APPLIED MATHEMATICS COLLOQUIUM:

Sex, Drugs and Radiomics of Brain Cancer

Kristin Swanson

Vasek and Anna Maria Polak Professor in Cancer Research Co-Director
Precision NeuroTherapeutics Innovation Program
Mayo Clinic Az

Date:
12/11/2020

Time:
3:00 PM – 4:20 PM

Link:
Please email snsgradstaff@ucmerced.edu for Zoom link and passcode.

About The Speaker:

Dr. Swanson is an internationally recognized mathematical oncologist focused on delivering optimal treatment to patients with brain cancer. Dr. Swanson received her BS in Mathematics in 1996 from Tulane University followed by her MS (1998) and PhD (1999) in Mathematical Biology from the University of Washington. Following a post-doctoral fellowship in Mathematical Medicine at UCSF, she joined the faculty at the University of Washington in 2000, with appointments in both Neuropathology and Applied Mathematics. In 2015, she joined Mayo Clinic in Arizona as Professor and Vice Chair of Research for the department of Neurological Surgery. She is co-Director of the Precision Neurotherapeutics Innovation Program and Director of the Mathematical NeuroOncology Lab at Mayo Clinic. She also holds appointment a secondary appointment as Professor of Mathematics at Arizona State University. She has over 120 publications and 200 abstract bridging mathematical modeling,

Her Mathematical NeuroOncology lab has spent the last 20 years pioneering a way to generate patient-specific mathematical models that are remarkably effectively at accurately predicting tumor growth and response to therapy in individual patients. Her lab works with the clinical and research teams at Mayo Clinic to bring these innovations to the clinic while also identifying new predictive models. Her research efforts have been supported through funding by the National Institutes of Health, the Ben and Catherine Ivy Foundation, the James S McDonnell Foundation, the James D. Murray Endowed Chair at the University of Washington, and the Mayo Clinic.

Abstract:

Glioblastoma are notoriously aggressive, malignant primary brain tumors that have variable response to treatment. This presentation will focus on the integrative role of 1) biological sex-differences, 2) heterogeneity in drug-delivery and 3) intra-tumoral molecular diversity (revealed by radiomics) in capturing and predicting this variable response to treatment. Specifically, I will highlight burgeoning insights into sex differences in tumor incidence, outcomes, propensity and response to therapy. I will further, quantify the degree to which heterogeneity in drug delivery, even for drugs that are able to bypass the blood-brain barrier, contributes to differences in treatment response. Lastly, I will propose an integrative role for spatially resolved MRI-based radiomics models to reveal the intra-tumoral biological heterogeneity that can be used to guide treatment targeting and management.

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