CPI Subcommittee 3 White Paper – Improving Core Labs and Resources

---

Chair: Brendan Roark (Geosciences)

Members (representation): Kayla Bayless (Medicine), Candice Brinkmeyer-Langford (CVM), Craig Carpenter (AgriLife Extension), Mike Hall (Science), Christian Hilty (Science), Steve Maren (Liberal Arts), Pamela Plotkin (Geosciences), Alexei Safonov (Science), David Stelly (COALS), Aaron Tarone (COALS), Lee Tarpley (AgriLife Research)

SUMMARY: The Subcommittee took on the charge of identifying and addressing barriers to improving current core labs and resources. Considerable discussion led to the following four recommendations to improve the success of core labs, which are vital to the research and education missions of the Texas A&M Research community.

I. DEFINE AND CATEGORIZE CORE FACILITIES

II. ALIGN CORE FACILITY ACTIVITIES AND SERVICES WITH THE TEXAS A&M UNIVERSITY MISSION TO PROVIDE TRAINING AND INNOVATION

III. DEVELOP AN ADVOCACY COMMITTEE TO PROVIDE SUPPORT AND CONSTRUCTIVE FEEDBACK

IV. DETERMINE A FEASIBLE FINANCIAL MODEL

REPORT: The CPI Core Facilities Subcommittee had several wide-ranging discussions about functions, benefits and the numerous issues that impact core facilities, both positively and negatively. Below are 4 critical issues that we propose the Council of Principal Investigators (CPI) should focus on in collaboration with critical partners across the Texas A&M Research Community and the Administration to improve the success of the Core Facilities:

I. DEFINE AND CATEGORIZE CORE FACILITIES

Rationale: Proper definition, categorization and organization of our diverse core facilities will enhance their management, user awareness, usage, impact and external fundability.

The NIH definition of Core Facilities (below) served as the starting point for discussion. (https://grants.nih.gov/grants/policy/core_facilities_faqs.htm#3597)

NIH Definition of Core Facilities:

- Core facilities are centralized shared research resources that provide access to instruments, technologies, services, as well as expert consultation and other services to scientific and clinical investigators.
- A core facility can share similar operating principles with other service (or recharge) centers, which may also provide resources necessary to support the research objectives of an institution.
- Institutions may determine that establishing a core facility is appropriate to address required services based on a variety of expected advantages. **Accordingly, these facilities can take many forms to address institution needs and objectives.**

- Core facilities may be fiscally supported by institutional funds, federal funds, external revenue, other funding, or any combination of these.

Texas A&M University lists 120 Core Facilities (https://tamu.corefacilities.org/), accessed March 20, 2019), which vary widely in size, services provided, user numbers, among other distinguishing factors.

Given the large number of diverse Core Facilities on campus, the Committee feels that this diversity highlights a fundamental need for the Texas A&M Research Community and CPI to ***define "Core Facility",*** as well as ***categorize Core Facilities*** to maximize utilization by the Texas A&M Research Community. Resources are always limited, so this definition and the categorization parameters will likely influence which facilities will have access to those resources, and if so, to what degree and with what stipulations. In our discussions we outlined several critical principles that should be considered in the Core Facility definition. These principles should be used to determine where to invest those limited resources.

Committee Recommendation: Assemble a committee or working group of relevant stakeholders, including the Division of Research (VPR), University Research Council (URC), CPI members, core directors, and users to define and categorize Core Facilities. This definition and categorization should be shared widely with the Texas A&M Research community. Critical elements to guide the categorization of Core Facilities could include:

- User base - size and distribution among colleges and departments.
- User impact - publications, grants, institutional status.
- Types of services - e.g., (*i*) turn-key (equipment and technical); (*ii*) equipment access; (*iii*) equipment and/or methods training; (*iv*) "store-front" services, e.g., outsourced analytical services (e.g., DNA sequencing); (*v*) education (workshops, etc.); (*vi*) other.
- Functional themes - such as mass spectrometry, structural biology, molecular characterization, imaging, micro/nanofabrication, irradiation services, and core services like machine shops, electronic shops, glass blowers, *et cetera*.

