

The School of Informatics and Computing (SoIC)

INTELLIGENT SYSTEMS ENGINEERING COLLOQUIUM SERIES

The Role of Hypoxia in the Dynamic Tumor Microenvironment

Daniele Gilkes

Abstract: Of all the deaths attributed to cancer, 90% are due to metastasis, or the spread of cancer cells from a primary tumor to distant organs, and treatments that prevent or cure metastasis remain elusive. Emerging data indicate that low oxygen states within a tumor, termed hypoxia, can alter the chemical and physical parameters of the extracellular matrix (ECM), or scaffold of the tumor tissue. These changes generate a microenvironment that may influence metastasis. During tumor evolution, changes in the composition and the overall content of the ECM reflect both its biophysical and biological properties and these strongly influence cancer cell properties, such as cellular proliferation and cell motility. The talk will cover how hypoxia arises

within normal tissue and also in tumor tissue. A discussion of the role of hypoxia in collagen biogenesis which influences compositional changes to the tumor microenvironment will reveal how hypoxia influences metastasis. The challenges in quantifying the extent of hypoxia within a tumor and modeling the dynamic changes in the microenvironment will also be considered.

Biography: Daniele Gilkes earned her MS in engineering from the University of Florida and her PhD in cancer biology from the University of South Florida. She is currently an assistant professor in the departments of Oncology as well as Chemical and Molecular Engineering at the Johns Hopkins University School of Medicine. Her research goal is to develop a breast cancer research program which utilizes new technologies that can rapidly advance our understanding of how the microenvironment, in particular hypoxia and hypoxia-induced genetic changes, promote breast cancer metastasis. The overall objective is to identify therapeutic strategies that focus on metastasis treatment and prevention strategies for breast cancer patients.



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