Science & Engineering Alliance, Inc.

Annual Report 1999

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1999 Annual Report

From the office of the Executive Director

The beginning of the new millennium brings extra importance to the life and future of the SEA. It was ten years ago that the idea of a unique partnership between four Historically Black Universities and Colleges (HBCU's), and a national research laboratory became what is called the Science and Engineering Alliance, Inc.

In today's environment, most public and private R&D solicitations mandate that partnerships and collaborations form the basis for research support. Many stellar organizations now recognize the value of partnerships, collaborations, teaming agreements, joint ventures and the many other forms of combining resources to conduct research.

The idea of teaming and combining resources has been the strategic focus of the SEA since its inception in 1990. There is no doubt, resource networks and partnering is the wave of the future as we move toward the next millennium.

However, in the 10 years that I have served as Executive Director of the SEA, I have become convinced that traditional institutional processes cannot manage collaborations and partnerships. Institutional mandates of the past used to govern isolated research activities do not work for collaborations and partnerships. The efforts of collaborations and partnerships follow the rules, more or less, of a contact sport, i.e., the more people focused and dedicated to a commonly held goal the better. In such an environment, there must be a strategy that enables the institutions to identify those actions that are individual enterprises from those that are institutional, both of which requires different approaches but inspire a common vision. In collaborations and partnerships there is no single source of resources or narrow research vision. The "one shoe fits all" mindset is rooted in failure.

The New World is embracing change as its constant. Thus, it is vitally important that each SEA institution make every effort possible to understand that "Collaborative Technology" (email, web sites, distant education, and teleconferencing) is the virtual world in which we must operate if we are to be successful participants in the future.

Robert L. Shepard
Executive Director,
Science and Engineering Alliance Inc.

I. Introduction

Purpose

This document serves as the 1999 Annual Report on the actions and accomplishments of the Science and Engineering Alliance (SEA). The report provides a broad view of the experiences and relationships that have evolved over the past year and chronicles the accomplishment of actions embodied in the strategic plan for this period.

Background

The Science and Engineering Alliance (SEA) serves four state-supported historically black colleges and universities (HBCUs) and a national laboratory. The members are: Alabama A&M University, Jackson State University, Prairie View A&M University, Southern University and A&M College, and Lawrence Livermore National Laboratory. The SEA Office of the Executive Director markets the capabilities of the SEA member institutions, develops training and experiential programs for alliance member institution students, develops scientific and engineering partnerships with the public and private sectors, and identifies opportunities for access and participation in high-profile scientific research. In Fiscal Year 1998, the process begun of prioritizing the SEA programmatic activities around the key strategic goals of Customer Suppport, Service to the Community and Management Infrastructure. In Fiscal Year 1999, the programmatic focus remained centered on these three strategic goals.

II. Scientific Program and Project Summaries

The SEA continues its multiple roles and associated responsibilities of exposuring the capabilities of scientific researchers and students from alliance academic institutions. The SEA provides a potential source of skilled scientists and researchers to the public and private sectors by increasing the awareness of the non-traditional academic institutions as a “pipeline” of highly qualified scientists and engineers. The role of the SEA will be to continue educating organizations and firms to the benefits and advantages of partnering with the non-traditional source of expertise and talent from non-traditional academic institutions. The SEA scientific research path has progressed through a variety of technical projects, and teaching and infrastructure enhancement initiatives. These initiatives include:

A. Distant Education Course in Molecular Biology

In the Spring of 1996, the SEA institutions embarked on an attempt of an exciting experiment in which the four HBCU academic institutions and LLNL offered a multi-disciplinary special topics course over the Intemet. Instruction was performed by video teleconferencing, video tapes, computer chat sessions, and assignments sent by E-mail.

Over the past four years, enrollment in the SEA distance education online course has doubled from year-to-year. This increase in enrollment tracks with the U.S. Department of Education findings which indicates that college-level distance education course enrollments in the U.S. grew from 753,640 to 1,343,580 between 1994 and 1998. The course is fast becoming one of the most popular additions to the course catalogue at each of the SEA institutions.

