



Quantitative studies for mechanobiology of cancer via data-driven *in silico* replication of human tissues

Mahsa Dabagh, PhD
Assistant Professor
Department of Biomedical Engineering
University of Wisconsin-Milwaukee



The *in silico* replication of patient-specific tissues has tremendous potential for screening to early diagnosis, prevention, and treatment of cancer via facilitating the study of cellular and molecular mechanisms predisposing the progression of the disease. Empowering *in silico* models provides an insight into other diseases and health conditions such as chronic wounds, atherosclerotic cardiovascular diseases, hypertension, aneurysm and so forth. The long-term goal of my research is to develop data-driven *in silico* replication of human tumor tissue that enables the modeling of tissues with all associated complexities and heterogeneities observed in patients. The state-of-the-art *in silico* model will reveal the mechanisms underlying the changes occurring in tissue components during disease progression, assist medical decision-makers in delivering precision therapies, and establish a unique knowledge on resisting factors against treatments on a per-patient basis.

In this seminar, I will first discuss my earlier study on the mechanobiology in cancer that elucidated the mechanisms facilitating cancer cells extravasation from blood flow to a secondary location. Then I will discuss my group's current activities on developing *in silico* replication of tumor tissues. Finally, I will provide an outline for my ongoing and future research where computational, imaging, experimental, and deep learning methods will be linked to develop drug screening platform, explore how the resistance against drug therapies can be stopped, and develop an *in silico*-trained-deep learning platform to predicting cancer cells' response to treatments. This will guide pathologists in deciding for an effective patient-specific treatment.

ABOUT the SPEAKER

Dr. Mahsa Dabagh is an Assistant Professor at the Department of Biomedical Engineering, University of Wisconsin-Milwaukee. Her primary areas of research are in cellular bioengineering, computational biology, mechanobiology, and high performance computing. She has linked multiscale modeling, imaging, experiments, and data science to build virtual clinical trials, drug screening platforms and discover biomarkers. She received her doctoral degree from Lappeenranta University of Technology in Finland. Her MS and BS degrees are from Sharif University of Technology at Tehran, Iran. Dr. Dabagh was previously employed as Research Associate at Duke University and worked as visiting scholar at MIT, Georgia Tech, and City College of New York. Dr. Dabagh's current research uniquely focuses on data-driven *in silico* replication of human tissues to provide an insight into the diagnosis, treatment planning, and prevention of various human diseases ranging from atherosclerosis to cancer and to wound healing.

Wednesday, April 5 from 11am - noon
1003 Engineering Centers (Tong Auditorium)