Transforming the Climate and Advancing STEM Women at JSU, an HBCU in the South (*JSUAdvance*)

Project Description

1. Introduction

Jackson State University (JSU), a Historically Black College and University (HBCU) and the major university in the urban center of the state of Mississippi, is committed to establishing diversity, and has been quite successful in terms of racial or ethnic diversity. However, a much more complex issue to address is gender diversity and the resulting inequities. This issue, particularly as it relates to women faculty, has been frequently ignored on the campuses of HBCUs (Geiger, 2006).

Although women have a definite presence on the campuses of HBCUs, women faculty with backgrounds in the Science, Technology, Engineering and Mathematics (STEM) disciplines are disproportionately over-represented in lower faculty ranks and instructor positions, and are notably less visible in lower, middle, and upper administration levels (Geiger, 2006). This is also true at JSU. JSU, thus, mirrors the realities in many historically black settings, as race is considered the more pressing concern, while the plight of women receives far less attention and calls for action. As a result, there is limited research nationwide regarding the intersection of gender and race, and especially at academic institutions similar to JSU, in historically Black settings.

There is an underlying theme which runs through all the gender challenges at JSU and that is an issue of exclusion, especially in the male dominated STEM disciplines. A planned culture of inclusion will help transform the university community through education, sensitization and exposure to the advantages of embracing bias-free polices, procedures, and operations. Many STEM female faculty members do not progress through the ranks, as they are not automatically included in the informal mentoring, training and exposure that occurs naturally with most of their male colleagues. The environment at JSU, like so many ADVANCE Institutions, is ideal for a challenging but rewarding institutional transformation.

The overall emphasis of the *JSUAdvance* program is the advancement of women. *JSUAdvance* will enhance the overall work climate at JSU not only for women in the STEM disciplines, but also for women in the Social, Behavioral and Economic Sciences (SBS), as well as informing and transforming the larger academic community about issues that are relevant to women at HBCUs.

Our Goals are to:

1. Advance the careers of all women faculty in the STEM and SBS disciplines by reinforcing their career and professional development at JSU in order to increase the number of tenured women at the Associate and Full Professor ranks and in administration at JSU with STEM-SBS backgrounds.
2. Develop and support a network of research and career mentors for women faculty in the STEM-SBS disciplines at JSU.
3. Foster and sustain a climate and culture which seeks the inclusion of all faculty regardless of gender, race, and other target characteristics at the university and in the department.
4. Establish a proactive disposition regarding the assessment of university policies, procedures, and practices, which supports all aspects of diversity and ensures the greatest contributions from all members of the JSU community.

2. Institutional Context and Data

2.1 Institutional Profile

Overall Jackson State University (JSU) has been recognized for its success, as it has grown from the teacher's college it was for Blacks who could not attend many other universities in the south, to a recognized urban university. The *Washington Monthly's* 2009 national university college rankings rate JSU 22nd out of 258 national universities and 2nd among HBCUs. The *Washington Monthly* rates schools based on their contribution to the public good in three broad categories: social mobility (recruiting and graduating low-income students), research (producing cutting-edge scholarship and PhDs), and service (encouraging students to give something back to their country). http://www.washingtonmonthly.com/college_guide/rankings/

Jackson State University is a historically Black, coeducational, research intensive, public institution of higher learning that has been designated by the Mississippi Board of Trustees of the Institutions of Higher Learning as the Urban Institution of Mississippi. JSU's mission focuses on encouraging a community of learners, where teaching, research, and service are central to a total learning environment. The University maintains a commitment to serve students from diverse academic, social, economic, ethnic and geographic backgrounds. The University also utilizes its resources to enhance the surrounding urban community. It seeks to develop responsible leaders who are capable and willing to seek solutions to human, social and technological problems, especially relevant to the metropolitan and urban areas of the state, the nation and the world.

JSU Fall 2008 Enrollment		
All Students	8,376	100%
Full-Time	6,291	75%
Part-Time	2,086	25%
Total Undergraduate	6,551	78.2%
Total Graduate	1,825	21.8%
Women	5,418	64.7%
Men	2,958	35.3%
African American	7,810	93.2%
Caucasian	498	5.9%
Hispanic	29	0.3%
Asian/Oriental	32	0.4%
Native American	7	0.1%
Mississippi Residents	7,097	84%
Out-of-State Residents	1,169	14%
International Residents	110	1.2%

Jackson State University (JSU) is located in Jackson, which is the largest metropolitan area in Mississippi and has a high African-American population density. JSU is the seventh largest among the nation's 117 Historically Black Colleges and Universities (HBCUs), supported by the State of Mississippi, governed by the Institutions of Higher Learning (IHL) and is the fourth largest institution among Mississippi's IHL institutions. Accredited by the Southern Association of Colleges and Schools (SACS), JSU offers forty one (41) bachelor's degree programs, forty (40) master's degree programs, and eleven (11) doctoral programs to more than 8,000 students. The university has 354 full-time scholarly faculty (191 male and 163 female) and 119 part-time faculty (57 male and 62 female). Sixty-nine (69) are instructors/lecturers (27 males and 42 females).

Designated by the Carnegie Foundation as a Research University with High Research Activity (RU/H), JSU has amassed over $350 million in external funding for research and education during the last decade. A significant amount of these external funds have assisted the university in developing a national and international reputation and an adequate infrastructure to strengthen research capabilities for university researchers, faculty members, graduate and undergraduate students.

