

Mississippi Enterprise for Technology (MSET)

# South Mississippi STEM Roadmap

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## ***South Mississippi STEM Roadmap***

### **1.0 Background**

Stennis Space Center (Stennis) has long been recognized as a key to the economic welfare of south Mississippi region, which comprises the South Mississippi Planning and Development District (SMPDD). Stennis is a NASA-managed “Federal City” with more than 30 government and federal contractor resident agencies and other entities focused on what can be referred to as “Hi-Tech” industry sectors. These include aerospace, rocket engine testing, oceanography, physics, modeling and mathematics, biology and ecology, environmental and laboratory science, and engineering, to name a few. In general, individuals in these careers garner higher than typical salaries, historically noted as averaging \$87,000 and including full benefit packages. In recent years, the economic impact of Stennis on the local area has been between \$600M and \$700M, with more than 75% of the positions requiring some form of post-high school training and education.\*<sup>1</sup>

As a non-profit supporting the business base at Stennis Space Center, the Mississippi Enterprise for Technology (MSET), works closely with companies in and around Stennis supporting various business development and workforce needs. This requires developing strategic partnerships with economic development organizations, workforce councils, business resources partners, and other non-technical organizations. It was increasingly apparent that the Stennis environment, and the STEM nature of this environment, is not well quantified. Nor is it connected well to other STEM efforts outside the Federal City gates. And, to further complicate this environment, STEM jobs in the area are not well understood. This study represents an effort to understand the STEM careers in southern Mississippi and the workforce development organizations that support STEM employers.

To our knowledge, this study is the first attempt to quantify the STEM workforce in the lower portion of the State, the area from which Stennis draws significantly for its employees.

There are a growing number of Hi-Tech companies in the local area that may not be associated with Stennis, but other large efforts such as Ingalls Shipbuilding, Northrop Grumman’s Ships Systems, Chevron, and companies associated with local ports and harbors. With the release of funds from the RESTORE Act, a resurgence of companies dealing with environmental concerns is also apparent.

The recent focus on boosting STEM curricula in local schools is evidence that the community at large understands the impact of STEM-related jobs in the region and this growing need. However, in recent years, college graduates looking for positions have more and more

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<sup>1</sup> NASA’s John C. Stennis Space Center Mission Brochure, 2014.



difficulty finding and obtaining STEM jobs locally. There is a possible disconnect between the expectations of these candidates and those of the prospective employers. This study helps identify local STEM employers, quantify the number of STEM jobs they have, and clarify the expectations of employers in order to communicate them to employment candidates.

## **2.0 Project Summary**

The purpose of this project was to identify and quantify the STEM (Science, Technology, Engineering and Mathematics) careers in the lower 15 counties of Mississippi, allow STEM employers to comment on various aspects of their workforce, and to identify gaps between employers needs and the existing/expected workforce. To accomplish this, data was collected from as many STEM employers in the study area as could be identified and who would respond.

The collected data sets were analyzed to create in a matrix of job categories and the training, education, and additional skills needed to successfully perform these positions. We were specifically looking for those skills outside traditional college curricula that employers are seeking in job candidates. The goal is to make this information available to those preparing for STEM careers so they will meet or exceed employer expectations. Using the data collected, a roadmap was created that identifies the requirements (education, as well as expected skills) needed to support STEM jobs in the area.

## **3.0 Goals and Objectives**

The main goal for this study was to identify and quantify the STEM jobs in the southern 15 counties of Mississippi in order to assist students (primarily in college, but also at the high school level) in preparing for STEM careers in the local area. This was accomplished by polling STEM employers to better understand what skills and background, over and above any required education or degree, they look for in job candidates. The STEM Roadmap, presented in Section 8.0 of this report, provides those details. Additionally, this information is useful to underemployed individuals looking for jobs to better use their technical skills, as well as those looking to begin a new career path.

A second part of this study included an assessment of the workforce training efforts in the study area. Information on educational and training programs currently supporting STEM sectors was used to determine where gaps in the skills of graduating students and additional skills desired of STEM employers could be bridged. Section 9.0 of this report provides those details.

