

Louisiana Space Consortium  
Louisiana State University  
Dr. John P. Wefel  
225-578-8697  
<http://laspace.lsu.edu/>

## **PROGRAM DESCRIPTION**

The National Space Grant College and Fellowship Program consists of 52 state-based, university-led Space Grant Consortia in each of the 50 states plus the District of Columbia and the Commonwealth of Puerto Rico. Annually, each consortium receives funds to develop and implement student fellowships and scholarships programs; interdisciplinary space-related research infrastructure, education, and public service programs; and cooperative initiatives with industry, research laboratories, and state, local, and other governments. Space Grant operates at the intersection of NASA's interest as implemented by alignment with the Mission Directorates and the state's interests. Although it is primarily a higher education program, Space Grant programs encompass the entire length of the education pipeline, including elementary/secondary and informal education. The Louisiana Space Consortium (LaSPACE) is a Designated Consortium funded at a level of \$785,000 for fiscal year 2009.

## **PROGRAM GOALS**

During 2009 the LaSPACE Goals and Objectives were reformulated into five separate areas consistent with the NASA Education Strategic Coordination Framework. These reformulated objectives, organized by the NASA Education Framework outcomes, are listed as follows.

**NASA Education Outcome 1:** Contribute to the development of the STEM workforce in disciplines needed to achieve NASA's strategic goals (Employ & Educate)

LaSPACE Objective 1: Facilitate Academic Achievement by supporting Graduate Student Fellows, graduate student research assistance, undergraduate research awards, Minority Research Scholars and student research involvement programs on HBCU campuses

LaSPACE Objective 2: Foster Aerospace R & D by supporting research enhancement awards and unsolicited research projects as scheduling and resources permit.

LaSPACE Objective 3: Train the Future Workforce by supporting the LaACES and HASP student ballooning research programs, student internships at NASA centers or related facilities, MoonBuggy student team at SUBR, and assist aerospace senior design projects.

**NASA Education Outcome 2:** Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty (Educate & Engage)

LaSPACE Objective 4: Contribute to STEM Education by principally building content knowledge and skills among K-12 STEM educators including supporting such educators to attend teacher enhancement workshops, training and, in particular, certification for the pre-engineering teachers at SMHS, the LaSPACE / NASA Michoud Education Fellows Program and the Sci-Botics teacher training initiative through Sci-Port.

NASA Education Outcome 3: Build strategic partnerships/ linkages between STEM formal/ informal education providers that promote STEM literacy / awareness of NASA's mission (Engage & Inspire)

LaSPACE Objective 5: Engage the Community by working with the BREC Highland Road Park Observatory and supporting the MARS vehicle for school visits, public events and IYA activities plus working with the IDEAS Place science / hands-on exhibits.

### PROGRAM/PROJECT BENEFIT TO OUTCOME (1,2, OR 3)

Dr. Maud M. Walsh, at Louisiana State University, completed a research project to study microbial signatures in 3.4 billion year old Earth rocks and assess implications for astrobiology. Over the course of this research Dr. Walsh established a successful collaboration with Dr. Sherry Cady at Portland State University and visited Alexandra Davatzes at NASA Ames to discuss the research. A series of new techniques for such analyzes were successfully developed, two new follow-on proposals were submitted to NASA and Dr. Walsh co-edited a book volume titled *From Fossils to Astrobiology* and contributed a volume chapter. (Benefit to Outcome 1)

Students Jessie McCormick and Kay Pouriraji completed a LURA project with mentor Dr. Scott Gold at Louisiana Tech University to study novel fuel cell catalysts using polypyrrole to enhance the activity of traditional metal catalysts. Both students have graduated in 2009 and are now employed in a STEM industry position. Commenting about the LURA experience Jessie stated *"This experience helped me to figure out my career path and goals."* and Kay said *"Working with advanced technology in efforts to better the future has been a great privilege and learning experience"*. (Benefit to Outcome 1).

The Barksdale Sci-Botics Teacher Education Program was first held during the summer of 2009. This program for 20 north Louisiana middle school teachers was designed to improve the teachers' ability to embrace robotics and create a pipeline of students for local high school robotics programs. The summer program included 35 contact hours during which the teachers visited Barksdale Air Force Base, learned how to use a LEGO NXT kit as well as how to develop robotic project for use in enhancing STEM education in the classroom. Pre- and Post- testing showed that all teachers gained knowledge of robotic and a typical teacher response to the workshop was *"Excellent and very informative. I feel prepared to guide my students because of this class."* (Benefit to Outcome 2).

