OVERVIEW OF SCSU YEAR 6 ACTIVITIES

The SCSU proposal included four specific objectives and accompanying milestones and approaches. An overview of the SCSU activities in Year 6 is placed in the context of matching each major activity with one or more specific objective-milestone combination. Recognizing that a reviewer may not have the original proposal in-hand, the objectives and milestones are reproduced here. The approaches are not included in order to save space.

Objective #1: To support and enhance faculty research in astrophysics at SCSU.
Milestones #1:
A. Provide technical support to carry out astrophysical research at SCSU.
B. Provide financial support for astrophysical research by faculty at SCSU.
C. Support existing astrophysical research collaborations and/or establish new ones.

Objective #2: To support and enhance student astrophysical research by underrepresented minority students at SCSU and collaborating institutions.
Milestones #2:
A. To maintain and/or expand existing research opportunities in astrophysics for underrepresented minority students at the college level.
B. Develop a program of research in astrophysics for high school students who are underrepresented minorities.

Objective #3: To facilitate education reform in teaching of science and in pre-service teacher preparation at SCSU and collaborating institutions.
Milestones #3:
A. Implement changes in teaching and research techniques used by faculty members and students to learn science and conduct research.
B. Provide technical and financial support to pre-service teachers at SCSU and collaborating institutions to learn and practice modern learning techniques for the teaching of science.

Objective #4: To increase opportunities for minority institutions to participate in NASA and other Federal agency research and education programs.
Milestone #4:
To provide technical assistance workshops and other facilitating activities for MU-SPIN and other organizations to increase minority involvement in NASA and other Federal agency programs related to research and/or education.

Milestone 1A was achieved through the following activities:
- Remote UNIX system support was provided by Dr. Patrick Shopbell of the Astronomy Department at Caltech. His services were partially funded by MU-SPIN. This support is critical to maintaining SCSU’s involvement in HST and other space-based and ground-based research programs.
- Local LAN and Windows-based support was provided by a CNRT technical person who is partially funded by MU-SPIN. This support is critical to...
maintaining Internet access and ancillary supporting services such as printing.

- A new SUN Sunblade 1000 server was purchased with MU-SPIN funds. This server replaced the old SUN SPARC 20 server which has been in use for the past seven years. This server houses all the astrophysical research data and UNIX-based image processing software used by Dr. Walter, faculty collaborators and students to conduct research. Additionally, it is home to the CNRT website and serves as the on-line source for the University course catalog and physics courses.

Milestone 1B was achieved through the following activities:

- Dr. Walter received summer salary and academic-year release time from MU-SPIN to carry out his research.
- MU-SPIN provided $20,000 for the purchase of narrow-band interference filters that will be installed on the RCT. These filters are essential to Walter’s research to better understanding the physical diagnostics and chemical abundances of the galactic and extragalactic interstellar medium.
- Travel support from MU-SPIN allowed Walter to travel to research meetings, including the American Astronomical Society meeting in Washington, DC, in January 2002 during which he was able to interview nine potential candidates for a new faculty position at SCSU in astrophysics.
- Travel and related expenses to conduct a meeting of the RCT Consortium in Orangeburg, SC in April 2001. This included travel support for visiting astronomers as well as funds to hold the meeting. This was an important meeting at which the SCSU administration met with visiting scientists from Western Kentucky University, Francis Marion University and the Planetary Science Institute. This generated local press coverage and enhanced support among administrators at SCSU for their involvement in the RCT.

Milestone 1C was achieved through the following activities:

- Walter collaborated on a HST Cycle 11 proposal, which was not funded. However, this helped maintain existing research collaborations with colleagues at Arizona State University and Rice University.
- Walter was coauthor on one published, referred paper and worked on two papers with colleagues at Arizona State and Rice related to his HST Cycle 7 PI project (the Bubble Nebula). The papers will be submitted to the *Astronomical Journal* for peer review in February 2002.
- CNRT funds from MU-SPIN supported a postdoctoral researcher for 2.5 months of salary. Dr. Mark Everett is located at the Planetary Science Institute in Tucson. He is providing software and other support to the RCT Consortium in preparation for the commencement of scientific operations. This represents a new research collaboration.
- Walter submitted a research proposal to the South Carolina Space Grant Consortium along with Co-I Dr. Richard Gelderman at Western Kentucky University. The status of the proposal is pending. While Walter and
Gelderman have collaborated on the RCT refurbishment proposal, this is their first science research collaboration.

