



The Space Congress® Proceedings

1998 (35th) Horizons Unlimited

Apr 29th, 8:00 AM

Paper Session II-D - The Space Life Sciences Training Program, Preparing For Tomorrow Today

Shannon Potter

Outreach Project Manager, Science and Flight Experiments Office, NASA/ KSC

Follow this and additional works at: <http://commons.erau.edu/space-congress-proceedings>

Scholarly Commons Citation

Shannon Potter, "Paper Session II-D - The Space Life Sciences Training Program, Preparing For Tomorrow Today" (April 29, 1998).
The Space Congress® Proceedings. Paper 17.

<http://commons.erau.edu/space-congress-proceedings/proceedings-1998-35th/april-29-1998/17>

This Event is brought to you for free and open access by the Conferences at ERAU Scholarly Commons. It has been accepted for inclusion in The Space Congress® Proceedings by an authorized administrator of ERAU Scholarly Commons. For more information, please contact commons@erau.edu.

EMBRY-RIDDLE
Aeronautical University,[™]
SCHOLARLY COMMONS

The Space Life Sciences Training Program, Preparing For Tomorrow Today

**Shannon Potter, Outreach Project Manager
Science and Flight Experiments Office, NASA/KSC**

The goal of NASA's Space Life Sciences Training Program (SLSTP) is to attract the country's brightest undergraduate students, and expose them to exciting research and career opportunities available in Space Life Science disciplines. A primary objective of the program is to influence the career paths of the students early in their education. SLSTP has been successfully meeting that objective since its inception in 1985. Eighty-five percent of the students in the SLSTP Class of '97 reported that the program has influenced their choice of career paths. SLSTP is sponsored by NASA Headquarters' Life Sciences Division (Code UL) and Office of Equal Opportunity Programs (Code E). Kennedy Space Center (KSC) hosts the program, educating approximately 40 students each summer. KSC and Florida A&M University (FAMU) work as partners to implement SLSTP.

Introduction

NASA and the Nation's education system maintain a symbiotic relationship. NASA depends on the education system to produce skilled, knowledgeable workers. The education community uses NASA to motivate and encourage students to study science, mathematics, engineering and technology.

SLSTP is an intensive six-week training program designed to develop a cadre of scientists and engineers to support future space life sciences and engineering challenges. Undergraduate students from universities across America compete to fill the 40 positions available each summer at the KSC. Students in disciplines associated with the sciences, medicine and engineering typically participate in the SLSTP. The program introduces students to the range of space life sciences and the processes involved in conducting life science experiments in space. KSC educates students by providing hands-on laboratory research activities, tours, lectures and team-building exercises. Throughout the course, students discover that teamwork is an essential ingredient to success.

Implementation Methods

Strategic implementation methods contribute to the SLSTP's success. NASA employs techniques such as goal sharing, partnering, and leveraging and integrating existing resources to implement the SLSTP. These methods are used to fund and manage the SLSTP, recruit students and support personnel, plan and execute the course, and prepare future professionals for successful careers in the Space Program.

Goal Sharing

SLSTP's goals coincide with those of its sponsors and customers. The primary goal of SLSTP is to develop qualified scientists and engineers who will choose careers in the Space Program. In the process of achieving that goal, the SLSTP helps NASA and the Nation's education system achieve numerous goals. These goals include increased cultural diversity, aca-

