

Summary Subcommittee 2: Enhancing Interdisciplinary Research (IDR)

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Statement of the Issue

Interdisciplinary research (IDR) teams improve output, reduce errors, and are more competitive in obtaining and sustaining federal funding as indicated by a wealth of published data. Nevertheless, we have identified challenges in building and sustaining IDR teams across the Texas A&M System that currently limit effectiveness and productivity.

This white paper provides an overview of the main barriers to collaborative research at Texas A&M and contains recommendations to overcome those barriers as identified by the IDR subcommittee of the Council of Principal Investigators. The attached Appendix summarizes the overall discussions and includes a more detailed report with additional comments on needs and recommendations.

Barriers to IDR

1. Lack of Recognition, Incentives, and Support of IDR at All Levels
2. Administrative Obstacles

1. Lack of Recognition, Incentives, and Support of IDR at All Levels

Barriers

- **A reward system** for Faculty participation in IDR is not part of the tenure or promotion process. For example, there is no clear mechanism to **recognize** or **credit individual contributions**.
- **Few incentives encourage IDR** at the college and departmental levels. Although participation in IDR may be valued within large “center-level” efforts, participation in and especially leadership of smaller multi-investigator teams is undervalued. Moreover, faculty members are hired at the Department level and consequently faculty participation in IDR can be viewed as not contributing to or even competing with Department needs.
- **Junior faculty** may not have the training to be successful in IDR and/or may be discouraged from participating in IDR because there are difficulties in recognizing individual faculty contributions in tenure and promotion decisions.
- **Established and mid-career scientists** who spent much of their career in academic environments that value independent research to secure tenure and promotion may not have developed skills to compete effectively in IDR.
- **Difficulty in identifying colleagues for IDR** and few opportunities for organic spontaneous collaboration exist.
- **Few incentives for faculty to advise graduate students participating in IDR.** In fact, faculty may be discouraged from advising graduate students participating in IDR due to competition between department and IDR graduate programs.
- **There are few incentives for graduate students to participate in IDR.** Graduate students may experience negative consequences for working across departments. For example, graduate students who engage in IDR may not have access to the same resources (e.g., mentoring, financial resources) as students within departmental graduate programs. Graduate students participating in IDR may have redundant requirements and not receive appropriate credit for filling redundant requirements.

Recommendations

1. **Develop broader recognition that establishing an independent research program and participating in IDR are not mutually exclusive.** CPI believes faculty members are able to develop independent research programs while working in an interdisciplinary field on collaborative IDR.
2. **Develop and disseminate** guidelines and training through the Dean of Faculties to faculty, mentoring committees, and Departments and Colleges P&T committees. There is a need for more precise guidelines to **convey and recognize the impact of IDR and individual contribution, including revising the format** of annual reviews and P&T packages.

3. **Provide broader recognition of existing IDR information and training**, especially through the Division of Research and the Office of the Vice President for Research using CPI connections.
4. **Conduct a GAP analysis with** representatives of Division of Research, Dean of Faculties, University Research Council, TAMU Library Office of Scholarly Communication, and CPI to identify gaps in training related to developing effective IDR teams. This would include project management and “team science” skills targeting initiation and management of effective IDR teams and projects.
5. **Develop IDR training and mentoring programs and workshops targeting faculty at ALL stages** of their careers run by the Division of Research and with support of the Dean of Faculties. The Division of Research could also offer clinics and professional workshops that issue certificates of completion.
6. **Develop guidelines for recognizing individual contribution at IDR project initiation.** Collaborate with the Provost and Dean of Faculties to assist faculty in clearly delineating individual contributions to collaborative work that include: definition of project roles, responsibilities, contributions, and how this relates to authorship on manuscripts and distribution of resources on future grant proposals. This could become a tool for evaluating individual contribution as part of IDR training, especially for junior faculty.
7. **Continue to foster a culture change that values IDR** and an interdisciplinary and collaborative culture through mechanisms such as the X-Grants and T3 grants, and continue emphasis on value of IDR by top University administrators.
8. **Provide university/agency-wide software** for joining speaker series and colloquia listservs of departments and schools to facilitate participation in intellectual communities.
9. **Develop faculty scholar programs** that include: faculty relocating for a specified period of time to another college, department, or interdisciplinary teams in a joint site to plan or progress IDR. Programs should also be developed to **relocate industry scholars** into multiple departments as part of their paid sabbatical to TAMU.
10. **Connect researchers through an opt-in electronic form** where researchers could post potential projects and look for partners. This should be developed with Scholars@TAMU (scholars.tamu.edu), the researcher profile system developed by the TAMU libraries.
11. Discuss incentives and **remove barriers to graduate student participation in interdisciplinary programs and IDR** with the Office of Graduate Studies that includes the long-term goal of **creating a Graduate College**. Initiate conversations at the University and College level to **alleviate competition between department and IDR graduate programs**, including discussion of CIP code problems, where appropriate.
12. **Work with OGAPS to evaluate its policies** to ensure that they enable the broadest possible engagement of graduate students in research being conducted outside of the student’s home department. For example, the rule that limits supported doctoral students to nine hours of paid work currently constrains engaging in interdisciplinary research

