazier
4 Digital Twin for Cardiovascular Disease	Predictive multiscale models for disease progression in cardiovascular applications	Abhay Ramachandra
5 Blood Pulp Twin	Ensure patients have optimal cardiac support and organ perfusion	Marc

BDT for Adaptive Radiotherapy Digital Twin for Decision Making under Uncertainty for Personalized Cancer 6 Treatment	How best to adapt radiotherapy (spatially and temporally) to improve patient outcomes (increase time to progression) and reduce normal tissue complications (cell to tissue scale models). Trustworthy decision making under uncertainty for RT/CT regimen.	David Hormuth Anirban Chaudhuri
7 Practical VVLIQ Strategies	How to develop trustworthy BDT	Toni Li Zhang
8 Digital Twin for Children's Mental Health	A holistic digital health platform for children's ADHD and autism prevention, diagnosis, monitoring, care management support, education, training, awareness	Zhen Xiao
Pathogenic Mutation Predestination RESET Insights into Microbiome Connection to 9 Diseases	Cancer prevention purpose The gut microbiome has been shown to have direct violation to all sorts of diseases and yet there is no model describing the gut microbiome connection to diseases	Chang Liang Husein Abdurakhinov
10 Automated Intravenous Anesthesia	Automation of anesthesia could provide access in austere settings (military, disasters) improve safety and decrease med consumption currently anesthetic is task and expertise intensive	Julian Goldman
11 Digital Twin of Living Human Eye	AI based - DT to advance ophthalmic diagnostic	Delia De Buc
12 Adjunctive PT History Biomedical Twin	Retrieval and storage of patient history which are lost because patients forget family members	Jung