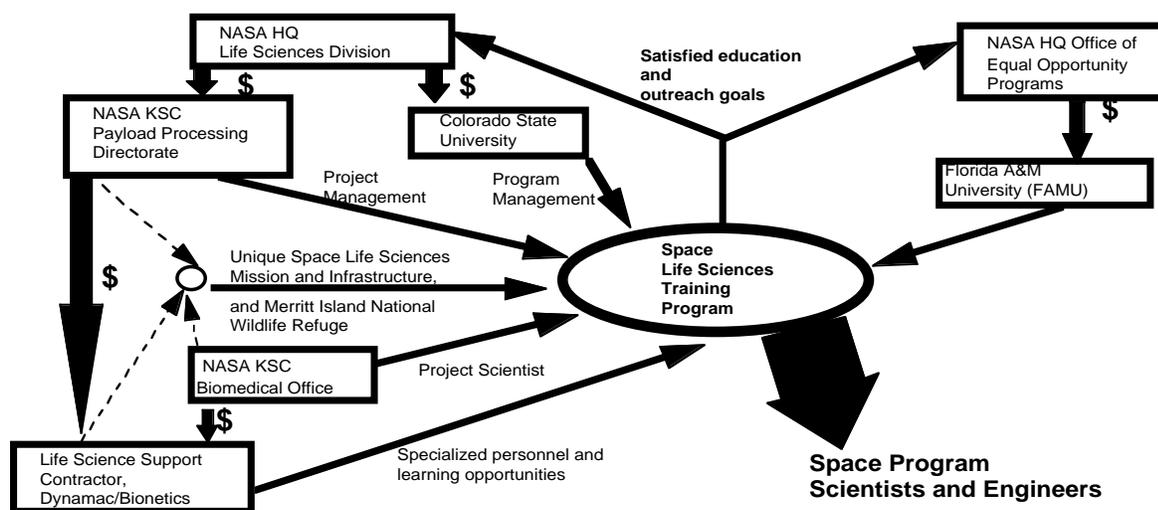
democratic excellence, enhancing the scientific and technical competence of all Americans, and expanding access to and understanding of NASA's activities and associated benefits.

FAMU's involvement in SLSTP is crucial to achieving many of the goals. In conducting the logistical aspects of the SLSTP, FAMU actively recruits students of cultural, racial, ethnic and geographic diversity, and consistently attracts some of the country's brightest students to the SLSTP. Each year, FAMU hires Project Counselors from universities around the country to help with logistical and curricular activities of the course. FAMU also maintains a Student Summary Profile to track metrics such as ethnicity and gender statistics of students (from 1985 to present), and the career paths of SLSTP graduates.

Leading educators agree that students learn best in an environment where they are allowed to discover answers through inquiry, by making observations and collecting data. Excellence in science education requires lessons be stimulating, engage the students' interests, and involve their minds and hands. The SLSTP's excellent science education opportunity is made possible by the qualified, dedicated employees of the Dynamac and Bionetics Corporations who provide interesting laboratory projects for students. Through their lab experiences, students learn first hand whether they have the aptitude, not just the intelligence, to be successful in their chosen fields of study. That lesson is invaluable to students and their future employers, and can not be learned from textbooks and academic lectures.

The SLSTP course enhances the scientific and technical competence of the participating students. It also exposes students to a variety of NASA activities, and the benefits of the Space Program. The knowledge reaches far beyond the students. Because the SLSTP experience is so meaningful to students, the graduates become ambassadors, conveying the knowledge to people in their hometowns and universities. Many alumni also enjoy carrying the lessons back to elementary and secondary schools in their areas. Because the students are recruited from diverse geographic regions, the scientific and technical competence of a broad range of Americans is enhanced, and messages describing the activities and benefits of the Space Program are delivered to constituencies far from KSC.

Figure 1: The SLSTP Infrastructure



Partnering

Partnering occurs in all phases of SLSTP, from funding through execution. SLSTP is jointly funded by two offices in NASA Headquarters, the Life Sciences Division (Code UL) and the Office of Equal Opportunity Programs (Code E). The Life Sciences Division funds KSC to apply its unique Space Life Sciences infrastructure and resources to SLSTP. The Life Sciences Division also provides for SLSTP Program Management via a grant to Colorado State University. The Office of Equal Opportunity Programs funds Florida A&M University (FAMU) to implement the logistical aspects of SLSTP. KSC and FAMU work as partners to plan and execute SLSTP each year. KSC civil servants and contractors form many partnerships throughout SLSTP. The civil servant partnership consists of a SLSTP Project Manager from the Payload Processing Directorate, and a Project Scientist from the Biomedical Office. The KSC Life Science Support Contractor, Dynamac Corporation, and its sub-contractor, the Bionetics Corporation, partner with NASA to provide a curriculum coordinator, SLSTP Principal Investigators, and various support personnel.

