**SAMPLE – For Reference Only** – This sample is a redacted copy of a work statement accomplished under a NITAAC GWAC. A Statement of Work (SOW) is typically used when the task is well-known and can be described in specific terms. Statement of Objective (SOO) and Performance Work Statement (PWS) emphasize performance-based concepts such as desired service outcomes and performance standards. Whereas PWS/SOO's establish high-level outcomes and objectives for performance and PWS's emphasize outcomes, desired results and objectives at a more detailed and measurable level, SOW's provide explicit statements of work direction for the contractor to follow. However, SOW's can also be found to contain references to desired performance outcomes, performance standards, and metrics, which is a preferred approach. **This sample is not all inclusive, therefore the reader is cautioned to use professional judgment and include agency specific references and regulations to their own PWS/SOO/SOW.**

Statement of Work

Engineering and Programming Support for XXX

As of <DATE>

# Task Order Title

Engineering and Programming Support Services for the <AGENCY> Projects

# Background

Background text

# Objectives

In its endeavor to meet demands, <AGENCY> requires programming support for several related projects in the genomic analysis field.

Specifically, <AGENCY> has ongoing needs for programming support for several microarray related projects including data management, data analysis, web-based applications and user support and training. The requirements to support the task include a broad base of system development and user support services. The provision of programming support for development and integration of Web based tools, an evaluation and integration of additional data resources pertinent to the support of microarray experiments, and the facilitation of tools for data import and export is required. In order to support the current and future user community, user support services and system training will also be required. In addition, system operations and customization will be essential in providing the necessary enhancements to the current and future user community.

# Scope

DNA microarray technology is constantly being adopted by laboratories across the<AGENCY>. This technology measures gene expression levels in cells of particular tissues, tumors, cell lines or other biological specimens. These methods have been shown to demonstrate outstanding promise in the advancement of understanding underlying biological processes and other biological phenomena; for determining the molecular profile of cancers; as a predictor for classifying disease. A critical component of this technology is the informatics tools needed to manage and analyze the 30,000 or more measurements that can be made with each microarray. Building systems to rapidly acquire data, to analyze the results of each microarray experiment, to dynamically grow a large data repository, to integrate external data resources, to rapidly present results to investigators, and to evaluate new technologies is crucial to the success of this promising approach.

The mAdb (micro Array data base) Informatics Platform for cDNA microarrays is a collaborative effort between <AGENCIES> and to support core intramural array facilities and meet the informatics, data-acquisition, statistical analysis, technical and engineering needs of intramural laboratories conducting microarray experiments including gene discovery and gene expression studies. The system currently supports over 1,200 users and contains over 50,000 array results.

The ongoing informatics project described here addresses the specific needs for gene discovery and gene expression profiling related to collecting and analyzing data from various human, mouse, bacterial and other biological tissue resources. Developing and managing this “informatics platform” will be coordinated by in collaboration with the <AGENCY>, the <AGENCY> and possibly with other <AGENCIES>. Steering committee(s) consisting of members from these working groups are established to help advise and recommend direction of the project.

The informatics platform is being developed in a modular fashion. This platform provides functionality for the multiple array formats supported by the Array core facilities and commercial platforms such as Affymetrix and NimbleGen CGH arrays. It will subsequently be enhanced and expanded to provide additional capabilities and utility to users. The advanced level will allow for fuller integration of external databases and advanced queries and analysis.

This will require assistance in the following Task Areas:

**Task Area list**

# Specific Tasks

## Task 1 ‑ Contract‑Level and Task Order (TO) Management

Subtask 1 – Contract Level Program Management

The contractor will provide the technical and functional activities at the contract level needed for program management of this Statement of Work. The contractor will provide the necessary centralized administrative, clerical, documentation and other related functions.

Subtask 2 ‑ Task Order Management

The contractor will provide a monthly status report monitoring the progress, cost, schedule, and quality assurance, as applicable to the work required in this task order.

Experience and Skills: Bioinformatics project management experience required. Requires solid knowledge of microarray concepts and experimental design. Strong background in molecular biology, cellular biology and bioinformatics highly desirable. Excellent communication skills are essential.

## Task 2 – Clinical Support, Research, and Studies

###  Subtask 1 –Platform Operations and Maintenance

#### Subtask 1 – Tool, Database and System Operations

The contractor will be responsible for mAdb tool, database, and system operations. Upgrades and backup operations required for the development and testing environments for the current system will be performed by the contractor. Due to the continued growth of the current system and its user base, development of system performance metrics will be established to allow for system evaluation. Enhancements will be evaluated and implemented as needed. It is expected that the mAdb system will integrate with 's "Single Sign-on" system. Database performance issues will be resolved by the contractor as they arise. Systematic updates of external data resources that are currently available or mirrored within the mAdb system will be performed as a part of the system operations. The contractor is expected to participate in schema development and modeling.

