MINORITY SCIENCE & ENGINEERING IMPROVEMENT PROGRAM (MSEIP)

PROJECT NARRATIVE: SPECIAL GRANT PROJECT PROPOSAL

(a) Identification of Need for the Project

H. Councill Trenholm State Technical College (Trenholm*Tech*), located in Montgomery, Alabama, is an HBCU (Historically Black College) public two-year institution within the Alabama Community College System (ACCS). Trenholm*Tech* is located in south-central Alabama and serves the technical and educational needs of all or a portion of the following six counties: Autauga, Bullock, Elmore, Lowndes, Macon, and Montgomery.   Of these counties, Bullock, Lowndes, Macon, and Montgomery have historically been included in Alabama's Black Belt Region, which includes some of the poorest counties in the United States. The total population served is *approximately* 399,000 citizens, with 53% of the population African-American and 22% of the population at or below the poverty level. Within this population, 28% of the people have not earned a high school diploma and only 17% have a Bachelor' degree (http://quickfacts.census.gov/qfd/states/). These statistics indicate the need for the technical and educational services provided by Trenholm*Tech*, which is the only public two-year college in this *specific* service area and the only *publicly-funded* educational liaison between high school and four-year colleges and universities in the same service area.

Trenholm*Tech* has two Montgomery-based campuses with a total enrollment of 1,380 students (Spring 2009). Of these students, 886 (64%) are African-American (see Table 1). To serve the needs of the 1,380 students, and in particular the 886 minority students, the following college divisions offer degrees, certificates, and training for certifications: a) Business and Service, b) General Studies and Communications, c) Health Services, d) Industrial Technology, e) Manufacturing Technology, and f) Service Occupations. Within these six divisions, the

college offers 32 degree/certificate programs of study. The Department of General Education

provides an extensive set of offerings to support the various needs of each program of study.

The college employs 156 full-and-part-time faculty members, 69 full-and-part-time support

personnel and 33 administrators. The overall operating budget is approximately $18 million,

which includes Federal grants and contracts.

Table 1. Spring 2009 Student Enrollment by Race and Gender.

	Male		Female		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
Black	395	29%	491	36%	886	64%
White	298	22%	148	11%	446	32%
Other	23	2%	25	2%	48	4%
Total	716	52%	664	48%	1380	100%

The CIS Department presently has 12% (164/1380) of the total student body; only 24%

of the CIS Department enrollment is African-American female, with approximately 40%

African-American male. Within the CIS Department, an even lower percentage of African-

American female (and male) students participate in the CISCO Regional Network Academy

(CRNA) Training Program. Consequently, this data formulates the framework of the need for

this project.

Within the CIS Department, each faculty member is a qualified, credentialed, practicing

Computer Science Technologist (STEM), ranging in experience from 5 years to over 30 years.

Each member of the Department is heavily involved in professional development, collaborative

efforts with each other, the community, and the workforce. These noted efforts also include an

evaluation of the CIS Program of Study by an Advisory Committee. The expert panel involved in identifying the need for this special project were: a) Dr. Ken Scott, the CISCO instructor in the CIS Department (STEM); b) Dr. Suresh Kaushik, Dean of Development (STEM); c) Ms. Barbara Anne Spears, Dean of Academic Services (Admin); d) Dr. Kamal Hingorani, Alabama State University CIS Chair and Professor (STEM); e) Dr. Ron Lindhal, Professor of Educational Leadership, Alabama State University (HBCU Leadership); e) Mr. Tom Moffses, Director, CISCO Academy Training Center (CATC) (STEM), and f) Ms. Susan Weatherly, Area Academy Manager, CISCO Systems (Regional Admin).

