Select Interim Committee on the Feasibility of a Statewide Technology Database

*(mandated by House Bill 51, 81st Texas Legislature)*

October 2010
Texas Higher Education Coordinating Board

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The Texas Higher Education Coordinating Board’s mission is to work with the Legislature, Governor, governing boards, higher education institutions and other entities to help Texas meet the goals of the state’s higher education plan, Closing the Gaps by 2015, and thereby provide the people of Texas the widest access to higher education of the highest quality in the most efficient manner.

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The Texas Higher Education Coordinating Board will promote access to quality higher education across the state with the conviction that access without quality is mediocrity and that quality without access is unacceptable. The Board will be open, ethical, responsive, and committed to public service. The Board will approach its work with a sense of purpose and responsibility to the people of Texas and is committed to the best use of public monies. The Coordinating Board will engage in actions that add value to Texas and to higher education. The agency will avoid efforts that do not add value or that are duplicated by other entities.

The Texas Higher Education Coordinating Board does not discriminate on the basis of race, color, national origin, gender, religion, age, or disability in employment or the provision of services.
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Executive Summary

In 2009, the 81st Texas Legislature in Regular Session passed House Bill 51 (HB 51), to increase the state’s support for and development of national research institutions in Texas. One section of the legislation mandated an Interim Study on the Feasibility of a Statewide Technology Database. The legislation also prescribed the establishment of a Select Interim Committee to conduct the study.

The Select Interim Committee to Study the Feasibility of Establishing a Research Technology Database held two meetings, the first on August 10, and the second on August 24, 2010, in Austin, at the Coordinating Board offices. The Committee’s charge was to “study the feasibility of collecting data and maintaining a searchable electronic database, search engine, or other collection of data relating to specialized technology research projects that are developed or conducted at Texas public universities, research facilities, or other facilities operated by a state agency, in order to facilitate coordination among the universities and facilities on the projects and improve access to and awareness of the specialized research and technologies developed at those institutions.”

The Select Interim Committee concluded that a statewide, searchable database of research expertise and research-related assets is feasible and has the potential to increase transparency. This may lead to increased industry investment and national competitiveness of Texas general academic institutions.

The Select Interim Committee discussed the various costs associated with the development and maintenance of a statewide database or search engine. Members also discussed the costs expected to be incurred for an institution to implement or adapt to a statewide electronic system. The Committee concluded that:

1. Institutions without organized electronic data structures would incur greater costs to establish an internal system, than would those institutions that already have established systems in place. Establishing a base level of required data elements would allow for a better estimate of the associated costs.

2. Institutions would incur costs to link existing or established data systems with a statewide system. This would include costs associated with data format mapping and maintaining data access.

3. The organization tasked with managing the statewide database or search engine would incur costs to develop, host, and maintain the system. Costs would also be incurred in the development of a data portal, and development and maintenance of special-purpose partnership applications.

The Committee agreed that the cost to the state would be greatest if a new, separate system were mandated. If the state directed the activities currently underway to be expanded and coordinated, the cost to the state would be lower. The Committee agreed that the lowest cost to the state would use the approach of linking data from the existing systems of Texas institutions through the expansion of an existing search engine created by faculty and graduate students at The University of Texas at Arlington, called the Collaborative Partnership.
The Select Interim Committee concluded that the Collaborative Partnership would best be administered in a joint venture with a non-institution partner, most likely a non-profit organization. The Committee agreed this approach would maximize institutional participation.

The Committee concluded that participation could be implemented in phases. The Committee recommended that the development of a statewide searchable database and portal begin with the existing Tier One and emerging research institutions. The second phase would include the remaining public general academic institutions. A final phase could incorporate Texas independent higher education institutions and private research centers.
**Legislative Charge**

In 2009, the 81st Texas Legislature in Regular Session passed House Bill 51 (HB 51), to increase the state’s support for and development of national research institutions in Texas. One section of the legislation mandated an Interim Study Regarding Technology Research Data Collection. The legislation also prescribed the establishment of a Select Interim Committee to conduct the study.

Section 18 of HB 51 established a committee, charged to “study the feasibility of collecting data and maintaining a searchable electronic database, search engine, or other collection of data relating to specialized technology research projects that are developed or conducted at Texas public universities, research facilities, or other facilities operated by a state agency, in order to facilitate coordination among the universities and facilities on the projects and improve access to and awareness of the specialized research and technologies developed at those institutions.”

The legislation specified that the study consider the following:

- Appropriate entities to administer data collection, including nonprofit organizations, Texas public universities, or state agencies;
- The extent of legislative oversight required for an entity that would maintain the data collection;
- The information the data collection would include, such as a list of projects involving one or more of the following:
  - Energy research
  - Biomedical science research
  - Nanotechnology research
  - Other specialized research

On June 22, 2010, the Coordinating Board staff was instructed via letter from the sponsors of HB 51, Representative Dan Branch and Senators Judith Zaffirini and Kirk Watson, to have the Coordinating Board convene the Select Interim Committee, appoint members, and prepare a report for submission to the Legislative leadership by December 1, 2010.

During its July 29, 2010 meeting, the Board authorized the Commissioner to invite higher education institutional officials from the following institutions to appoint a representative to serve on the Select Interim Committee: The University of Texas at Austin, Texas A&M University, Texas Tech University, University of Houston, University of North Texas, The University of Texas at Arlington, The University of Texas at Dallas, The University of Texas at El Paso, and The University of Texas at San Antonio. The Board also authorized the Commissioner to appoint additional members to represent data collection providers and the technology industry. The Coordinating Board staff established the committee roster and developed an aggressive timeline to gather input and draft the report. The Select Interim Committee membership roster is provided as Appendix F.

The Select Interim Committee to Study the Feasibility of Establishing a Research Technology Database held two meetings, the first on August 10, and the second on August 24, 2010, in Austin, at the Coordinating Board offices. The Committee’s charge was to “study the feasibility
of collecting data and maintaining a searchable electronic database, search engine, or other collection of data relating to specialized technology research projects that are developed or conducted at Texas public universities, research facilities, or other facilities operated by a state agency, in order to facilitate coordination among the universities and facilities on the projects and improve access to and awareness of the specialized research and technologies developed at those institutions.”