STEM employment possibilities in the southern Mississippi region are not well understood, which leads to confusion on the importance of promoting STEM educational tracks in local schools, even at the high school level. For those who would like to promote STEM efforts, it



becomes difficult without supporting background data. Another goal of this study is to provide some baseline quantification of the STEM sectors and jobs within the region. Data of this sort are useful to a number of organizations well above and beyond STEM employers and job candidates, including local Chambers of Commerce, economic development organizations, realtors, workforce developers and councils, political entities, business resource providers, and others who promote the employment environment in the area. Data contained in Section 7.0 of this report provides those details.

A final goal for this project was to provide mechanisms by which those concerned with STEM jobs in the area could find information, collaborate, and better compete on larger, national and/or international procurements. Recommendations for this are given in Section 10.0 of this report.

#### **4.0 Method/Approach**

To establish the proposed roadmap, a mechanism for collecting needed data was identified. A questionnaire to be completed by each STEM employer was developed and can be found in Appendix A.

A number of methods were used to identify STEM employers in the lower Mississippi counties. These included phone directories for local concentrations of potential STEM employers, membership lists from local Chambers and industry associations, company names provided by local universities and community colleges, internet searches, and local phone books. A master list of companies, contact information, whether they were sent a questionnaire, whether we received a completed questionnaire in return (or comments received), was created. This Master List allowed us to keep track of returned questionnaires and was used to identify companies not responding to re-contact them.

Given the location of MSET at Stennis and the existing relationship with the Stennis business base, initial efforts were made to capture the STEM jobs at Stennis within federal agencies, large prime contractors, and small companies. An introductory letter explaining the project was sent to the Directors of all federal agencies onsite at Stennis, who in turn identified the person(s) with which to work. The questionnaire was sent to these individuals and interviews to obtain and discuss results were conducted.

Following data collection from federal agencies, the same process was conducted for the contractor workforce at Stennis. In general, most organizations were willing to complete the questionnaire; however, the issue of protecting company proprietary data arose.

To ensure the confidentiality of data being collected, a process was put into place that allowed a single point of data collection and removal of all identifying information prior to



questionnaire data entry into an Analysis Spreadsheet. Using this process, responses to the questionnaire were separated from any information that might identify the responding entity. Additionally, all project summary information to be distributed to potential STEM employers was updated with a clause confirming the data was protected and no individual responses would be reported. This was accounted for by removing the name and contact information from responses received and adding a unique number to each questionnaire. This unique number was recorded on the Master List, but never paired anywhere else with the company name or contact information, allowing anonymous entry into the Analysis Spreadsheet.

Data collection continued, expanding to entities outside of Stennis. In some cases, direct contact with individual organizations was possible – this resulted in the most returned responses. In other cases, contact with STEM employers was attempted through organizations STEM employers belong to, such as industry associations or manager groups. A presentation was developed to briefly explain the project and given to the following groups/at the following meetings:

- Hancock County Port & Harbor Plant Managers Association
- Industry Suppliers Association (Pascagoula, MS)
- Marine Industries Science & Technology (MIST) Cluster Small Business Forums
- MS Gulf Coast Community College's Industry Outreach meeting

When not possible to make a presentation to a group, a request was made to distribute a project summary and questionnaire to members of various support organizations. Through this, contact was made with members of the following organizations:

- Hancock County Chamber of Commerce
- Pearl River Community College (Quarterly Industry Luncheon)
- Jackson County's Economic Development Foundation
- Mississippi Gulf Coast Chamber of Commerce
- Gulf Coast Business Council

Over the course of the project, questionnaires were received, processed to ensure confidentiality of the data, and the data entered in to the Analysis Spreadsheet.

A second set of data was obtained from local community resource providers such as SMPDD, community colleges and universities, economic development groups, incubators, small business service providers, and others to determine their workforce training and development programs in support of STEM careers. These organizations assist local industry in developing their workforce through existing, as well as customized programs.



## 5.0 Summary of Information Received

MSET delivered questionnaires to 181 organizations, of which 18 indicated they had no relevant STEM jobs in the area. This results in an overall number of STEM employers in the area of 163. MSET received 73 questionnaires in return, which represents a return rate of nearly 45%. Of this, all federal agencies contacted (11 of the 73 received) provided responses to all questions. The number of private companies receiving the questionnaire was 170. Of these, 62 completed or partially completed the questionnaire and returned it to MSET.

