

**Request for Funding from the College of Agriculture and Life Sciences
Inquiry/Research-based Education of Undergraduates
Quality Enhancement Plan
Academic Year: 2007-2008**

Part I: Cover Page

College of Agriculture and Life Sciences

Proposal Title: *Creating an Interdisciplinary Inquiry-based Learning Community for Undergraduates*

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Abstract

This proposal from the COALS QEPC is to create an Interdisciplinary Inquiry-based Learning Community (IILC) “to provide students with greater curricular coherence, and to provide both students and faculty an opportunity for increased intellectual interaction and shared inquiry” (Washington Center News, Spring, 1995). We believe that we should make learning relevant to research and research relevant to learning by explicitly integrating education, research, and practice in real experiences. In most Research universities, the perception is that research is rewarded, but teaching is not. This project will integrate undergraduate students into the faculty and graduate student research process as a teaching-learning activity, through building a community of scientific practitioners. Learning outcomes of the IILC include increased critical thinking and problem-solving abilities, enhanced social and communication skills, and improved technical competence to conduct scientific research. Expected outcomes from this project will include increased enrollment in 491 courses and University Honors Program Undergraduate Research Fellows from COALS, increased numbers of undergraduate students who attend professional meetings and faculty who have research proposals funded, and increased dissemination of knowledge through posters, presentations, and papers (e.g. Student Research Week; professional meetings).

Part II: Learning Outcomes

By actively participating with faculty, graduate students, and undergraduate peers in the COALS Interdisciplinary Inquiry-based Learning Community (IILC), students will...

- *Develop critical thinking and problem-solving abilities*
- *Execute social skills used in leadership and team-building*
- *Execute technical skills used to conduct scientific research*
- *Practice oral and written communication skills.*

Part III: Process

Background

The College of Agriculture and Life Sciences is committed to improving teaching effectiveness and learning excellence. Our College created a document that promotes our vision to “improve students’ problem-solving, critical-thinking, and leadership skills by providing opportunities for experiential learning through internships, teamwork, research projects, and participation in student organizations” (*Teaching Roadmap*, COALS). Inquiry-rich courses are a way that academic programs can become more relevant and effective in developing students’ lifelong learning skills. In a college such as ours, the scientific method is the predominant “way of knowing.” Involvement of undergraduate students in such courses will increase their awareness, understanding, and confidence in their ability to not only conduct scientific research, but also enter advanced degree programs (Russell, et al., 2007).

To integrate higher order thinking skills into the undergraduate learning experience, we have to create an atmosphere for scholarship and a community that promotes open exchange of ideas. For example, problems addressed in our disciplines are complex, interdisciplinary, and global. Our students often perceive their courses as isolated from one another, and may never make the complex connections across disciplines. An *Interdisciplinary Inquiry-based Learning Community* can provide a forum for dialog, debate, discussion, and discourse to diversify and expand students’ perspectives and competencies.

The Process and Timeline

Learning is a social process; therefore interacting across departments and disciplines promotes diversity of approaches to enhance students’ confidence, problem-solving and critical-thinking skills. Furthermore, collaborations among interdisciplinary students and faculty will create an active and inviting community of experts to serve as mentors for undergraduate research protégés.

The COALS QEPC has identified inquiry-driven/research courses in the College and solicited participation in a questionnaire that formed an inventory (baseline). The COALS QEPC will invite those self-identified faculty members who teach inquiry-rich courses and mentor undergraduates in their research programs to participate in a series of workshops. In the fall of 2007, the IILC will coordinate 3 workshops (forming learning communities, undergraduate research programs/fellows programs, and funding research proposals). Guest speakers, who are experts in learning communities, regularly participate in proposal development, and have laboratory facilities and/or field research opportunities for undergraduates will be invited. We will team with the University Honors Program to promote participation by COALS undergraduates in the Undergraduate Research Fellows program. We will also collaborate with

the Aggie Scholars Program (Research Intensive Community) in the College of Veterinary Medicine. Students will research various sources of funding for travel to plan their participation in professional meetings or workshops.