outside of the student's department even when such research serves the student's dissertation.

13. **Create graduate student IDR programs** that require involvement of faculty from different colleges/departments, such as a T3 graduate student grant program and degree programs not housed in one college or program (e.g., Honors, McFerrin Center, I School).

Initial Steps: We contacted Research and Development Services in the Division of Research and the Dean of Faculties about developing training programs. Representatives from the Dean of Faculties initiated a meeting with CPI to discuss needs, including ensuring that instructions/guidelines for each faculty, mentors, and evaluators are coordinated.

2. Administrative Obstacles

Barriers

- The **additional skill sets (e.g., communication across traditional disciplinary boundaries) required to conduct IDR increases complexity** of the entire research project process for researchers and project administrative staff.
- **Low staff support** with necessary tools within departments increases cost, time, stress, and errors for faculty and department support staff, and SRS staff.
- **Other administrative barriers include:**
 - **SR1501** requires faculty in ENG to submit grants through TEES, faculty in COALS to submit grants through AgriLife, and all others through TAMU.
 - Multi-investigator grants with faculty in COALS and ENG may have **sub-contracts** requiring substantial paperwork (and convoluted signoff process) by both faculty and SRS, especially if the grant is not initiated in the university (i.e. originates within the agencies). These barriers create disincentives for faculty to work with others at TAMU versus other institutions since the subcontracting process is no different.
 - There is **no single Bryan-College Station entity with which corporate partners can establish cooperative agreements** when expertise crosses colleges.
 - **Some Federal granting agencies** view TAMU, AgriLife, and TEES as three independent institutions. Faculty who move across organizational units within the university have lost grants or are required to resubmit applications when grants are relinquished by one system component.
 - **Some Federal regulatory agencies** view TAMU, AgriLife, and TEES as one entity. These agencies have voiced concerns over compliance issues for TAMU faculty grants managed by TEES or AgriLife.

- **Federal agencies** are increasingly requiring academic institutions to file **mandatory reports** on any faculty or staff member accused of sexual harassment or scientific misconduct. Many requirements are centered on students, for which TAMU is specifically responsible. TAMU is required to report events in agencies over which they have no oversight.
- **The mechanism to split PI return** when working with multiple TAMU and TAMU System entities (e.g., TEES, AgriLife, or HSC) is complex. This issue has been especially problematic for Extension.
- Impacts may differ across grant types: large grants versus small and short term grants with little or no IDC.

Recommendations

1. **Conduct a survey** of PIs “now” and 2-years post-implementation of changes to assess impact, barriers and outcomes.
2. **Develop and support existing** training/support/services at the Department/College level to streamline administration of IDR grants and help PIs and project administrators effectively work together.
3. **Support ongoing GAP analysis** by multiple groups to anticipate training/services needed to streamline IDR project administration by support staff.
4. **Develop additional opportunities for IDR administrative support trainings with certificates of completion** to include: best practices for streamlining administration of IDR grant, managing collaborative projects, personnel management, data management, budget and resource management, and project conclusion and transition.
5. **Continue to raise issues related to specific administrative barriers** with appropriate administrators, such as talking directly to AgriLife Research.
6. **Continue to provide CPI membership feedback** and survey data on barriers in project administration.

