

**Center for the Integration of Science Education and Research:
Mission, Vision, Values, and Goals**

*Center for the Integration of Science Education and Research:
Mission Statement*

The Center for the Integration of Science Education and Research encourages, promotes, and supports the integration of education and research in the sciences, not only for Texas Tech students, but also for students and teachers in the K-12 schools.

*Center for the Integration of Science Education and Research:
Vision Statement*

The Center for the Integration of Science Education and Research will be a national leader in the integration of research and education in the sciences. The Center will provide a mechanism for assuring that the increasing research activity at Texas Tech will impact positively the educational experiences in the sciences of students at Texas Tech and in the regional and local K-12 schools.

The Center will:

- develop innovative programs to involve students and teachers at all levels in the research enterprise.
- create a seamless community of science educators from K-12 to the university.
- contribute positively to Texas Tech's reputation by developing nationally recognized programs in the integration of research and education.
- serve as a mechanism for recruiting more students into the sciences and as a mechanism for recruiting and retaining K-12 science teachers

*Center for the Integration of Science Education and Research:
Core Values*

- Commitment to the concept that research and education in the sciences are inseparable and complementary
- Commitment to the removal of barriers: between education and research, between organizations, between academic units, between disciplines, between scientists and non-scientists, between the university and the schools

Center for the Integration of Science Education and Research: Goals and Objectives

Goal 1: To encourage and enable the integration of science education and research at all educational levels and to explore innovative mechanisms for doing so.

Critical Success Factors

- Success in obtaining nationally competitive grants in support of these programs
- Creation of a dynamic and interactive community of science educators including K-12 teachers and university faculty members
- Publications and presentations at national meetings describing these programs
- Identifiable programs and projects that exemplify the ideal of integration of science education and research

Objective 1.1: To promote and support innovation in science education at all levels, particularly bringing the methods of science inquiry into the classroom and involving students at all levels in research processes.

Strategy: Apply for and administer grants from federal agencies and private foundations to support these activities.

Strategy: Monitor funding agency announcements, to identify programs consistent with the Center's goals, to build teams of faculty members and others to prepare proposals, to monitor national trends that impact the integration of science education and research, and to participate in national conversations regarding those trends.

Strategy: Support faculty to develop research-based courses, to develop inquiry-based laboratories, and to explore new technologies with the potential to enhance the integration of research and education, and track the nature and results of the support.

Strategy: Develop collaborative projects with area teachers to involve their classrooms in research projects.

Assessment: Track the number of proposals submitted in support of these activities.

Assessment: Track the projects funded and work with the project directors to compile their assessment results into a master assessment database.

Assessment: Maintain a database of projects, including number (as well as gender and ethnicity) of students affected, summary student evaluations, and other information to serve as a resource for future grant applications.

Objective 1.2: To catalyze science education efforts of university faculty members, not only those hired as science education experts, but also those who have come to science education from a standard research background.

Strategy: Invite science faculty members to participate in activities of the center, and aggressively recruit those with a demonstrated record of concern with science education.

Strategy: Create a sophisticated web site that will serve to provide a common source of information and a means for ongoing information about science education

Strategy: Provide logistical and financial support for preparation of proposals for external grants by faculty members.

Strategy: Support faculty members engaged in these activities in terms of promotion and compensation.

Strategy: Support sabbatical leaves by faculty interested in developing major initiatives in the integration of science education and research.

Assessment: Maintain a database of participating faculty and be able to report on the percentage of science faculty who participate in the Center's activities.

Assessment: Track the projects funded and work with the project directors to compile their assessment results into a master assessment database.

Assessment: Maintain a database of projects, including number (as well as gender and ethnicity) of students affected, summary student evaluations, and other information to serve as a resource for future grant applications.

Objective 1.3: To coordinate efforts of other programs and centers with overlapping interests in this area (e.g., the various student research programs, the Honors College, the SBC-CLEAR project, the McNair program, etc.).

Strategy: Develop permanent lines of communication between these different entities.

Strategy: Sponsor an annual meeting of the directors and other key personnel from these entities to share information about programs, plan joint grant proposals, and identify areas of common concern.

Assessment: Perform periodic surveys and meetings to determine the level of program duplication and whether or not the individual entities are aware of each other's programs.

Goal 2: To expand educational opportunities for undergraduate science students by promoting and supporting undergraduate research.

Critical Success Factors

- Increased numbers of undergraduate science majors participating in undergraduate research in local and national programs
- Increased numbers of undergraduate students as authors on published papers and as presenters at national scientific meetings
- National recognition of our undergraduate research students by receipt of Goldwater Scholarships, NSF Graduate Research Fellowships, and admittance to national graduate programs
- Success in obtaining nationally competitive grants in support of undergraduate research
- Creation of a "culture of research" amongst our undergraduate science students, where the unusual student will be the one who hasn't participated in research

Objective 2.1: To increase the number of TTU undergraduate students participating in undergraduate research at Texas Tech as well as other institutions.

Strategy: To apply for grants from federal agencies and private foundations to support undergraduate research.

Strategy: Develop a web site of local and national undergraduate research opportunities.

Strategy: Over time, make the undergraduate research opportunities web site increasingly sophisticated so that it can actually guide students towards appropriate undergraduate research opportunities. This would be accomplished by the system asking questions and providing explanations of alternatives.

Strategy: Encourage science faculty members to include funds for undergraduate students in their research grant budgets and/or to apply for supplements for this purpose that are available from some agencies for their grantees.

Assessment: Maintain a database of undergraduate student participation in research. Link this to a database of undergraduate student outcomes (i.e., graduate programs entered, fellowships earned, etc.)