II. ALIGN MISSION OF CORE FACILITIES WITH THE TEXAS A&M UNIVERSITY MISSION TO PROVIDE INNOVATION AND TRAINING

Rationale: Our investments should help us address our goals.

The committee feels strongly that a significant part of the missions of University Core Facilities should be to collectively support the mission of the University, which reads:

> *"Texas A&M University is dedicated to the* ***discovery, development, communication, and application of knowledge*** *in a wide range of academic and professional fields. Its mission of providing the* ***highest quality undergraduate and graduate programs is inseparable from its mission of developing new understandings through research and creativity****. It prepares students to assume roles in leadership, responsibility and service to society. Texas A&M assumes as its historic trust the maintenance of freedom of inquiry and an* ***intellectual environment nurturing the human mind and spirit****. It welcomes and seeks to serve persons of all racial, ethnic and geographic groups as it addresses the needs of an increasingly diverse population and a global economy. In the 21st century, Texas A&M University* ***seeks to assume a place of preeminence among public universities*** *while respecting its history and traditions."*

To align with the Texas A&M University mission, the Committee recommends that University Core Facilities should support innovation that expands the research capabilities of the Texas A&M Research Community, and, where possible, provide hands-on training opportunities. The committee's highly-valued characteristics include:

- Methods development and analytical innovation that expands the research enterprise both in terms of outcomes that address societal challenges as well as in the generation of grant funding.
- Core Facilities should be supportive of the educational and training mission of the Texas A&M Research Community by contributing to teaching courses or integrating within the services they provide hands on experience and training opportunities for undergraduate, graduate students, and post-docs.
- Long-term/full-time technical support is key to maintaining a quality core facility and is especially important when training and/or education of students/staff is a critical function.

III. DEVELOP AN ADVOCACY COMMITTEE TO PROVIDE SUPPORT AND CONSTRUCTIVE FEEDBACK TO CORE FACILITIES

Rationale: Advice and advocacy by a balanced committee could enhance development, integration, management, funding, functional relevance and evolution of cores of the Texas A&M Research Community.

Core Facilities and the greater institution must be responsive to stakeholder needs. We recommend the establishment of a Core Facilities Advocacy Committee (and/or Advisory Council) including Core Facilities directors, managers, and users along with appropriate University and College level administrators (e.g. VPR and URC). Some of the issues and actions that such a group could help address include:

- Criteria and protocols for the review of existing core facilities (e.g., impact, training, innovation, customer feedback, and financial sustainability).
- Best practices in developing advisory committees and how to best use them.
- Methods to enhance Core Facility outreach to improve visibility and accessibility.
- Alternative funding models.
- Processes for User-Core Facility conflict resolution.
- Identify investment opportunities in Core Facilities.
- Improve Core Facility functionality, e.g., iLab, rate studies, billing and invoicing.
- Cost-benefit aspects from institutional and user standpoints.
- Potential for use of alternative external services -- constraints and other considerations for institutional research, training, services and education efforts? (e.g., DNA sequencing at North Texas Genome Center)
- Define how University-wide Core Facilities should function and network:

- When there are multiple cores or facilities with overlapping and/or complementary functionality, but perhaps serving different sets of users and needs, we should determine - Are they complementary? Integrated? Networked? Should they be?

- How should Agency, College, Department-level or other Core Facilities be integrated?

IV. ESTABLISH FINANCIAL MODEL(S) FOR CORE FACILITIES

Rationale: Ensuring the long-term financial health of Core Facilities is critical to their success.

- Develop models by which various types of Core Labs could be expected to address financial needs.
    - Core Facilities are often best served by shared financial responsibilities. A single model may not suffice. But some large University-wide facilities might be funded through a mix of service center fees, College, and VPR funds, while cores with a more limited user-base and footprint might be funded through a mix of College, Department, PI and service center fees.
    - Infrastructure investment: Physical facilities, Equipment
- Continue the RDF to promote acquisition of state-of-the-art technologies with a wide user base to support interdisciplinary research.
- Utilize a portion of RDF or other University funds to maintain ongoing cores with a focus on maintaining full-time technical expertise, and service contracts.