An outcome of the collaborative exchanges within this panel has identified the specific need to improve the enrollment and career preparation within the CISCO Regional Network Academy (CRNA) at Trenholm*Tech*, inclusive and notwithstanding a targeted outreach and increase in minority students. Therefore, this special project proposal has two specific Science, Technology, Engineering, and Mathematics (STEM) needs-based goals:

Goal 1)   To utilize institutional and CISCO resources, with the support of the MSEIP Special Projects funding, to extensively expand the outreach to minority students as a method to inform them of and prepare them for the STEM applications within the network engineering and design community (CISCO Technologies) as a highly viable career choice; and,

Goal 2)   To update the equipment-base for students participating in the CISCO Regional Network Academy (CRNA) to improve the depth of learning materials available to students participating in the program. The update of equipment and materials includes an inherent set of science and engineering learning outcomes, including: design skills, higher-order analytical skills, engineering principles, mathematical

applications, project management, leadership, National Registered Certifications, teamwork, and many other fundamental engineering and design applications which prepare students for work in the Science, Technology, Engineering, and Mathematics (STEM) fields of study.

Within the CISCO Regional Network Academy (CRNA) Training Program, CISCO Systems offers support to the CRNA sites, which includes online materials to students. The lack of on-site current equipment and other instructional materials (e.g., software simulators) hinders the full spectrum of learning outcomes within the engineering and design aspects of the CRNA program at Trenholm*Tech*. Additionally, this proposal includes a certification component within the CRNA program. This certification program, *CISCO Certified Network Associate (CCNA)* (http://www.CISCO.com/web/learning/le3/le2/le0/le9/learning_certification_type_home.html), provides access for minority students to obtain a highly sought and valued certification within the global economy system related to network engineering and design.

(b) Plan of Operation

As an outcome of the needs assessment just described, this project—with MSEIP grant support—seeks to accomplish the following objectives within the timeframe of October 1, 2009 through September 30, 2012. These objectives will be accomplished within each goal identified in this project as noted below:

1. To bring the CISCO Regional Network Regional Academy (CRNA) Training Program Lab to industry standard by upgrades to the networking equipment, computers, peripherals, and servers to enable significant student skill development at current Network Engineering and Design standards (e.g., Institute of Electrical and Electronics Engineers (IEEE), standards of the IEEE 802.3 series, Request for Comment (RFC)

analysis, Electronics Industry Alliance/Telecommunications Industry Association (EIA/TIA) Standards, wireless systems design and applications (IEEE 802.11b,a,g,n), etc.) [Goal 2];

2. To utilize a specific course, DPT291 Case Study in Computer Science, as the capstone course to synthesize the CRNA engineering and design outcomes within a formal project management learning process to prepare students to meet the needs of the workforce by being exposed to critical analysis and reporting of a network engineering and design project [Goal 1 & Goal 2];

3. To involve community engineers and designers of networking and computer related systems to serve as Expert Panels for students to present their Case Study in Computer Science. This practice provides validity to real world preparation as network and other design engineers and has the potential to lead to employment opportunities [Goal 2];

4. To participate in National competition programs, such as SkillsUSA VICA, to provide competition related to preparing students for the world of work [Goal 1 & 2];

5. To ensure students in the CRNA program utilize the online resources provided by CISCO Systems to understand their role as engineers and designers in the global economy, as well as their valuable role as minority engineers in the context of extensive information within the CISCO global engineering and design function [Goal 1];

6. To collaborate with the previously noted 'Panel of Experts' to ensure an outreach process has been established to expand the knowledge base of opportunities in the CRNA program as a method to promote Science, Technology, Engineering, and Math (STEM) teaching and learning as a method to support the development of critical and analytical

skills of minority students. This objective is computer technology based, with a heavy peripheral emphasis in the STEM careers [Goal 1 & 2]; and,

7. To post student achievements on the CISCO Academy web site. This web site is reviewed by students and faculty all over the world, and is a valued-added incentive for minority student engagement, collaboration, and success and is a potential source of review by employers nationally and internationally.