- Walter also began new collaborations with Dr. Kuzman Adzievski, a mathematician at SCSU, Dr. Varsha Kulkarni, an astronomer at the University of South Carolina, and Dr. John Mattox, an astronomer at Francis Marion University. All three of these collaborations occurred when each faculty member was funded by CNRT to serve as a mentor to a student research team under the URIA program. However, there is potential for faculty research collaborations between Walter and each of the three.

- Walter participated in a statewide 2-day meeting of South Carolina astronomers in December 2001. The group has decided to continue an annual meeting and to propose as a group for future NASA EPSCoR funding.

Milestone 2A was achieved through the following activities:

- The SCSU Undergraduate Research Institute in Astrophysics (URIA) was created under the original 5-year IRA for the CNRT. During the summer of 2001, ten undergraduate students attended this 8-week residential program for underrepresented minorities held at SCSU. The students studied a variety of astrophysical topics while gaining useful computer, web and multimedia experience. Each student was a member of a team that consisted of 2-3 students and one faculty mentor. Each team worked on a different research project, which ranged from processing images from the NICMOS camera on HST to calculating the probability of clustering of galaxies using Mathematica software.

- A new undergraduate research program in astrophysics for underrepresented minorities was created in 2001, the Undergraduate Research Program in Astrophysics (URPA). This new program was created under the SCSU Minority Initiative grant from the Office of Space Science (OSS), but MU-SPIN provided financial, logistical and technical support for its implementation. In this program, students with a previous space science research experience were placed at one of three national laboratories: the Goddard Space Flight Center (GSFC), Kitt Peak National Observatory (KPNO) or Lawrence Livermore National Laboratory (LLNL). A total of five students from four institutions were selected to attend (1 at GSFC, 2 each at KPNO and LLNL). The URPA was designed to be comparable to the popular NSF program Research Experiences for Undergraduates (REU) and similar NASA programs for summer undergraduate research.

- The URPA in conjunction with the URIA represents a two-tier system that accommodates various levels of student experience. URIA students from one summer can feed into URPA the next summer. That is what happened to students Nelvin Thomas (U. of Virgin Islands) and Vincent Davis (Elizabeth City State University) who attended URIA at SCSU in the summer of 2000 and went to KPNO in 2001. The five students carried out research on: field testing a new camera system for wide-field asteroid searches, solar physics, classification of variable star light curves from data collected by the MACHO
project and testing of materials to be used in a new generation of cryogenically cooled CCDs.

Milestone 2B was NOT achieved for the following reason:

- Incremental funding by the funding agency meant that insufficient funds were available when it was time to recruit high school teachers and students in the spring of 2001. In fact, the necessary funds were not available until August 2001. This was too late to begin a 10-month research project, so Academy II was cancelled. The Academy II program proposed to set up teams of high school students to conduct research under the guidance of a high school teacher and the science faculty at SCSU.

Milestone 3A was achieved through the following activities:

- A total of nine SCSU faculty members and two high school teachers attended a workshop at Tennessee State University NRTS in November 2000. During the workshop, they received training in the use of the “Explorers of the Universe” website as well as exposure to the metacognitive tools known as the Concept Map and the Vee Diagram. That trip was partially funded out of the first CNRT IRA.
  - Under the new CNRT IRA, Walter and two other physics faculty members have applied these concepts to courses in the teaching of quantum mechanics, science for education majors, physics for education majors, physical science for non-science majors and a space science seminar course (a total of 5 courses and 53 students).
  - The Concept Map was used on the CNRT URIA research students during the summer of 2001 and by the SCSU NASA PAIR students to improve their conceptual understanding of their research projects (a total of 22 students).

- CNRT funded travel for three SCSU faculty members to the NASA NOVA workshop in February 2001, and CNRT assisted in the writing of the SCSU NASA NOVA proposal that was submitted in June of 2001. The proposal received was rated a “very good” proposal, but was not funded by NOVA because the education Co-I was not from the Department of Education. The team intends to submit again using a new, science education faculty member on the team.

- CNRT funded travel for the CNRT Co-I for Education to the national NASA ERC meeting in Ohio including a visit to the Glenn Research Center.

- CNRT funded travel for the CNRT Co-I for Student Research to the American Association of Physics Teachers in Philadelphia in January 2002 where he presented a paper.