Appendix

CPI Subcommittee 3 White Paper – Improving Core Labs and Resources

This section includes more detailed information related to each of the key 4 key issues discussed in the working group report.

I. DEFINE AND ORGANIZE CORE FACILITIES TO FACILITATE USAGE AND ACESSIBILITY

Committee Recommendation: Assemble a committee or working group of relevant stakeholders, including the VPR Office, CPI members, core directors, and users to define and categorize Core Facilities to distribute to the Texas A&M Research community. Critical elements to guide categorization of Core Facilities include:

- User base size and distribution among departments and colleges.
- User impact (publications, grants, institutional status).
- A defined process of how a facility becomes a "core" facility, i.e. how new core facilities are created.
- How can a Core Facility be sunset?
- How to support Core Facilities where we would advocate for a shared responsibility model (Individual PI, Departmental, College, and VPR).
- Increase visibility using existing website as well as limited access networks (such as SLACK) to provide a platform for discussing the sharing of information and facilitate broader core discussions.
- Outsourcing analytical services verses building and maintaining on-campus facilities; cost effectiveness.
    - Example North Texas Genome Center.
        - TAMU buying 25% of machine time and getting reasonable turnaround time. (https://northtexasgenomecenter.com/)
- Defining how University-wide Core Facilities should function
    - Genomic sequencing as an example. There are multiple genomic sequencing facilities; Are they integrated? Should they be?
        - Large uniform demand.
        - Link to high performance computing can be required to make full use of the genomic facilities.
        - Instrumentation required, how long before instruments become obsolete? Benefits from seed grants.
            - Is it more cost effective to invest in off-campus analytical facilities.
        - Facilities can improve students/post-doc training.
    - Virtual Core Facilities: Example Mass Spectrometry Core Facilities
    - Means of addressing client services

- Potential themes by which to categorize Core Facilities include mass spectrometry, structural biology, molecular characterization, imaging, micro/nanofabrication, core services like machine shops, electronic shops and glass blowers. Computing / IT, super computing
- Participation in the iLab program will likely be a part of the definition/requirement for University core facilities.

II. ALIGN MISSION OF CORE FACILITIES WITH THE TEXAS A&M UNIVERSITY MISSION TO PROVIDE INNOVATION AND TRAINING

To align with this mission, the Committee recommends the following: Core Facilities should not only support innovation that expands the research capabilities of the Texas A&M Research Community, but also value and support Core Facilities that provide hands-on training opportunities. The committee's highly-valued characteristics include:

- Methods development and analytical innovation that expand the research enterprise both in terms of outcomes that address societal challenges as well as in the generation of grant funding.
- Core Facilities should be supportive of the educational and training mission of the Texas A&M Research Community by contributing to teaching courses or integrating within the services they provide hands on experience and training opportunities for undergraduate, graduate students, and post-docs.
- Long-term/full-time technical support is key to maintaining a quality core facility and is especially important when training and/or education of students/staff is a critical function.
    - Hands on experience and training.
    - In typical cores training is not emphasized as it is difficult to incorporate into the cost of doing business.
    - No or limited support for the technicians and lab manager who are typically doing a lot of the training.
    - GARs could be supported as a means of developing MS or PhD level technicians.

III. DEVELOP AN ADVOCACY COMMITTEE TO PROVIDE SUPPORT AND CONSTRUCTIVE FEEDBACK TO CORE FACILITIES

Another barrier to improving Core Facilities lies in making them more responsive to stakeholder needs. Here our **recommendation** is the establishment of a Core Facilities Executive Committee or advisory council including Core Facilities directors, managers, and users along with appropriate University and College level administrators. Some of the issues relevant to this barrier that such a group could address include;

- Best strategies for developing customer feedback
    - Require Core Facilities state their mission(s), capabilities, services and access.
- Develop mechanism for the review of existing core facilities that include impact, training, innovation, customer feedback, and financial sustainability among others

- Developing common criteria for annual reports to be used in evaluation of Core Facilities
- Develop guidelines for core reviews to determine impact
- Are the facilities servicing local needs? Cost, turnaround times, training
- Processes for outsourcing work when a Core Facility is unable to meet demand due to backlogs, equipment breakdown etc.
- Establish Internal committee to review cores? What should that committee look like?