Initial Steps: AgriLife Research initiated a meeting with CPI to discuss relevant concerns.

Appendix: Summary of Group Discussions

The group worked on 5 ideas—overlap between these ideas was removed in the Summary.

Challenges and Opportunities for Improvements in IDR

1. Building Effective IDR Teams
2. Recognition and Support of IDR
3. Creating Opportunities and Incentives to Collaborate
4. Overcoming Administrative Obstacles
5. Obtaining Data/Feedback

Building Effective IDR Teams

Opportunities:

- IDR is increasingly valued by funding entities
- IDR likely to result in greater probability of sustained funding
- Effective research teams have improved output with less errors/problems and are more competitive / successful
- Effective project support will increase PI willingness to participate, enhance success, ease administrative burden / reduce potential for error problems

Challenges

- IDR **increases complexity** of the entire research project process for researchers and project administrative staff.
- IDR success **requires additional skill** sets beyond expertise in basic research and research communication.
- **Established and mid-career scientists** who have developed successful independent research programs in a culture where this was highly valued or for securing tenure and promotion may not have developed skills to compete effectively on this “playing field”. Their needs for re-tooling may be overlooked, yet in IDR teams their leadership may be sought. “How to” workshops targeting junior faculty may not provide the needed training (too basic), reducing both participation and potential for success in IDR.
- **Junior faculty** may be discouraged from participating in IDR and there often are difficulties in recognizing their individual contributions in promotion decisions.
- Successful IDR research teams depend on **project support staff having the tools** to be successful. Although the IDR landscape is highly fluid with regard to changing opportunities and requirements, current administrative processes are too rigid. **Low staff support** within departments makes IDR leadership extremely taxing for researchers and support staff.

Needs:

- **Guidelines and training on IDR project management basics: Preparation** of IDR proposals and manuscripts. **Best practices** to manage collaborative projects to effectuate timely success. **Best practices** for personnel management, data management, and budget and resource management of ongoing projects. **Best Practices** to effectively conclude projects (including mandatory storage of and accessibility to data and other deliverables) and transition to the next.
- **Mentoring programs / workshops targeting faculty at ALL stages of their careers.** Addressing: best practices on how to initiate and maintain successful collaborations, how to lead IDR teams, how to conduct team meetings/write proposals that develop **integrated objectives**, how to effectively communicate (including scheduling meeting, coordinating via email, dealing with distance, sharing documents and data), team science: group dynamics and conflict resolution, staff/student training and management.
- **Guidelines on developing clear deliverables plans** for IDR projects that set ground rules for the definition of project roles, responsibilities, contributions, and how this relates to authorship on

manuscripts and distribution of resources on future grant proposals. Establishment of ground rules **at project initiation** may serve as the basis for **fair evaluation of individual contributions** to the collaborative work.

- **Continued emphasis** on training/support/service at the College/Department level to streamline the administration of IDR grants and help PIs and project administrators effectively work together.

Recommendations

14. **Provide broader recognition of existing IDR information and training**, especially through the Division of Research using CPI connections.
15. **GAP analysis**: bring together representatives of Division of Research, Dean of Faculties, University Research Council, TAMU Library Office of Scholarly Communication, and CPI to identify gaps in: training and mentoring project management skills, training and mentoring “team science skills” targeting initiation and management of effective IDR teams.
16. **Gap analysis**: continue to provide support to ongoing efforts by multiple groups to anticipate training/services needed to streamline IDR project administration by support staff.
17. **Develop IDR training and mentoring programs / workshops targeting faculty at ALL stages** of their careers to be run through the Division of Research and with support of the Dean of Faculties. Could offer clinics or professional workshop series with certificate of completion.
18. **Work with Provost and Dean of Faculties for guidelines on establishing ground rules at project initiation** for clear delineation of individual contributions to collaborative work. This could become an important tool for evaluating individual contribution and could become part of the IDR training especially for junior faculty.