Experience and Skills: HTML, Javascript, CGI, Perl, Java, JDBC, DBI, Web Design, SQL, UNIX, and RDBMS. Requires DBA experience on an RDBMS; Sybase preferred. Knowledge of the mAdb database structure is preferred. Knowledge of gene annotation databases, especially Gene Ontology and NCBI databases. Knowledge of CVS (Concurrent Versions System) version control system and AFS (Andrew File System) distributed file system is desirable.

#### Subtask 2 – Microarray User Support and Training

The contractor will provide users of the system any necessary training on the current system with special emphasis on the updates and upgrades that have been added to the system. The contractor will provide sufficient system documentation, user manuals, on-line help, and/or training documents for the users to employ as references when operating the system. The contractor will create and maintain user accounts, troubleshoot data and system problems, and fix errors in entered data. It is expected that the contractor will provide demonstrations, presentations, and tutorials when necessary for new and potential users of the system.

Experience and Skills: Requires advanced teaching and presentation skills, customer/user communication skills, technical writing experience, and a solid knowledge of microarray concepts, analytical approaches to microarray data analysis and experimental design. Strong background in molecular biology, cellular biology and bioinformatics is required.

### Subtask 2 – Development, Implementation and Integration of mAdb Web Tools

#### Subtask 1 – mAdb Tool Enhancements

The contractor will provide programming support to develop and implement enhancements to the functionality of the current WEB based tool set available in the mAdb system. Improvements made to data presentation, visualizations, and computation will ultimately be implemented as the system evolves through the development process. Tasks may include, but are not limited to report generation, development of data filtering capabilities and data storage and retrieval capabilities.

Experience and Skills: Experience with HTML, Javascript, CGI, Perl, Java, JDBC, DBI, Web Design, SQL, UNIX, and RDBMS are required. Knowledge of microarray concepts and biological databases is important. Knowledge of the baseline mAdb tools is preferred. Knowledge CVS (Concurrent Versions System) version control system and of AFS (Andrew File System) distributed file system is desirable.

#### Subtask 2 – Development and Implementation of Web Tools

The task involves providing Web based access to expression and additional related data types and development of advanced tools. At a basic level of development, rudimentary SQL queries, simple statistical summaries and downloading of tabular data will be provided through Web clients. At the advanced level, complex SQL queries will be developed to handle a variety of user requirements and tools incorporating advanced statistical algorithms will be implemented. Extracting and filtering data for various analyses across arrays and comparison of results using multiple types of arrays will be provided. The need to perform analysis between not just two, but across many experiments and sets of experiments requires advanced statistical analysis. An interface from the database to statistical packages will be provided. The data analysis component of this project will interface directly to the mAdb database, and provide a standard set of tools. It will also provide for Web-based access to statistical results and for downloading of data tables in standard formats.

Experience and Skills: Experience with HTML, Javascript, CGI, Perl, Java, JDBC, DBI, Web Design, SQL, UNIX, and RDBMS are required. Knowledge of microarray concepts and biological databases is important. Knowledge of statistical concepts relative to microarrays. Familiarity with statistics packages such as Bioconductor, R or S-plus is desirable. Knowledge of the baseline mAdb tools is preferred. Knowledge of CVS (Concurrent Versions System) version control system and AFS (Andrew File System) distributed file system is desirable.

#### Subtask 3 – Integration of Web Tools with the mAdb Platform

In addition to the development of new and novel tools for the analysis of microarray data, integration of existing custom or commercial applications for analysis will be evaluated and integrated into the system upon recommendations from the steering committee(s). While the ongoing microarray project has focused on broad-based informatics support to users of the mAdb Web enabled system, additional investigators have developed other stand-alone applications for users to evaluate and analyze their microarray data. When required, the contractor will be responsible for necessary changes to the existing software in order to enable tool functionality.

Experience and Skills: HTML, Javascript, CGI, Perl, Java, JDBC, DBI, Web Design, SQL, UNIX, and RDBMS. Familiarity with Bioconductor. Knowledge of microarray concepts and biological databases is important. Knowledge of the baseline mAdb tools is preferred. Knowledge of CVS (Concurrent Versions System) version control system and AFS (Andrew File System) distributed file system is desirable.