The university has formed collaborative partnerships with national and international scientific organizations and universities for STEM-SBS programs in computational sciences. Academic faculty members are afforded opportunities for conducting research under science noble laureates; joint publications; joint presentations at international, national and regional conferences; joint teaching assignments; social networking and mentoring. In addition, more than twenty-five Centers of Excellence and Institutes, including those for STEM-SBS disciplines and interdisciplinary research, teaching and publishing activities, have been established. Further, the College of Science Engineering and Technology (CSET) has established a number of STEM-SBS collaborations with doctoral research Universities including Pennsylvania State University; University of California System Universities; University of Southern California; University of Colorado; Georgia Institute of Technology; Indiana University; University of Michigan; University of Nebraska, Lincoln; University of Massachusetts and other large HBCU's including Howard University, North Carolina A&T University, Prairie View A&M University, and Southern University.

CSET is one of six colleges in the university. CSET consists of two Schools, the School of Science and Technology and the School of Engineering. The School of Science and Technology is composed of six departments: Aerospace Studies, Biology, Chemistry, Mathematics, Physics (which also houses Atmospheric and Science Education Programs), and Technology. The School of Engineering is composed of four departments: Civil and Environmental Engineering; Computer Engineering; Computer Science; and the Graduate Engineering Program. The School of Social and Behavioral Sciences is located within the College of Liberal Arts, and supports programs in Political Science, Psychology, and Sociology. Several Centers within this college supports the University's historical and urban mission. Faculty members are actively involved in the Mississippi Consortium for International Development projects that focus on civic education in the West Bank, Morocco and Lebanon.

2.2 Institutional Data

Tables 1 and 2 present institutional data on the representation of female faculty and students at JSU.

Table 1. Number of Female Faculty by Rank in STEM and SBS Departments

Department	Male				Female				Overall	%
Or Program	Asst.	Assoc.	Full	Total	Asst.	Assoc.	Full	Total	Total	Female
Computer Science	6	3	0	9	1	1	1	3	12	25%
Computer Engineering	5	3	1	9	0	0	0	0	9	0%
Civil Engineering	5	0	1	6	0	0	1	1	7	14%
School of Engineering	16	6	2	24	1	1	2	4	28	14%
Biology	4	2	3	9	3	3	1	7	16	44%
Chemistry	4	3	8	15	2	1	0	3	18	17%
Mathematics	6	0	4	10	1	1	0	2	12	17%
Physics	6	1	0	7	0	0	1	1	8	13%
Technology	0	2	2	4	1	0	0	1	5	20%
School of S&T	20	8	17	45	7	5	2	14	59	24%
CSET	36	14	19	69	8	6	4	18	87	21%
Economics	1	3	2	6	0	1	1	2	8	25%
Political Science	2	1	1	4	0	1	1	2	6	33%
Psychology	3	1	2	6	3	3	0	6	12	50%
Sociology	1	1	1	3	1	2	1	4	7	57%

Table 2. Percentages of Female Students versus Female Faculty in STEM and SBS Departments

Department or Program	Male	Female	Total	% Female Students	% Female Faculty
Computer Science	119	59	178	33.15%	25%
Computer Engineering	141	40	181	22.10%	0%
Civil and Environmental Engineering	66	15	81	18.52%	14%
Engineering, MS	19	4	23	17.39%	
Total School of Engineering	345	118	463	25.49%	14%
Biology	230	615	845	72.78%	44%
Chemistry	52	105	157	66.88%	17%
Mathematics	34	38	72	52.78%	17%
Physics	29	19	48	39.58%	13%
Technology	118	51	169	30.18%	20%
Total School of Science and Technology	463	828	1291	64.14%	24%
Total, College of Science, Engineering and Technology	808	946	1754	53.93%	21%
Economics	16	13	29	44.83%	25%
Political Science	60	104	164	63.41%	33%
Psychology	76	234	310	75.48%	50%
Sociology	43	106	149	71.14%	57%
Total, Social and Behavioral Science Departments	367	679	1046	64.91%	48%
Total, University	2958	5418	8376	64.68%	46%

2.3 Barriers at JSU

Underrepresentation of Female Faculty Members in the Majority of STEM-SBS Departments: As Table 1 reveals, in CSET at the Assistant Professor level, 82% are males and 18% are females. At the Associate Professor level, 70% are males and 30% are females. At the Full Professor level, 83% are males and 17% are females. Within CSET, 79% of the faculty positions are held by males while only 21% are held by females. However, the total female student population within CSET is 59.3% as shown in Table 2. The Departments of Economics and Political Science have female faculty representations of 25% and 33%, respectively. Representation within the Departments of Psychology and Sociology are at 50% and 57% for female faculty, respectively. Within CSET only 1 of the eight Department Chairs are female, and there are no females among CSET's Associate Deans and Dean.

Challenges Faced by STEM-SBS Women Which Impact Advancement: Administrators from JSU's Executive Ph.D. Program (EPhD)/Jake Ayers Institute for Research (JAIR) in Urban Higher Education and the JSU's College of Science Engineering and Technology, along with the Center for Studies in Higher Education, University of California Berkeley met in early spring of 2005 to assess the need to prepare senior level administrators to support advancing the status of diverse women in Science, Technology, Engineering and Mathematics (STEM). This initiative was derived from the longstanding reports that women of color are significantly underrepresented in STEM-SBS disciplines. JSU women of color in STEM-SBS disciplines were identified and interviews were conducted to discuss these issues. This effort led to several annual meetings of STEM-SBS women faculty and the 2006 and 2008 conferences entitled *Advancing the Status of Diverse Women in Science, Technology, Engineering and Mathematics (STEM) Conference*. Out

of the meetings and conferences, a number of challenges which must be addressed in order to eliminate the barriers which STEM women at JSU, and other HBCUs, face were identified. These include the need 1) to create summer development programs and experiences for female STEM-SBS faculty; 2) to identify supplemental start-up funding, mentors, laboratory space and research supplies, travel and conference funds for female STEM faculty; 3) to organize women faculty in settings and identify mentors to assist STEM faculty with gaining empowerment; 4) to facilitate the progress of women in leadership roles, in STEM disciplines; 5) to create opportunities for women faculty to participate in external engagements with business, governmental agencies, external advisory boards, as well as international travel; 6) to facilitate the progress of women through the promotion and tenure process; 7) to ensure and promote equitable assignment, evaluation, and promotion of women by the university; 8) to educate and increase awareness of pertinent issues faced by women in STEM; and 9) to recognize and promote accomplishments and achievements of women in STEM.