Leveraging and Integrating Existing Resources

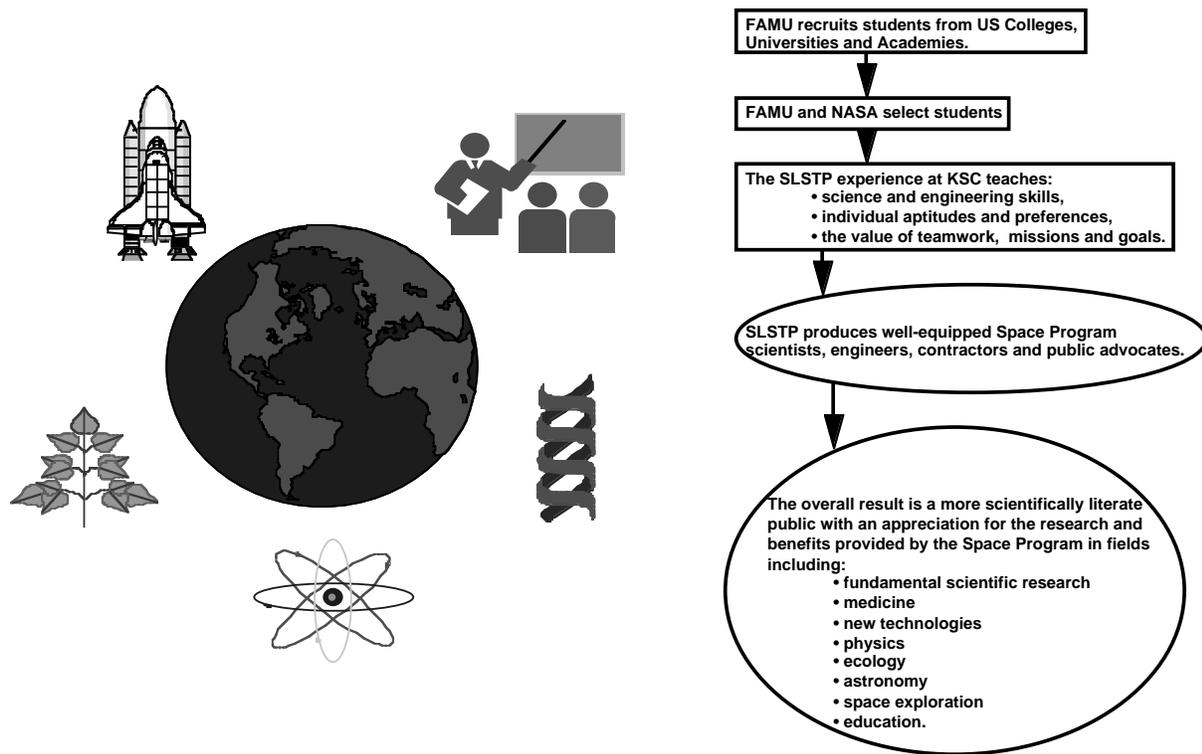
A NASA Headquarters Life Sciences Division policy states that effective outreach and education programs are to be an integral part of NASA's mission. Every NASA manager, scientist, engineer, grantee, and contractor is responsible for the success of these programs. The SLSTP provides the KSC Life Sciences community a mechanism for complying with that policy. KSC integrates existing personnel, facilities, research activities, and mission related ground and flight projects to educate SLSTP students. KSC also integrates research activities performed by its cohabitant, the Merritt Island National Wildlife Refuge, into SLSTP.

KSC invites scientists, engineers and educators from various NASA centers, professors from academia, researchers from within the global Life Sciences community, and representatives from government and industry to participate in SLSTP as lecturers. The diverse lectures provide students a glimpse of the Space Program's complexity, and insight into the variety of careers enabled by the Space Program.

The curriculum for the six week training program integrates lab work, lectures and tours to provide a unique educational experience for the students. Each student selects a lab project from one of four areas: Space Biology, Advanced Life Support, Ecology, and Flight Preparation Operations. Throughout the course, experienced scientists and engineers from the Dynamac and Bionetics Corporations serve as SLSTP Principal Investigators (PIs), preparing and guiding students' lab activities. Prior to the course start date, each SLSTP PI typically devises candidate projects that enable students to help the PI accomplish specific research or experiment objectives relevant to the PI's ongoing work projects. Students normally perform research for these projects in existing laboratories and ecological fields. If necessary, PIs configure labs specifically for SLSTP activities.

