

## EDUCATION

The TORRE initiative embraces multiple objectives while targeting a diversity of audiences, perhaps none more directly than to reach and grow a base of future astronomers, drawing from younger people and under-represented groups.

Our users will be comprised of a diverse base of K-12, undergraduate and graduate students and professional organizations.

TORRE's educational charter is to advance discovery and understanding while promoting teaching, training and learning.

Education and research will be bridged by providing opportunity and access to students graduate students and professional organizations as well as experienced research professionals to work together in a web enhanced environment to promote the purposes for the remotely operated observatory.

## OPPORTUNITY PORTAL

The Remotely accessed telescope, high in the clear skies above the Davis mountains of west Texas, is brought home to the users through broadband access via the world wide web for remote control of both the rotating dome and the telescope itself, including the necessary functions of queuing objects for nightly sessions of observing, photographing, archiving and transmitting back to the users.

In addition, the TORRE website functions as "place" as much as content, offering users "stickiness" and involvement in the many aspects of the great resource which is this telescope and its cameras, spectroscope, and related equipments, also the information available at the website, and the people who are a part of the extended community of users. The following paragraphs give a sense of the many ways the TORRE community can benefit from the instrument at Mount Locke, and also the web site that is associated with it.

Examples of these educational "opportunities" include:

### **1. CLASSROOM SUPPLEMENT**

The TORRE website is a great resource for any teacher of Astronomy, as it provides student access to the rare opportunity to work with a high quality research grade instrument mounted high atop the atmosphere in a remote location.

The students in addition have full access to the many educational links and resources which are housed at the TORRE website, to the people who form the extended TORRE community, and to the many archived astronomy-related links which are accumulated there.

The regular posting of astronomical news to this web site provides yet more value to the teacher who wants to enrich his or her astronomy class.

### **2. VIRTUAL AND REAL LABS**

TORRE provides solid hands on lab experiences for the student. Under the proper supervision students can learn to operate a telescope 800 miles away, request that the dome be rotated, the telescope be turned and properly aimed, pictures be taken and returned to the classroom for analysis. Students can see, study, discuss what they have found, and learn together in an atmosphere rich with excitement and enjoy the feeling of working with the latest tools, which in fact they will be.

### **3. VIRTUAL AND PHYSICAL "FIELD TRIPS"**

TORRE provides the opportunity for students to visit the MacDonald Observatory site in the real physical sense, by traveling there as a school approved field trip.

They can also travel there "virtually", by computer, through the web, interacting with real people at the Macdonald site, asking questions, viewing through the instrument there very much as if they were present in person.

### **4. A TASTE OF RESEARCH**

Since the TORRE Telescope is a serious research grade instrument, serious research is ongoing, done by both Rice university professional astronomers, serious amateurs from the Houston Community College and the local Astronomy organizations, plus others around the state of Texas. Their collected works will be disseminated via the web site and regular progress updates will be available at the web site for all interested parties. High school and Community College students will be interested to follow the progress of these researchers through regular visitations to the web site, and through the dialogue and contacts which will be a result of their involvement.

In addition, under the supervision of their instructors, students will have the opportunity to conduct small research projects of their own, which may range from photographic safaris and objects classifications, to the active search for new comets and asteroids, SETI, and beyond.

### **5. STUDENT GALLERY**

The TORRE Web site will maintain a gallery of student photographs taken through the .9 meter telescope, and maintain discussion lists so that the sense of "community" can be enriched over time as the image base is expanded. These archived images will be of superb quality due to the nature of the instrument, and should build to a rich supplement to the usual classroom materials, made of increased value because they were collected by the students themselves.

### **6. STUDENT CERTIFICATIONS**

Participating teacher will encourage students to use the TORRE telescope in pursuit of certifications that they have observed a certain number of objects in any of several classifications. Groupings that come to mind are certification in observing nebulae, open star clusters, tightly bunched star clusters, double stars, and galaxies.

### **7. EDUCATION PROGRAMMING**

During the Fall and Spring terms, and especially during summer terms, the TORREE telescope site in west Texas may be visited by educators and their students, after suitable arrangements have been made with the host organization. The TORRE web site will be the clearinghouse for these site visits, with information posted on a regular basis promoting these opportunities/

In addition, the TORRE team will design workshops for teachers, as well as workshops for interested students, fully separate experiences from the normal K-12 or undergraduate or graduate astronomy curriculum, and self contained as enrichment experiences in the many and varied fields of astronomical interest.

Of particular value will be workshop s designed especially for teachers, helping them to teach in new ways, building their programs around the extraordinary resources and capabilities of the TORRE project.

### **8. EDUCATION PLAN**

Once fully designed and calendared, the full educational plan in support of all TORRE related activities will appear at this place in the web site, and will be calendared with easy access to online registration procedures.

### **9. EDUCATION-RELATED LINKS:**

Current Activities: HCCS

Current Activities: Rice

## Education

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Current Activities: University of Texas

Current Activities: Area ISD's K-12

Current Activities: Area Professional Groups

Full Educational Calendar, all TORRE participants

Observatory Schedule