Each project goal and objective lends guidance to the overall successful outcome of the proposal. For example, each objective is intended to promote outreach to minority students in the CISCO program with the specific outcome to prepare network engineers and designers. As the purpose of this proposed project and its goals and objectives are intended to strengthen the CIS department's CISCO academy program, the goals and objectives will ensure that the purpose of this special project proposal meets its overarching purpose: to promote minority pursuit of network engineering and design careers. To accomplish the project's purpose and to correlate the specific needs of the project in relationship to the MSEIP proposal, the project will be implemented in three phases (Phase I, Phase II, and Phase III):

a)   **Phase I (Year 1), October 1, 2009 – September 30, 2010:**

1. Purchase of CCNA bundles for the CISCO lab. To accommodate the upgrade of student network resources, two CCNA bundles will be purchased. Additionally, new computer systems, servers, support peripherals, inclusive of SmartRoom items, will also be purchased. These resources will be identified and ordered by the Project Manager, Dr. Ken Scott. Dr. Hingorani, Mr. Moffses, and Ms. Weatherly will provide guidance and consulting services. Mr. Moffses and Ms. Weatherly are available to discuss the CISCO opportunities and outcomes with state officials to ensure their understanding and

inclusion in this overall project to increase outreach and participation by minority students. These activities are included in Phases I – III, and also beyond this timeframe as noted in this proposal;

2. A CCNA certified and experienced adjunct will be hired to teach CISCO courses to allow limited release time for the Project Manager;

3. Dr. Hingorani will provide technical consulting services throughout Phase I, whereas Dr. Lindahl will provide consulting services for HBCU leadership activities within the project to improve outreach efforts and reporting activities in the service area;

4. Travel by Dr. Scott to the annual CISCO Networkers Conference and recertification preparation as needed and one CIS-related conference to support the project;

5. Twenty-one (21) stipends will be offered to CISCO networking students, with an emphasis in minority females. These stipends will serve the needs of students in the CISCO program by providing resources, lab simulators, and funds to establish an e-portfolio for participants; and,

6. End of Phase I reports will be prepared and submitted as needed within MSEIP and institutional requirements. The documentation will form the basis of creating a model, research, peer journal publications, and to present a clear application of the MSEIP support and funds.

b) **Phase II (Year 2), October 1, 2010 – September 30, 2011:**

1. Purchase of two additional and much needed CISCO bundles for the CISCO lab. These resources will be identified and ordered by the Project Manager, Dr. Ken Scott. Dr. Hingorani, Mr. Moffses, and Ms. Weatherly will provide guidance and consulting services as a continuation from Year 1, with a critical review of the project and reports;

2. An adjunct will be retained or hired to teach CISCO courses to allow limited release time for the Project Manager;

3. Dr. Hingorani will provide technical consulting services throughout the Phase II, whereas Dr. Lindahl will provide additional and review consulting services for HBCU leadership activities within the project to improve outreach efforts in the service area subsequent and supporting Phase II, with a special emphasis in evaluation of present operations within the project;

4. Travel by Dr. Scott to the annual CISCO networkers conference and recertification preparation as needed and one CIS-related conference to support the project; and,

5. Twenty-one (21) additional stipends will be offered to CISCO networking students, with an emphasis in minority females. These stipends will serve the needs of students in the CISCO program by providing resources, lab simulators, and funds to establish an e-portfolio for participants;

6. End of Phase II reports will be prepared and submitted as needed within MSEIP and institutional requirements, with revisions and supplements as needed. At this point in the project, the evaluation of Phase I and Phase II will be a significantly thorough and critical review of the outcomes of the project to this point in the overall process.

c) **Phase III (Year 3), October 1, 2011 – September 30, 2012:**

1. Purchase of the final two CCNA CISCO Lab Bundles and renewal and extension of the SmartNet maintenance agreement to cover CISCO equipment for three additional years. This coverage will ensure the equipment is viable for two additional years beyond the MSEIP grant period. Subsequent to this maintenance period, institutional funds will be used to cover the equipment on a yearly maintenance basis. This activity will be

identified and coordinated by the Project Manager, Dr. Ken Scott. Dr. Hingorani, Mr.