Of the 62 questionnaires received from local companies, 43 responded to every question. By far the question with the least number of responses was Question 5, which requested composite salary information for the current STEM employees. Of those companies not completing all questions, 17 completed all but Question 5.

In all cases, any information gathered for any question was used in the analyses of the data. No information was discarded; however, the total number of responses for each question varied.

## 6.0 Assumptions

When this study began, it was assumed the data collection would be relatively simple and straightforward. However, identifying and obtaining responses from STEM employers in the study area proved more complicated and time-consuming than expected. In many cases, MSET was familiar with STEM employers in the area. Others were identified through business resource partner associations. However, a good number were also identified through web searches, which was unexpected. For the statistics noted within this document, it is assumed MSET identified all relevant (see next paragraph) STEM employers in the study area.

To help focus the study on under-observed STEM jobs, MSET elected not to include specific sectors that have already been satisfactorily quantified. These included all types of healthcare, CPAs/accounting professionals, or school district personnel. It was only near the end of the project that we added this last group (schools districts) to this list. During the last phases of our data collection, we received a completed survey from a school district within the study area. We were surprised at the number of STEM employees on their staff, but knew we did not have enough time to query any other similar organizations. We decided not to include the responses in the Analysis Spreadsheet. However, any further studies would need to include these organizations.

This study was conducted over a two-year period, with data collection lasting approximately one full year. Although the data received was not completely synoptic, it needs to be



considered such for the sake of the study. All data analysis was performed assuming the data were consistent throughout the term of the project.

Our final assumption is that the received responses adequately represented the responses that would have been received from those organizations that did not complete the questionnaire. We use this assumption to extrapolate overall totals for all STEM employers based on data received.

## **7.0 Analysis/Evaluation of Information**

Whenever possible, an objective analysis of the data received is provided in the sections below. When an objective analysis was not possible, such as in the case with non-numeric responses, as much data as reasonable is provided. A summary and recommendations based on these data can be found in Section 10.0.

**Question 1.** *My organization relies on the local talent pool to fill our STEM related jobs.*

Of those who responded, 87% stated that they agreed to some extent with this statement. Those that stated that they somewhat disagreed or disagreed with this statement (8%) indicated they were required by law to go through the USAJobs website to hire individuals, regardless of the geographic location of the candidate – these are the federal agencies responded to the questionnaire. This leaves roughly 5% of the responders indicating they did not rely on local talent for open STEM positions in their organization.

**Question 2.** *It is important for my organization to work closely with local communities for the mutual benefit of both entities.*

An overwhelming number (98%) of STEM employers indicated they were a part of the local community and worked with local organizations to identify STEM candidates and to keep the community informed of their needs. They kept connected through all sorts of organizations and business resource providers.

**Question 3.** *We work to ensure that our STEM needs are known and understood by the local communities.*

Eighty-five percent (85%) responded that they agree to strongly agree to this statement. Most STEM employers worked in some way to make sure local communities were aware of their STEM hiring needs. Most responders indicated they established specific recruiting and information dissemination methods and felt these worked well.



This leaves 15% that were neutral to negative to this statement. The mandate that federal agencies use federal websites (USAJobs) comes into play for this question as well. However, it was unclear if these agencies publicized this website locally.

**Question 4.** *We participate in local community events to ensure that STEM career opportunities and related activities are well known by the local communities.*

This was used as a follow up and a cross-check for Question 3 and, as one would expect, the results were about the same. Most STEM employers agreed that interaction with local community organizations was an important method used to disseminate information on STEM hiring needs.

**Question 4a.** *This organization belongs to the following local community organizations.*

In this question, MSET identified multiple local organizations that are involved, or can be involved, in assisting organizations with their STEM needs. Of those who responded, 33% considered themselves members of at least one community organization. 67% considered themselves members of more than one community organization. No verification of actual membership in these organizations was conducted as part of this study.

**Question 5.** *What is the annual amount in salaries for STEM professionals in your organization?*

The combined total salary amount for the 55 organizations that responded (33.7%, or approximately one third of the 163 STEM organizations we identified) to this question was \$347,017,827. If one assumes this is typical for those that did not respond, as well as those who did not return the questionnaire, an extrapolated salary total for STEM jobs in the area would be slightly more than one billion dollars. It is very clear that STEM positions make up a significant portion of the salaries in the study area.

