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.

Suggested Readings:

See next page.
Suggested Reading List

- Quantifying Uncertainty and Robustness in a Biomathematical Model Based Patient-Specific Response Metric for Glioblastoma
- Sex differences in GBM revealed by analysis of patient imaging, transcriptome, and survival data
- Accurate Patient-specific Machine Learning Models of Glioblastoma Invasion Using Transfer Learning
- Integration of Machine Learning and Mechanistic Models for Cell Density Mapping of Glioblastoma under Multiparametric MRI
- Sex-specific impact of patterns of imageable tumor growth on survival of primary glioblastoma patients
- The imaging of intratumoral heterogeneity in high-grade glioma
- Image-based metric of invasiveness predicts response to adjuvant temozolomide for primary glioblastoma
- Roadmap for clinical integration of radiomics in neuro-oncology
- Deep learning for accurate, rapid, fully automatic measurement of brain tumor volume. *Journal of Medical Imaging, In Press*
- Quantifying glioblastoma drug response dynamics incorporating treatment sensitivity and blood brain barrier penetrance from experimental data (Preprint)
- Predictors of Seizure in Contrast-Enhancing Gliomas at Clinical Presentation: A Network Approach (Preprint)
- *Robust Automatic Whole Brain Extraction on Magnetic Resonance Imaging of Brain Tumor Patients Using Dense-Vnet (Preprint)*
- *Uncertainty Quantification in Radiogenomics: EGFR Amplification in Glioblastoma (Preprint)*