Moffses, and Ms. Weatherly will provide guidance and consulting services in this final

year of the MSEIP proposal. An e-conference will occur at this point to discuss the status

of the project, take any corrective actions to improve practices and operations;

2. An adjunct will be retained or hired to teach CISCO courses to allow limited release time

for the Project Manager in Phase III and beyond as it is anticipated that the CISCO

program will have increased enrollment to support the continuance of an Adjunct

instructor or possibly the hiring of a full-time employee to work in the CISCO program;

3. Dr. Hingorani will provide technical consulting services throughout the Phase III,

whereas Dr. Lindahl will provide additional and review consulting services for HBCU

leadership activities within the project to improve outreach efforts in the service area

subsequent and supporting Phase III. Dr. Lindahl will, in Phase III, provide support to

prepare an extensive report for the project, outcomes, analysis, etc., including a statistical

analysis of the data collected throughout the course of the project;

4. Travel by Dr. Scott to the annual CISCO networkers conference and recertification

preparation as needed and one CIS-related conference to support the project; and,

5. Twenty-one (21) additional stipends will be offered to CISCO networking students, with

an emphasis for minority females. These stipends will serve the needs of students in the

CISCO program by providing resources, lab simulators, and funds to establish an e-

portfolio for participants;

6. End of Phase III reports will be prepared and submitted as needed within MSEIP and

institutional requirements, with revisions and supplements as needed. This report will be

professionally bound, data-centered, and will be presentable as an online pdf document

for review by all interested parties, inclusive of a PowerPoint set for presentations to other community or technical colleges.

Each phase component, e.g., equipment, personnel, etc., will be identified and noted in the budget section of this proposal, and inclusively linked to persons responsible for that section of the budget. Generally, all technical aspects of this proposal will be addressed by Dr. Ken Scott, Dr. Kamal Hingorani, and Mr. Tom Moffses. All administrative and outreach considerations for this project will be addressed by Dr. Ken Scott, Dr. Suresh Kaushik, Ms. Barbara Anne Spears, Dr. Ron Lindhal, and Ms. Susan Weatherly. The administration of the project is included in the next section, Quality of Key Personnel.

(c) Quality of Key Personnel

Dr. Ken Scott, Senior Instructor-CIS Department/Director-CISCO Regional Academy, will serve as the Project Manager/Director. He will be responsible for implementation, management, reporting, and outcomes of the project. Included in these responsibilities will be the coordination of personnel, application of resources within and throughout the CISCO program, outreach activities within the six county service area, and compilation, dataset control, and submission of project reports. He has considerable experience in project management, both public and private and at the state and federal levels, and is the key individual for ensuring the success of the project. His salary will continue to be paid from institutional funds; however, he will devote forty percent (40%) of his time to the project (e.g., travel, systems upgrades, web design, project management, etc.), with sixty percent (60%) of his time devoted to CISCO/CIS instructional duties (Network Engineering, Open Source Systems Design, and Business/ePortfolio/eCommerce Applications). To do this will necessitate the hiring of a qualified, certified adjunct instructor to teach a part-time load of classes in the CISCO/CIS

department as noted in the budget. This part-time hire will allow Dr. Scott to devote time and

resources to promote and facilitate the unbridled success of the project to include coordination

across and between impacted areas of the CIS Department and within the college. Dr. Scott

holds the B.S.E.E.T. in Electrical Engineering, a M.Ed. in Supervision and Curriculum

Development and the Ed.D. in Educational Leadership and Technology.