**Current State of Access to Public Information**

In an effort to enhance the research coordination of Texas higher education institutions and expand collaborations among faculty across institutions and systems, the Texas Legislature directed a study of the feasibility of a statewide searchable database. Improving and coordinating data sharing efforts underway to increase research capacity would strengthen Texas’ ability to obtain federal research dollars and establish beneficial relationships with private industries.

Research efforts of Texas emerging and existing Tier One higher education institutions are as varied and diverse as the array of institutions themselves. Ongoing research activities include the development of new methods, procedures, equipment and technologies, and inventions, as well as basic research efforts. Because the research efforts of Texas universities’ researchers are cutting-edge and use the newest methods and equipment, related industries are often interested in establishing beneficial collaborations. Often such industries seek out research partners in specific states or cities that house a single or multiple research universities. This has the potential to lead to notable economic development. Examples of this include the development of the “Research Triangle” established in the areas encompassing Raleigh-Durham, North Carolina, and the “Silicon Valley” of Palo Alto, California.

While many Texas research universities provide information to the public about their faculty’s research efforts, industry leaders have voiced difficulty in accessing information on these research activities in a timely and uniform way. Because there is no single source of information that may be accessed by multiple parties, including researchers, private investors, and the public, Texas is likely to be missing funding opportunities that could enhance economic development. Access to current research information would provide interested parties with insight and understanding of the efforts underway at Texas higher education institutions and has the potential to help promote the economic development of the state.

The Select Interim Committee heard from institutions and agreed that no formal state mechanism is in place in Texas to allow for the systematic collection of data related to current research activities. Such lack of coordination could result in missed opportunities for private industry to partner with the public higher education institutions.

The Select Interim Committee members agreed that much of the information about specific research and individual researchers’ work is public information. They also agreed that researchers are required to report the information to several groups, including the federal government. They concluded that the information could be coordinated to allow interested parties the ability to access the information. However, they agreed that access to the majority of research information, including work in a specific discipline or area, is not easy to access, nor is it presented in a searchable format.
The Select Interim Committee members stated that they had heard concerns that funding opportunities available through private industry may be missed because no single access to research information exits for Texas. They agreed that data sharing has the potential of allowing quick dissemination of research activities and individual researchers’ contact information. Several statements were made related to the current status of research activities, which while available are often incomplete and not uniformly maintained. It was noted that most researchers develop and maintain their own web pages, and often within an institution there is no coordinated effort to link the research of faculty working in a particular research area. Instead, it is common for each university researcher to have a single research web page that presents specific information about their research activities. Often specific research on a particular topic, such as “battery” research, would have to be collected from individual faculty web pages. No single source exists to quickly assess the majority of Texas researchers current activities related to “battery” research.

Additionally, Texas institutions have no common standard or format for researchers to use to present their research information, making access to research information difficult and time-consuming. Lack of standardization related to definitions, terms, and key word assignments may also confound those seeking quick access to information. Scientific and technical researchers often use different terminology to describe like or similar kinds of research. Accessing information about technologies in early developmental stages and basic research is often difficult because the research has no common or distinguishing search name. Such research may be listed under many varied research areas. For collaborators from industry, locating information often requires a time-intensive process of “drilling down” in order to find the type of research or researcher they may be seeking.

Certain specialized information, such as patent information or grant solicitations, is available from publicly accessible databases. The United States Patent Office publishes information related to all levels of patent information. However, the information is not easily stratified by state. Aggregate data show that Texas averages 5,900 patents issued annually. However, it is neither quick, nor easy to determine the institutional affiliation of researchers who obtained these patents. Access to these data through a specialized search portal has the potential to be a valuable time-saving feature for industry personnel seeking collaboration with Texas research faculty.

In order to understand the current institutional efforts underway to allow data sharing among higher education institutions, representatives from two institutions were invited to address the Select Interim Committee.

**Institutional Efforts – Electronic Data Collection and Sharing Efforts**

Several Texas higher education institutions have begun to develop searchable databases that would allow for greater public access of their faculty research information. During the Select Interim Committee’s first meeting, held on August 10, 2010, presentations and overviews of two institutional efforts currently underway were provided. Ronald Elsenbaumer, Ph.D., Vice President of Research-Federal Relations, The University of Texas at Arlington (UT Arlington), and Leonarda Horvat, Ph.D., Chief Information Officer and Director of Information Systems at Texas A&M University System (TAMU System)–Texas Engineering Experiment Station (TEES), informed the Committee of their efforts. Dr. Elsenbaumer oversees the UT Arlington Profile
The University of Texas at Arlington

*Profile System and Collaborative Partnership*

Ronald Elsenbaumer, Ph.D., Vice President of Research-Federal Relations, UT Arlington presented an overview of the Profile System and the Collaboration Partnership. Both systems were developed internally by the institution’s faculty, staff, and students. The Profile System, [www.uta.edu/ra/real/](http://www.uta.edu/ra/real/), allows researchers, industry representatives, and students to quickly access information about the institution’s research. When accessing the Profile System, searches are available related to equipment, research topics, and publications. Dr. Elsenbaumer explained that having information easily accessible increases the likelihood of developing new collaborations with industry representatives. Dr. Elsenbaumer added that the Profile System was not a traditional database, but a fully interactive and integrated system to organize institutional data, which allows for real-time transfer of data and sharing of information. Additionally, at a relatively low cost the Profile System has the potential for expansion and use statewide.

Dr. Elsenbaumer also provided an overview of UT Arlington’s efforts to provide a network of research information that would be accessible to interested parties, but not limited to the research conducted by the researchers at UT Arlington. The Collaborative Partnership is a single search portal that links eight institutions, six within the UT System and two across another university system. The following institutions currently participate in the collaborative partnership: The University of Texas at Arlington, The University of Texas-Pan American, The University of Texas at Tyler, The University of Texas at El Paso, The University of Texas at San Antonio, The University of Texas Health Science Center San Antonio, University of North Texas, and University of North Texas Health Science Center. Four additional collaborations (including one with an independent institution, one with a university consortium, and another with an academic institution) are underway. Institutions may participate in the Collaboration Partnership through a variety of data sharing options, which will allow most institutions to participate with their existing databases (as long as the information desired for the State portal is available). The Collaborative Partnership data standards will also align with the ontology and data standards with various federal initiatives, including, but not limited to VIVO and STAR METRICS. An overview of the Profile and Collaboration Partnership is provided in Appendix B.