It is interesting to note that, when receiving completed questionnaires, the Project Team uncovered some unexpected information. It was expected that the majority of STEM positions in the area would be found in Hi-Tech organizations. However, other, non-technical sectors also had STEM positions. One example is the gaming industry. Not only requiring a number of mathematics professionals, this industry employs a number of engineers and IT professionals. In addition, some local banks employed professionals with mathematics and IT backgrounds as well.

If one were able to add salaries of those sectors not included in our data (healthcare, CPA/accounting, and school district STEM employees), our overall total for STEM salaries would increase. As a result, our assessment of total salaries for STEM professionals in the study area can be considered conservative.



Using the data collected from the 55 responders giving salary information, an average salary across all STEM position types was also calculated. This average was \$95,808 per year, much higher than other previously reported averages.

**Question 6.** *What is the current breakdown of STEM positions in your organization?*

Organizations were asked to categorize the types of STEM professionals they currently had on their current staff. We identified as many as possible, but also left space for types of jobs we did not initially consider. The table below provides this distribution.

Position	No. Employees	Percentile
Scientist	964	26.5%
Technology/IT	711	20%
Engineer	1730	47.5%
Mathematics	217	6%
Total	3622	

The data from the agencies and companies responding indicate that most existing STEM employees are in the Engineer category, followed by the Scientist category. Together, these account for 74% of all STEM jobs in the study area. Another 20% of the STEM jobs are associated with the Technical/IT category, and a small percentage is associated with the Mathematics category.

**Question 7.** *How many of the following STEM professionals have you hired within the past two (2) years?*

The Project Team felt that it was important to determine if any trends were discernible from the collected data and asked some questions on recent past hiring activity, as well as expectations for future hires. The distribution of responses to the question of recently hired STEM professional is given in the table below.

Position	No. Employees	Percentile
Scientist	74	23%
Technology/IT	111	35%
Engineer	125	39%
Mathematics	10	3%
Total	320	



The data indicate that STEM professionals hired within the past two years has more focused on Engineers and Technology/IT professionals. This could be a result of ever-changing and increasingly complicated hardware and software required to operate efficiently, an increase in software (particularly applications) development, or increased cybersecurity needs.

**Question 8.** *What are your challenges or difficulties when recruiting STEM talent from out of the area?*

The Project Team asked STEM employers about difficulties experienced when hiring from outside the local area to determine if any perceptions of the south Mississippi area influenced candidate decisions, as reports of this concern have been noted. MSET developed a list of challenges based on the experience of MSET client companies in the past, but also allowed employers to insert other options. The responses to the listed challenges, as well as any others provided by responders, and the number of organizations giving each response, are presented in the list below.

Local quality of life	12
Local schools	13
Insufficient compensation package	13
Cultural issues	7
Cost of living	5
Local taxes	2
Lack of challenging work	3
Others (responder added):	
Do not recruit outside local area	8
No problem hiring from out of area	8
City not well known	2
No relocation package	2
Time and cost of arranging interviews in person	2
Bad reputation	1
Candidates not willing to move from current home town	1
Difficult to find new hires at government contractor salaries	1
Hard to find candidates who qualify for security clearance	1
Hurricane-prone geographical area	1
Lack of other employment options	1
Lack of qualified personnel for specialized positions	1
Larger cities nearby have more challenging work	1
No open positions	1
Outside hires do not tend to stay	1
Small pool of available talent	1
Websites with average salaries have higher entry salaries	1
Wind/Hail insurance	1



**Question 9.** *In the next two years what characterizes your organization best in reference to STEM Jobs?*

To further help determine if any trend exists in STEM hiring, organizations were asked what the prospects were in hiring over the next two years. The responses received are given in the following table.

Expect to:	Number	Percentile
Grow	24	41%
Remain Same	34	58%
Decline	1	1%

Ninety-nine percent (99%) of those who responded to this question expect to either maintain or grow the STEM positions within their organization. This confirms the importance of addressing the requirements of STEM employers. It must also be kept in mind that those that anticipate staying the same in overall number will also have to replace STEM professionals that leave for whatever reason. With the expected retirement of Baby Boomers at 50% of the upper-level employees and fewer numbers of Millennials entering the workforce, maintaining capacity and quality will be pressing future issues for STEM employers.<sup>2</sup>

If one takes the 59 organizations that responded to this question and, assuming they are representative of the total 163 identified STEM employers in the area, this indicates that 67 organizations will be looking for STEM employees in the next few years, with another 95 in need of retaining their employee base.