The following individuals will be actively involved in the instructional or supporting

aspects of the project, noting their commitment to professional development, system upgrades,

instruction, or as otherwise noted in this proposal. Each of the individuals below will participate

in the project as noted in the Plan of Operation just discussed and these individuals hold the

following degrees and/or experiences:

1. **Dr. Ken Scott, Project Director.** Dr. Scott (BSEET, MEd, and EdD), identified as the
   Project Director/Manager, has over 30 years experience in the CIS/Computer field. He
   has been a project engineer/manager and has been responsible for various-sized projects
   with publicly and privately funded budgets at the state and federal levels of activity. As
   noted, he will devote forty-percent (40%) of his time to the project;

2. **Mr. Tom Moffses.** Tom Moffses, CIS instructor, North Florida Community College and
   Director, CISCO Academy Training Center (CATC), has over twenty years in the
   CIS/Networking field. As the CATC, he is located at the official CISCO preparation site
   where Train-the-Trainer courses are offered. He holds a BS and MS in CIS, and is a PhD
   candidate in CIS. He will be a technical resource person in this proposal. Mr. Moffses is
   committed to unlimited online support as needed; his onsite support is ad-hoc as needed
   to meet the project goals and objectives;

3. **Mr. Susan Weatherly**. Susan Weatherly, Area Academy Manager, CISCO Systems, is a resource person who will provide liaison duties with schools and colleges, state officials, curriculum designers, CISCO program students, etc., to ensure that knowledge of the CISCO program receives widest possible dissemination and outreach consideration. She has over ten years in the Management area of CISCO Systems and implementations across the Southeast service area. She has a BS and Masters degree in Business Management. Ms. Weatherly has committed to at least two on-site visits per year and as much online/phone/web support as is needed for maximization of project success: Ms. Weatherly also has access to the incentives and research conducted by CISCO Systems in the WorldWide Academy to use as critical information in reaching to minority women to facilitate maximum participation in the program, e.g., network engineering and design;

4. **Dr. Kamal Hingorani.** Dr. Hingorani, Alabama State University, will be the technical consultant in this project and also provide professional development in areas related to the project. Dr. Hingorani has the Ph.D. in Information Systems from Auburn University. Dr. Hingorani will be available as the needs of the project require and will provide at least one professional development session per Project Phase (I – III);

5. **Dr. Ron Lindahl.** Dr. Lindahl, Alabama State University, will be the HBCU Leadership consultant to support the project outcomes. He has a Ph.D. from Florida State University in Educational Planning and Management Systems. Dr. Lindahl will be available as the needs of the project require, and specifically as a consultant in reporting needs. He will provide professional support throughout the life-cycle of the project and will be instrumental in the final document that is produced to validate this project.

The hiring practices of Trenholm*Tech* include disclaimers that prohibit the discrimination of persons based on ethnicity, religion, age, etc. When the hiring of an adjunct is undertaken, the notice will include this disclaimer and will also include a notification that the college encourages the hiring of minorities, especially minority women as an incentive to locate qualified individuals to work in this exciting field of network engineering and design.

(d) Budget and Cost Effectiveness

The budget proposed covers the entirety of the thirty-six (36) months of the special project. A separate detailed budget summary sheet is provided and summarized in ED FORM 524. The following section contains the budget narrative to explain the purpose and rationale for the amounts specified in the proposed budget. All items in this proposal are at the best possible rates and discounts which are available directly from CISCO Systems, Dell Computers, and HP Printers. The goals and objectives previously identified are the key elements to drive this project to success. Notwithstanding, within the budget structure, the CISCO lab operations are precisely dependent on adequate hardware/systems resources to engage students in the structured learning processes which leads to positive network engineering and design outcomes. Each item requested in the budget directly supports each student in the CISCO program by ensuring that there is sufficient equipment and related materials to practice engineering skills development. In short, a lack of current technology in the lab severely hinders the level of skills developed relative to the network engineering market demands.

Detailed Budget Narrative

Personnel. To facilitate the release time of the Project Manager (PI) to devote forty-percent (40%) of his time to the project, the hiring of a qualified adjunct instructor is needed during the duration of the project. The cost of this adjunct instructor is within the range of earning potential

for professionals in this field of work. It is anticipated that an adjunct could be hired and retained during the project; however, at the rate proposed, locating a qualified individual should prove a viable option to support this project.

