Promoting Inclusion in the Geosciences: Recruitment, Team-based Multidisciplinary Research Scholarship, and Service Learning

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Abstract: Promoting diversity and inclusion in the geosciences is vital to student success by developing a safe and effective learning community. Intensive student recruitment programs, undergraduate research opportunities, and experiential learning opportunities are some of the ways that the College of Geosciences at Texas A&M University has been able to cultivate undergraduate and graduate student development. GeoX and Geosciences Exploration (GEO) projects were designed to engage undergraduate and graduate students in relevant research. These programs represent a team-based, vertically-tiered, and multidisciplinary approach to research that can promote dialogue and increase inclusion at a research-intensive university. The programs are structured such that a faculty member serves as a mentor to one or more graduate students or postdocs, who, in turn, mentor(s) 3 to 6 undergraduate students, freshmen to seniors. Undergraduate teams are encouraged to participate in multidisciplinary inquiry to leverage the experience and perspective that comes from students in different areas of study. Dialogue and collaboration with students from other fields of study increase student engagement because it removes the pressure of becoming an expert in all topics related to the research. Eventually, the younger students will advance through to senior students and will have the opportunity to serve as mentors for incoming students. The College of Geosciences has been effective at promoting diversity and inclusion through innovative recruitment strategies, vertically-tethered research opportunities, and hands-on learning.

Investigate the Geosciences (IGEO)

Introduce motivated and talented under-represented high school juniors and seniors to the geosciences.

Geosciences Exploration (GeoX)

Weeklong experience for high school students to discover careers through hands-on experiences.

Pathways to the Geosciences

A gateway for students to discover and consider the geosciences starting as a college freshman.

Proactive in helping students at partner institutions find information they need to effectively transfer to a 4-year program.

Pathway template is less confusing than more degree plan formats.

Milestone column helps guide students towards tasks that will benefit them academically, professionally, and personally.

Course numbers of the first four semesters should reflect a course number used in the respective college.

Pathway identifies the prerequisites that a student must/have in their first two semesters prior to applying to Texas A&M University.

Sequencing of courses is based upon successful semesters of current students.

Career information at the bottom of page 2 helps identify the diversity of career paths geoscience majors have upon graduation.

Template demonstrates completion to degree in 4 years, and shows the path a successful student would have for entering a career, graduate school, or professional school upon graduation.

Sample worksheet for Brookhaven College:

Multidisciplinary Team-Based Undergraduate Research

Suitable, vertically-tiered, multidisciplinary approach to research mentoring at Texas A&M University.

Research-intensive community Tier One Program (TOP) supported by Office of Graduate and Professional Studies (OGAPS) and Learning communities. Academic excellence. Undergraduate research, National fellowships, Capstones, and Honors programs (LAUNCH).

Increase undergraduate student involvement in research and encourage hands-on learning in geoscience through coursework, conferences, and research collaborations.

Enhance professional development opportunities for faculty, graduate and professional students, and undergraduate students through active mentoring relationships.

Aggie Research Programs

Aggie Research Scholars Program

Gain valuable research experience in a multidisciplinary team.

Develop opportunities to produce publishable research.

Network with practicing scholars and secure professional reference.

Earn certification as an Aggie Research Scholar.

Develop interpersonal communication skills through papers and presentations.

Opportunities for hands-on learning (i.e. fieldwork) to develop marketable skills.

Aggie Research Leaders Program

Gain mentoring and management experience for industry and academic careers.

Increase research productivity.

Network with leaders in research who can provide professional references.

Earn certification as an Aggie Research Leader.

Enhance grant opportunities through undergraduate student engagement.

Assessment and Team Leader Meetings

Weekly online assessments track undergraduate student and team leader perceptions about research and their project.

Q1. I am currently satisfied with how the team has been enabled to make progress toward its project goals.

Q2. At this time, I am confident that I can perform research tasks that meet team needs.

Q3. I am currently making contributions to the project that are useful to the team.

Q4. What I am currently working on for the project is very important to me.

Q5. Overall, what is your enthusiasm level with the team-based research?

Q6. Overall, what is your frustration level with your research?

Monthly team leader meetings help individual team leaders develop and disseminate effective mentoring and management practices based on guidelines set by the national Center for Integration of Research, Teaching and Learning (CIRTL).

Faculty Facilitator: Faculty member who introduces leadership principles and guide reflection on experiences of team leaders.

Aggie Research Leaders: Team leaders who discuss challenges of managing and mentoring teams, identify best practices, and complete certification.

Sample ARLP team progress report.

High-Impact Experiences

Fieldwork

Hands-on experience and training in field observation and field equipment.

Conference Presentations and Publications

Undergraduate student researchers present research at local, regional, national, and international conferences.

Students develop excellent written and visual communication skills to a broad audience.

Enhanced opportunities for graduate school networking. Develop external research collaborations.

For sample poster, see poster 8-46 by Lemy Tufte et al (“Mapping the geologic framework of Padre Island National Seashore using geophysical surveys”).

Sample ARLP team progress report.

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Sample worksheet for Brookhaven College.

Sample worksheet for Binn College.