**Question 10.** *If you answered a) [Yes] to question 9, what type of STEM positions will you require?*

As the final question that will help determine hiring trends, organizations that answered positively to growing their workforce in the next two years were asked to categorize their expected requirements. Results are given in the table that follows.

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<sup>2</sup> End of the Boom: Retiring Baby Boomers and the Consequences for Your Business, 2010, <https://www.tandemhr.com/userfiles/file/Exit%20of%20Baby%20Boomers%20Affecting%20the%20Workplace.pdf>



Position	No. Employees	Percentile
Scientist	59	13.5%
Technology/IT	120	27.5%
Engineer	248	57%
Mathematics	9	2%
Total	436	

It is clear from the answers to Questions 8-10 that trends in hiring are expected remain the same as hiring in STEM categories over the past few years. Clearly, the need for Engineers and Technology/IT professional will continue.

**Question 11.** *Would you recommend any type of training, technical or otherwise, that would help better qualify the STEM candidates that apply to your organization?*

The following responses, along with the number of organizations giving that response, are presented in the list below.

Basics of engineering (electrical/mechanical/chemical/drafting)	10
Computer programming	10
Science basics	7
Network programming	6
Algebra/advanced mathematics	4
Customer service	4
Geographic Information Systems (GIS)	3
Microsoft Office basics	3
Process technology/improvement	3
Internships	2
IT Basics	2
Aerospace technology	1
Automation	1
Basics of measurement methods & equipment	1
Business for STEM organizations	1
Data analysis	1
Experience with Macintosh computers	1
Remote sensing	1
Technical writing	1

By far, the skills most needed in today’s local workplace are computer related, with programming, network support, GIS, and other related skills listed multiple times by those who responded to the questionnaire. Note that many STEM employers wanted to see IT skills in



employees holding non-IT positions, such as engineers and scientists. It was also desired that IT professionals have an understanding of basic science, engineering, or math, or a combination of these, depending on the specific work environment.

Also of note was the need for customer service skills in STEM positions. Although it was not a frequent response, recent emphasis has become a topic of discussion, especially for those STEM employees who interact with others during the course of their duties.<sup>3</sup>

**Question 12.** *What type of general work activity will your new STEM professionals be involved in?*

The following responses, along with the number of organizations giving that response, are presented in the list below.

Ocean/weather/laboratory measurement systems	13
Software engineering/programming/application development	11
Help desk support	6
Design/build/test engineering	6
Data/image processing and analysis	4
Electrical/mechanical technician	4
Network support and IT Security	4
Quality control and assurance	4
Aerospace/aircraft and unmanned systems	3
Computer/data center operation and maintenance	3
Education/training/outreach	3
Civil engineering	2
GIS programming	1
Hydrography/Bathymetry	1
IT	1
Management	1
Scientific data analysis	1

It is of interest that the top response on this list, as well as some others lower on the list, involves the maritime industry sector. Over the past year, details on Mississippi’s “Blue Economy” have emerged. The National Ocean Economics Program online database ([www.oceaneconomics.org](http://www.oceaneconomics.org)) allows one to enter coastal counties and retrieves data on maritime sector jobs and salaries using a combination of North American Industry Classification System (NAICS) codes and geography. Entering the three coastal counties in Mississippi for

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<sup>3</sup> Lucier, B., 2013. Don’t sweat for tech: Make customer service skills your first priority, Zendesk Report, <http://benlucier.com/blog/dont-sweat-for-tech-make-customer-service-skills-your-hiring-priority/>



2014, an estimate of 30,926 jobs with total salaries of \$1.1M is given. This again is considered conservative, given some sectors (federal, fishing, and gaming are three examples) are not considered within the datasets used by the program, but have a substantial impact in the area. One further study conducted by a University of Southern Mississippi Master’s class in Economic Development estimates the “Blue Economy” once truly quantified in the state, will be as much as one-third of the total economy, possibly more.<sup>4</sup>

**Question 13.** *Do you currently have any incentives for STEM professionals that would help in recruiting them to this area?*

The following responses, along with the number of organizations giving that response, are presented in the list below.