By leveraging its unique resources, the KSC Space Life Sciences community uses its exciting mission, and its infrastructure of diversified facilities and outstanding personnel as effective vehicles for implementing the SLSTP. This approach exposes bright, impressionable undergraduate students to exciting career opportunities in the Space Program, and results in an influx of students who choose careers in the Space Program. It produces not only a well equipped resource pool for the Space Program, but also increases the scientific literacy of the general population.

Figure 2: The SLSTP Implementation Process



Ensuring Continued Success

Measuring and Improving

As with any program, the SLSTP must continue meeting customer's needs to remain successful. The SLSTP has a variety of customers including the Life Sciences Division, the Office of Equal Opportunity Programs, the participating students, American taxpayers, and the KSC and FAMU scientists, engineers, managers and support personnel who make SLSTP possible. The SLSTP uses numerous indicators to measure its effectiveness in meeting customers' needs. These include data from student surveys, goals and objectives of funding organizations, and data describing the post-graduate status of SLSTP alumni.

Student surveys show that SLSTP is meeting the students' educational needs. One of the questions on the student survey asks students to compare SLSTP to other educational experiences. From the Class of 1997 students, 55% responded "excellent", 35% responded "very good", 7.5% responded "good", and 2.5% responded "average". None of the students responded "poor". Since SLSTP students represent a pool of academically excellent students, these percentages show that SLSTP offers one of the country's best undergraduate educational experiences. Surveys also provide an effective tool for identifying improvement opportunities. The primary critique cited by the 1997 students was that they did not have enough time to complete research projects in the laboratories and while conducting field research. The majority of the SLSTP Principal Investigators agreed, and the SLSTP curriculum plan for 1998 reflects a significant increase in students' lab time.

Another effective indicator for the SLSTP is found in the methods whereby SLSTP meets the education and outreach objectives of its customers.