Initial Steps: we have already contacted Research and Development Services in the Division of Research and the Dean of Faculties about developing training programs.

Recognition and Support of IDR

Challenges

- **Reward System for Faculty participation** in IDR not built into tenure and promotion.
- Lack of **encouragement** or **value** at the departmental level—although IDR is often valued at the center level, faculty efforts contributed to smaller multi-investigator teams is not.
- Lack of appropriate **individual recognition/credit** for faculty IDR involvement (especially junior faculty) in the faculty evaluation process.
- **Advising out-of-department PhD students** may not be adequately recognized or valued.
- **Advising graduate students** belonging to interdisciplinary graduate programs or research teams may be strongly discouraged in smaller Departments that have difficulty graduating the required number of students from graduate degree programs.
- **Reward system for Graduate student participation** in IDR is nearly non-existent to punitive.
- **Graduate students belonging to interdisciplinary programs** working for a PI belonging to one of these smaller Departments **may not be eligible for the same Department resources** provided to other members of the lab group who are members of Departmental graduate programs—may become “poor stepchild” relative to other graduate students.
- Graduate students working on interdisciplinary research **may not get adequate interdisciplinary mentoring or support** and **may have competing or redundant requirements increasing time to graduation.**
- Graduate students may not receive **appropriate individual credit** for IDR involvement

Needs:

- Given that IDR is increasingly favored by funding agencies, the University, Colleges, and Departments may need to **reassess the value** of research independence vs. ability to perform, fund, direct research in a collaborative environment. This represents a culture change—need to create an interdisciplinary / collaborative culture.
- Generate guidelines for **denoting authorship and author contribution** and a corresponding **recognition system of author contribution** for evaluating collaborative grants and manuscripts to be used on evaluations and promotion and tenure decisions.
- Generate guidelines for **recognition that co-corresponding authorship** on collaborative proposals and manuscripts is **generally equivalent to single-authorship** to be used on evaluations and promotion and tenure decisions
- Generate guidelines to ensure that **participation in IDR by junior faculty with senior faculty will not jeopardize their perceived level of research independence** for evaluations, promotion
- Provide training to faculty, mentoring committees, Department/College P&T committees on guidelines to convey and recognize impact of IDR.
- Identify ways to remove competition between graduate student interest in IDR and Department needs with regard to value on teaching/advising and graduation quotas.

Recommendations:

1. Work with the Dean of Faculties to provide guidelines and training to faculty, mentoring committees, Department/College P&T committees on guidelines to convey and recognize impact of IDR.
2. Alter the current format of annual reviews and particularly tenure and promotion packages to provide opportunities/context to describe contributions to IDR.
3. Initiate conversations at the University and College level to alleviate pressure on Departments with small graduate programs to graduate difficult-to-achieve quotas that are both roadblocks to IDR and may not make sense for the Department or discipline.
4. Work with the Office of Graduate Studies to discuss incentives/remove obstacles to graduate students' participation in interdisciplinary programs or research. Is it time to create a Graduate College?

Initial Steps: Representatives from the Dean of Faculties initiated a meeting with CPI to discuss needs, including ensuring that instructions/guidelines for each faculty, mentors, and evaluators are coordinated.