Course Objectives for 1999:

- Learn the latest concepts in molecular biology, recombinant DNA technology, and the polymerase chain reaction technique, as well as their applications to biomedical sciences, to scientific investigation and to the environment.

- Participate in discussions during class, as well as during assigned computer chat sessions in and out of class.

- Send and receive course assignments as well as to communicate to the instructors and other students within their discussion groups by E-mail or chat sessions.

- Perform and submit internet assignments to improve skills in the use of cyberspace.

- Improve critical thinking skills through the reading and discussion of assigned relevant scientific articles, the analysis of given data and the planning of experiments.

- Measure student progress through exams and graded assignments.

Since this is a selected topics course, topics varied from time to time. In the Spring of 1999, the topics included the latest advances in modern molecular biology, most of which related to biomedical sciences, regulation of gene expression and the environment. Graduate students were given extra assignments which require acquisition of more advanced skills.

B. Impact of the SEA Research Collaboration with the Center For Advanced Microstructures and Devices (CAMD)

C. GRE Training – Enhancement to Summer Research Program at LLNL

D. High Performance Computing and Communication (HPCC)

The HPCC initiative has provided SEA researchers access and has fostered their extensive engagement into the field of high performance computing. The initiative is helping the alliance member institutions make significant contributions to the full range of HPCC activities, including existing supercomputing systems, special purpose and experimental systems and the new generation of large scale parallel architecture.

A significant aspect of the SEA model is that it simultaneously provides institutional and individual career opportunities. As institutional research infrastructure is enhanced, students attending the alliance member institutions gain a competitive advantage by having research experiences with mentors and coaches in cutting-edge technical areas like HPCC. One such example is the enhanced capability at Jackson State University in the area of high performance computing and visualization (HPCV).

- **High Performance Computing and Visualization (HPCV) at Jackson State**

The SEA partnership has significantly strengthened the research and training capabilities of its members. The benefits derived to Jackson State University (JSU) in the area of high performance computing and visualization (HPCV) have been, by the faculty's observations, immense. As such, significant research work has been established in several areas: computational chemistry, computational fluid dynamics, data storage, processing and management, mesoscale, stratospheric and other atmospheric modeling, computational environmental modeling, etc. In faculty development, several faculty members have been exposed to state of the art technology and research activities in HPCV.

Additionally, faculty and students are now publishing in peer-reviewed journals and making presentations at national and international conferences relating to HPCV. In the area of curriculum development, several existing courses are changing their content and format because of the exposure to computational environment and technology created by the Alliance. Infrastructure development with state-of-the-art computing equipment has been established.

The following summary of accomplishments is an example of how Jackson State University faculty and students have been stimulated by the HPCV programs since the initial HPCC project:

Over 80 students actively or have participated;
Over 180 articles published in referred journals;
Four book chapters published;
Five books edited;
More than 200 presentations at scientific meetings;
Active research programs involving numerous visiting scientists;
Sponsorship of the Conference on Current Trends in Computational Chemistry.

The SEA partnership has enabled Jackson State University, a SEA member institution, to emerge as a key player in the national high priority of HPCV.

III. Significant Accomplishments

SEA Five-Year Strategic Plan

During 1999, the SEA embarked on a journey to enhance its infrastructure and management capability. An initial and priority step has been to develop a five-year strategic management plan for the period 1999 through 2004. The purpose of this plan is to serve as a catalyst for directing SEA resources to those activities, programs, and initiatives that are most effective in helping to carryout the mission and to achieve our vision and the strategic goals over the next five years.

The mission of the SEA is to enhance and promote the combined capabilities of the academic partners to ensure the production of quality African-American scientist and engineers, while simultaneously meeting the R&D needs of the public and private sectors.

The vision is that by the year 2004, the SEA will be widely recognized as a model partnership engaged in facilitating the emergence of a high performance, diverse work force.

In implementation of its mission, the SEA actions will enable its customers to seek new opportunities based on the existing and emerging infrastructures and use the new opportunities to make infrastructure enhancements. Customers and stakeholders will recognize our actions and have the utmost respect for and confidence in the SEA.