Table 1: The SLSTP Meets Customers Goals

Customer(s)	Objective	SLSTP Method of Satisfying Goal
Life Sciences Division	Increase public awareness and appreciation of the scientific rationale and public benefits of space life sciences research and technology development.	Equip students to be ambassadors conveying the knowledge they gain through SLSTP experiences to other students, educators and taxpayers.
Life Sciences Division	Use the excitement of ground- and space-based research and engineering to support and enhance education at all levels (K-12 students and faculty; community college students and faculty; baccalaureate college and university undergraduate, graduate and postgraduate students, faculty and researchers).	Integrate college-aged students into existing research and engineering activities; support students' efforts to transfer the knowledge gained to K-12 students in their communities.
Life Sciences Division	Maintain the quality of ongoing programs and improve coordination between the life sciences community and education opportunities sponsored by NASA and other federal, state, and local organizations.	Wherever feasible, use resources from other NASA sponsored programs (e.g., SIFT, MARS, NRC, graduate students, summer faculty, interns, etc.) to help teach and guide SLSTP students.
Life Sciences Division	Improve intercenter and intracenter communication and coordination among space life sciences and other NASA organizations to increase the combined effectiveness of all NASA outreach programs and to enhance the transfer of information, knowledge, and technology.	SLSTP uses a variety employees from many NASA organizations, within and external to KSC, within and external to the Life Sciences community, to provide lectures to SLSTP students.
Life Sciences Division	Strengthen program partnerships (with complementary or congruent goals and objectives) between the NASA life sciences community and other federal agencies, state and regional organizations, science and engineering technical societies, academic, non-profit, and commercial organizations.	SLSTP has strong ties with the American Society for Gravitational and Space Biology. SLSTP alumni present papers describing the research they performed during the course, and interact with NASA-sponsored scientists each year at the ASGSB annual meeting. The SLSTP is planning to hold an alumni symposium to coincide with ASGSB's 1999 meeting.
Life Sciences Division and Office of Equal Opportunity Programs	Develop and implement programs that encourage women, underrepresented racial and ethnic minorities, differently abled individuals, and all other underserved groups to become active participants in the space life sciences enterprise and assume their role as stakeholders.	As one of the Nation's Historically Black Colleges and Universities (HBCUs), FAMU actively recruits various minorities for SLSTP. Recent student surveys show the SLSTP influenced the career paths of 76% in 1995, 92% in 1996, and 85% in 1997.
Life Sciences Division	Ensure that measurement and evaluation procedures are developed and implemented to assess the effectiveness of CODE UL outreach and education efforts in an accurate and timely manner.	SLSTP management analyzes student surveys, and gathers input from KSC and FAMU personnel at the conclusion of each course. The data is used to make improvements prior to the next year's course.
U.S. Taxpayers	Improve the U.S. education system.	SLSTP provides a quality, unique, effective undergraduate educational experience that can benefit all levels of the education system.
KSC Life Sciences community	Comply with Life Sciences Division policy stating well-defined outreach and education efforts will be integral components of all Division-funded flight and ground-based activities.	SLSTP is integrated into CODE UL funded activities performed by the Life Science Support Contractor (LSSC).
KSC Life Sciences community	Increase public's awareness of the benefits of Space Life Sciences research.	SLSTP provides researchers a channel for communicating their work to a diverse public.
SLSTP students	Obtain a quality education that prepares individuals for successful careers.	SLSTP's unique program offers students skills for succeeding in their chosen careers, and increases students' awareness of career options.
Office of Equal Opportunity Programs	Employ and empower a competent and highly skilled workforce, representative of America's great diversity, to accomplish NASA's mission.	SLSTP's students represent America's diversity. The SLSTP experience improves their competencies and skills, and prepares them for successful employment.
Office of Equal Opportunity Programs' Minority University Research and Education Division (MURED)	Formulate and execute NASA's MURED budget, develop policies, procedures and guidelines that enhance the involvement of HBCUs and Other Minority Universities (OMUs) in NASA's mission.	FAMU, an HBCU, is an essential element of SLSTP. FAMU promotes SLSTP, establishes student selection criteria, recruits students, processes student applications, assists with student travel, arranges local accommodations, social activities, transportation and supervision, and maintains Student Summary Profiles.
Office of Equal Opportunity Programs' Minority University Research and Education Division (MURED)	Increase the Agency's responsiveness to Federal mandates related to Historically Black Colleges and Universities (HBCUs) and Other Minority Universities (OMUs).	FAMU actively recruits students from HBCUs, Hispanic Serving Institutions and Tribal Colleges and Universities.

One of the most important indicators for SLSTP is reflected in the data describing the activities of SLSTP alumni, as documented by FAMU in the SLSTP Student Summary Profiles. Former SLSTP participants are associated with an array of activities related to the Space Program, such as:

- engineering work with JPL on the Mars Pathfinder project
- consulting with Lockheed Martin Corporation, Aeronautics Sector on the X-33/RLV Program
- researching changes in the Central Nervous System during long term space flight
- rewriting Medical Standards for Selection and Retention of Astronauts
- receiving NASA Space Grant Fellowship at MIT for Lunar/Mars Micro-Rover control
- researching Robotics for NASA/JPL
- participating in various NSCORT Programs
- flying two experiments on Space Shuttle and one on MIR Space Station
- analyzing brine shrimp data from Space Shuttle experiment
- planning missions for JPL, and authoring Rise from Earth
- receiving NASA Graduate Student Research Program fellowship from NASA/ARC, to describe spaceflight and simulated spaceflight effect on bones
- working on satellite remote sensing for terrestrial ecosystem management with Oak Ridge National Lab, NASA/GSFC
- researching Space Medicine Microgravity-related cardiovascular activities
- designing hardware for JPL's High Resolution Microwave Survey
- interning with MIT's Center for Space Research in the area of Theoretical geoplasma physics
- participating in NASA/Langley and George Washington University Joint Institute for the Advancement of Flight Science
- aerospace engineering work with Bioserve Space Technologies
- interning with JSC and KSC
- receiving NASA GSRP Fellowship and NASA/GSFC Director's Discretionary Fund Award
- bioengineer work for Lockheed Martin providing flight crew support in NASA's Anthropometry and Biomechanics Facility
- researching the effects of gravity on the growth of oxide single crystals at MIT
- flying experiments on the KC-135 aircraft.