Policies, Practices, and Procedures which impact Advancement: The underrepresentation of women in science and engineering is well-documented. The data indicate that the underrepresentation of women in STEM-SBS has social and cultural components as opposed to innate differences in ability. Therefore, policies that affect the social and cultural barriers experienced by some minority women in STEM-SBS disciplines can have a positive impact on workforce diversity. Jackson State University's Faculty Personnel Policies and Procedures were reviewed for items that may adversely affect the recruitment, retention, and advancement of women in STEM-SBS disciplines with a particular emphasis on women of color.

Faculty hiring processes and practices at JSU are similar to other colleges and universities in that a search procedure is initiated by the Chairperson of the department as authorized by the appropriate Dean and Vice-President of Academic Affairs. The Search Committee is established by the departmental faculty who develops a job description and recruitment plan for the vacant position to meet the needs of the department. However, there are no specific guidelines or best practices relative to the recruitment of women faculty and administrators. In addition, JSU does not have an Equal Employment Opportunity Officer.

Once hired, there is no formal plan or best practices for the retention and advancement of female (or male) faculty in STEM-SBS disciplines at JSU. Faculty performance for Tenure and Promotion to Associate Professor consideration is assessed in the areas of 1) Professional Collegiality; 2) Academic Citizenship and University Service; 3) Teaching and Advising Excellence; 4) Research, Scholarly, and Creative Activities; and 5) Service and Professional Activities. There is a strong focus on research, publication, and grantmanship activities. Similarly, for promotion to the rank of Full Professor, the candidate must present evidence of his/her contributions to improving the quality of instructional programs in his/her academic area, a strong, continuing record of productive research, publication, grantsmanship (record must be outstanding in both quantity and quality), and evidence of a continuing record or responsible, academic citizenship., and service. However, the "weight" of the various criteria for tenure and promotion are not transparent from the guidelines and seems to vary within the institution. *There are no provisions for stopping the tenure clock.* Therefore, there is a need for JSU to develop and integrate best practices into the evaluation process for tenure and promotion at all levels within the institution.

The amount of time allocated to teaching versus research can affect the tenure and promotion of faculty in CSET. The faculty work-load at JSU requires a minimum of 30 hours per week to fulfill obligations for teaching, research, and university service. The current full-time equivalency (FTE) at JSU is twelve hours undergraduate or nine hours graduate teaching per

semester combined with other duties required by good academic citizenship. However, negotiations between the Chairperson and faculty member can result in replacing part of the teaching component of one FTE by time assigned to research or other activities which contribute to the mission of the university. The negotiation process for reducing the teaching component is not transparent and it is unclear whether women in CSET have a higher teaching load relative to men as a result of this policy and how the teaching load affects tenure and promotion attainment.

2.4 Evidence of Progress at JSU

JSU has made some progress in identifying challenges which exist for female STEM faculty members. Both progress and barriers were noted when The Jake Ayers Institute for Research in Urban Higher Education initiated a collaborative effort with diverse women in Science, Technology, Engineering and Mathematics (STEM) at JSU in May of 2006. The Jake Ayers Institute for Research (JAIR) in Urban Higher Education serves as the research arm for the Executive PhD (EPhD) in Urban Higher Education. The formation of Advancing the Status of Diverse Women in STEM (ADWiS) was designed with the primary goal to develop on-going dialogue and exchange with women in STEM disciplines at JSU, relative to their accomplishments, opportunities, challenges and best practices. ADWiS accepted the challenge to address issues that are plaguing our respective communities in this state and forged an Alliance with Alcorn State University and Mississippi Valley State University, also HBCUs. Ongoing conferences were hosted to support the advancement of women of color in STEM, regionally and nationally, especially at HBCUs; and to address research related to issues and challenges for diverse women in the STEM disciplines, especially those faculty who were displaced as a result of Hurricane Katrina.

This beginning work and focus group meetings held over recent years have helped identify a number of challenges for JSU that will be addressed in the activities of *JSUAdvance*. JSU is uniquely situated to serve as a model for the progress of women at HBCUs as the need for the work has been identified here. Despite the progress made and the leadership role that JSU has taken, some challenges remain, and they are the focus of our *JSUAdvance* program. Completing the work will help JSU and other HBCUs to live up to their full mission of being an inclusive place for the underrepresented. African Americans make up approximately fifty percent of the population for the State of Mississippi; JSU can serve as a model of how to effectively address lingering gender problems.

3. Goals, Objectives and Strategies

The overall goal of the ADVANCE program at JSU will be to enhance the overall work climate for women faculty of color in the Science, Technology, Engineering and Mathematics (STEM) disciplines, and the Social, Behavioral, and Economic Sciences (SBS) disciplines while informing the larger academic community about issues that are relevant to women of color at HBCUs. It is expected that an overall transformation of the institution will take place.

Objectives:

1. Accumulate relevant data that explore the unique workplace dynamics that are faced by women faculty, and especially those of color, at HBCUs with a particular focus on their relationships with male colleagues and administrators.
2. Collect and analyze data that help to identify work-related challenges (e.g., climate and salary equity) within departments and JSU that impact the under-representation of women.

3. Increase the retention of women STEM-SBS faculty and support their promotion into Associate and Full Professor ranks at JSU.
4. Increase the visibility of JSU STEM-SBS women both nationally and internationally.
5. Increase access and opportunities of JSU STEM-SBS women to leadership positions.
6. Review, modify, and establish institutional policies, procedures, and/or practices in order to sustain the advancement of female STEM-SBS faculty at JSU.

