Abstract: Genomic and molecular heterogeneity of solid tumors is now recognized as the primary cause of treatment failure and therapy resistance in modern cancer treatment. Emerging targeted cancer therapeutics exploit proliferation and survival pathways with specificity at the individual patient level, but the development of effective therapy is currently limited in part by a lack of understanding of the spatial and temporal patterns of genomic and somatic heterogeneity, which cannot be assessed by surgical pathology alone. In this work we evaluate the potential to predict microscopic properties of brain tumor tissue at the individual voxel level using only contemporary clinical MR sequences. We use a machine-learning algorithm to create nosologic images of up to 17 different tumor and tissue compartments across the entire image space of brain biopsy patients, and investigate the microscopic predictive power of the nosologic labels at the location of each core biopsy.

Bio: Dr. Jason Parker, PhD, DABR, is Associate Professor of Radiology & Imaging Sciences at IU School of Medicine. He also serves as the Director of Clinical Diagnostic Medical Physics for IU Health. His primary area of research is in the characterization of microscopic properties of brain cancer from non-invasive, macroscopic imaging signatures.

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