Because time is a limiting factor, we will create a “virtual” opportunity for engagement. In the fall the IILC will use an electronic forum for dialog and discussion (see <http://asp.tamu.edu/asp/page.php?q=ug-about.txt>). This “virtual team” tool will be developed with assistance of the COALS Technology-Assisted Learning Laboratory (TALL) and TAMU ITS within a Blackboard Vista framework. It will include features such as a blog and wiki for monitoring and sharing ideas and practices, and the opportunity to verify and date stamp authorship. Students and faculty who are interested in teaming on research projects will be able to interact asynchronously. This electronic tool allows the QEPC to gather data to measure various outcomes (e.g., communication, interaction, and engagement as number of messages exchanged, titles of projects created, funding sources for research projects, publications and presentations) that result from participating in the IILC. We envision an optional AggieE-Folio feature for students to document and share their research skill development with potential employers and graduate schools. An electronic forum allows the QEPC to collect outcome data to assess our progress toward attaining the objectives of the COALS IILC. These data provide background information to support additional faculty research projects (through extramural agencies that increasingly value and require evidence of broader impacts of funded research) that will attract and maintain high-quality faculty participation and overall sustainability of the IILC.

By the spring of 2008, we predict dynamic formation of subsets within the IILC as focal interests emerge over time. Our COALS QEPC will develop a travel grant program for undergraduate students to attend and participate at research meetings relevant to their focal interest. Presentations by these undergraduate students, and reports back to the IILC about their experiences and discoveries, will further disseminate new knowledge and spark additional synergistic research and learning activities.

Change theory suggests that faculty may be hesitant to participate initially because they perceive greater time expenditure for undergraduate research projects. Implemented correctly, the IILC will NOT increase the workload of faculty; instead it could direct additional human and monetary resources toward their research productivity. Faculty will be facilitators and mentors; undergraduate students will gain practical experience in research settings. This model allows vertical integration across an academic hierarchy (faculty, undergraduate and graduate students) and horizontal integration across disciplines. COALS QEPC members will serve as coordinators to launch the IILC and as the selection committee for the undergraduate student travel grant program.

Outcome Measures

- 1) Increased enrollment in 491 courses and University Honors Program Undergraduate Research Fellows from COALS.
- 2) Increased numbers of undergraduate students who attend professional meetings and faculty who have research proposals funded as a result of IILC activities.

- 3) Increased research and teaching productivity of faculty as extramural funding for IILC activities and dissemination of knowledge through posters, presentations, and papers (e.g. Student Research Week; professional meetings).
- 4) Faculty participants in IILC who have ≥ 10 undergraduates registered for research credit each semester could negotiate a reduced “formal” teaching load.
- 5) Increased student awareness, understanding, and confidence in ability to conduct scientific research.
- 6) Increased long-term benefits and broader impacts as increased inquiry skills and problem-solving/critical thinking abilities enhance student employment opportunities.

Part IV: Budget

\$4,000	Materials and extramural guest speaker costs, food and refreshment for meetings and workshops to promote and launch the IILC
\$1,000	Technology-Assisted Learning Laboratory (COALS)– costs for creating online community and outcome assessment data collection
<u>\$6,000</u>	Research meeting travel grant program* (\$500-\$600 per student)
\$10,000	TOTAL

*Student travel grant program has IILC learning outcomes—to bring back ideas and experiences to cross-pollinate opportunities within the IILC. Undergraduate research developed as a result of IILC activities could be rewarded by larger travel grants including funds for posters or to collect data at meetings. Also, students gain valuable experience writing proposals and participating at research meetings to further network and enhance their career opportunities. Students will be encouraged to use IILC travel grants to leverage matching money from other granting agencies.

Part V: Future Needs

After year one of the integrated research learning community, the COALS QEPC will evaluate the learning outcomes to assess the IILC program. We envision extending the IILC to include activities across TAMU colleges and expanding its scope to more global perspectives.

Undergraduate students in the first “cohort” could become peer trainers/mentors for the next cohort. A dynamic network of faculty and students would become a coherent research and learning community that demonstrates and shares its best practices and successful approaches across the university.

Works Cited:

College of Agriculture and Life Sciences, Texas A&M University, *Teaching Roadmap: Priorities for Academic Programs*.

Russell, S. H., Hancock, M. P., & McCullough, J. (2007). Benefits of undergraduate research experiences. *Science*, 316, 548-549.

Washington Center for Improving the Quality of Undergraduate Education, Learning Communities National Resource Center. Available Online at <http://www.evergreen.edu/washincenter/lcfaq.htm>