Texas A&M University System

*EPIK - Maestro*

Jeffery Seeman, Ph.D., Vice President for Research and Graduate Studies at Texas A&M University, and Leonardo Horvat, Ph.D., Chief Information Officer and Director of Information Systems at Texas A&M University System, presented an overview of the Texas A&M University System’s project Epik-Maestro. The TAMU System project is a research data management and collaboration system that will link researchers and finance administrators to research awards throughout the system and align internal accounting systems. The Maestro System will improve and allow for better oversight of the financial aspects of the TAMU System’s research efforts.
The Maestro system, while still in development, will provide an internal mechanism to monitor research in the pre- and post-award stages. Maestro will link the TAMU System’s 11 component institutions, seven agencies, and its health-related institution. The research portal will provide researchers with real-time access to their own and others’ research data, information, and finances. The Maestro system allows researchers to manage their awards online. It also provides researchers with timely and accurate financial information about their awards and will strengthen the system’s research capabilities, allowing increased collaborations across the various institutions. The Maestro system includes three developmental efforts: 1) research portal, 2) pre- and post-award database, and 3) research finance information. The TAMU System is currently in the first developmental phase of the multi-year project.

Other Efforts

The Select Interim Committee members provided additional information about efforts that are underway at the national level and in the private sector.

Susan Sedwick, Ph.D., Associate Vice President for Research and Director of the Office of Sponsored Projects at The University of Texas at Austin (UT Austin), informed the Select Interim Committee of the STAR METRICS project, which is a national demonstration partnership effort. STAR METRICS stands for Science and Technology in America’s Reinvestment — Measuring the Effect of Research on Innovation Competitiveness and Science. The effort is a federal and university partnership and includes two phases, with the first phase to develop uniform measures related to the impact of the American Recovery and Reinvestment Act and the second phase to develop a standardized set of measures related to four areas of science: economic growth, workforce outcomes, scientific knowledge, and social outcomes. Dr. Sedwick is Chair of the Federal Demonstration Partnership (FDP) and serves as Co-Chair of FDP’s STAR METRICS steering committee. She explained that the purpose of the project is to “create a reliable and consistent interagency mechanism to account for the number of scientists and support staff that are on research institution payrolls supported by federal funds.” Additional information about STAR METRICS is included as Appendix D.

Representatives from industry serving on the Committee provided brief descriptions of existing commercial data systems. Several Committee members noted that often commercial systems serve specialized purposes, such as providing information about a specific scientific area related to a particular industry. It was noted that commercial systems may be too expensive to use and difficult to implement. Industry representatives and others noted that as information retrieval methodologies evolve in the coming years, it is likely that they will move from a traditional targeted search to a contextual framework, one in which information will be provided to the end user based on interest and historical use of data, rather than direct searches.

Feasibility of a Statewide Searchable Database

The Select Interim Committee members concurred that a statewide searchable technology database was feasible. However, they asked that the Coordinating Board staff survey the general academic institutions to better assess the feasibility of such a database. Institutional respondents provided information about efforts to collect data in an electronic form. The survey was designed to provide insight into the feasibility of data distribution. Of the 43 general academic institutions surveyed, 30 institutions (70 percent) provided responses. The survey
responses showed that more than half the institutions maintain data related to research in an electronic form (see Table 1). Additional survey information is provided in Appendix E.

Table 1. Public Institutional Responses – Electronic Database

<table>
<thead>
<tr>
<th>Yes – Data Elements in Organized Electronic Form</th>
<th>No – Data Elements Not in Electronic Form</th>
<th>Did Not Respond</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Yes Electronic Storage</td>
<td>Format of Electronic Storage</td>
<td>No Plan to Implement</td>
</tr>
<tr>
<td>Database</td>
<td>Spreadsheet/Flat File</td>
<td>Static HTML Pages</td>
</tr>
<tr>
<td>Faculty</td>
<td>77%</td>
<td>59%</td>
</tr>
<tr>
<td>Core Facilities</td>
<td>51%</td>
<td>32%</td>
</tr>
<tr>
<td>Centers/Institutes</td>
<td>61%</td>
<td>31%</td>
</tr>
<tr>
<td>Institutional Research Interests/Intellectual Property</td>
<td>65%</td>
<td>37%</td>
</tr>
</tbody>
</table>

Source: THECB Survey of Institutions, September 2010

Based on the additional information provided by the survey, the Select Interim Committee identified three types of data sharing systems that could be linked to allow greater access to research data:

1. Self-contained database systems: Database developed and maintained by the organization/institution. Federal database systems, such as the Catalog of Federal Domestic Assistance (CFDA) for federal research grants and the United States Patent and Trademark Listing, are examples of self-contained database systems.

2. Database systems linked with common data structure: Database Systems that have common data elements. Adherence to these structures allows for data sharing. A federal example of this is the STAR METRICS pilot program.

3. Distributed database systems: The system allows access and links electronic data systems of different types, structures, and formats to a higher-level search tool through use and adherence to a data dictionary. Existing institutional research databases may not require any changes. Individual stakeholders can customize the functionality of the top-level search tool by adding targeted applications. An example of this type of system is The University of Texas at Arlington’s Profile System and Collaborative Partnership project.
At Texas general academic institutions, databases have grown in response to specific data management needs. Institutional research data are widely dispersed, are stored in different formats, and contain varying levels of research detail. The Select Interim Committee members agreed that the Collaborative Partnership model would allow for the content management system to access a substantial amount of currently available data and allow for growth based on future demand and usefulness.

Such a system would build on the existing foundation related to institutional research. Institutions would continue to collect, organize, and maintain their research data. The partnership model would allow for the various institutional databases to be connected through a search model, which would connect institutional and individual data to be shown. This would begin to build a comprehensive, statewide system, which would ultimately lead to a system that would allow industry and the public to easily access data. The Interim Committee recognized that a searchable data system based on this model would require a three-step process for implementation:

1. data management and reporting at the institutional level;
2. data connection at a statewide level with standardized data elements and data format mapping; and
3. feedback to assess the usefulness of the system and periodic update of data standards and search applications.

Data Elements

The Select Interim Committee discussed the essential elements required for a searchable database and agreed that the required data standards should not be complex or difficult for the institution to maintain. They agreed that if a statewide system were to be implemented, it would provide an opportunity to develop statewide standards related to data terminology and sharing. They felt this would allow for data sharing across the state.