Strategies include:

1. Establish research, career, and tenure and promotion mentoring relationships specifically designed for STEM-SBS junior women faculty.
2. Establish Summer Writing Retreat and Academic Year Follow-Up for STEM-SBS women faculty and administrators at all ranks to support their scholarly development.
3. Establish visibility mentoring relationships specifically designed for JSU STEM-SBS senior women to support them in obtaining more visibility for their established work.
4. Establish leadership mentoring relationships, specifically designed for STEM-SBS women who are administrators seeking to advance into upper administration, or who are faculty seeking to advance into administration at all levels.
5. Establish focus groups and other mechanisms to transform the informal culture with bias education policy, to educate and to mitigate bias by exploring issues which impact the retention and promotion of STEM-SBS female faculty on the campus.

4. Conceptual Framework

Institutional theory provides a basis for how women faculty have been traditionally absent from leadership positions in the academy. Institutional theory offers one explanation of how organizations legitimize themselves by acquiring similar characteristics and converging on similar mechanisms to operate within an industry (Zucker, 1987, Oliver, 1992). Universities often maintain a lack of women administrators because other respected and legitimate organizations have had similar levels of women leadership. However, part of the institutional theory is the concept of deinstitutionalization (Oliver, 1992). In order to implement and maintain significant changes to legitimized structures, three types of pressures are utilized: functional, political, and/or social. Social pressure can be very instrumental for the success of this project. Social pressure at the university level may be experienced by university administrators who begin to feel external social pressure to ensure that majors and faculty more closely mirror each other (Dacin, Goldstein, & Scott, 2002). As more women faculty begin to fill positions traditionally held by males, university decisions are likely to reflect more favorable decisions for women. Issues that are often ignored such as changes to the tenure clock and work/family balance issues will be considered because the discussion includes the voices of women. Recent data indicate women students are becoming a higher percentage of majors in the STEM-SBS fields; however, the percentage of women faculty is drastically below the increases seen in student enrollment. Students may begin to find this reality troubling and question the legitimacy of the institution for maintaining such a practice (Dacin et al., 2002). Research also indicates that when a university does not demonstrate a value for diversity in faculty and administrators, there may be unintended consequences on the perceived value a student has for his or her education (Bernard Hodes Group, 2008).

Research in formal mentoring systems demonstrates its usefulness in promoting organizational change (Dreher & Ash, 1990; Dreher & Cox, 1996; Murrell et al., 2008). While informal mentoring has also been demonstrated to have relevance for women advancing into upper management positions (Murrell et al, 2008; Ragins & Cotton, 1999), organizations attempting structural change may benefit from formalized mentoring systems. The *JSUAdvance* project will

provide external mentors for female STEM-SBS faculty. In addition, social networking theory emphasizes the importance of visibility for women faculty and administrators as they advance their careers in the discipline. Visibility can improve the participant's social networks, which impacts a person's career potential. Furthermore, a study of social networks found that diversity of managerial networks is instrumental in the careers of people from underrepresented groups (Ibarra, 1995). Universities where few women faculty/administrators exist, can benefit from the knowledge that opportunities to network with people in critical management levels are important for career development.

4.1 Components

JSUAdvance Fellows will be the designation given to all faculty, male and female, who participate in the programs of the *JSUAdvance* project. *JSUAdvance* proposes a 6-component program: (1) a mentoring program for junior faculty women; (2) summer writing retreats, with academic year follow-ups; (3) a visibility plan that highlights the work and accomplishments of senior faculty women; (4) a leadership component for female faculty; (5) bias prevention training; and (6) the development and implementation of bias-free policies and procedures.

4.1.1 Faculty Mentoring Component

A mentoring program will be established to support tenure and promotion of STEM-SBS junior women. Senior faculty will help identify criteria for success and address strategies for advancement. This mentoring component will become a model for university wide application to assure success of all faculty, regardless of race or gender.

Based on statistics, STEM-SBS areas are often male-dominated; therefore mentoring and networking opportunities often do not address how to advance careers of women and minorities. Focus groups of the STEM-SBS female faculty members suggested a definite need for more mentoring for female faculty in these disciplines. Some men may unconsciously believe that STEM-SBS disciplines are inappropriate for women. Consequently, female STEM-SBS faculty may be left without essential support to advance through the academic process, since there are fewer women in STEM-SBS discipline.

JSUAdvance will establish both external mentors and internal mentors for junior faculty in STEM-SBS. Women faculty will be paired with an external mentor in her discipline from another institution. This *JSUAdvance* mentor will help the faculty member in establishing a research agenda and will help guide the faculty member through the process necessary for advancement, such as research, publishing, networking, collaborating, and presenting at related conferences. Interactive workshops will be designed to assist female STEM-SBS faculty with tenure and promotion. Workshops will include topics, such as: developing the dossier; building a curriculum vitae; time management; addressing expectations from Assistant Professor to Associate Professor; addressing expectations from Associate Professor to Full Professor; developing a personal research niche; and promoting one's work.

4.1.2 Summer Writing Retreats

The Summer Writing Retreat will provide a means of supporting the research career of STEM-SBS female faculty by providing a circle of faculty who focus on completing either a refereed paper or proposal during the summer. The goal is to redefine the role of female faculty in STEM-SBS by strengthening their research and writing knowledge. Ultimately, this component can be used to support all pre-tenure faculty, as part of the university's promotion/tenure review process.

JSUAdvance will conduct summer writing workshops for female faculty. One week in residence will be held at a retreat center at the beginning of the summer, and another week at the end of the summer. Participating faculty will have all expenses paid and will receive a summer stipend. The stipend will provide the necessary financial support to replace lost salary, as these fellows will agree not to teach in summer school or to be otherwise employed during the summer months.

