Standing on the Shoulders of Giants

From the top, on left, William Flesner works on the new 24-panel vis wall, Matthew Bischoff inspecting one the custom “Little Fe” machines, Jon Watson using Whirlwind. On the right, Matt Pevey and Bryan White building TSTC’s first “Little Fe”. The two are now both employed at data centers.
One instructor’s experience with the annual TeraGrid conference and the Texas Advanced Computing Center brings monumental change to a Texas technical college.

Texas State Technical College would not be where it is today in the computational science realm without the TeraGrid,” according to Walton Yantis, Chair of the college’s High Performance Computing (HPC) Department.

Yantis attended his first TeraGrid conference in 2007 during which he witnessed efforts by TeraGrid staff and other conference attendees to work with faculty from underrepresented institutions to assist them with learning and adopting high performance computing resources, tools and methods into their research and education endeavors. Yantis met many people who were utilizing HPC technologies within their own institutions, and among them was Tom Murphy, a faculty member at Contra Costa College, a two-year college in northern California. He learned from Murphy and other faculty about the portable LittleFe educational cluster and how it can be effectively used to engage students in computational science and computer science.

Texas State Technical College (TSTC) students began constructing their own LittleFe machines and posted project information on the Internet, which gained industry attention from Conoco-Phillips. Conoco then donated two clusters to the program. Another energy company also provided Texas State Technical College (TSTC) with additional servers to allow the students to build larger clusters and expand their learning.

Yantis took a team of TSTC students to visit the Texas Advanced Computing Center (TACC). They were exposed to TACC’s high performance computing and scientific visualization systems, including Colt, a visualization cluster with a 3x3 display wall made up of nine 30” Dell monitors and XPS gaming systems, and Stallion, a visualization cluster of 24 nodes and a 15x5 display wall. The students told Yantis they wanted to build their own display wall based on Stallion, and requested a copy of TACC’s white paper on large-scale tiled displays. Yantis and his students scraped together various used components, and in less than two weeks, his students had built their own powerful scientific visualization cluster and a 2x2 panel display, named Whirlwind. They also created a YouTube video to demonstrate Whirlwind and explain how it works.

Referring to his student’s success, Yantis has enthusiastic praise for TeraGrid. “I had the opportunity to expand my knowledge and bring new ideas back to enhance my courses and motivate my students. TeraGrid is open and available,” says Yantis, “I can stand on the shoulders of giants and avoid reinventing the wheel.”

Yantis learned from his interactions at the TeraGrid conference that Murphy had helped lead a consortium of four community colleges, supercomputer sites and business partners, to form the Center of Excellence for High Performance Computing Technology, with funding from the National Science Foundation (NSF). The consortium had developed skill set standards and competencies needed for certifying high performance computing technicians and for developing an Associate Degree program in high performance computing technology. Yantis was able to take the report from this NSF project, along with their materials and experiences, back to his own institution. With the materials from the NSF report, Yantis was able to demonstrate the need for high performance computing workforce development. This, coupled with the excitement level of his cluster computing students, enabled Yantis to secure approval from the Texas Higher Education Coordinating Board to launch the new HPC Department in May 2010.

Students will graduate from the new HPC program at TSTC with an Associate’s Degree in Applied Sciences. This new department will engage its first students during the fall 2010 semester. The students will take new courses that focus on HPC and will also benefit from courses offered by five other departments including computer science, security, networking, heating and air conditioning, and electronics. The students who complete the program will be knowledgeable about setting up computer center facilities, installing and maintaining systems, and performing parallel computing, including CUDA programming.

Steven Meisner, an undergraduate student at TSTC says, “TeraGrid has allowed me to step into the world of HPC and see for myself firsthand what it is all about. The connections of our Campus Champion, and the opportunities that we have seized have helped immerse me in HPC while at TSTC.”

Adds Matthew Bell, an undergraduate student who has taken many of Yantis’ courses, “It has been an amazing experience attending TeraGrid with Yantis and now seeing the development of an HPC department at our college. I always share what I have learned with other students and encourage them to participate in the TeraGrid conference and to take advantage of the opportunities that are available to us. Because of my experiences, I have decided to pursue further studies in computational engineering.”

When asked what advice he would give other faculty, Yantis says “Get advice from others, involve the administration, bring solutions to the table, and do not give up. It will not be easy, but the benefits to the students outweigh the challenges. You can do it regardless of the size of your department or institution.”

Relevant links:
Texas State Technical College: http://www.tsct.edu/ 
LittleFe: http://littlefe.net/ 
Whirlwind YouTube video: http://www.youtube.com/watch?v=jf4SeYu9kjs