Milestone 3B was achieved through the following activities:

- The SCSU NRTS funded a total of two SCSU preservice teachers during the past year. Their projects included:
  - One student intern worked at the SCSU Math/Science Hub, an NSF-funded resource center for K-12 teachers. He was involved with the
preparation for and the implementation of teacher workshops in the areas of science, mathematics and technology. He was also in charge of cataloging and organizing resource materials from NASA and other sources, including those materials inventoried as part of the SCSU NASA Educator Resource Center on campus. He was also trained in the operation of the StarLab Portable Planetarium and assisted teachers with its use.

- One education major, who will graduate in May 2002, participated in the middle school science day camp known as Academy I (see below). She was in charge of a group of five students who were part of a larger group of 20 students. These students spent two weeks studying the solar system, learning about careers in science and engineering and developing computer skills such as learning how to prepare and present in PowerPoint.

Milestone 4 was achieved through the following activities:

- The scheduling of a spring technical assistance workshop was not possible during Year 6 because of the delays in funding until more than half the award year was completed. Plans were underway for CNRT to conduct a fall, grant writing workshop in support of the NASA CIPA grants; however, a poll of potential attendees showed that most schools either would not attend or were not qualified for CIPA. Finally, the events of September 11, 2001, but a damper on travel. As a result, a series of smaller workshops and one-on-one assistance were provided by the CNRT.
  - CNRT webcast the live NASA coverage of the total solar eclipse in Africa on June 21, 2001. A total of 2 college faculty members, 3 college staffers, 15 college students and 1 precollege student attended.
  - Two high school teachers were funded by CNRT to attend the Elizabeth City State University NRTS workshop, Earth System Science Academy, which covered a variety of earth science topics related to environmental science and wetland ecosystems.
  - The CNRT collaborated with the SCSU OSS Minority Initiative grant and the SCSU Math/Science Hub to hold a 1-week intensive space science workshop for teachers in grades 6-12 during July 2001. In order to include the required number of contact hours for a 3-credit course, the teachers met most days from 8:30 am to 9:30 pm. Each day of the week a different space science theme was covered (e.g. Sun-Earth Connection). A typical day included science content and web searches by Dr. Walter as well as hands-on activities lead by the CNRT Co-I for Education, Dr. Linda Payne, and a middle school teacher with previous experience in space science. The teachers were given a significant amount of NASA handouts, lithographs, CDs and other resources. The hands-on activities were chosen so that they both highlighted important astrophysical concepts and could be easily reproduced in the classroom. At a Saturday session in the fall of 2001, each teacher discussed how they implemented the concepts they learned into the classroom.
    - One of the teachers from the summer workshop was given a NASA Radio Jove Kit (funded by SCSU’s NASA PAIR project) for her high
school astronomy club, which they setup and acquired radio
observations of Jupiter and the Sun,
• Three teachers from the summer workshop and Dr. Linda Payne
presented a workshop on space science at the South Carolina Science
Council meeting in November 2001. Over 1,000 science educators
attend this event each year. The space science workshop was filled
beyond the limit of 25.
• In planning for a grant-writing workshop, we spoke with a number of our
current and former partner schools and met with some of them one-on-one to
assist in the writing and review process.
  o Claflin University
    • Applied for a NASA CIPA grant with technical assistance in the
writing and review phase provided by SCSU and Ms. Valerie
Thomas, Education Consultant to the MU-SPIN office.
  o Allen University
    • Already has a NASA CIPA grant, therefore not eligible in 2001.
    • SCSU held a one-on-one meeting with a science faculty
member from Allen and Dr. Willease Sanders, a grant writer and
Allen’s NOVA Co-I. The two schools made plans to write an
IDEAS grant with SCSU’s Dr. Walter the Science Co-PI and
Allen’s faculty member the Education Co-PI. Allen was to be
the lead institution. SCSU provided Allen with copies of a past
SCSU NASA proposal and budget to serve as a starting point in
their writing. Unfortunately, during a time of uncertainty due to a
change in the presidency of Allen, the proposal did not receive
administrative approval so it was not written.
  o Edward Waters College
    • They were not eligible for the NASA CIPA.
    • We suggested they write and submit a NASA NOVA proposal
but have not heard from them.
  o Morris College
    • Since they were eligible for NASA CIPA, we traveled to Morris
and met with two faculty members who seemed interested in
writing a grant. We provided them with a copy of one of our
successful NASA grants to serve as a starting point in their
writing. However, several weeks later they informed us that
they were not going to write a proposal since their Dean had
recently passed away and they were encountering resistance to
their ideas within the department.
  o Voorhees College
    • Note eligible for NASA CIPA
    • With regard to a rewrite and submission of their previous
attempt at a NOVA proposal, they were unable to do so in the
fall of 2001 since they experienced turnover in the campus
administration with the retirement of their president. We will
work with them in the spring of 2002 to carry out this rewrite.
• SCSU partnered with the College of Charleston in 2001 to win a 5-year Broker/Facilitator award from NASA’s Office of Space Science. The College of Charleston is the lead institution for the SouthEastern Regional Clearing House (SERCH) and SCSU is funded under a subcontract for $38,500 per year for each of five years. SCSU, with Dr. Walter as the Co-PI, will be responsible for conducting workshops and other activities which will increase minority participation in SERCH and OSS programs.

