



# Montague-CTE Scholar Kim-Vy Tran (2010-11) Dept. of Physics & Astronomy



## Teaching Astronomy in the 21st Century: Advancing Scientific Understanding Through Active Learning

*It's not what the instructor does that matters, it's what the students do.*  
(Slater & Adam, 2003)

The primary challenge in teaching basic astronomy is having students grasp the three dimensional Universe. Hands-on classroom demonstrations and lab exercises enable a better understanding of physical concepts by integrating and reinforcing lecture material. The Montague-CTE award was used to purchase equipment to teach astronomy through active learning to students enrolled in introductory courses.



**Solar Motion Model:** The path of the Sun through the sky depends on where you are on Earth (latitude) as well as the time of year. Most students have difficulty visualizing how this works in practice. The Solar Motion Model is an excellent hands-on demonstration tool that shows how the Sun's position in the sky changes due to the Earth's tilt and orbit. Understanding this fundamental concept is critical for understanding the reason the Earth has seasons.

**Infrared Camera:** Astronomers use light at all wavelengths to study the Universe. Only by viewing objects at multiple wavelengths can astronomers obtain a complete picture. An effective in-class demonstration is with an Infrared Camera. The Infrared Camera shows in real time that what is hidden at visible wavelengths is revealed at infrared wavelengths.



### Computerized Telescopes & CCDs:

Students work in groups to acquire images of the night sky using computerized telescopes, analyze their results with professional software, and interpret their scientific conclusions. The lab exercises engage the students in active learning and also promote learning through peer instruction. The Montague-CTE award purchased one additional computerized telescope and eight CCDs to attach to all of the available telescopes.



**Star Parties:** The astronomy group holds regular star parties throughout the academic year for students and the community. The telescopes are set up on campus and provide an important opportunity for the students enrolled in astronomy courses to view the night sky and interact with instructors. For many students, this is the first time they have ever looked through a telescope!

For upcoming Star Parties, visit [mitchell.tamu.edu/outreach](http://mitchell.tamu.edu/outreach)