The Committee discussed data elements and agreed on elements related to faculty and facilities. The Committee agreed that faculty data should include the researcher’s name, position, area of research interest, listing of grants (past, current, and possibly pending), and intellectual property. The Committee also agreed that data elements related to research facilities, centers, and institutes should include facility descriptions. The descriptions should provide information about the facilities purpose, capabilities, current contact information, physical location, link to website, availability of fee for service, and specialized research equipment valued at over $100,000 and available for fee for service, as well as any data an institution may also choose to share.

Appropriate Entities to Administer Statewide Searchable Database

The Select Interim Committee discussed possible entities that could administer a statewide database. Under the Collaborative Partnership model, institutions would maintain ownership of their data. Responsibility for administration would allow for:

1. Data collection and management to be the responsibility of each general academic institution. Within each institution, faculty could be responsible for the maintenance
and upkeep of their research information, and that effort could be administered by 
and could be delegated to administration. Data linkage and data format mapping 
would also be maintained at the institutional level.

2. Management of the Collaborative Partnership model search facility would best be 
placed under the management of a neutral non-profit organization created for that 
purpose.

The Select Interim Committee agreed that data maintenance and ownership should be held by 
the institution. Permissions for access can be granted separately for different user groups within 
an institution or system, between agencies, or the public.

**Legislative Oversight**

The Select Interim Committee agreed that legislative oversight should include a requirement 
that institutions report their activities related to participation in the statewide effort. They 
agreed that this could be accomplished through submission of a report.

The Committee added that mandated data element requirements should be kept at a minimum 
to allow for the greatest participation. The Committee concluded that faculty members would be 
better drivers for successful implementation of a program, if it were based on self interest, 
rather than legislative mandates. However, they acknowledged that participation could be 
required at the institutional level. They also noted that any mandated legislative compliance 
measure would require additional oversight by institutional staff.

**Issues Related to Compliance with Federal and State Laws**

It was recognized that any public reporting or access requirement would exclude reporting of 
classified projects and acknowledge the potential need for exemptions for reporting projects 
where public disclosure is restricted by contractual requirements. The responsibility of 
adherence with federal and state laws, including the handling of Controlled Unclassified 
Information (CUI) and For Official Use Only (FOUO) information would remain the obligation of 
individual institutions. Institutions would remain responsible for compliance to federal and state 
laws.

**Cost Estimate**

A statewide project that would link the research efforts of Texas’ higher education institutions 
through a single search portal to allow the industry and public to access current real time 
information about Texas research projects has the potential to be a costly endeavor. While the 
total cost of such a project could not be determined by the Committee, the essential elements 
to consider in developing a cost estimate were discussed.

A statewide, self-contained database system could require an investment of several million 
dollars of new state money. Building a statewide database would require funding, as would 
consolidating existing information into a common dataset, and additional resources would be 
required to maintain and update the research data. Several members of the Select Interim 
Committee, including those from industry and general academic institutions, acknowledged that
the cost to develop and maintain a self-contained database system could be in excess of several millions of dollars over several years.

Institutional representatives from TAMU System noted that the development of the financial management Maestro system was a multi-million, multi-year system investment. However, a lower cost option would allow the costs of data maintenance to be the responsibility of the institution, rather than the development of a new system. The Committee felt that the Collaborative Partnership and the faculty-centered Profile system would require less investment by the State because data collection and maintenance could be facilitated through data standards to link data from existing databases.

Several members of the Interim Select Committee noted that the cost of expanding the Collaborative Partnership to more Texas institutions could be kept relatively low. It was noted that linking existing institutional databases is not complex and could be accomplished by each institution if their data are sufficiently organized. Additionally, the cost for building additional applications could be kept low by utilizing existing faculty and students to help in the development and maintenance of the data. However, expanding the existing UT Arlington Collaborative Partnership/Profile System would require some additional funding, perhaps in the thousands, rather than millions. Funding of a statewide expansion of these systems must include an upfront investment to further develop the system or expand the existing system and would have to allow for continued funding to support the ongoing maintenance and administration of data.

The Select Interim Committee discussed the various costs associated with the establishment of a statewide database or search portal and what the costs incurred would be for an institution without their desired data stored or organized for connectivity.

The Committee concluded that:

1. Institutions without organized electronic data structures would incur greater costs to establish an internal system than would those institutions that already have established systems in place. Establishing a base level of required data elements would allow for a better estimate of the associated costs.

2. Institutions would incur costs to link existing or established data systems with the servers of the Collaborative Partnership. This would include costs associated with data format mapping and maintaining data access.

3. The organization tasked with managing the statewide database or search engine would incur costs to develop, host, and maintain the system. Costs would also be incurred in the development of a Texas search portal and the development and maintenance of special-purpose Partnership applications.

The Committee agreed that the cost to the state would be greatest if a new, separate system were mandated. If the state directed the activities currently underway to be expanded and coordinated, the cost to the state would be lower. The Committee agreed that the lowest cost to the state would use the approach of linking data from the existing systems of Texas
institutions through the expansion of an existing search engine created by faculty and graduate students at The University of Texas at Arlington, called the Collaborative Partnership.

Conclusions and Recommendations

The Select Interim Committee concluded that a statewide, searchable database of research expertise and research-related assets is feasible and has the potential to increase transparency. This may lead to increased industry investment and national competitiveness of Texas general academic institutions.

The Committee recommends a data distribution system, such as the UT Arlington Collaborative Partnership model. This system allows access to data from dispersed data sources through a top-level portal that utilizes data standard mapping to ensure uniform search results. The Collaborative Partnership model creates access to data at the source and does not require that data be uploaded to a centralized place. The model also allows inclusion of different data formats in the search capability.

In the Collaborative Partnership, data may be accessed in a single search. However, these data are not stored centrally; rather, the portal searches the databases housed at the participating institutions. Such an approach would have the following characteristics:

1. Institutions would retain ownership of data.
2. Institutions would bear an initial cost of identifying and organizing requested data, if they had not already developed this process. Costs related to this would vary depending on an institution’s current level and type of data organization.
3. Institutions would be responsible for access and restrictions of data. Access to data would be decided by the institution, not a state agency or database partner.
4. Institutions would be responsible for maintenance of the data.
5. Institutions may selectively restrict searches to subsets of partners and could access data related to specific topics or geographic locations. Such filters would be available to all institutions, but each institution could set their own limits.
6. Institutions and partners could customize search characteristics and display formats. For example, search and display applications could be tailored for either internal management use or to the needs of industry customers.

