

Democratizing access to data science boosts university's research

Texas State University helps more students and faculty use AI, ML and other data tools with Dell Data Science Workstations.



“Instead of spending a day or more configuring research environments from scratch, students can start projects in about an hour on Dell DSWs.”

Damian Valles

Professor, Ingram School of Engineering,
Texas State University

Organization needs

To scale up its research enterprise, Texas State University needed to give more students and faculty access to high performance computing (HPC) resources with NVIDIA® GPUs. Data science students and professors require NVIDIA RTX-powered HPC technologies to expand and improve their own research as well as collaborative work with colleagues across all disciplines.

Organization results

- Boosts ML model training speed by 27x compared with CPU performance of on-campus HPC cluster.
- Simplifies collaborative data science research efforts.
- Improves learning with hands-on, data-centric projects.
- Increases the probability of securing grants.

Solutions at a glance

- [Dell Precision 7920 Tower Data Science Workstation \(DSW\)](#)
- [Dell Precision 5820 Tower Data Science Workstation \(DSW\)](#)
- [Dell Precision 7760 Mobile Data Science Workstation \(DSW\)](#)

More students are learning with the help of AI

All industries are driving innovation with data science techniques including artificial intelligence (AI) and machine learning (ML). This is why emerging research institutions must give increasing numbers of students access to high performance computing (HPC) technologies. Not only are they required to facilitate learning and research in the data science field but professors across disciplines are also encouraging and participating in collaborative projects with data scientists to equip students with in-demand skills.

The symbiotic relationship between grants and HPC

Additionally, universities that are on track to become Research 1 (R1) institutions, such as Texas State University, must provide students and faculty in all departments with the HPC resources necessary to secure more grants. However, without grant funding, it can be difficult to afford the HPC technologies top students and professors expect when they're choosing where they want to study and work.

Cross-disciplinary research requires HPC with GPUs

Texas State was all too familiar with the technology-related challenges of becoming an R1 institution. It had an HPC cluster to facilitate advanced research. However, the cluster lacked the GPUs data scientists needed to run their AI models and visualize data using techniques such as virtual reality (VR) and augmented reality (AR). As a result, data science students and faculty often faced limitations in what they could accomplish in their research because they couldn't analyze enough data in their given timeframes to train models or run simulations. The lack of access to GPU-powered HPC resources also hindered other areas of study as well. Eric Dean, Corporate Relations Officer at Texas State University, says, "We're aiming to provide more hands-on experience with HPC technologies across our campus so that students in any department can expand their learning by using emerging technologies such as AI, ML, VR and AR."



"With our Dell DSWs, we can approach more grant agencies to fund increasingly complex projects and help move Texas State University to R1 status."

Eric Dean

Corporate Relations Officer,
Texas State University

Hands-on collaborative projects

For example, data scientists at Texas State have been working on collaborative projects with:

- The McCoy College of Business to speed fraud detection in healthcare by using AI and ML to detect issues such as unauthorized medical record access.
- The Department of Communication Disorders and Ingram School of Engineering on AI and ML applications that help autistic children recognize emotions by analyzing people's facial expressions.
- The College of Education on 3D virtual classrooms built with AI and VR technologies that improve learning, especially in remote settings.
- The City of Austin and students from Social Work and Computer Science on improved first responder training using AI, VR and AR applications.

All stacked up and ready to go — in less than an hour

After investigating viable HPC solution options including adding NVIDIA GPUs to their cluster, Texas State decided to deploy Dell Data Science Workstations (DSWs). Not only do the machines include the NVIDIA GPUs the university wants, but they also come with NVIDIA GPU-accelerated AI and data science software stacks pre-installed so that people have ready-to-go data science environments. This is significant because standing up data science software stacks is challenging and time consuming, even for engineers.

For example, experienced data scientists can easily spend two days creating a research environment. Not only do they have to determine which software versions they need, but they must also download, install and configure their software stacks, integrate them with the hardware they're using, and then test and tune everything. Damian Valles, professor for the Ingram School of Engineering at Texas State University, explains, "Instead of spending a day or more configuring research environments from scratch, students can start projects in about an hour on Dell DSWs. Everything people need to work on their data science model is in the box, including pre-configured NVIDIA GPU-accelerated software stacks and integrated hardware. As a result, the turnaround times and ROI of our research efforts are much shorter and more productive today."

Easier access to AI modeling expands learning

To expand access to HPC technologies, Texas State deployed tower and mobile Dell DSWs in Dr. Valles' High Performance Engineering (HiPE) lab, as well as in Dr. Larry Fulton's lab in the School of Health Administration. "Collaborative research doesn't just happen in one building," says Valles. "We can put these Dell Data Science Workstations anywhere on campus. The more GPU-enabled technologies we have, the easier it is for students across departments and colleges to take a data-centric approach to their research."



"Compared with our HPC cluster, our Dell DSWs run models at least five times faster."

Damian Valles

Professor, Ingram School of Engineering,
Texas State University



“One model that took 27 hours to train on one of our existing high performance servers took just one hour to train on a Dell DSW powered by NVIDIA RTX GPUs and NVIDIA software.”

Damian Valles

Professor, Ingram School of Engineering,
Texas State University

Removing the intimidation factor

Additionally, unlike HPC clusters which intimidate many students and faculty, workstations deliver a more intuitive desktop experience. “One of the advantages of having Dell Data Science Workstations is that no one has to implement a rack server,” Valles explains. “You can put one in your office or your lab and have the capabilities and performance that you need for your research. And unlike an HPC cluster, which many students have never even heard of, towers and laptops are familiar. Everything they’re doing is taking place in the box that they can see.”

Improved research performance enhances grant consideration

Faculty and students now have the GPUs that are necessary to process more data in less time. “Compared with our HPC cluster, our Dell DSWs equipped with NVIDIA RTX GPUs run models faster,” Valles says. “For example, one model that took 27 hours to train on one of our on-campus HPC clusters that only has CPUs took just one hour to train on a Dell DSW.”

Being able to process more data in less time improves the performance of research and AI models because innovative conclusions are based on the capacity to support larger datasets. Additionally, faster research cycles help to accelerate projects and publication times — and free up HPC resources for additional projects so that Texas State can boost its research momentum. Dean concludes, “With our Dell DSWs, we can approach more grant agencies to fund increasingly complex projects and help move Texas State University to R1 status.”



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