Strategic Goals and Objectives

The ambitious goals and objectives contained in this plan serve as the impetus for achieving our mission and vision. The initiatives, actions and activities that support the goals and objectives form the basis for annual action plans, budget documents, and performance reports. Achieving the SEA:s goals and objectives described requires the dedication and commitment of the Off ice of the Executive Director, as well as the support of the alliance member institutions. Paramount to our success will be our ability to fund adequate infrastructure support, to secure unrestricted resources to create special scientific and engineering student research programs, and to maintain an adequate level of technological readiness. In Fiscal Year 1998, we began the process of prioritizing our work based on these goals and our commitment to achieving them is illustrated by the 1998 Annual Report.

The SEA Strategic Plan contains three major strategic goals: Customer Support, Service to the Community, and Management Infrastructure. Each of these strategic areas is of equal importance to the SEA and is considered to be of high priority in this Plan.

Goal 1. Customer Support

Expand the support to alliance member institutions in the preparation of future scientists and engineers, by expanding the research opportunities for senior faculty, providing headstart opportunities for the research of junior faculty and implementing linkages to the public and private sector to advance and improve the combined capability of the alliance member institutions.

Goal 2. Service to the Community

Expand the provision of technical assistance to: (1) K-12 school districts; (2) federal agencies and private industry organizations desiring to partner with (3) alliance member institutions, HBCUS; and smaller HBCUS.

Goal 3. Management Infrastructure

Continue to expand efforts to improve the management and administration of the Office of the Executive Director to meet customer (alliance member institutions) needs in an efficient and cost-effective manner.

SEA Team Win Department Of Defense Award

SEA member Prairie View A&M University, was one of eleven Historically Black Colleges and Universities and Minority Institutions (IHBCUs/MIs) to receive an indefinite delivery/indefinite quantity (ID/IQ) contract from the Defense Information Systems Agency (DISA). The winning research teams will provide the Department of Defense customers a variety of information technology support services. The total ceiling for the contracts is $24,000,000 over a five-year contract period consisting of a one-year base period and four one-year options.

In addition to other SEA members, Clark Atlanta University (Atlanta, GA) is also a partner on the Prairie View A&M University lead team, known as Team Prairie View. Industry partners are JAVIS Automation and Engineering, Inc. (Mclean, VA), Advanced Resource Technologics, Inc. (Alexandria, VA); and Science Application International Corporation, Inc. (Mclean, VA). Under the contract, Team Prairie View will provide the DOD analytical, engineering, logistical communications, integration, computer Systems research and development, application software development, testing and maintenance, information assurance, and education and training services.

Under the ID/IQ contract, HBCU faculty, staff, and students, and personnel of the industry partners will be assigned as technical personnel to DOD task orders. The effort of university faculty, staff and students will enhance the expertise and reputation of the SEA members and provide meanings work experiences for undergraduate and graduate students assigned to the various projects

IV. Advocacy and Marketing

The SEA continues to develop avenues for familiarizing the public and private sectors about HBCUs. Notwithstanding the fact that additional resources are needed, speeches and presentations on the capabilities and vision of the SEA are an important part of the executive director's active advocacy on behalf of the SEA institutions. During 1999, the executive director held many meetings and discussions on the capabilities as well as needs of HBCUs with the following organizations:

- **U.S. Department of Defense, Defense Information System Agency (DISA)**
  Topic Discussed: "Proposed DISA Minority Institution Technical Support Services (MITSS) Initiative"

- **U.S. Department of Energy (DOE), Office of Economic Impact and Diversity**
  Topic Discussed: "Introduced SEA Program to New Leadership"

- **U.S. Small Business Administration (SBA), Office of Technology**
  Topic Discussed: "Increasing Participation of HBCUs and SDBs in Small Business Innovation Research (SBIR)/Small Business Technology Transfer Research (STTR) Programs"