The Select Interim Committee discussed the various costs associated with the development and maintenance of a statewide database or search engine. Members also discussed the costs expected to be incurred for an institution to implement or adapt to a statewide electronic system. The Committee concluded that:

1. Institutions without organized electronic data structures would incur greater costs to establish an internal system, than would those institutions that already have established systems in place. Establishing a base level of required data elements would allow for a better estimate of the associated costs.

2. Institutions would incur costs to link existing or established data systems with a statewide system. This would include costs associated with data format mapping and maintaining data access.
3. The organization tasked with managing the statewide database or search engine would incur costs related to develop, host, and maintain the system. Costs would also be incurred in the development of a data portal, and development and maintenance of special-purpose partnership applications.

The Select Interim Committee concluded that The Collaborative Partnership would best be administered in a joint venture with a non-institution partner, most likely a non-profit organization. The Committee agreed that this approach would maximize institutional participation.

The Committee concluded that participation could be implemented in phases. The Committee recommended that the development of a statewide searchable database and portal begin with the existing Tier One research and emerging research institutions. The second phase would include the remaining public general academic institutions. A final phase could incorporate Texas independent higher education institutions and private research centers.
References


Texas Higher Education Coordinating Board Higher Education Research Centers Inventory, [https://www1.thecb.state.tx.us/apps/centers](https://www1.thecb.state.tx.us/apps/centers).


The University of Texas at Arlington Profile System, [https://www.uta.edu/ra/real](https://www.uta.edu/ra/real).

The University of Texas at Arlington Collaborative Partnership project, [http://www.uta.edu/research/collaborate](http://www.uta.edu/research/collaborate).
Appendix A
House Bill 51, Section 18

SECTION 18. INTERIM STUDY REGARDING TECHNOLOGY RESEARCH DATA COLLECTION. (a) A select interim committee is created to study the feasibility of collecting data and maintaining a searchable electronic database, search engine, or other collection of data (data collection) relating to specialized technology research projects that are developed or conducted at public universities in this state, research facilities of public universities in this state, or other facilities operated by a state agency, in order to facilitate coordination among the universities and facilities on the projects and improve access to and awareness of the specialized research and technologies developed at those institutions and facilities.

(b) The study must consider:

(1) appropriate entities to administer the data collection, including nonprofit organizations, public universities in this state, or state agencies;
(2) the extent of legislative oversight required for an entity that would maintain the data collection;
(3) compliance with state and federal laws regarding access to public information; and
(4) the information the data collection would include, such as:
   (A) a list of projects involving one or more of the following areas:
      (i) energy research, including methods of creation, storage, distribution, and conservation of energy;
      (ii) biomedical science research, including research that involves stem cells or human cloning;
      (iii) nanotechnology research, including nanomedicine; and
      (iv) other specialized technology research;
   (B) for each project listed under Paragraph (A) of this subdivision, a brief description of the project, including the field of technology involved, the entity involved with the project, and additional comments regarding the research the Texas Higher Education Coordinating Board considers appropriate; and
   (C) other relevant information and available resources in this state relating to specialized technology research, including:
      (i) expert faculty or research personnel;
      (ii) available technology and patents obtained;
      (iii) the location of and policies for the use of available research equipment;
      (iv) public grants or contracts awarded; and
      (v) the process through which any stem cells and stem cell lines utilized were derived.

(c) The study shall examine the current state of access to public information about specialized technology research projects and shall assess the best methods of facilitating access to the information. In addition, the study shall consider what information should be accessible by the general public and what information, if any, should have restricted access.

(d) The committee shall be composed of:

(1) representatives of the following institutions, with one member named by each institution: The University of Texas at Austin, Texas A&M University, Texas Tech University, the University of Houston, the University of North Texas, The University of Texas at Arlington, The University of Texas at Dallas, The University of Texas at El Paso, and The University of Texas at San Antonio; and
(2) a number of members appointed by the Texas Higher Education Coordinating Board as the coordinating board considers appropriate to represent the coordinating board, data collection providers, and the technology industry.

(e) On the request of the committee, a general academic institution of higher education, research facility of a general academic institution of higher education, or other facility operated by a state agency shall provide to the Texas Higher Education Coordinating Board or advisory committee any information necessary for the board or advisory committee to perform its duties under this section.

(f) Not later than December 1, 2010, the committee shall report the committee's findings and recommendations to the lieutenant governor, the speaker of the house of representatives, and the governor. The committee shall include in its recommendations specific legislation that the committee considers desirable to address the need for and feasibility of establishing a data collection as determined by the committee's findings.

(g) The committee is abolished and this section expires January 16, 2011.
Appendix B
UT Arlington System: Collaborative Partnership

The Collaborative Partnership
(www.collaborativepartnership.com)
An inter-institutional search for finding research resources to solve problems, spur innovation, collaborate and pursue funding prototype

The Collaborative Partnership is a prototype web portal for individuals throughout academia, industry and state/federal government organizations to build relationships in the pursuit of conducting research, identify commercialization opportunities, and seek sponsored funding.

Searching Academia: All universities and institutions which produce academic and intellectual products have the following expertise and research related resources within their organizations:

- Know-how (expertise)
- technologies and patents
- research centers
- laboratories and research groups
- research facilities
- equipment

These common resources should exist on each university’s respective website. If available within an organization, the Partnership can connect these assets in Texas to form a “Collective” of resources and expertise.

A New Model of Connectivity
The Partnership sets itself apart from other systems because it is NOT a central database. The Partnership connects live data from the source where the information resides without the actual transfer of data.

Using open source tools and simple data standards, the Collaborative Partnership can take new partners in without affecting their security, data, or business practices. It is a collaboration model built for individuals to identify collaboration opportunities and speed the transfer of knowledge throughout the marketplace. Expertise, resources, and research information can be organized at the individual, University, University System, and State levels as well as by geographic regions.

Some entities can join the Partnership as quickly as ONE DAY!
**Building Successful Clusters:** The "clustering" of industry, technology and intellectual assets has become a viable mechanism for driving economic development. The Partnership enables the identification of assets to their source and provides a knowledge network and infrastructure that makes clustering successful:

- by speeding the movement of new ideas into the marketplace,
- knowing what expertise and resources exist and their geographic proximity to one another
- allowing for individuals to find each other, form partnerships and solve problems together.

