Computational facilities
The Advanced Research Computing Center (ARCC) located at the University of Wyoming (UW) provides support for research computing endeavors including high performance computing (HPC), large research data storage, and training and consulting to further UW’s research and educational activities. ARCC provides systems administration for the campus HPC condominium cluster, Teton, which is open to all facets of research. In addition, ARCC supports numerous specialty clusters used by different UW research organizations. ARCC also provides the petaLibrary (PL), an easily scalable research data storage system. The PL is available to all researchers at UW for short and archive long term data storage.

Teton is an Intel x86_64 based HPC system consisting of 502 nodes which include Sandy Bridge/Ivy Bridge, Broadwell, Knights Landing, and Skylake architectures utilizing a Mellanox InfiniBand FDR&EDR interconnect. Varying scientific workloads can benefit by having heterogeneous computing components. Teton hosts specialty nodes to address the many different computational requirements including huge memory (1TB RAM) nodes, GPU nodes with dual NVIDIA Tesla K20 series GPU’s, and nodes with 512 GB RAM and quad NVIDIA Tesla K80 GPU’s, as well as multiple Nvidia DGX nodes with 8 Tesla V100 GPU’s each. Teton utilizes the SLURM workload manager and Lmod environment modules to provide a robust and flexible HPC user experience. The system supports a wide range of compilers (GNU, Intel, LLVM, and PGI) and Allinea tools like DDT and MAP for advanced debugging and profiling as well as new emerging technologies such as containerization frameworks like Singularity. The system job scheduling configuration is based on a condominium model that encourages researchers to purchase compute nodes in the system granting additional priority and predictable access times. We also leverage fairshare mechanisms to fairly distribute compute workloads between various research projects as well as weighted scheduling parameters (job size, age, etc.) to utilize the cluster as efficiently as possible. Teton is backed by a DataDirect Networks GS14k IBM Spectrum Scale (formally GPFS) parallel filesystem hosting approximately 1.2 PB of high-performance storage. The Teton storage system supports GridFTP via Globus data transfer servers that are connected to the UW Science DMZ (100 Gbps Internet2 link) at 40 Gbps. In addition, Teton provides SMB/CIFS and NFS for researchers to transfer data from their daily work environment.

The petaLibrary is a peta-scale capable DataDirect Networks (DDN) system utilizing IBM’s Spectrum Scale filesystem and DDN’s Web Object Storage (WOS) to safely generate secondary copies of data. The petaLibrary is designed for collaboration and to provide easy access to research data via SMB/CIFS and Globus GridFTP. The petaLibrary also offers functionality to facilitate the publication of datasets which are curated by the UW Libraries.

Besides our computing resources ARCC provides training courses, bootcamps, and research consulting utilizing graduate and undergraduate students who are specializing in computer
science, computer engineering, and other computationally driven sciences. Future such training of new students will continue under ARCC.