## **PROGRAM ACCOMPLISHMENTS**

Outcome 1: We graduated two Fellowship students in FY09, one to a post-doctoral position and the other to STEM employment. The remaining Fellows made good progress and we anticipate additional graduations next year. In addition, we were able to help six promising graduate students through the GSRA program.

A big success was the new Institutional Scholars program at Xavier and the Timbuktu Academy at Southern University which supported ~20 new under-represented students, thereby addressing the diversity issue. In addition, we had increased applications for the Minority Research Scholars sub-program and were successful in supporting a half dozen student-faculty teams through the LURA research mentoring process. Finally, Louisiana students were selected for summer internships at GSFC and MSFC.

The Research Infrastructure component had another banner year with seven new REA awards plus several URP projects. These led to significant publications and presentations plus follow-up funding. One of the teams moved up to win a NASA EPSCoR Research Award. The research component attracted ~\$500K in non-federal support (with a SG commitment of \$34K) making it a major part of our matching component, and demonstrating the leveraging that occurs in the LaSPACE program.

Our student experiment programs had another year of successful flights, HASP in September, LaACES in May and PACER Advanced ACES in July. This year we were forced by NASA to abandon CSBF and successfully mounted our sounding balloon flights from Lubbock and Sulphur Springs, TX (we are grateful for the hospitality provided by Texas Tech University and Aerostar Corp.) Despite landing in a water-trap, the student learning experiences were exceptional.

We piloted a new Consortium Sustaining Grants (CSG) program which proved popular and successful. This both increased participation by consortium members and brought additional student researchers into the overall program.

Outcome 2: LaSPACE joined the advisory council for the Academy of Engineering (AoE) at the (mainly minority) Scotlandville Magnet High School (SMHS) in order to further their pre-engineering program which feeds students, primarily, to the Engineering schools at Southern University and LSU. We were able to enhance the training of the pre-engineering teachers through sending them to workshops/courses sponsored by AoE. The teachers returned 'invigorated' with new ideas that were then incorporated into the curriculum for the school year. In addition, SMHS is fielding a HS team for the Great Moonbuggy Race (with technical assistance from the universities and local industry).

Our NASA / LaSPACE Michoud Education Fellows project completed a second year with teachers from St. Tammany Parish developing (and using) curricular materials based upon their experience at Michoud over the summer. The videos of the classroom

activities that they prepared were outstanding. We hope to expand the program to include the Zachary School District in the next year.

Through our new affiliate, SciPort: The Louisiana Science Center, we organized the Barksdale Sci-Botics Teacher Education program mentioned earlier, which added a new dimension to the LaSPACE K-12 teacher training initiative. In addition, SciPort also offered “To the Stars: Moon Rocks, Mars and Beyond” to 20 pre-dominantly middle-school educators, utilizing NASA solar system and Messenger Ambassadors and NASA MSFC educators. The key-note was Elaine Scott on tying together Science and Literacy. Finally, we were successful in having several Louisiana teachers selected for “LiftOff-09” sponsored by NASA JSC and the Texas Space Grant Consortium.

Through these new / expanded programs, we have more than tripled the number of pre-college educators undergoing training.

Outcome 3: We continue to work with Activity Station, a hands-on Science exhibition, at the IDEAS Place on the LaTech campus in Ruston, LA. This science exploration activity attracted over 13,000 students via field trips with one group coming from Arkansas. Further, we have continued to utilize the Mobile Astronomy Resource System (MARS) truck to reach venues in and around the Baton Rouge area.

### PROGRAM CONTRIBUTIONS TO PART MEASURES

- **Longitudinal Tracking:** During 2009 there were 106 students directly benefiting from LaSPACE programs, 88 of which are undergraduates and 18 are graduate students. Of these 39 were in the Fellowship / Scholarship category and 67 were in the Higher Education / Research Infrastructure category. Of the total number of students 31 are female and 50 are from under-represented groups. In the Fellowship / Scholarship category 19 are female and 26 are from under-represented groups. Eight (8) undergraduates finished their degree and have gone to graduate school for an advanced STEM degree. Three (3) graduates have found employment in aerospace industries, eight are employed by non-aerospace industries and three (3) are seeking employment.
- **Course Development:** No full courses were developed during FY09
- **Matching Funds:** LaSPACE achieved its matching fund commitment for FY09. Preliminary financial reports show a larger than required match, a leveraging of ~1.2:1 on the non-Fellowship portion of the NASA award.
- **Minority-Serving Institutions:** LaSPACE includes Dillard University, Grambling State University, Southern University – Baton Rouge, Southern University – New Orleans and Xavier University which are the major MSI = HBCU institutions in the state. During 2009 all these institutions returned to active status and we have initiated a number of programs to which these institutions have applied. In particular, during 2009 we piloted the Institution Scholars program at SUBR and Xavier in order to streamline selection, support and participation of minority scholars. We also continue

to support the Grambling participation in the PACER program as well as beginning two new institutions, Albany State University and Central State University, in the program. SUBR students continue to participate in the MoonBuggy competition as well as in the LaACES student balloon research program.