**Connecting Texas:** By establishing a few "core" data elements common for each resource (information asset), the Collaborative Partnership can identify, search and associate these resources into a virtual storefront for multiple universities and entities. It simply takes an entity to identify and organize their data to the "the core" and make it available for the Collaborative Partnership to have the results in XML format.

---

**PARTNERSHIP TOOLS:**

**The Profile System**

The Profile System is built to organize and market intellectual assets and resources for entities. It is in part a content management system, information repository and web page builder with the goal of saving individual (faculty) and entities time and resources. Although any institutional database/information system could be connected to the Partnership, the Profile system has web services built-in to automatically connect to the Partnership.
Collaborative Funding Network
By utilizing daily downloads of the funding opportunities from Grants.gov, the Collaborative Funding Network (CFN) provides individuals one place to find collaborators and related funding opportunities along with the ability to assign roles, post collaborations sought after and openly communicate.

Collaborative Cluster Initiative
The Collaborative Cluster Initiative is a script of disciplines and keywords to organize the research endeavor into meaningful State and Federal clusters. Individuals may search research resources and funding opportunities based on the Texas Industry and Technology Clusters.

A Collective and Interactive Search: Each entity partner can have their own Partnership portal search page to tailor search results from the Partnership with whatever weights/rankings they want to employ. This model could be used for specific industry clusters or consortia. Collective reports from partners can also be rolled-up into charts and graphs through a Shibbolized Reporting Website.

Contact Information: For additional questions or comments, contact
Dr. Ronald Elsenbaumer
Vice President for Research and Federal Relations
elsenbaumer@uta.edu
817-272-1021

Jeremy Forsberg,
Assistant Vice President for Research
j.forsberg@uta.edu
817-272-3657

Rajat Mittal
Director, Electronic Research Administration
rmittal@uta.edu
817-272-3896
The Profile System
(http://www.uta.edu/expertise).
(An Open Enterprise to manage: Expertise, Resources and Electronic Systems)

Purpose: The University of Texas at Arlington developed an open enterprise system for identifying and organizing the expertise and resources within academia, research/education consortia, or industry, called the Profile System. The Profile System is an open-source tool for organizing the following institutional assets (in the form of “profiles”) necessary to encourage research collaboration and economic development for easy distribution throughout the internet:

- Know-How (expertise including Publication data and Grant data)
- Facilities and Instrumentation
- Laboratories and Research Groups
- Technologies and Patents

The Profile System incentivizes faculty and administration input by serving as:

- An Information Repository that accommodates automatic generation of curriculum vitae, biosketches and other reports
- A Web editor for authors to update information in real time
- An Accountability and Performance Reporting Mechanism (Automation for Faculty Progress Reports)
- A portal to save faculty time in completing multiple tasks asked from their institution

The Profile System also comes equipped with an Application Programming Interface (API) that allows webmasters across campus to query the data and repurpose it on custom branded department and personalized faculty webpages. Profiles can be searched/browsed by:

- Basic Keyword Search
- Boolean Searches (Exact Phrase, emphasis on certain keywords)
- Texas Industry & Technology Clusters (in development)
- Advanced Search by Section/Field
- Course Search & Browse (H.B. No. 2504)
Architecture: The profile system is based on an open architecture framework which houses tools for access control, workflow, reminders & notifications etc. These tools can be leveraged to rapidly deploy new applications that conform to the business practices of the institution. Some applications that have been developed at the various participating institutions are: Grant Management System, IRB Protocol Submission, Training, Faculty Evaluation, Purchase Order Tracking, Curriculum Management System etc.

Participants: The following institutions have licensed a beta version of Profile System and adapted it for their own institutional use:

- UT Arlington
- UT El Paso
- UT Health Science Center San Antonio
- UT San Antonio
- UT Tyler
- UT Pan-American
- UNT
- UNT Health Science Center Forth Worth
- UT Dallas*
- Texas Christian University*
- Texas State University*
- Gulf Coast Consortia* (for Biological Sciences featuring members from Rice University, UT HSC Houston, UT Medical Branch, UT MD Anderson, UT Houston, Baylor College of Medicine)

* indicates not yet live
**Contact Information:** For additional questions or comments, contact

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Email</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Ronald Elsenbaumer</td>
<td>Senior Vice President for Research and Federal Relations</td>
<td><a href="mailto:elsenbaumer@uta.edu">elsenbaumer@uta.edu</a></td>
<td>817-272-1021</td>
</tr>
<tr>
<td>Jeremy Forsberg</td>
<td>Assistant Vice President for Research</td>
<td><a href="mailto:j.forsberg@uta.edu">j.forsberg@uta.edu</a></td>
<td>817-272-3657</td>
</tr>
<tr>
<td>Rajat Mittal</td>
<td>Director, Electronic Research Administration</td>
<td><a href="mailto:rmittal@uta.edu">rmittal@uta.edu</a></td>
<td>817-272-3896</td>
</tr>
</tbody>
</table>
EPIK-Maestro will be an enterprise-wide system that supports researchers and research administration across the Texas A&M University System (TAMUS). The Chancellor and CEOs of TAMUS College Station based research institutions approved the development and implementation of integrated research administration system by using EPIK system as a prototype.

EPIK is in-house developed cradle-to-grave research pre- and post-award management tool, created to assist the research administration offices within Texas Engineering Experiment Station, one of the TAMUS research agencies.

Project Objectives

- Provide researchers with timely and accurate information needed to manage their research activities and to establish collaborations.
- Publish up to date research key performance indicators for all TAMUS institutions and Board of Regents.
- Streamline research administration processes to minimize inefficiencies and improve turnaround time.
Appendix D
STAR METRICS Project

STAR METRICS
Science and Technology in America's Reinvestment – Measuring the Effects of Research on Innovation, Competitiveness and Science

Goal: Empirical framework to measure the impact of science investments

Challenge: No data infrastructure currently exists; existing data collection systems balkanized across agencies
  - Minimal data collected on principal investigators – and only during period of award.
  - Almost no data collected on most recipients of federal funds (students; tech support; postdocs etc)
  - Almost no data captured on subawards, vendors and overhead
  - Outputs only captured during funding period (typically 3-5 years) – and then manually, sporadically, and in unstructured format
  - Outputs not linked either to inputs or infrastructure investments

Approach: Leverage existing HR and finance administrative data (within recipient institutions); match to existing administrative and transaction data on measurable outcomes: initially publications, citations, patents and, later, tax and other data. Collaborative effort between federal science agencies and scientific community.