These indicators show that SLSTP offers a high Return on Investment to its sponsors and customers.

Remaining Relevant in a Dynamic Environment

SLSTP must stay relevant to the needs of the Space Program in order to enjoy continued success. SLSTP management must remain cognizant of incipient trends in the Space Program, and sensitive to the effects of Public opinion on NASA appropriations activities.

One current Space Program trend is to internationalize programs. SLSTP's current charter requires students be American citizens. However, since internationalization is a worthwhile goal, SLSTP management has begun to discuss ways to internationalize SLSTP while enhancing the educational experience and career opportunities of the American students.

The Space Program profits when the general public understands and appreciates the benefits of its activities. SLSTP graduates make excellent ambassadors, conveying that information to many people. They represent diverse ethnic populations and geographic regions, and they are enthusiastic about the Space Program and its mission and benefits.

Formalizing an Alumni Association

The synergy enabled by a formal SLSTP Alumni Association would extend SLSTP's out-reach effects. It would better equip the former students to carry the knowledge of Space Life Sciences research benefits to their communities. It would also ensure the communication between alumni and NASA remains current and valuable. SLSTP management is working with alumni to help them organize and formalize an SLSTP Alumni Association, which will benefit the Space Program and the former students.

Conclusion

NASA's Life Sciences Division and Office of Equal Opportunity Programs sponsor SLSTP to expose bright undergraduate students to exciting research and career opportunities available in Space Life Science disciplines. Thanks to the dedication and support of numerous professionals, the SLSTP has been successfully influencing the career paths of those students since its inception in 1985. NASA will continue to use this successful program to help build a solid space future.

Additional SLSTP Information

Additional information about the SLSTP can be obtained by emailing any of the contacts, or referring to the internet sites.

Contacts

Dr. Tom Dreschel
Dynamac Corporation
SLSTP Curriculum Coordinator
thomas.dreschel-1@ksc.nasa.gov

Dr. Carl Goodman
FAMU
SLSTP Director
cgoodman@famuedu

Ms. Shannon Potter
NASA/KSC
SLSTP Project Manager
shannon.potter-1@ksc.nasa.gov

Internet Sites

- <http://atlas.ksc.nasa.gov/education/general/slstp.html>
- <http://atlas.ksc.nasa.gov/education/general/educate.html>
- <http://www.famu.edu/copps/slstp/index.html>
- <http://nesc.me.utexas.edu/~hhuang/SLSTPHome.html>
- <http://stellar.arc.nasa.gov/SLSNews/Spring96/Training.html>
- <http://stellar.arc.nasa.gov/dedekian.html>
- <http://149.84.65.231/students/korwinml/myabode.html>
- <http://www.hq.nasa.gov/office/codee/index.html>
- <http://www.hq.nasa.gov/office/olmsa/lifesci/index.htm>

Acronyms and Abbreviations

- Code E - The NASA Headquarters Office of Equal Opportunity Programs
- Code UL - The NASA Headquarters Office of Life and Microgravity Science Applications' Life Sciences Division
- FAMU - Florida Agricultural and Mechanical University
- GSFC - Goddard Space Flight Center
- GSRP - Graduate Student Research Program
- HBCU - Historically Black Colleges and Universities
- JPL - Jet Propulsion Lab
- JSC - Johnson Space Center
- KSC - Kennedy Space Center
- MARS - Mission to America's Remarkable Students
- MIT - Massachusetts Institute of Technology
- LSSC - Life Science Support Contractor (the Dynamac and Bionetics Corporations)
- MURED - The NASA Headquarters Office of Equal Opportunity Programs' Minority University Research and Education Division
- NASA - National Aeronautics and Space Administration
- NRC - National Research Council
- NSCORT - NASA Specialized Centers Of Research and Training
- OMU - Other Minority Universities
- RLV - Reusable Launch Vehicle
- SIFT - Summer Industrial Fellowship for Teachers
- SLSTP - Space Life Sciences Training Program