West Texas A&M University

- Comprehensive university serving Rural West Texas
- 10,000 students
- 50% first generation
- Hispanic Serving Institution
- College of Engineering
  - 800 students
  - Engineering 2003
  - Computer Science fastest growing program
  - 35-40% Hispanic

Academic Computing Resources

COE building houses two computer labs with a total of 60 machines.

- ECS 143 ECS Open Access Lab and ECS142 Computerized Classroom
- 50 machines – Dell Optiplex 7040 Small Form Factor machines
  - Intel(R) Core(TM) i7-6700 CPU @ 3.40GHz (4 cores)
  - 16 GB RAM
  - 1 – 500GB SSD for Windows | 1 – 500G for Linux
  - Microsoft Windows 10 Pro

We also have our own local server Thor, the server that the CS department maintains and has the following specs:

- 1TB of hard disk space
- 32GB memory
- 10CPUs

If need arises such that we might need more space, we have the capacity to build our own server that has increased capacity.

Computing Curriculum Developments

- A new data science track (on top of the existing tracks: Software engineering and Enterprise systems) was introduced in the CS curriculum to meet the needs of local industries and research
- Faculty line with expertise in the data science areas were hired in the last academic cycle
- New courses in the data science area were introduced
- New interdisciplinary courses with a computing component are developed (MATH 6375, MATH 6376)
- Master's thesis/projects that investigates on using computing resources to solve problems are encouraged and mentored

Collaborations

- WT collaborated with TTU, SPC, and few local industries during 2020-2021 on "Critical Infrastructure Security Training Programs for Industry Professionals and University Students" a project through Texas Workforce Commission (TWC)
- Regional Hackathons were hosted by the ACM student chapter to reach out to community college students interested in the computing discipline.

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Major Goals:

G1. Develop cyberinfrastructure (equipment and personnel) for computational and AI research for campus researchers.

G2. Provide HPC computational resources for students to meet STEM educational goals.

G3. Develop courses/course components that can harness CI facilities and spearhead CI workforce development.

G4. Develop research programs and publish work that can capitalize on CI resources.

G5. Share computational resources nationally across institutions and contribute to national cyberinfrastructure.

Science Drivers:

S1. Computational Mechanics (Finite Element Method)

S2. Computational Fluid Dynamics (Finite Volume Method, Lattice Boltzmann Method)

S3. Computational Materials Science (Molecular Dynamics, Density Functional Theory)

S4. Cybersecurity (Machine Learning)

S5. Energy systems (Machine Learning)

S6. Computer Vision and Data Visualization (Machine Learning, various methods)

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Progress:

SR1: WTAMU has acquired a DELL high performance computing cluster (CentOS, Bright CM, SLURM, Spack)

SR2: Remote cluster access with DUO.

SR3: New Course Offering: High Performance Computing Applications in Engineering. The focus is on applications of techniques such as finite element modeling, molecular dynamics, and data visualization in engineering practice.

SR4: Submission of research and educational grants that leverage campus CI resources.

SR5: Working with OSG Staff on sharing resources nationally with the Open Science Grid.

Enabled acquisition of **DELL HPC** (10+3 computational nodes, 2x32-core AMD EPYC processors for 10 nodes, 2x NVIDIA TESLA V100s GPUs for 3 nodes, Infiniband fabric)

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Future work:

- Expand user base and cluster use, locally and via shared resource (OSG).
- Increase training opportunities for users on topics such as submitting jobs, linux command line, package management.
- Develop webpage and database for recording information and publications involving HPC resources.
- Develop UG opportunities for capitalizing on HPC resources (senior design, capstone, course projects, UG research)
- Enable and accelerate the pursuit of research grants that utilize CI.

Stakeholders:

- Charley Marsh, Cluster Administrator
- James Webb, CIO
- Emily Hunt, Dean, College of Engineering
- Vinitha Subburaj, Asso. Dean, College of Engineering
- Anirban Pal, Asst. Prof., College of Engineering