Relocation package	27
Mentor program	25
Flexible work schedule	40
Financial assistance for continuing education	48
Access to continuing education	47
Challenging work	51
Above-market salaries	24
Above-market benefits	30
Career advancement opportunities	47
Other (responder added):	
Job security	1
Family/supportive culture	1
Accelerated training for select junior employees	1

**Question 14.** *Would you be willing to share Job Postings with MSET in order to help find qualified candidates for STEM positions?*

This question was asked to determine whether companies would be willing to post local jobs through MSET to gain access to a wider population of STEM candidates. With the exception of federal agencies and in all but a few cases, the answer was yes, attesting to the increasing need to advertise widely to obtain the best candidates for STEM jobs.

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<sup>4</sup> Mississippi’s Blue Economy, 2014. [https://www.usm.edu/sites/default/files/groups/trent-lott-national-center/pdf/mississippis\\_blue\\_economy.pdf](https://www.usm.edu/sites/default/files/groups/trent-lott-national-center/pdf/mississippis_blue_economy.pdf)

## 8.0 STEM Roadmap

Using the data collected, the following roadmap is provided to give job candidates an idea of what local employers are looking for in terms of education/training and skills. For the roadmap, a variety of STEM job categories were grouped where it made sense within the data and within the jobs themselves (for example, most companies that employed mechanical engineers also employed electrical engineers). As a check, additional information was taken from [www.study.com](http://www.study.com) to verify study data were consistent with national requirements for STEM positions.

Position	Types of degree options	Additional skills desired by employers	No. of local employers
Mechanical or Electrical Engineer	BS or higher degree in relevant engineering field	<ul style="list-style-type: none"> <li>• Mechanical eng: familiarity with electronics</li> <li>• Electrical eng: familiarity with mechanics</li> <li>• Drafting/CADD software</li> <li>• Computer programming, and/or basic sciences</li> <li>• Technical writing</li> <li>• Communication skills</li> <li>• In-sector internship</li> </ul>	27
Aerospace Engineer	BS or higher degree in Aeronautics or Aerospace Engineering	<ul style="list-style-type: none"> <li>• Familiarity with both mechanics and electronics</li> <li>• Drafting/CADD software</li> <li>• Computer programming, and/or basic sciences</li> <li>• Technical writing</li> <li>• Communication skills</li> <li>• In-sector internship</li> </ul>	6
Civil Engineer	BS or higher in Civil Engineering	<ul style="list-style-type: none"> <li>• Drafting/CADD software</li> <li>• Technical writing</li> <li>• Communication skills</li> <li>• In-sector internship</li> </ul>	14
Industrial Engineer	AS is sometimes a minimal requirement, but more typically BS or higher in Industrial Engineering required	<ul style="list-style-type: none"> <li>• Drafting/CADD software</li> <li>• Technical writing</li> <li>• Communication skills</li> <li>• In-sector internship</li> </ul>	12



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Environmental or Chemical Engineer	BS or higher in Engineering or Chemical Engineering	<ul style="list-style-type: none"> <li>• Computer programming, and/or basic sciences</li> <li>• Technical writing</li> <li>• Communication skills</li> <li>• In-sector internship</li> </ul>	12
Computer Hardware Engineer	BS or higher in Engineering, Computer Engineering, or Electrical Engineering, sometimes an MS required	<ul style="list-style-type: none"> <li>• Drafting/CADD software</li> <li>• Computer programming</li> <li>• Technical writing</li> <li>• Communication skills</li> <li>• In-sector internship</li> </ul>	5
Drafter/CADD Specialist	Training in CADD packages, AS or BS degree sometimes preferred	<ul style="list-style-type: none"> <li>• Computer programming</li> <li>• Math through Algebra</li> <li>• Communication skills</li> <li>• In-sector internship</li> </ul>	15
Technician	Technical training in mechanical, electrical, or computer engineering, AS or BS degree sometimes preferred	<ul style="list-style-type: none"> <li>• Computer programming, and/or basic sciences</li> <li>• Math through Algebra</li> <li>• Communication skills</li> <li>• In-sector internship</li> </ul>	29
Oceanographer, Hydrographer, Physical Scientist, Meteorologist, Acoustician, Biologist, Chemist, Geologist	MS or PhD in relevant field, some positions at BS level	<ul style="list-style-type: none"> <li>• Computer programming, and/or basic engineering</li> <li>• Technical writing</li> <li>• Communication skills</li> </ul>	29
Remote Sensing Specialist	BS or higher degree in GIS Technology, Geomatics, Environmental Sciences, or Remote Sensing	<ul style="list-style-type: none"> <li>• Understanding of basic sciences</li> <li>• Math through Algebra</li> <li>• Computer/GIS programming</li> <li>• Technical writing</li> <li>• Communication skills</li> </ul>	4
System/Enterprise Engineer/Developer, Software Engineer/Developer	BS or MS in Computer Technology/Science, Information Technology, Computer Engineering, or Systems Engineering	<ul style="list-style-type: none"> <li>• Understanding of basic sciences</li> <li>• Math through Algebra</li> <li>• Technical writing</li> <li>• Communication skills</li> </ul>	23