- **National Institute for Standards and Technology (NIST), Information Technology Laboratory**
  Topic Discussed: "Keeping HBCUs Abreasted of Cutting-Edge Technology like the Electronic Book"

- **Los Alamos National Laboratory (LANL) Representative**
  Topic Discussed: "Background on the SEA and the LANL HBCU Program"

- **U.S. Department of Defense, HBCU/MI Program Office**
  Topic Discussed: "The SEA Program and Its Impact on Institutional Development"

- **University of California Black Administrators**
  Topic Discussed: "Developing Educational Partnerships with HBCUs"

- **Mayor of Washington, DC**
  Topic Discussed: "Needs of the District's Non-Profit Business Community"

- **Army Research Laboratory (ARL), HBCU/MI Program Office**
  Service Render: "External Reviewer for Science and Technology Academic Recognition System (STARS) Program"

- **University of Maryland Eastern Shore, HBCU Research Day**
  Keynote Address: "The SEA Program: A Model for Research Partnerships"

- **Army Materiel Command (AMC), Office of the Director**
  Topic Discussed: "Role SEA could Play in Assisting the AMC with Implementation of its HBCU Goals and Objectives"

- **Army Materiel Command (AMC), CECOM Division**
  Topic Discussed: "Role SEA could Play in Supporting CECOM"

- **Army Research Laboratory, Office of the Director**
  Topic Discussed: "SEA Presentation to New Laboratory Director"

- **Army Corp of Engineers, Office of the Deputy Director**

Topic Discussed: "The SEA Program and Its Impact on Long-Term Institutional Development

- **Howard University Graduation Ceremony**
  Keynote Address: "A Challenge to the Final Graduating Class of Master's and Ph.D. Students in the 20th Century from Howard University Graduate School of Arts and Sciences"

- **Byrd and Associates**
  Topic Discussed: "The SEA Program and Its Support of Students at Jackson State University and Throughout the State of Mississippi"

- **SBA, EPA and DARPA**
  Service Render: "Conducting SBIR Seminars to Build Partnerships Between Small Disadvantaged Businesses (SDBs) and HBCUs"

- **General Electric Diversity Symposium**
  Topic Discussed: "How to Ensure Diversity in the Technical Work Force"

- **Interagency Technology Transfer Symposium**
  Topic Discussed: "Engaging HBCUs in Technology Transfer Initiatives"

- **Army Research Laboratory (ARL), HBCU/MI Program Office**
  Service Render: "Exit Interview with Science and Technology Academic Recognition System (STARS) Students"

- **U.S. Department of Energy (DOE), METCOM Student Program**
  Keynote Address: "Making the Most of Your Summer Research Experience"

- **U.S. Department of Agriculture, HBCU/MI Program Office**
  Topic Discussed: "Expected Outcome of the SEA-Lead SBIR Seminars"

- **Associated Western Universities (AWU), President**
  Topic Discussed: "The Need for SEA and AWU to Seek Partnering Opportunities"

- **National Heritage Foundation, President**
  Topic Discussed: "How the National Heritage Foundation (NHF) Might Benefit HBCUs"

- **U.S. Environmental Protection Agency (EPA), Office of R&D**
  Topic Discussed: "Expanding the SEA-Lead SBIR Seminar Series"

- **Army Research Laboratory (ARL), Division of Information Science and Technology**
  Technical Exchange: "Assessing the Potential for Collaboration Between ARL and SEA"

- **Science Application International Corporation**
  Technical Exchange: "How to Deliver Oral Presentations Before Federal R&D Organizations"

- **ACCESS, Inc., Univesity of Illinois Facility**
  Topic Discussed: "Internet Connectivity at Tribal Colleges"

V. New Initiatives

Building Strategic Alliances with the Small and Disadvantaged Business (SDB) Community

The Executive Director is moving the SEA member institutions, with diligence and prudence, towards increased opportunities for partnerships and interactions with the small and disadvantaged business (SDB) community. By providing information and connecting academic institutions with SDBs, the SEA hopes to expand the support and opportunities for the academic institutions, while affording a business connection through the Federally sponsored Small Business Innovative Research (SBIR) program. Invitations to seminars, cosponsored by the SEA and other Federal partners, are encouraging SEA member institutions and other HBCUs and Minority Institutions (MIs) as well as SDBs to take an active role in building educational and entrepreneurial relationship while providing service to the nation. The SEA believes that these partnerships and business arrangements could be the response needed to providing an environment that attracts highly qualified minority scientist and researchers from non-traditional institutions and backgrounds.