Assessment: Contract for periodic external evaluations to determine the effectiveness of the programs.

Assessment: Assure that all funded projects include in their budgets sufficient funds for valid assessment of their program.

Assessment: Determine the funds expended annually at Texas Tech and the TTUHSC to support research by undergraduates in laboratories.

Assessment: Perform surveys and interviews with students who do not participate in research to determine why as a basis for changing existing programs or designing new ones.

Objective 2.2: To develop innovative programs that use undergraduate research as a mechanism for recruitment and retention of science students, particularly those from minority groups that are underrepresented in the sciences.

Strategy: Apply for grants from federal agencies and private foundations to support these programs.

Strategy: Work with the TTU Office of Cultural Diversity to develop research based programs that will help to recruit and retain science students from minority groups that are underrepresented in the sciences.

Strategy: Work with the TTU Office of New Student Relations and the TTU Regional Centers to recruit promising science students to TTU.

Strategy: Develop mentorship and advisement programs to improve recruitment and retention of science students.

Strategy: Expand supplemental instruction programs to improve retention of science students.

Assessment: Maintain a database of undergraduate student participation in research. Link this to a database of undergraduate student outcomes (i.e., graduate programs entered, fellowships earned, etc.)

Assessment: Contract for periodic external evaluations to determine the effectiveness of the programs.

Assessment: Assure that all funded projects include in their budgets sufficient funds for valid assessment of their program.

Assessment: Determine the funds available annually to support research by undergraduates in laboratories.

Assessment: Perform surveys and interviews with students who do not participate in research to determine why as a basis for changing existing programs or designing new ones.

Goal 3: To enhance recruitment and retention of pre-college science teachers.

Critical Success Factors

- Increased numbers of students in the science teacher certification program
- Improved science teacher retention

- Improved science teacher morale
- Increased numbers of TTU students participating in precollege outreach programs and internships

Objective 3.1: To enhance retention of pre-college science teachers by providing on-going support and up-date training and education and developing a seamless community of science educators from K-12 through graduate education. We believe this support and sense of community will enhance retention by increasing the sense of professionalism among teachers and reducing their sense of isolation.

Strategy: Apply for grants from federal agencies and private foundations to support these activities.

Strategy: Apply for state line-item support for this program.

Strategy: Continue the efforts of the TTU/HHMI Outreach Program, including the operation of a science education resource center to provide workshops and materials, and other services for in-service and pre-service science teachers.

Strategy: Create a program of teacher sabbaticals, where an in-service teacher will take a one-year sabbatical from their school district and work with our campus-based precollege outreach programs, take courses, and participate in a research project.

Strategy: Provide support for teachers to engage in summer research experiences in faculty laboratories.

Strategy: Encourage science faculty members to include funds for K-12 educators in their research grant budgets and/or to apply for supplements for this purpose that are available from some agencies for their grantees.

Strategy: Encourage TTU science faculty to form long-term, two-way partnerships with area teachers.

Strategy: Provide support for area teacher support organizations.

Strategy: Encourage and enable local teachers to apply for national teaching awards.

Strategy: Provide resources and support for K-12 student fieldtrips.

Strategy: Inform teachers of opportunities for them and their students in research, workshops, internships, etc.

Strategy: Develop a sophisticated web site to facilitate interactions between teachers and between teachers and university faculty members.

Strategy: Provide a mechanism for the periodic, in-person interaction of the K-12 and university science education communities. Use these occasions to help the communities communicate with each other and to appreciate each other's needs.

Strategy: Promote public science education by providing centralized access through our web site to programs and internships available locally and statewide, targeting zoos, museums, aquaria, and other public science venues.

Assessments: Maintain a database of teacher involvement in all programs. This will then be able to provide critical data for future grant proposals and for periodic requests for information.

Assessment: Contract for periodic external evaluations to determine the effectiveness of the programs.

Assessment: Perform surveys and interviews with teachers who do not participate in any programs to determine why, as a basis for changing existing programs or designing new ones.

Objective 3.2: To develop innovative research-based programs for recruitment and retention of pre-college science teachers.

Strategy: Apply for grants from federal agencies and private foundations to support these activities.

Strategy: Apply for state line-item support for this program.

Strategy: Involve science faculty more in the training of preservice teachers.

Strategy: Involve science faculty as mentors of preservice teachers.

Strategy: Include preservice science teachers in enrichment activities developed for science majors.

Strategy: Offer supplemental instruction for preservice science teachers.

Strategy: Encourage science faculty to offer laboratory experiences, educational projects, or other special experiences for preservice teachers.

Assessments: Maintain a database of student involvement in all programs. This will then be able to provide critical data for future grant proposals and for periodic requests for information.

Assessment: Contract for periodic external evaluations to determine the effectiveness of the programs.

Assessment: Perform surveys and interviews with students who do not participate in any programs to determine why, as a basis for changing existing programs or designing new ones.

Objective3.3: To encourage more undergraduate students to consider careers in science teaching.

Strategy: Create three-credit hour course that provide a one-semester course, which emphasizes field experience in the K-12 schools for science students.

Strategy: Recruit undergraduate science majors as counselors and volunteers for precollege outreach programs.

Strategy: Encourage the development of lab or course experiences that involve creating and performing science demonstrations in the schools.

Strategy: Support science student service organizations that are already involved in science education efforts with K-12 students.

Assessment: Maintain a database of student involvement in all programs.

Assessment: Through surveys and interviews, determine if any of these programs result in students choosing to pursue careers in science teaching.

Assessment: Determine the number of departments that require all of their majors to participate in at least one precollege outreach activity. For those departments that do not, determine why.

Assessment: Monitor student evaluations of center programs that focus on the recruitment and retention of science teachers.