Programmer, GIS Programmer, Database Specialist	BS or higher in Computer Science or GIS Technology	<ul style="list-style-type: none"> <li>• Software certifications</li> <li>• Understanding of basic sciences</li> <li>• Math through Algebra</li> <li>• Technical writing</li> <li>• Communication skills</li> </ul>	11
GIS Specialist	GIS certification, BS or higher degree in GIS Technology, Geomatics, or Environmental Sciences	<ul style="list-style-type: none"> <li>• Understanding of basic sciences</li> <li>• Math through Algebra</li> <li>• Technical writing</li> <li>• Communication skills</li> </ul>	13
Network Specialist	Training, sometimes a BS or higher degree is required in Computer Technology, Software Engineering or Network Technology	<ul style="list-style-type: none"> <li>• Network certifications</li> <li>• Computer programming, and/or basic engineering</li> <li>• Technical writing</li> <li>• Communication skills</li> </ul>	17
Website Professional	Certification and/or Training, sometimes an AS or BS is required	<ul style="list-style-type: none"> <li>• Web developer certifications</li> <li>• Graphic arts</li> <li>• Technical writing</li> <li>• Communication skills</li> </ul>	12
IT Security/System Administration	Certification and/or training, sometimes BS or higher degree required	<ul style="list-style-type: none"> <li>• Certifications</li> <li>• Computer programming, and/or basic engineering</li> <li>• Technical writing</li> <li>• Communication skills</li> </ul>	32
Help Desk Support	Training	<ul style="list-style-type: none"> <li>• Communication skills</li> <li>• Customer Service training</li> </ul>	14
Mathematician or Modeler	MS or PhD in Mathematics, some positions at BS level	<ul style="list-style-type: none"> <li>• Computer programming</li> <li>• Basic understanding of sciences (in some cases)</li> <li>• Technical writing</li> <li>• Communication skills</li> </ul>	17

AS = Associates degree, BS = Bachelors degree, MS = Masters degree, PhD = Doctorate



## **9.0 Resources and Attributes Necessary to Address STEM Development and Enhancement**

Most local employers indicated they were able to keep pace with their STEM job requirements through hiring local candidates. In our study, we identified a number of workforce training organizations and community colleges working closely with the private sector to identify STEM gaps in the workforce and to develop training programs to address these gaps. This flexibility will become even more important in future years as the economy recovers and employers return to more aggressive hiring practices. The Project Team feels the close collaboration between STEM employers and the local community is one mechanism that is keeping these training/educational organizations informed of STEM employer needs.

In some cases, community colleges worked closely with industry to create certification programs that allow STEM candidates to acquire specific skills prior to obtaining a degree. The certified individual can then directly enter the workforce or choose to continue under a degree program or progression toward advanced degrees. These stepwise opportunities often include hands-on training, something identified as desired by STEM employers to some degree in this study.

The advantage of these progressive programs to STEM candidates is they can elect to enter the workforce at any point along the progression. If one associates this with the responses concerning employee benefits, a candidate can consider entering the workforce with some hands-on skills, and then advance their position by utilizing continuing education benefits provided partially or completely by the employer.