Travel. There are two primary sources of travel associated with this project. 1) Dr. Scott will need to attend the CISCO Networking Conference each year; these conferences are critical professional development activities which provide updates to the curriculum and other academy materials used at Trenholm*Tech*; 2) in order to remain current in the peripheral field of CIS, one additional conference per year is needed to enhance professional skills which support the overall outcome of the project and the CISCO lab/program operations.

Equipment. Due to a lack of equipment upgrades in the past several years, the CISCO lab has maintained a relatively low level of adequacy for supporting STEM learning in the CISCO Regional Network Academy (CRNA) program. The equipment noted in the detailed budget and ED FORM 524 establishes a critical baseline to bring the CISCO operations up to industry standard. The purpose in the CISCO Lab Bundles (6 total) is to enable sufficient equipment to be available in the lab so that students might maximize their learning experience associated with network engineering design functions, inclusive of skills building at a high level. Additionally, the computer systems, printers, servers, and SmartRoom configuration items are necessary to bring the lab to industry standard, as well.

Supplies. There are two items within the supplies section. 1) Router Simulators. These software-based items provide a methodology that enables and promotes learning at a high level of engineering design, analysis, critical-thinking, and integrated solutions outcomes. Associated with the goals and objectives of this project, it is critical that students be exposed to these types of technologies (e.g., router simulators, 'lab sims', etc.) to improve their learning,

comprehension, and application of theories and hands-on applications; 2) Other supplies are needed to support student work such as pencils, printer paper, toner, project binders, color charts, PowerPoint color handouts, posters for 'conference quality' poster presentations, and so forth.

Contractual. This project explicitly anticipates the utilization of the professional services and vast experiences of Dr. Ron Lindahl and Dr. Kamal Hingorani, professors at Alabama State University, who have given their full support of the project in a written statement. Each individual has institutional commitment and approval to participate in this project. As previously noted, these individuals will have separate roles in support of the project; however, each individual will have vital participatory roles in the outcomes of the project. Consequently, this project proposes to utilize their services under the auspices of the MSEIP special grant funding.

Other or FORM ED 524 Training Stipends. One of the major components of this proposal is the outreach to minority students, particularly minority women. To support outreach and participation, this proposal has included a student stipend of $1,200 per student who participates in the program. The stipend is directed at minority women, but is open to minority and other students in the program on a first-come, application basis (priority to minority women). The stipend includes financial support for work the student will accomplish as a participant in the CISCO program, and also includes the development and publication of a professional E-Portfolio, which will heavily emphasize STEM activities. Included in the ePortfolio will be the dissemination of the Case Study in Computer Science, which will culminate in a quality-based student outcome to indicate to potential employers the level of STEM/Network Engineering and Design work the student has accomplished. This activity will not be possible at the desired level of student professional development without the support of the training stipends. Future federal, state, and institutional funds will be sought at the completion of the MSEIP grant period to

perpetuate the Student Stipends as a method to 'reward' hard work of a professional and motivated nature with the high requirements in the network engineering and design learning process.

(e) Evaluation Plan

The evaluation processes associated with this project include various methods of assessment to improve student success outcomes and project success. In this regard, Dr. Ron Lindahl will provide professional input and evaluative strategies to ensure that any and all measures are valid, reliable, and applicable to the MSEIP special project, the institution, community college practices, and students. The evaluation procedures will track with the three Phases of the project. This process is described below:

Phase I - III Assessment Plan. For all Phases of the project, students participating in the CISCO program will be required to take a Network Engineering and Design Pre-Test. These scores are not used as a determinant of attendance or participation; these Pre-tests measure current levels of knowledge. At the end of a student's tenure in the CISCO program, they will be given a Post-test to measure variances in scores. The purpose in the Pre-test/Post-test is to validate changes in the learning of those students exposed to network engineering and design instruction and teamwork. The Pre-test/Post-test element is directly correlated to the MSEIP special project support which provides equipment, stipends, and human resources (e.g., Dr. Hingorani, Dr. Lindahl, etc.). A suggested assessment outcome would be that because of the difference made by the MSEIP support, students have better equipment, services, and resources to enhance their level of learning in the STEM activities associated with this project.