• Dr. Dan Smith, CNRT Co-I for Student Research, submitted a curriculum enhancement proposal to the NSF for $2.5 million. The “HBCU-UP” program is designed “…to enhance the quality of undergraduate science, mathematics, engineering and technology (SMET).” The status of his proposal is pending.

• The first ever SCSU FAR proposal was submitted by a chemistry professor in July 2001. The status of the proposal is unclear at this time. The CNRT, with assistance from the MU-SPIN Office, established a contact at the Glenn Research Center with a research chemist who was interested in collaborating with the SCSU faculty member.

• SCSU’s first ever NASA NOVA proposal was submitted in June 2001 and, as discussed above, was judged to be a very good proposal, but was not approved because the Co-I for education was not a member of the SCSU Department of Education. SCSU was encouraged by the NOVA reviewers to submit again. A new science-education faculty member was recently hired and has expressed an interest in working with the physics faculty on their resubmission.

• SCSU, with Dr. Walter as PI, submitted its first ever IDEAS grant to the Space Telescope Science Institute (STScI) in October 2001. The proposal is still pending. SCSU is asking for two years of funding from STScI to expand their MU-SPIN Academy I program for middle school students from a 2-week day camp to a residential program.

• Dr. Walter has also submitted a grant to the South Carolina Space Grant Consortium (in collaboration with Dr. Richard Gelderman from Western Kentucky University) for funds to partially support a postdoctoral research assistant. The status of the proposal is pending.

• Two other physics faculty members at SCSU submitted proposals to the South Carolina Space Grant Consortium. For one of the faculty members, this was the first proposal of any kind he had written. The status of these proposals is pending.

Other Activities
• The CNRT lab and staff provided technical and/or administrative support for all NASA programs housed in the science building including the following funded projects: MASTAP, PAIR, Space Grant, OSS Minority Initiative, a subcontract with the Tennessee State URC, OSS Broker/Facilitator, ERC, Space Telescope Science Institute research and the group attempting to obtain a NOVA grant.
• The CNRT Co-I for Student Research is working with a computer science major to develop a variety of web-based activities and exercises related to cosmology. The student is learning how to write in Java as well as being exposed to different opportunities not normally available to SCSU students in his field.
• An SCSU student majoring in nuclear engineering tested various PC-based and UNIX-based image processing packages. The results of his work will assist the CNRT in future workshops.
• A total of seven SCSU students were funded to serve as lab monitors. In addition to being concerned about the security of the lab, these students are exposed to multimedia and web-based resources that they might not normally encounter.
• The CNRT provides ISDN group videoconferencing, multimedia and web support for science faculty members in Biology, Chemistry and Physics.
• The CNRT lab is open during normal working hours throughout most of the year. This means that both walk-ins and classes with reservations use the lab extensively. It is the only computer lab in the science building and is used extensively by science majors and students enrolled in science classes. A total of more than 5,000 students use the lab as walk-ins during the year.
• Faculty members reserve the use of the CNRT lab for their classes. A partial list of courses which used the lab on a regular basis during the past year include Physical Chemistry, Genetics, General Physics, Quantitative Analysis Ecology, Introductory Biological Science, Mammalian Anatomy and Inorganic Chemistry. Not counting repeat use by the same class, annually over 1,000 students and faculty used the facility for in-class sessions.
• The CNRT videoconferencing equipment is currently used infrequently but is an important resource. The Dean of the School of Engineering Technology and Sciences uses it on a monthly basis for videoconferencing with the University of South Carolina and the Medical University of South Carolina as part of a collaborative NIH grant among the schools.
• A distance learning course in Art Appreciation used the CNRT videoconferencing lab this past year.
• Faculty members in Biology, Chemistry and Physics use the color printers and scanner as well as CD writers and other CNRT lab resources for their proposal writing, reports and coursework.
• The CNRT technical support staff member is partially funded by MU-SPIN. He provides extensive support for all the NASA projects at SCSU and limited technical support to other science projects and faculty.