### Subtask 3 – Evaluation and Integration of Additional Data Resources

To better interpret microarray results, integration and access to external biological knowledge is required. With the fast pace at which many of these data repositories are establishing, growing, and changing themselves, it is an immense challenge to provide a large-scale integration of all the relative data resources. An evaluation of the current and most pertinent data resources available is required to establish a focused plan for updating and establishing the integration of additional data resources. The necessary schema and mechanism must be provided to integrate and update information from such external sources/databases as they pertain to the Genes/ESTs represented on the microarray. Continual evaluation and re-evaluation of data repository attributes, over the task life, will be necessary. Examples of additional integration tasks may include the use and/or adoption of evolving data standards including ontologies to support data normalization. Also, biological pathway information associated with a feature will be useful in providing feature reporting information and biological processes.

Experience and Skills: HTML, Javascript, CGI, Perl, Java, JDBC, DBI, Web Design, SQL, UNIX, RDBMS, and data modeling experience. Knowledge of microarray concepts, publicly available biological databases and a basic understanding of molecular and cell biology is required.

### Subtask 4 – Development and Implementation of Data Import/Export tools

Programming support is required for the continued expansion of the current mAdb capabilities to import and export cDNA microarray data and experiment information to and from a relational database. Novel changes in microarray technology will also require modifications and improvements in the developmental approaches to handling various data types. In addition, users must be able to download their designated data into various formats to better enable them to generate publishable quality information and data files necessary for additional analysis. Data export protocols must be established to support public database formats such as the GEO database and potentially other commercial tool kits.

Experience and Skills: HTML, Javascript, CGI, Perl, XML, Java, JDBC, DBI, Web Design, SQL, UNIX, and RDBMS. Knowledge of commercial/off the shelf array scanning system software and commercial/off the shelf bioinformatics analysis packages are important. Knowledge of proposed microarray data exchange formats. Knowledge of CVS (Concurrent Versions System) version control system is desirable.

### Subtask 5 – Microarray System Customization and Support

### Subtask 1 – Support for XXX Project

The XXX uses cDNA microarrays to define the gene expression profiles of all types of human lymphoid malignancies. Working closely with members of the XXX project team, the contractor's responsibility is to provide the necessary bioinformatics tools required in particular support of Affymetrix technology. This task requires both in depth scientific knowledge and demonstrated computing knowledge/skills. Where appropriate, these tools will become a part of the mAdb system. This task correlates to, and, is a focused extension of Task 5.2.3, Evaluation and Integration of Additional Data Resources, specifically for the XXX Project.

Experience and Skills: Perl, Java, C/C++, SQL, UNIX, and RDBMS. Experience with microarray cDNA chip bioinformatics, Affymetrix and knowledge of molecular and cancer biology required. An advanced degree in one of the biological/genetic sciences and a computer science degree are highly desirable. A working knowledge of the Lymphoma/Leukemia Molecular Profiling Project is preferred.

#### Subtask 2 – Support of <AGENCY> Project Development Customization

<AGENCY> research focuses on the basic biology of the immune system and mechanisms of immunologic diseases. The use of microarray technology to investigate the immune system and the mechanisms of immunologic disease will be explored. The <AGENCY> core Array facility has come into production since the summer of 2001. It is anticipated that new, unique informatics requirements from the <AGENCY> project will require modifications to existing mAdb tools and potentially the development of new tools. The contractor will work closely with <AGENCY> staff to identify requirements and work with other members of the mAdb team to develop and incorporate solutions into the mAdb system. At a minimum, this will require generation of new gene reports and external links to supporting microbial databases. The contractor will also coordinate the necessary training for the <AGENCY> user community.

Experience and Skills: HTML, Javascript, CGI, Perl, Java, JDBC, DBI, Web Design, SQL, UNIX, and RDBMS. Knowledge of microarray concepts, microbiology and molecular biology is required. Knowledge of the baseline mAdb tools is preferred. DBA and data modeling skills desired. Knowledge of the baseline mAdb tools is preferred. Knowledge of CVS (Concurrent Versions System) version control system and AFS (Andrew File System) distributed file system is desirable.

#### Subtask 3 – Support of Future Microarray Projects

Other ICDs continue to express an interest in gaining access to the full mAdb system (database and analysis) or to gaining access to various mAdb analysis tools. Tasks will also include additional support of users outside of the <AGENCY> and <AGENCY>, but within the community. An addition, novel and new creative approaches to analysis and data mining techniques are already being investigated by current system users. The contractor will provide bioinformatics solutions to the upcoming microarray projects that will ensure the co-development of the mAdb system with the advancing technology.