A second assessment component is to survey high school students in the service area to determine what specific factors might lend themselves to increasing minority participation in STEM careers. This assessment is peripheral to the outreach efforts as part of the project;

A third assessment is to manage the project in three stages per year. For example, at the end of each semester of the project, an assessment to evaluate the success of the present semester activities will be undertaken. This assessment practice will produce twelve reports indicating areas of success, needed improvements, restructuring practices, enhancing outreach activities, and a feedback loop to ensure the project remains on a time-line of progress throughout the tenure of the project.

A fourth and final assessment (less any ad hoc requirements) is to request once per year a meeting with Dr. Hingorani and Dr. Lindahl to assess the data, reports, and outcomes to provide guidance and input to promote maximum success of the project. This activity includes the review of all items and documentation by Dr. Hingorani and Dr. Lindahl to validate the direction of the project and the expected and intended outcomes.

All project assessments will be stored within the control of the Project Director. Upon the completion of this project, all documentation will be compiled into an institutional report for review by MSEIP individuals and appropriate college personnel, as previously indicated.

(f) Adequacy of Resources

Institutional resources in the CISCO Lab, at present, are correlated as minimal to standards set in the Network Engineering and Design Area. For this proposal, the MSEIP special grant funds will provide upgrades to the lab equipment, inclusive of: routers, switches, computers and monitors, overhead projector and screen, servers, and printers. To meet the objectives of this proposal, the updates noted in the budget are needed to bring the CISCO Lab to

industry standard. Additionally, those supplies noted in this grant include basic items of printing

of student projects, e.g., paper, toner for printers, student materials needed to support their

learning, mechanical pencils, etc.

Let it be noted that these resources, provided by the MSEIP funds, will provide

substantial learning resources and equipment to conduct the project at full throttle in enabling

students to become network engineers and designers, as well as become avid and technically

savvy connoisseurs of STEM knowledge and applications. It is a longitudinal observation that

even the most motivated student can only achieve at the level of learning materials provided;

nowhere is this more critical than when STEM practitioners are in the learning and design

processes. The MSEIP funding is a most critical component of this proposal.

(g) Potential Institutional Impact of the Project

The potential impact of this special project is extended throughout the institution,

particularly the Computer Information Systems Department. While this project focuses on

Network Engineering and Design skills and applications, the project is far-reaching due to its

coverage of STEM careers, the technologies used, the learning achieved, and the expansion of a

student's view of Science, Technology, Engineering and Mathematics opportunities for those

who pursue these career fields.

While this project is within the confines of a CISCO program, the outcome of this project

will establish a methodology within the institution on the enhancement of reaching minorities in

STEM careers, and specifically on reaching minority women in these technical fields. In other

words, this project will inherently develop a method to reach out to minority women and bring

them into an understanding of STEM careers, the impact on their lives and the lives of their

families, and the overall impact of these careers on the national and global economy. As a side

note, this data will be collected as part of the overall report to create a dataset which addresses these issues.

(h) Institutional Commitment to the Project

H. Councill Trenholm State Technical College, within the auspices of the President, is highly committed to the proposal herein. There are two areas of institutional commitment:

1) Current Project Life-Cycle: the college will provide resources and facilities to support the project; the Dean of Development and Dean of Academic Services will provide time and resources to support the on-going activities during the project time-line; institutional services will be provided during the project, inclusive of outreach, enrollment management, student services, and academic preparation and support; and, the institution will provide tutoring and learning resources for individuals to significantly enhance their individual and collective success as network engineering and design employees of the future—this is inclusive of every single person participating in this project;

2. End-of-Project-Life-Cycle Continuation. Subsequent to the official conclusion of the project, the institution will continue to support the practices and methods developed during the project. It is expected that this will include: a) a value-added methodology to establish and maintain an outreach strategy to increase minority women engagement in STEM careers, in general, and in specific STEM educational programs at Trenholm*Tech* for careers in STEM fields. It is expected that this project will initiate self-sufficiency by increased enrollments, community and business financial support, and with institutional funding. The major component of the institution is a plan of systemic upgrades to equipment and materials to keep pace with Network Engineering and Design standards,

which in turn, perpetuates the life-cycle established in the successful activities and

outcomes of this project.