Creating Opportunities and Incentives to Collaborate

Challenges

- There are few opportunities for organic spontaneous collaboration.
- Faculty wishing to identify colleagues for IDR may be unsure how to locate them.
- We struggle with "bottom up" innovation from graduate students who could bring together faculty of multiple disciplines if given the chance to innovate and discover

Approaches to Increase Faculty Collaboration:

1. **Unrelated TAMU scholars relocate for a couple of weeks** during the summer to a remote site together and spend facilitated time in "think-tank" style dialog. Mini-think tanks could be a nice perk for newly tenured faculty, new hires, or part of the faculty leave options for ways to launch or wrap-up faculty sabbatical or leave periods.
2. **TAMU scholars relocate offices during the fall or spring semester** to other departments: could be a "scholar swap" or one-way exchange. Goal to work someplace else, meet different people, attend lectures and classes, generally immerse in the culture.
3. **Temporary relocation of INDUSTRY SCHOLARS** into multiple departments as part of their PAID sabbatical to TAMU. We would learn from them and they could provide and attend lectures, and generally contribute to student life and faculty growth while stimulating their own personal growth.
4. **Connect researchers through an opt-in electronic forum** where researchers could post potential projects and look for partners. This should be developed with **Scholars@TAMU** (scholars.tamu.edu), the researcher profile system developed by the TAMU libraries.

Approaches to Increase Graduate Student participation in IDR:

1. Fund T3 style grants for Graduate students that pay for their GRA slot with the requirement that they **MUST** have 3 faculty from separate colleges as committee members or mentors
2. Create graduate degrees or programs resulting in research that is **NOT** housed in one college or program but rather is housed in or start with challenges from a central group such as Honors, McFerrin Center, I School.
3. Consider feasibility of creation of overarching "Graduate School".

Overcoming Administrative Obstacles

Challenges

- **SR1501** requires faculty in ENG to submit grants through TEES, faculty in COALS to submit grants through AgriLife, and all others through TAMU.
- Multi-investigator grants with faculty in COALS and ENG may have **sub-contracts** requiring substantial additional paperwork (and convoluted signoff process) by both faculty and SRS if the grant does not initiate in the university (i.e. originates within the agencies). Some faculty see little incentive to work with others at TAMU versus other institutions since the subcontracting process is no different.
- There is **no single BCS entity with which corporate partners can establish cooperative agreements** when expertise crosses colleges.
- **Federal granting agencies** view TAMU, AgriLife, and TEES as three independent institutions. Faculty who move within the university have lost grants or are required to resubmit applications when grants are relinquished by one system component.
- **Federal regulatory agencies** view TAMU, AgriLife, and TEES as one entity. Concerns voiced over compliance issues for TAMU faculty grants managed by TEES or AgriLife.
- **Federal agencies** are increasing requiring academic institutions to file **mandatory reports** on any faculty/staff accused of sexual harassment or scientific misconduct. Many requirements centered on students, for which TAMU is specifically responsible. Liability for TAMU for reporting events in the agencies over which they have no oversight.
- **Concern over split of PI return** when dealing with TEES, AgriLife, or HSC.
- Impacts may differ across grant types: small/short term grants, with little or no IDC

Bottomline: Current multi-institution structure discourages IDR

Those faculty brave enough to take on the cumbersome system face:

- Increased cost, time
- Unnecessary stress between colleagues/agencies
- Unintended errors. It is a continuing issue, for faculty and SRS.

Approaches:

- Provide continuous feedback on specific issues that need to be addressed, *including providing specific examples*, and work through proper channels to keep this a priority.
- Joint meeting with all relevant parties (leadership of system, agencies and university along with CPI) to discuss the issues, approaches, potential gains, unforeseen consequences of changes to current system.

Initial Steps: AgriLife Research initiated a meeting with CPI to discuss relevant concerns.

Obtaining Data/Feedback on Challenges and Opportunities

Challenges:

- Identifying opportunities and challenges as well as approaches to fostering IDR and addressing obstacles these will depend on having data on which to base decision making.

Needs:

- A multi-dimensional metric of successful teams is needed, as opposed to merely counts, funding and statistics.

Approaches:

- **CPI will continue to assist by providing data and feedback by:**
 1. **Provide** Survey Data as needed
 2. **Encouraging usage** of and providing feedback on available information
 - ✓ The University Research Council (URC) survey
 - ✓ Studies of T3, X-Grants on the multidisciplinary/interdisciplinary culture at A&M.
 - ✓ Published Literature

Initial Steps: Reach out to Dr. Michael Beyerlein, lead on project to evaluate on the T3 and X-Grants.