The workshops will focus on proposal writing skills and publication of results in order for faculty to progress through Tenure, promotion to Associate Professor, and promotion to Full Professor. Each week will include informative sessions on topics such as: publications, time management, requirements for tenure and promotion, and work-life balance. In addition to these formal sessions, participants will receive daily mentoring and coaching on their respective research projects. Participants will also spend several hours each day working on their individual projects.

Presenters will include women faculty who have advanced with established research agendas, and faculty from other disciplines whose expertise will benefit participants. At the end of the first week, participants will present their work informally and receive feedback from mentors and other participants. In the interim between the two separate weeklong sessions, participants will be expected to continue work on their projects. The second week of the summer writing retreat will be scheduled for the end of the summer. The format for this week will be similar to the first week, except participants will make a formal presentation at the end of that week.

All faculty, both male and female, at JSU in STEM-SBS will be eligible to participate; however, women faculty in STEM-SBS will have first preference. Female STEM-SBS faculty, who are on tenure track, and those approaching promotion reviews will have priority. The Leadership Team will seek additional funding to support any male faculty seeking to participate. The two weeks will be in residence to afford retreat fellows an opportunity to focus on their projects with fewer distractions from their day to day obligations. Academic year follow-up will take place through short one day workshops, held to support progress of participants.

4.1.3 Visibility Component

The establishment of visibility opportunities specifically designed for JSU STEM-SBS senior women faculty to expand their horizons, and highlight their work and accomplishments locally, nationally, and abroad is proposed. This component should also be considered as part of a university wide program available to all faculty, which will help the university achieve greater overall visibility.

JSUAdvance mentors will assist the senior female faculty member with establishing visibility, and a national and international reputation. *JSUAdvance* will establish a program to support travel to national and international conferences in the related STEM-SBS areas, and the faculty member's specific areas of research. JSU has a long and distinguished history of involvement in the international arena.

Women faculty members are not invited to participate in international travel opportunities as often as male faculty members. Cultural differences or stereotypes may hinder the opportunities of joint travel by male and female faculty. Women faculty will be mentored and coached through the process of gaining access to JSU international opportunities. Special efforts will be initiated to establish academic travel groups consisting of both male and female faculty with the goal of increasing travel abroad opportunities for women, and changing the culture at JSU by removing travel barriers for women

4.1.4 Leadership Component

A plan to mentor female administrators in advancing to upper administration and female faculty interested in becoming administrators is proposed. Leadership mentoring relationships will be formed specifically designed for STEM-SBS women who are administrators seeking to advance into upper administration, or faculty seeking to advance into administration at all levels.

In male dominated disciplines, male faculty may have greater opportunities to receive informal mentoring and support as they seek to move into administration, or move into upper administration. Therefore, this component of *JSUAdvance* is targeted for female faculty in STEM-SBS disciplines. Here leadership opportunities will be structured to provide faculty release time so that a *JSUAdvance* fellow can spend a semester working in an upper administrative office at JSU, learning and being mentored. The President of JSU and co-PI has committed to supporting rotations through his office.

An announcement will be made publicizing this mentoring opportunity. A selection committee of Department Chairs and the Leadership Team will be formed to establish specific criteria and to select from the interested candidates. One individual will be selected each year and will be paired with a member of the upper administration (Dean or above). The selected faculty member will be provided release time through this grant to spend a semester in the Administrator's office working on a specific project of relevance to that office. Women faculty members already in administration will be assigned mentors to help them advance through upper administration. In addition, leadership workshops will be held and all STEM-SBS faculty members will be invited to participate.

4.1.5 Bias Prevention Training

The goal of Bias Prevention Training is to transform the informal culture of the university by providing information to employees designed to help them understand and eliminate bias. Focus Groups and other methods of transforming the informal culture will be established. All methods will be infused with bias prevention educational strategies. These strategies will be designed to educate and to mitigate bias by examining and rectifying issues that impact the retention and promotion of STEM-SBS female faculty on the campus.

Biases are personal, based on the individual's ideology, and institutional, embedded in rules (written and unwritten), regulations, policies and procedures. This makes bias difficult to measure, recognize, or change. However, social science experts have found that biases affect hiring, evaluation, promotion, and institutional decision making (Sevo & Chubin, 2008). Therefore, bias literacy is part of the goals of *JSUAdvance*. This will involve education that fosters an understanding of bias, and an acceptance that biases do exist.

Laws have been enacted to address intentional biases from a legal standpoint. However, biases that are unconscious, unknown, deeply rooted, and subtly taught and learned, are difficult to redress through the legal system. Jackson State University has accepted the challenged to educate, mitigate, and eradicate biases at all levels of our institution. Social scientists will be instrumental in designing, implementing, and assessing the Bias Prevention Training component of this study. They will help design the intervention training sessions, and they will have a key role in conducting focus groups and interviews to gather information. The information will be used to design the initial surveys and focus groups, but it will also help guide adjustments that will be made as the study progresses (see *The Social Science Supplement*).

We propose a three step process to insure that all individuals in the institution are exposed to and understand the commitment to fair and equitable practices in the workplace. First, we will focus

on education and awareness. Second, the emphasis will be on the implementation of strategies to eliminate bias. Third, the results and findings will be used to construct policies that will guide operations at the university.