Experience and Skills: HTML, Javascript, CGI, Perl, Java, JDBC, DBI, Web Design, SQL, UNIX, and RDBMS. Knowledge of bioinformatics and genomics and the ability to follow rapid scientific advances are critical. Knowledge of XML, artificial intelligence, data mining, data warehousing, and tissue and protein arrays are desirable. Knowledge of the baseline mAdb tools is preferred. Knowledge of microarray concepts is desirable.

# Contract Type

The contract type contemplated is CPFF.

# Place of Performance

Work will be performed at the government’s site in XXX

# Period of Performance

This contract will have a 12-month base period base period, subject to incremental funding, from XXX

# Deliverables/Delivery Schedule

The contractor shall provide two (2) copies of all deliverables for review and acceptance.

The following deliverables are anticipated:

| **SOW TASK #** | **DELIVERABLE TITLE** | **DELIVERABLE DATE** |
| --- | --- | --- |
| All | Status Report | Monthly, on 15th calendar day |
| 5.2 | Analysis Reports | As mutually agreed, upon during Subtask 5.2 |
| 5.2. | Computer Program End Item Documentation | As appropriate |
| 5.2. | Development Status Report | As mutually agreed, upon during Subtask 5.2 |
| Form 2706 | 2706 Form | Provided monthly with status report |

All work performed in regard to these tasks will be reviewed for acceptance. Acceptance will be based on completeness, accuracy, consulting performance, and review of contractor reports by the Project Officer.

# Security

## Information Technology Systems Security

## Confidential Treatment of Sensitive Information

The Contractor shall guarantee strict confidentiality of the information/data that it is provided by the Government during the performance of the task order. The Government has determined that the information/data that the Contractor will be provided during the performance of the task order is of a sensitive nature.

Disclosure of the information/data, in whole or in part, by the Contractor can only be made after the Contractor receives prior written approval from the Contracting Officer. Whenever the Contractor is uncertain with regard to the proper handling of information/data under the contract, the Contractor shall obtain a written determination from the Contracting Officer.

## Information Technology Systems Security Specifications

The contractor agrees to comply with the IT systems security and/or privacy specifications set forth herein; the Computer Security Act of 1987; Office of Management and Budget (OMB) Circular A-130, Appendix III, “Security of Federal Automated Information Systems,” and the Automated Information Systems Security Program (AISSP) Handbook, which may be found at the following websites:

The contractor further agrees to include this provision in any subcontract awarded pursuant to this task order. Failure to comply with these requirements shall constitute cause for termination.

The contractor shall be responsible for properly protecting all information used, gathered, or developed as a result of the SOW. The contractor shall establish and implement appropriate administrative, technical, and physical safeguards to ensure the security and confidentiality of sensitive Government information, data, and/or equipment.

In addition, during all activities and operations on Government premises, the contractor shall comply with, including Operational Division, rules of conduct.

# Government Furnished Equipment (GFE)/Government Furnished Information (GFI)

The Government will supply the necessary working space, computer equipment, manuals, specialized training, documentation, etc., needed to provide support under this contract.

The Government may request that the contractor acquire other hardware and software resources for the use of <AGENCY>-XXX project as part of this contract. These efforts will be instituted only upon proper modification of this contract.

# Packaging, Packing, and Shipping Instructions

The contractor shall ensure that all items are preserved, packaged, packed and marked in accordance with best commercial practices to meet the packing requirements of the carrier and to ensure safe and timely delivery at the intended destination.

# Inspection and Acceptance Criteria

Final inspection and acceptance of all work performed, reports and other deliverables will be performed at the place of delivery. The project officer will base acceptance on completeness, accuracy, consulting performance, and review of all deliverables and contractor reports.

# Accounting and Appropriation Data

Funds are available for these tasks for the base period or will become available prior to award.

# Other Pertinent Information or Special Considerations

**Minimum Skills and Experience Requirement**—Minimum skills and experience requirements are addressed within each subtask under “Experience and Skills.”

**Personnel**—Resumes are required for key personnel proposed. Resumes should contain details (length of experience, depth of experience, dates, employer), which specifically address the skills and experience contained in the Statement of Work.

**Section 508 Compliance**— Work performed under this task is subject to the requirements of Section 508 of the Rehabilitation Act. Section 508 requires that Federal agencies' electronic and information technology is accessible to people with disabilities. The Federal Acquisition Regulations (FAR) Final Rulefor Section 508 (Accessibility)can be found at: http://www.section508.gov.

# Post‑Award Administration

The performance of the contractor will be evaluated in accordance with the contractor’s adherence to the requirements stated in the SOW. At a minimum, the contractor’s performance will be evaluated on an annual basis and at task completion.

# Transition Plan