## **10.0 Summary and Recommendations**

MSET and consulting company Professional Solutions Company International (PSCI) conducted a survey of STEM employers in the lower 15 counties of Mississippi, collecting data on past STEM hires, current staff, and expected future needs, as well as other data pertaining to recruiting and retaining STEM professionals. The following data points resulted:

- A total of 3622 STEM jobs were reported from 73 employers.
- 163 STEM employers were identified. If the reporting from the 73 STEM employers is consistent with the 90 not reporting, the number of STEM jobs exceeds 8000 in the study area.
- 55 organizations reported their cumulative STEM salaries. Salaries for those STEM jobs reported totaled \$347,017,827.
- If the reporting from the 55 STEM employers is consistent with the 108 not reporting, total salaries for STEM jobs in the study area may exceed \$1B.
- The average salary for the STEM professionals reported was nearly \$96,000.



- The Engineering category had the most STEM jobs identified in the area, with close to 50% of the total jobs reported. This category also had the highest activity in recent hires, as well as the highest expectation for new STEM jobs in the area.
- The Science category had the second highest number of jobs in the area; however, recent hiring trends and expected future positions did not reflect as strong a need.
- The Technology/IT category, although having the third highest number of existing positions, had more recent hiring activity and higher expected numbers of future jobs.
- Most STEM employers expected the need to retain their numbers of STEM employees or needed to grow their numbers in the next two years.
- Most STEM employers seek and obtain candidates from the local workforce.
- Most STEM employers work with local community groups to make their STEM needs known.
- Workforce development groups and community colleges appear to be keeping pace with the training needs of local STEM employers.

In reviewing the data points above, it is clear the STEM employment environment in lower Mississippi is much more extensive than expected or previously reported.

An unexpected observation from the data received was the number of STEM positions in non-STEM industry sectors. For example, one of the larger gaming establishments in the region responded with 143 STEM positions across all but the Scientist category. The same was true for the banking sector, non-technical local state and federal agencies, school districts, and some others. Given the prevalence of STEM jobs in these sectors, we believe our study underestimates the true number of STEM jobs in the area.

Although most STEM employers indicated they identified and hired most professionals from the local talent pool, many of those responding to our questionnaire provided information on difficulties they had attracting non-local candidates. There was a wide range of responses to the question asking about reasons for this difficulty, which ranged from perceptions about the area to company-specific reasons such as insufficient compensation package. However, other responses from employers who have no problem hiring from outside the area counter these. As a follow-on effort, it would be of interest to survey STEM workers that were recruited from non-local areas to identify any reservations they may have had before relocating to the area, and to see if those reservations have dissipated since their hire.

It was also of interest to note some of the “softer” skills that STEM employers seek in job candidates. Customer service skills ranked high on this list, with others such as technical writing and communication skills. Additionally, professionals entering specific STEM careers may be at an advantage if they obtain skills related to other related work going on within a company. For example, scientific companies that also employed programmers desired a basic



understanding of science in their programmers. These desired skills are reflected in the STEM Roadmap in Section 8.0.

One factor in not only the recruitment of STEM professionals, but retention, is an employer's benefits package. From the responses we received, most local STEM employers indicated they did not have above-market salaries, vacation/leave, or insurance benefits. However, there was a propensity of other benefits that improved the skill set of the employee as well as helped company capabilities, such as continued education and training opportunities, mentor programs, and opportunities for internal advancement.

It was clear from our overview of workforce training and local educational institutions, that STEM employers are working with those organizations and others to make their training needs known. Once identified, workforce training organizations and local community colleges are creating flexible certification programs that can lead to more formal degrees, offering a progression of education/training options.

Although this study identified some important data for the lower counties of Mississippi, over the time frame of this work, it became clear that the responses received only captured a portion of the STEM careers. Follow-on efforts to more accurately quantify this important portion of the workforce are warranted. Additionally, surveys of employment candidates, particularly those from outside the area, would assist in a more comprehensive understanding of the perceived employment environment in the area.

Discussions with organizations that assist individuals in finding employment also indicate that candidates often do not understand the STEM offerings in the area or how to easily locate companies with STEM jobs. The Project Team would like to recommend a webpage/website listing STEM employers by job category with links to Job Opportunities pages. This would make it much easier for candidates to identify multiple STEM employers for their desired position.