The first phase of education and awareness will include a climate study, campus wide training sessions, seminars and workshops for administrators and faculty, and specialized workshops for STEM-SBS faculty, deans, and department chairs. Workshops and seminars will be modeled like those of previous ADVANCE awardees and experts in the field, such as the AAAS Center for Advancing Science and Engineering Capacity. The second step of implementing and eliminating bias will be guided by the data collected in the first phase and research. Research indicates that women in STEM-SBS experience biases in hiring, selection, advancement, promotion and tenure, laboratory space, institutional support, departmental decision making, colleague acceptance, salary, etc. (Beyond Bias and Barriers, 2007). Therefore, these areas will be the initial focus of change. Baseline data from the climate study will also guide the prioritization of strategy implementation. Information from focus groups will help identify the areas of concentration specific to each STEM-SBS culture. The third step will use University-wide committees for the recruitment, retention, and promotion of female faculty trained to recognize and eliminate bias through formal policy changes.

4.1.6 Policy Review, Modification, and Adoption

An in-depth review of JSU Policies and Procedures will be conducted. The JSU current policies will be compared to adopted/modified policies from Cohort 1 (2001) and Cohort II (2003) ADVANCE Institutions that emphasized work-life balance initiatives and best practices for recruitment, hiring, retention, and promotion evaluation as effective processes to alleviate possible barriers for recruitment, retention and advancement of women in STEM-SBS disciplines. Policies were reviewed for 16 of the 19 ADVANCE institutions for Cohort 1 (2001) and Cohort 2 (2003). All of the ADVANCE institutions had adopted/modified policies related to work-life balance issues and/or best practices for recruitment, hiring, and promotion of women faculty in STEM-SBS disciplines. Fourteen of the ADVANCE institutions reviewed had some type of tenure clock extension policy for the birth or adoption of a child, sixteen had parental leave (either paid or unpaid), thirteen had on campus child care, eight had policies related to part-time tenured faculty, and nine ADVANCE institutions had some type of transitional support programs for faculty in crisis.

An ADVANCE Policy and Procedures Committee will be established to review policies and procedures at JSU and ADVANCE institutions and to develop and integrate best practices for recruitment, retention, and tenure and promotion evaluation procedures. The committee will first establish a baseline by reviewing data from the past three years. The committee will then track institutional data concerning hiring, retention, and advancement of women in STEM-SBS and SBS disciplines. The committee will be co-Chaired by the Associate Dean of the College of Science, Engineering and Technology (Whalin), who was the former director of the U. S. Army Research Laboratory and a female Chemistry Professor (Campbell). Some initial policies and procedures that will be reviewed are as follows: (1) Recruiting and Hiring Practices/Policies – develop and integrate best practices for recruiting and hiring practices which may include hiring of an EEO officer; (2) Tenure and Promotion Policies – develop and integrate best practices in the evaluation process for tenure and promotion; (3) Medical Leave Policy – investigate the utilization of medical leave for illnesses for members of the immediate family and/or dependent children; (4) Child Care Assistance - evaluate the current on-campus child-care facility for access, hours of operation, programs, cost, and utilization by current faculty. Evaluate the need and availability of on-campus after-school care programs and summer camps; (5) Transitional Support Program – an in-depth evaluation of the transitional support programs at Georgia

Institute of Technology (was originally funded through the ADVANCE program and provided funding to supplement a decrease in teaching loads and/or service activities for female faculty members to assist with work-life issues such as child birth or adoption) and the University of Wisconsin-Madison (a WISELI Life Cycle Research Grant Program that allowed women faculty at critical junctures in their professional careers to apply for research support).