(i) Expected Outcomes

There are seven expected outcomes from the successful development and outcomes of

this project:

1) To increase the participation of minority students in the CISCO Network Engineering and
   Design program course offerings, with the intent to specifically increase minority women
   in the CISCO program by twenty-five percent (33%) each year during the project, with
   the overall goal to increase minority women in the CISCO program by 100% in three
   years;

2) To initiate an improved user knowledge-base in high schools in the service area of
   Trenholm*Tech* specific to STEM careers, the purpose of STEM in society and the
   national and global economy, and how to research and pursue STEM careers;

3) To establish a model for which other HBCU two-year colleges might emulate in outreach
   and inclusion of minorities in STEM careers;

4) To collect data as a method to validate the value of MSEIP support in STEM-based
   programs;

5) To provide MSEIP-funded resources to students (e.g., equipment, etc.) as a fundamental
   tenet of student success, with the specific outcome of verifiable ePortfolios which are
   professional, STEM-based, and viable/current 'search-tools' for employment;

6) To use the revised CISCO program, in conjunction with the MSEIP support, as a
   community resource to improve the collaborative relationships between Trenholm*Tech*
   and the businesses in the service area; and,

7) To publish the results in peer-reviewed journals as a method to inform other two-year colleges of these methods to achieve student success in STEM related programs.

(j) Scientific & Educational Value of the Proposed Project

This project, based on the proven networking system within the CISCO Network Academy program worldwide, will provide opportunities for minority women (and men) in the Network Engineering and Design area of practice. The relationship of this proposal to the STEM-based careers is as follows:

1. The project will promote network engineering and design by an active, hands-on set of practices in the lab and outside the lab, e.g., a set of technology tested materials via http://cisco.netacad.net.   The contribution to education for students and in particular, minority women, is that this type of educational process supports the understanding of engineering in general, and networking specifically. This type of learning is geared to the science of networking in terms of how materials work, the fundamental tenets of electronics, natural laws, and design engineering principles;

2. The project will use comparative and analytical methods to ensure the student or learner benefits from the relationship of systems design and mathematical relationships. For example, number systems are used as a basic function to relate how engineering systems conduct or carry packets through a system as an outcome of "systems-level" decisions;

3. The project will provide skills development which requires learners to work as a member of a functional design team. The value of this activity is the noted workforce requirement that individuals are able to work in teams to accomplish STEM-based projects; and,

5. This project will form the basis of a model which students can access as a learning methodology. Stated differently, within the techniques, instructional methods, and

outreach endeavors, students participating in this type of program will form life-long personal methods to investigate problems from the standpoint of analysis, synthesis, and viable outcomes to enhance society's needs for Scientists, Technologists, Engineers, and Mathematicians. The truly value-added benefit of this proposal is that a thread of development within this project is to ensure that learners understand that there are levels of function among and between Scientists, Technologists, Engineers, and Mathematicians, and further, that to become one of these "individuals", does not mean that theoretical constructs are the only approach. This project is founded on the applications side of this issue, so that students better understand that a viable career in Science, Technology, Engineering or Mathematics is doable if a project of this type is open to minority women, men, and students in general. One final note: this project includes elements of character and leadership building as a prima facie aspect of a future generation of Scientists, Technologists, Engineers, and Mathematicians.

Thank You,

Dr. Ken Scott, Prospective Project Manager