- **Utilize advisory committees**
  - Develop recommendations or guidelines for Cores to form, maintain and use Advisory Committees (CACs)
  - Require each core have an AC
- **Increase awareness, visibility and accessibility of Core Facilities**
  - Common portal(s) with up-to-date information: https://tamu.corefacilities.org/landing/276#/about (iLab and non-iLab cores)
  - Improve Core Facility Outreach
    - Review websites
    - Optionally recommend adding brief narrated videos of each core lab
    - University-wide research day to allow cores to demonstrate capabilities e.g. "Ions at Work: A Symposium Introducing TAMU's Mass Spectrometry Core" (http://mass-spec.tamu.edu/inaugural_symposium/)
    - Require core leaders to present periodically across campus (to early stage graduate students)
- Investigate alternative funding models
  - Models for technician support
  - Service contracts and collective bargaining power
  - Equipment maintenance and repair, in house technicians or service contracts
- Develop processes for user – Core Facility conflict resolution
  - Publication guidelines for users of core facilities
  - Processes for outsourcing work when a Core Facility is unable to meet demand due backlogs, equipment breakdown etc.
- Assisting the Texas A&M Research Community in identifying investment opportunities in Core Facility
  - RDF program generally viewed as successful
  - Periodic survey of faculty to develop a list of needs and potential new or expansion opportunities for Core Facilities
  - Facilitating development of new cores and sun setting obsolete and non-utilized cores
    - What are the criteria and how to go about sun setting obsolete and non-utilized cores?
- iLab integration into Core Facilities and how can iLabs improve Core Facilities function; education and training. Participation in centralized billing/scheduling
- Participation in the iLab program will be part of the definition/requirement for University core facilities. Participation in centralized billing/scheduling
- Rate Study best practices and education for Core Facilities and business administrators
- Billing and invoicing best practices; e.g. credit card payments

IV. DETERMINE A FEASIBLE FINANCIAL MODEL FOR CORE FACILITIES

- Financial
  - Infrastructure investment: Physical facilities, Equipment
  - Core Facilities are best served by a shared responsibility funding model. For examples for large University-wide facilities funding would be divided, 1/3 service center fees, 1/3 College, and 1/3 VPR or for smaller facilities, 1/3 service center fees, 1/3 College, and 1/3 Lab PIs.
- Institutional annual operating costs (Total; Recovery by type of source (%))
  - Type of strict fees for services and strict self-sustaining funding models.
- Continue the RDF to promote *acquisition* of state-of-the-art technologies with a wide user based to support interdisciplinary research.
- Utilize a portion of RDF or other University funds to maintain ongoing cores (full-time technical expertise, service contracts, and infrastructure). A cross-facility competitive mechanism for acquiring seed money to use facilities may enhance, in a capitalistically informative manner, the facilities that are of most importance to the faculty / system.
- Require that core directors seek funding subsidies through seed grants and other mechanisms.
- Participation in the iLab program will be part of the definition/requirement for University core facilities. Participation in centralized billing/scheduling;
- Lab "Maturity": New or "Start-up"; Nascent (phases?); "Established"; "Update/Upgrade", any special consideration?
  - Gratis actions (scope, numbers, impact)
  - Self- sustaining (see Core Facility support below)
  - Access to equipment
  - Consultation (free and/or fee-based)?
  - Training and information (use of equipment, data analysis, interpretation or results)?
  - Turn-key experimentation (equipment plus execution)?
- Technician Support
  - Long term support is a central issue to address. RDF and other funding have allowed for the purchase of expensive equipment items that require expert technical support.
  - Service contract cost
    - Collective bargaining power?
  - Potentially being addressed in part by RDF 20% allocation and recent RFP.
    - What are some other models utilized for technician support?