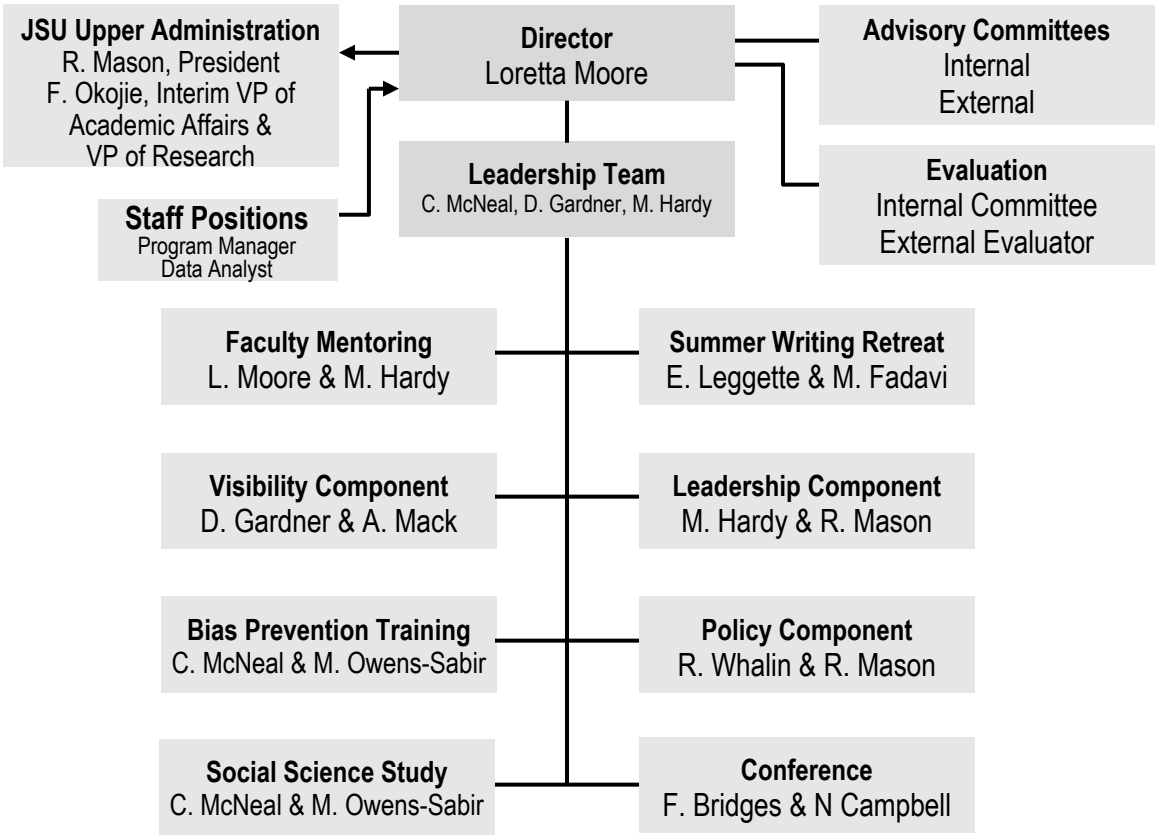
5. Dissemination

A website and brochures will be designed to post information from all *JSUAdvance* activities and findings. The results of *JSUAdvance* will be disseminated to a variety of audiences in the forms of journals, conferences, workshops, and presentations. JSU will continue hosting the *Advancing the Status of Diverse Women in STEM-SBS Conference* in order to disseminate the finding to participants, as well. Manuscripts based on the findings will be published in popular journals in the STEM-SBS and SBS fields. These findings will also be used to strengthen policies and procedures at JSU as they relate to gender equity. A special target of dissemination of results will be HBCUs in the EPSCoR States. See letters of support from Alcorn State University (MS), Dillard University (LA), Tougaloo College (MS), and Tuskegee University (AL).

6. Project Management

A very talented team of 14 individuals have committed to the success of this project. These include the President of JSU (Mason); the Dean and Associate Deans of CSET (Hardy, Whalin, & Tchounwou); Deans of the Divisions of Undergraduate Studies, Graduate Studies, and International Programs (Leggette, Gardner, and Mack); Distinguished Tenured Professors from STEM (Campbell & Fadavi) and SBS disciplines (McNeal & Owens-Sabir); Assistant Director of the Jake Ayers Institute (Bridges); and Computer Science Professor and Chair (Moore). The organization chart below shows the management plan for *JSUAdvance*.

Figure 1.*JSUAdvance* Management Structure



7. Project Evaluation

The development and design of the program evaluation component described in this proposal is compliant with the Joint Committee on Standards for Education Evaluation (1994), and is informed by a comprehensive review of social science research and related documentation on the topics of program evaluation (Caracelli & Greene, 1989; Worthen, Sanders & Fitzpatrick, 1997), and African Americans and women in STEM-SBS fields. The overall goal of the evaluation component is to determine the efficacy of the JSU Advance Inclusive Program in regards to meeting the programs goals and objectives. The primary objectives of the evaluation component are to: (1) Measure the effect of the *JSUAdvance* Program on women faculty in the STEM-SBS disciplines and (2) Assess the quality and rigor of the *JSUAdvance* Social Science Study.

In order to achieve these objective, survey questionnaires, focus groups, individual interviews, and data tracking will be used to yield data regarding the effectiveness of the JSU Advance Inclusive Program. Taken as a whole, the evaluation component will consist of a mixed methods study to explore the aforementioned program objectives and goals. Because of the different context for inquiry and discovery, the increased validity through triangulation, using both research methodologies (i.e., quantitative and qualitative) will increase the scope and depth of the program evaluation component (Jorgensen, 1989; Mason, 1996; Patton, 1980). Overall, the program evaluation will assess the quality and effectiveness of the JSU Advance Inclusive Program. Findings from the program evaluation will provide institutional decision makers with empirically based data on providing environments and opportunities for women in STEM-SBS at HBCUs.

Data Collection for the Quantitative Research Component of the Program Evaluation: The data for the quantitative research component of the program evaluation will be collected from the participants of the JSU Advance Inclusive Program within the six components (i.e., faculty mentoring; summer writing retreat; visibility, leadership exposure; unconscious bias and assumptions training; and policy review, modification, and adoption) of the program. Survey instruments will be used to collect quantitative data for the evaluation. These instruments will be developed by the evaluation and research team. Items on the survey questionnaires will be based on a comprehensive review of the literature addressing issues germane to women in STEM-SBS fields (e.g., Gottfredson, 1981; Gottfredson, 2002; Hall & Post-Kamer, 1987; Hrabowski & Maton, 1995). Pilot testing of the survey questionnaires will be done using approximately 50 women in STEM-SBS at both an HBCU and PWI. Respondents will be asked to complete the survey questionnaire, give comments on the clarity of statements, and identify other items that should be included. Comments will be analyzed, feedback was reviewed, revisions were made, and the instruments were revised.

Behavioral changes reflect actual change in participant behavior, such as participating in professional mentoring networks. Affective changes reflect changes in attitude or perception, such as expressing an increased interest in senior-level positions both faculty and administration. Cognitive changes reflect change in knowledge, such as becoming aware of previously unknown professional opportunities. With this in mind, the evaluation forms that will be administered at the six intervention components will gather both types of data. The evaluation instruments will be used to capture the women in STEM-SBS disciplines beliefs prior to the interventions and identify affective and cognitive changes as a result of the intervention.

Analytical Procedures for the Quantitative Research Component of the Program Evaluation: Data analysis will occur in multiple stages. In the first stage of data analysis, employing ordinary least squares regression, while applying statistical controls for the effects of demographic

variables and experiences while at work, participants' scores from each subscale (nine) on professional aspirations will be regressed against program phase (i.e., faculty mentoring; summer writing retreat; visibility, leadership exposure; unconscious bias and assumptions training; and policy review, modification, and adoption). The second stage of the data analysis will consider whether the effects of program phase are general or conditional. More specifically is the influence of the program phase on professional aspirations similar in magnitude for all JSU Advance Inclusive Program participants, or does it differ for JSU Advance Inclusive Program participants with different demographic characteristics or experiences during at work? To test for the presence of conditional effects, a series of cross-product terms will be computed between dummy variables indicating program phase, and each of the other independent variables of the prediction model. The set of cross-product terms will then he added to the general effects equations employed in the direct effect analyses. A significant increase in explained variance (R2) due to the set of cross-product terms will indicate the presence of significant conditional effects (Pedhazur, 1997).