Structure: A memorandum of understanding has been signed between the National Science Foundation (NSF), the National Institutes of Health (NIH), and the Office of Science & Technology Policy (OSTP), acting through its Committee on Science, a committee of the National Science and Technology Council to partner in the creation of the program. DOE and EPA are the next agencies to be joining. About 100 Federal Demonstration Partnership Institutions (universities) in various stages of participation.

Sample Reports:

FTE Equivalents

<table>
<thead>
<tr>
<th>Funding Source</th>
<th>Total</th>
<th>% Chg from prior period</th>
<th>Faculty</th>
<th>% Chg from prior period</th>
<th>Undergraduate Student</th>
<th>% Chg from prior period</th>
<th>Admin</th>
<th>% Chg from prior period</th>
<th>Post Grad</th>
<th>% Chg from prior period</th>
<th>Grad Student</th>
<th>% Chg from prior period</th>
<th>Technical Support</th>
<th>% Chg from prior period</th>
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</thead>
<tbody>
<tr>
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<td>596</td>
<td>10.0%</td>
<td>1.0</td>
<td>-14.3%</td>
<td>0.5</td>
<td>-38.9%</td>
<td>78.0</td>
<td>21.3%</td>
<td>84.8</td>
<td>41.9%</td>
<td>161.0</td>
<td>79.8%</td>
<td>2190.0</td>
<td>-3.8%</td>
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<tr>
<td>Federal Non-Salary Stimulus</td>
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<td>+17.3%</td>
<td>15.8</td>
<td>11.1%</td>
<td>-23.0%</td>
<td>2.5</td>
<td>0.9%</td>
<td>3.3</td>
<td>16.8%</td>
<td>5.2</td>
<td>47.0%</td>
<td>7.2</td>
<td>15.4%</td>
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</tr>
<tr>
<td>Federal Salary Science</td>
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<td>1.5</td>
<td>-50.0%</td>
<td>112.0</td>
<td>10.0%</td>
<td>3.6</td>
<td>-50.0%</td>
<td>325.2</td>
<td>82.0%</td>
<td>461.7</td>
<td>11.9%</td>
<td>274.3</td>
<td>12.8%</td>
</tr>
<tr>
<td>Federal Salary Stimulus</td>
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<td>45.2%</td>
<td>16.7</td>
<td>-20.0%</td>
<td>31.0</td>
<td>57.0%</td>
<td>0.8</td>
<td>0.8%</td>
<td>43.9</td>
<td>62.2%</td>
<td>55.7</td>
<td>58.2%</td>
<td>54.7</td>
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<td>Other</td>
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<td>-80.2%</td>
<td>1,244.4</td>
<td>-17.0%</td>
<td>4,007.5</td>
<td>-24.5%</td>
<td>12,728.3</td>
<td>1.9%</td>
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<tr>
<td>Total</td>
<td>24,000</td>
<td>-2.7%</td>
<td>1,273.5</td>
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<td>1,402.2</td>
<td>722.6%</td>
<td>1.4</td>
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<td>5,007.2</td>
<td>-2.2%</td>
<td>13,250.3</td>
<td>2.3%</td>
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</tbody>
</table>

Field: How Derived
- FTE (full-time equivalent): Defined from available agency data and OTD code
- % Chg from prior period: The percentage change in the number of FTEs from the prior reporting period
- FTE Equivalents: The percentage change in the number of FTE Equivalents from the prior reporting period

Translation of the various occupational classifications into a standard set of classifications. A standard classification is used per university.

FTE Jobs and Positions

17
## Local Economic Impact
for UNIVERSITY OF TEXAS, AUSTIN

### Total Jobs

<table>
<thead>
<tr>
<th>County Name</th>
<th>County Code</th>
<th>Award FTEs, Sub-Award &amp; Vendor Jobs</th>
<th>Total Jobs</th>
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<td>4.1</td>
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<td>BASTROP</td>
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<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>BELL</td>
<td>27</td>
<td>0.2</td>
<td>0.2</td>
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<tr>
<td>BEKAR</td>
<td>29</td>
<td>0.8</td>
<td>0.8</td>
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<tr>
<td>BRAZOS</td>
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<td>0.7</td>
<td>0.7</td>
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<tr>
<td>BROWN</td>
<td>49</td>
<td>0.1</td>
<td>0.1</td>
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<tr>
<td>DALLAS</td>
<td>113</td>
<td>22</td>
<td>22</td>
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<tr>
<td>DENTON</td>
<td>121</td>
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<tr>
<td>EL PASO</td>
<td>144</td>
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<td>0.1</td>
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<tr>
<td>FORT BEND</td>
<td>157</td>
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<td>0.1</td>
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<tr>
<td>GONZALEZ</td>
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<td>0.2</td>
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<td>HARRIS</td>
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<td>1.7</td>
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<td>HAYS</td>
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<td>0.1</td>
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<tr>
<td>HIDALGO</td>
<td>213</td>
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<td>0.1</td>
</tr>
<tr>
<td>JEFFERSON</td>
<td>245</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>LUBBOCK</td>
<td>260</td>
<td>0.3</td>
<td>0.3</td>
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<tr>
<td>MC LENNAN</td>
<td>309</td>
<td>0.1</td>
<td>0.1</td>
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<tr>
<td>MONTGOMERY</td>
<td>319</td>
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<tr>
<td>NUECES</td>
<td>315</td>
<td>2.4</td>
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<tr>
<td>REFUGIO</td>
<td>391</td>
<td>0.1</td>
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<tr>
<td>TARRANT</td>
<td>439</td>
<td>3.8</td>
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<tr>
<td>TRAVIS</td>
<td>463</td>
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<tr>
<td>WILLIAMSON</td>
<td>491</td>
<td>1.2</td>
<td>1.2</td>
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<td></td>
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<td>41.7</td>
<td>1,005.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1,241.5</td>
</tr>
</tbody>
</table>