### **IMPROVEMENTS MADE IN THE PAST YEAR**

A singular and astonishing success over the past year has been to address the diversity issue identified in the 20<sup>th</sup> Year Evaluation PPR. In the LaSPACE Program Plan for FY09 we stated two major objectives: 1) Add one additional minority graduate student to the Fellows program and 2) Add at least five minority scholars to the undergraduate program. The first objective was achieved by awarding a Fellowship to Corey Baham who is working on a Masters degree in Computer Science at Southern University – Baton Rouge. Our second objective was greatly exceeded when we initiated the pilot Institutional Scholars program at Southern University and Xavier University, providing support for 20 new minority undergraduate scholars. An additional program we were able to pilot during 2009, the Consortium Sustaining Grant (CSG), accounts for another eight (8) minority undergraduate students. Thus, we were able to significantly improve our percentage of awards to underrepresented minority students from 15% in FY08 to 47% in FY09.

The consortium was augmented by the addition of Louisiana State University in Shreveport, and we developed a new partner, Jacobs Technology, who took over the support contract at the Michoud Assembly Facility.

We have also made progress on the longitudinal tracking issue identified in the LaSPACE Program Plan for FY09. An online website has been initiated where students can establish, access and update their current program, contact, graduate status and employment information status. This site was initially populated with available Fellowship / Scholarship student information, was used to collect information on the 2009-2010 LaACES and HASP student participants and, in part, to establish the student longitudinal tracking data provided in this FY09 performance report.

### **PROGRAM PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION**

Consortium members include colleges/universities [Research Intensive (RIU); Research Active (RAU); Four year institutions (4YI)], HBCU's, business/industry partners (B/I), state education boards (Ed), and non profit organizations (NPO), structured as Active Members (AM), and Inactive Members (IM). The LaSPACE Council, composed of the institutional representatives from each affiliate, provides advice and direction to LaSPACE management. During 2009 we held two LaSPACE Council meetings, one in May and one in December each with about 50% attendance, during which we discussed the 20<sup>th</sup> year PPR results, revised the LaSPACE Strategic Plan for the next five year period, established the CSG pilot on advice of the Council, heard a selection of student research projects and organized the Five Year Proposal writing / review activities for 2010.

Dillard University (Dillard)	AM, HBCU, 4YI
Grambling State University (GSU)	AM, HBCU, 4YI
Jacobs Technology, Inc.	AM, B/I
Louisiana State University Agricultural Center (LSU-Ag)	(Research and Extension) AM, RIU
Louisiana Board of Elementary & Secondary Education (BESE)	AM, Ed
Louisiana Board of Regents (BOR)	(Co-founding Institution) AM, Ed
Louisiana Business and Technology Center (LBTC)	AM, B/I
Louisiana State University and A&M College (LSU)	(Lead Institution) AM, RIU
Louisiana State University of Shreveport (LSU-S)	AM, 4YI
Louisiana Tech University (LaTech)	AM, RAU
Loyola University (Loyola)	AM, 4YI
McNeese State University (McNeese)	IM, 4YI
Nicholls State University (Nicholls)	AM, RAU
Northwestern State University of Louisiana (NWSU)	AM, 4YI
Recreation & Park Commission for the Parish of East Baton Rouge (BREC)	AM, NPO
Sci-Port Discovery Center (Sci-Port)	AM, NPO
Southeastern Louisiana University (SELU)	AM, 4YI
Southern University and A & M College (SU)	(Co-founding Institution) AM, HBCU, RAU
Southern University of New Orleans (SUNO)	AM, HBCU, 4YI
Tulane University (Tulane)	AM, RIU
University of Louisiana at Lafayette (ULL)	AM, RAU
University of Louisiana at Monroe (ULM)	AM, 4YI
University of New Orleans (UNO)	AM, RAU
Xavier University of Louisiana (Xavier)	AM, HBCU, RAU