The first seminar, held July 14, 1999 at the Lawrence Livermore National Laboratory's (LLNL) Washington DC Office, used the Department of Defense's FY 1999 SBIR solicitation. The seminar brought together six HBCUs and 32 small businesses. In addition to the four SEA institutions, Morgan State University and Clark Atlanta University also participated.

The second seminar, held September 9, 1999 at the J.W. Marriott, used the Environmental Protection Agency's (EPA) FY 2000 SBIR solicitation. This seminar brought together a total of 68 participants: (17 from HBCUs; 40 from Small

Businesses; and 11 from government). In addition to the SEA institutions, the other HBCUs represented were Florida A&M University ((Tallahassee, FL); Fort Valley State University (Fort Valley, GA); Hampton University (Hampton, VA); Howard University (Washington, D.C.); Norfolk State University (Norfolk, VA); Texas Southern University (Houston, TX); and University of Maryland Eastern Shore (Princess Anne, MD).

Preliminary evaluations indicate that the one-day seminar is too short which give rise to having to push important topics along much too fast. Respondents stated that the seminar is too valuable to move at such an accelerated pace.

Following the September 9th seminar, the Executive Director held meetings with officials of the EPA to discuss opportunities and plans for expanding the partnership and fostering scientific research and entrepreneurial opportunities for Alliance member institutions and other HBCUs. Important topical areas in these discussions included increasing the seminar to 1 and 1/2 days; taking the seminars to the HBCU campuses starting with one of the SEA institutions, with clear guidance on the process for engaging the local SDB community in the seminar; the benefits to be derived from co-sponsorship of follow-up conferences; the utility of SEA sponsored conferences to promulgate information to other HBCUs and SDBs on the requirements of the SBIR and STTR programs.

A major recognition is the potential of these learning situations to create research opportunities for senior faculty, provide headstart opportunities for the research of junior faculty and foster business relationships with the public and private sector organizations and to advance and improve the combined capacity of the SEA member institutions and other non-traditional academic institutions. These recent meetings with the EPA, and future meetings with the other agencies and small business community, are very important occasions in the efforts of the SEA to enhance the Alliance membership infrastructure.

With the support and co sponsorship of four major Federal agencies (U.S. Small Business Administration (SBA); U.S. Department of Defense's Defense Advanced Research Program Agency (DOD/DARPA); U.S. Environmental Protection Agency (EPA) and National Aeronautics and Space Administration (NASA)) and the Minority Business Enterprise Legal Defense and Education Fund (MBELDEF), SEA's work with Federal agencies is a continuing effort.

Establishing a Partnership Between the Army Research Laboratory (ARL) and SEA

The SEA Executive Director, Director of the Army Research Laboratory (ARL), Director of ARL's Information Science and Technology (IS&T) Directorates, and

executive level representatives from SEA member institutions met recently to discuss formation of a formal partnership between ARL and the SEA. A draft Statement of Work (SOW), reflecting collaborative technical interactions between SEA researchers and technical staff at ARL-sponsored Federal Laboratories and University Applied Research Centers (UARC), is under review by the Director of ARL.

In addition to the SEA academic research partner, this activity could engage our Laboratory partner, LLNL, through the summer research program. During July 1999, one of the SEA students split their summer research experience between ARL's Science and Technology Academic Recognition System (STARS) program (one month) and LLNL's Summer Research Program (six weeks). While much work is involved, this tripartite relationship will, in the end, produce some of the nations most energetic, dedicated and committed scientific researchers. Students continue to express their appreciation for the experiences created by the partnership.

VI. SEA 2000 and Beyond