

Summary: Brain Tumor Research with GPUs

Problem:

- Each type of cancer has multiple subtypes. Accurately identifying these subtypes is important in the determination of the most effective treatments.
- Classifying the various types of brain tumors is typically done through a manual process of reviewing slides of brain tissue under a microscope and identifying tissue patterns.
- This process can be subjective, with variability among different pathologists regarding tumor classification, which can impact treatment decisions and patient prognosis.

Solution:

- Researchers at Emory University are using the Keeneland supercomputer in an effort to automate and digitize this process on a large scale (“digital pathology”).
- Using GPU-accelerated custom algorithms, they can analyze over 300 ultra-high resolution images (100K x 50K pixels) of brain tissue in 15 minutes – a process that would normally take close to a week on a single CPU system.

Benefit:

- Through this research, Emory Cancer Biomedical Informatics researchers led by Drs. Dan Brat and Joel Saltz aim to reduce variability inherent in the pathology process of classifying brain tumors, improving the quality of the diagnosis, and identifying more effective treatments faster.
- In the course of their research, Emory researchers have already found evidence of new discrete, morphologically-defined categories of brain tumors
- In the future, they plan to scale their research to include a vast collection brain tumor tissue data collected nationwide, which is expected to dramatically improve the accuracy of their “digital pathology” approach.