Qualitative Study Design: The qualitative research component will consist of two parts: (a) individual interviews; and (b) focus groups. Both parts will occur at the research sites and summer writing retreat. The research sites and summer writing retreat serve as the only aspect of the JSU Advance Inclusive Program were all participants will be together. Therefore, these venues serve as a prime opportunity to collect qualitative data since the participants will have pro-longed engagement with the program in both of these cases. Data collection will follow a comprehensive interview protocol.

The primary objective of the qualitative research component is to obtain data by exploring various topics (e.g., participants' experience and their perceptions of the program) by engaging those participants involved with the JSU Advance Inclusive Program (Flowers & Moore, 2003; Moore & Flowers, 2003). Given the complexity of the JSU Advance Inclusive Program, a qualitative component of the evaluation is deemed necessary and will permit the evaluation team to collect in-depth data reflective of women in STEM-SBS at HBCUs. To ensure validity of the program evaluation, the evaluation team will collect multiple types of data (e.g., experiences at work and perceptions of the program quality) and use multiple modes of data collection (e.g., quantitative and qualitative) at various phases and times throughout the program implementation (Greene, Caracelli, & Graham, 1989).

Analytical Procedure for Qualitative Research Component of the Program Evaluation: All data from the qualitative component of the program evaluation will be coded and analyzed utilizing the grounded theory approach. The process involves the following steps: "(a) comparing the data applicable to each conceptual category; (b) integrating the categories and their properties; (c) delimiting the emergent theory; and (d) writing up the theory" (Jorgensen, 1989, p. 113). This procedure will continue until saturation and redundancy occurs (Scott, 1995). The evaluation team will rely heavily on the transcripts for analyzing the data. This procedure is referred to as transcript-based analysis (Morgan, 1998).

All focus groups and individual interviews will be both coded and analyzed utilizing the grounded theory approach. Specifically, the evaluation team will review and analyze the data throughout the study. This process will be continued until the evaluation team is able to formulate a comprehensible picture of the participants and is able to answer the research questions. During this phase, the evaluation team will be instructed to look for patterns in the data and will be asked to code the data so themes and sub-themes could be easily identified.

The evaluation team will initially code the data, independently, and after this process the evaluation team will meet collectively to discuss the patterns in these data. Employing this

method, patterns and emergent themes will be identified and discussed. Thus, each member of the evaluation team will discuss "how" and/or "why" he or she identified certain themes in the data. This method of analysis will again allow these data to be constantly compared and organized as recommended by the grounded theory approach (Glaser & Strauss, 1967; Jorgensen, 1989). Once patterns and themes are identified, the evaluation team will use direct excerpts from the transcripts to present and illustrate the themes and sub-themes.

Data Tracking Component of the Program Evaluation: The evaluation team will: (a) establish baseline data that aligns with the Advance Data Indicator Toolkit (3-5 year average) and (b) monitor the annual progress of institutional advancements on the Advance Data Indicator Toolkit.

8. Institutional Commitment and Sustainability

JSU is committed to the success of this project as illustrated by the commitment of the President of the institution and the many other Deans. It is expected that the Bias Prevention training and the Policy review will become a permanent of the University's practices and procedures. We will proactively seek additional funding from other agencies and corporations to not only sustain but to grow the components so that they are available to a larger range of faculty members.

9. Results from Prior NSF Support

NSF BPC Grant; Extension, Lead Institution North Carolina A&T, JSU Award # - 0940573; JSU Funding Amount - $43,805.00; 9/1/2009 – 08/31/2010; BPC-AE: Collaborative Research: The Alliance for the Advancement of African-American Researchers in Computing (A4RC); Loretta Moore (JSU Principal Investigator) and Jacqueline Jackson (JSU Co-Principal Investigator). Initial BPC Award # - 0540577 to North Carolina A&T Lead – Sub-Award to JSU (4/1/2006 – 2/28/2010).
The Alliance for the Advancement of African-American Researchers in Computing (A4RC, pronounced A-Force) was formed in the spring of 2006 with the ultimate goal of increasing the number of African-American faculty in faculty research careers by creating pathways for African-Americans from HBCUs to pursue doctoral degrees and partnerships with majority institutions. Because of A4RC, the African-American students in HBCU partner schools have an increased awareness of various research career paths and an opportunity for exposure to additional experiences in computing research.

NSF CISE REU Grant; Award # - 0851646; Amount - $319,989.00; Period - 1/15/2009 – 12/31/2011; REU Site: Undergraduate Research Program in Wireless Ad hoc Networks and Sensor Networks; Natarajan Meghanathan (Principal Investigator), Loretta Moore (Co-Principal Investigator), and Marvin Watts (Senior Personnel)
The primary objective of this program is to establish a Research Experience for Undergraduates (REU) site in Wireless Ad hoc Networks and Sensor Networks in the Department of Computer Science. This program is the only NSF CISE REU in Computer Science at a Historically Black College and University (HBCU) and the only NSF CISE REU in the State of Mississippi. Recruitment was successful, with 25 applications received in the first year and 9 students selected (2 Female and 7 Male; 5 African-Americans, 3 Caucasians, and 1 Asian) using a holistic review process. Students came from: Elizabeth City State University, North Carolina (1), Jackson State University (2), Mississippi Valley State University (2), Northern Kentucky University (1), Texas Southern (1), University of Maryland – Eastern Shore (1), and Winthrop University, South Carolina (1). So far, three papers (covering the research work of 4 of the 9 students) have been submitted for publication in peer-reviewed International conferences and one paper has been already accepted for publication.