***Research Computing Data Core (RCDC):***

*The Hewlett Packard Enterprise Data Science Institute (HPE DSI) is located in the new $51M USD Durga D. and Sushila Agrawal Engineering Research Building. HPE DSI owns and maintains several high performance computing platforms that are housed in its Research Computing Data Core (RCDC).*

*HPE DSI supports researchers and projects by offering leading-edge computational resources. Capabilities include high-capacity storage and backup, parallel and big data applications, high-speed networking and access to widely used software. The HPE DSI has three large clusters, Opuntia, Sabine, and Carya to support scientific computation, big data/analytics applications and large-scale data storage, and also managed a large cluster procured from the NSF.*

*Opuntia: contains 1,860 cores (within 80 HP Proliant SL 230 compute blades), and 4 HP Proliant SL 250 NVIDIA K40 GPGPU blades. The system is also equipped with 3 large memory nodes – 1 HP Proliant DL 580 with 1 TB of main memory and 2 HP DL 560 each with 512 GB of main memory. The system storage includes a ~600 TB shared file system. Opuntia also provides access to eight nodes containing two NVIDIA GPU’s, giving users access to high-throughput computing and remote visualization capabilities respectively. A 56 Gb/s Ethernet Mellanox switch fabric interconnects the nodes (I/O and compute). Theoretical peak performance is approximately 58 TFlops.*

*Sabine: contains 5,704 CPU cores in 147 compute and 12 GPU nodes, including four nodes with 8 NVIDIA V100 cards each and a large memory (768GB) node (116 HPE Proliant XL170r nodes, and 8 HPE ProLiant XL190r nodes). Sabine also provides access to eight nodes containing two NVIDIA Pascal GPU’s, giving users access to high-throughput computing and remote visualization capabilities respectively. Sabine has 530 TB of usable NFS shared storage, and 235 TB of Lustre storage for parallel IO applications, and its nodes are connected via Intel OmniPath switch with a 100Gb Line Rate. Theoretical peak performance is approximately 600 TFlops.*

*Carya: is the latest addition to the RCDC, 2020, offering a total of 208 Hewlett Packard Enterprise compute HPE nodes (ProLiant HPE XL170r and HPE ProLiant DL380) and 64 Nvidia Volta V100 GPUs (Accelerator HPE ProLiant XL270d & XL190r). It contains about 10,000 CPU cores, 327K GPU cores, 45 TB of main memory and 2 TB of high bandwidth GPU memory. Carya nodes are connected via Mellanox HDR Infiniband switch with 100Gb/s Line Rate. This cluster has 1,560 TB of shared hard-disk based storage and 122 TB of shared flash storage space. Theoretical peak performance is approximately 770 Teraflops.*

*Visualization Theater: The Visualization Theater features seating for 30 people and a 16’x9′ screen supporting 4K digital cinema, 4096 x 2160 and both active and passive stereo 3D modes. The system is powered by a workstation with 64 GB RAM and dual Intel Xeon Haswell processors (E5-2618L v3, 8 cores), and 2 TB of local storage. Two AMD v8800 graphics cards drive two Sony SRX-S105 projectors with polarizing shutter filters at 4096 x 2160 pixels. The theater is also equipped with 7.1 surround sound.*