Source: STAR Metrics - Jobs (2010_Q2)
Appendix E
CB Survey of Institutions

Technology-Research Survey Participation List

Angelo State University
Lamar University
Midwestern State University
Prairie View A&M University
Stephen F. Austin State University
Texas A&M Health Science Center
Texas A&M International University
Texas A&M University
Texas A&M University - Commerce
Texas A&M University - Corpus Christi
Texas A&M University - Kingsville
Texas Southern University
Texas State University - San Marcos
Texas Tech University
Texas Woman’s University
The University of Texas - Pan American
The University of Texas at Arlington
The University of Texas at Austin
The University of Texas at Brownsville and Texas Southmost College
The University of Texas at Dallas
The University of Texas at El Paso
The University of Texas at San Antonio
The University of Texas at Tyler
The University of Texas Health Science Center at Houston
The University of Texas Health Science Center at San Antonio
The University of Texas M.D. Anderson Cancer Center
The University of Texas Medical Branch at Galveston
The University of Texas of the Permian Basin
The University of Texas Southwestern Medical Center at Dallas
University of Houston
University of North Texas
University of North Texas Health Science Center at Fort Worth
West Texas A&M University
Survey of Electronic Research Data Collections

Survey for the Select Interim Committee Studying the Feasibility of a Texas...

The Coordinating Board was directed by Section 18 of House Bill 51, passed by the 81st Texas Legislature, to appoint a Select Interim Committee to “study the feasibility of collecting data and maintaining a searchable electronic database, search engine, or other collection of data relating to specialized technology research projects” that are being conducted at public facilities in Texas.

The Committee met on August 10 for discussion and asked the Board staff to survey institutions to help determine the feasibility of developing or adopting a statewide system that would match private industry opportunities with general academic and health-related institutions conducting research in specified areas.

In order to better assess the state’s existing resources, please complete the attached survey. The survey should take approximately 7-10 minutes to complete.

The results of the survey will help inform and direct the study. If you have any questions please contact Reinold Cornelius at 512-427-6156 or at Reinold.Cornelius@THECB.state.tx.us.

* Contact Information

| Institution
| Responder's Name
| Responder's E-mail

Faculty Data:
Using the drop-down menus, please select the choice that best describes your institution's efforts to collect data related to faculty. Please do not be concerned about whether the information is currently publicly available or not.

<table>
<thead>
<tr>
<th>Name</th>
<th>Yes, Data in Organized, Electronic Form</th>
<th>No, Data Not in Electronic Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree (year, institution)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree (research field)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research Interest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professional Credentials</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professional Memberships</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Publications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associated Grants</td>
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<td></td>
</tr>
<tr>
<td>Number of Graduate Students</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please comment on whether there is a policy for database maintenance and update frequency:
**Survey of Electronic Research Data Collections**

**Core Facilities:**
Using the drop-down menus, please select the choice that best describes your institution's efforts to collect data related to facilities. Please do not be concerned about whether the information is currently publicly available or not.

<table>
<thead>
<tr>
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<th>No, Data Not in Electronic Form</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name of Facility</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Research Field for Facility</strong></td>
<td><strong>Data Base</strong></td>
</tr>
<tr>
<td><strong>Square-Footage of Facility</strong></td>
<td><strong>Spread Sheet/Flat File</strong></td>
</tr>
<tr>
<td><strong>Associated Faculty Names</strong></td>
<td><strong>Static HTML Pages</strong></td>
</tr>
<tr>
<td><strong>Specialized Equipment of Facility</strong></td>
<td><strong>Readable PDF Files</strong></td>
</tr>
<tr>
<td><strong>Rates for External Use of Facility</strong></td>
<td><strong>No Plan to Implement</strong></td>
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<tr>
<td><strong>Plan to Implement Within a Year</strong></td>
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Please comment on whether there is a policy for data base maintenance and update frequency:

**Centers or Institutes:**
Using the drop-down menus, please select the choice that best describes your institution's efforts to collect data related to research centers or institutes. Please do not be concerned about whether the information is currently publicly available or not.

<table>
<thead>
<tr>
<th>Yes, Data in Organized, Electronic Form</th>
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<tbody>
<tr>
<td><strong>Name of Center</strong></td>
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<td><strong>Center Director</strong></td>
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<td><strong>Research Field(s)</strong></td>
<td><strong>Data Base</strong></td>
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<td><strong>Mission Statement</strong></td>
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<tr>
<td><strong>Readable PDF Files</strong></td>
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<tr>
<td><strong>Annual Funding</strong></td>
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<td><strong>Associated Grants</strong></td>
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<tr>
<td><strong>Associated Faculty Names</strong></td>
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<tr>
<td><strong>Specialized Equipment at Center</strong></td>
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<tr>
<td><strong>Rates for External Use of Specialized Instrumentation</strong></td>
<td></td>
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</table>

Please comment on whether there is a policy for data base maintenance and update frequency:
Survey of Electronic Research Data Collections

Institutional Research Interests:
Using the drop-down menus, please select the choice that best describes your institution's efforts to collect data related to intellectual property. Please do not be concerned about whether the information is currently publicly available or not.

<table>
<thead>
<tr>
<th>Yes, Data in Organized, Electronic Form</th>
<th>No, Data Not in Electronic Form</th>
</tr>
</thead>
</table>
| Grants (investigator, title, amount, research area) | Data Base
Spread Sheet/Flat File
Static HTML Pages
Readable PDF Files |
| Technologies or Patents and Patent Applications | |
| Licensing Availability | No Plan to Implement
Plan to Implement Within a Year |
| Equity Ownership and Business Participation in External Business Applications | |
| Spin-Off Companies | |

Please comment on whether there is a policy for database maintenance and update frequency:

Please tell us if you have suggestions or comments:
Appendix F
Select Interim Committee Representatives on Feasibility of Statewide Technology Database

Industry Representatives

Cesar Maldonado, P.E.
President
Texas State Technical College
Texas Emerging Technology Fund
Harlingen, Texas

Brian Windsor, Ph.D.
Senior Vice President
Portfolio Company Management
Emergent Technologies, Inc.
Austin, Texas

David Capps
Founder, Chairman, CEO
Pure Discovery Corporation
Dallas, Texas

Carsten Hein Westergaard, Ph.D.
Global Technology Director
Vestas Technology R&D Americas, Inc.
Houston, Texas

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