



THE NATIONAL SPACE GRANT COLLEGE & FELLOWSHIP PROGRAM

FISCAL YEAR 2020 ANNUAL PERFORMANCE REPORT (APR)

FUNDING SOURCE:
OFFICE OF STEM ENGAGEMENT
SPACE GRANT

MANAGING ORGANIZATION:
NASA HEADQUARTERS OFFICE OF STEM ENGAGEMENT

PROJECT MANAGER:
DR. RAJIV DORESWARMY
RAJIV.DORESWAMY@NASA.GOV

DEPUTY PROJECT MANAGER:
DR. ERICA J. ALSTON
ERICA.J.ALSTON@NASA.GOV

LOUISIANA SPACE GRANT CONSORTIUM LEAD
INSTITUTION:
LOUISIANA STATE UNIVERSITY (LSU)

LOUISIANA SPACE GRANT DIRECTOR:
T. GREGORY GUZIK
TGGUZIK@LSU.EDU

COOPERATIVE AGREEMENT/GRANT NUMBER:
80NSSC20M0110

ACTIVITY DESCRIPTION: (100 – 250 words)

The Louisiana Space Grant Consortium (LaSPACE) is an open consortium, offering membership to any organization that shares our goals and objectives. We currently have 31 affiliates: all major universities and four-year colleges (including 5 HCBUs), four community colleges, two industry organizations, both state education boards, and four non-profit, public organizations. The vast majority of our NASA funding and jurisdiction cost share is devoted to competitively awarded projects which address NASA Mission Directorate research priorities, while supporting jurisdiction needs. The core focus of the LaSPACE competitive award program is college student involvement in genuine scientific research and engineering projects. Graduate Students Research Assistance (GSRA) is competed for funding in support of NASA-related research. Our HBCU Institutional Scholars (HIS) and LaSPACE Undergraduate Research Awards (LURA) Programs are year-long mentored research and design projects in which a faculty member and student work on a pre-approved project. Additionally, our seed-funding research program (REA) highly encourages the inclusion of student researchers. In addition, LaSPACE has invested significantly in project-based experiential learning programs to promote technical workforce development. LaSPACE has developed a comprehensive student ballooning program with LaACES, which introduces basic technical and project management skills to entry level students at Louisiana institutions and HASP, for advanced student teams across the nation. LaSPACE also funds Senior Design projects for materials and supplies and/or travel to competitions. Finally, we have a nominal program to support K-12 teacher development and public scientific literacy.

ACTIVITY GOALS: (Bulleted list)

The alignment with particular OSTEM and Louisiana objectives are indicated for each LaSPACE objective in parenthesis. More details regarding the NASA and Louisiana goals and objectives are detailed in our base proposal.

- 1) Foster Aerospace technology, Solar System exploration, and Space Science & Engineering research and education at Louisiana colleges and universities.
 - (1) Maintain the undergraduate and graduate research funding programs (*OSTEM 1.1, SG2*)
 - (a) Our goal is to annually fund around 10 LaSPACE Undergraduate Research Awards (LURA) and at least 6 Graduate Student Research Assistance (GSRA) awards
 - (b) Our goal is to fund up to 4 campuses under our HBCU Institutional Scholars (HIS) program, supporting at least 20 students in hands-on research and design projects annually.
 - (2) Continue to refine and develop targeted programs to reach faculty & students at non-research intensive colleges and universities, especially our HCBUs and Community Colleges (*OSTEM 2.1, 2.2, SG4, LA3*)
 - (3) Build NASA-relevant research capabilities in the state through a comprehensive, complementary portfolio of opportunities from both Space Grant and NASA EPSCoR (*SG1, SG7, LA1*)
 - (a) Using matching funds from the Louisiana Board of Regents, our goal is to fund between 4 and 7 Research Enhancement Award (REA) Projects annually.
 - (4) Investigate and pursue additional funding opportunities from NASA OSTEM and the Mission Directorates (*OSTEM 1.2, SG6*)
 - (5) Create opportunities for Louisiana researchers to network and collaborate to increase the number of LaSPACE sponsored research groups applying for federal support (*OSTEM 2.4, SG1*)

- (6) Provide opportunities for students to develop professional communication skills and experience (*LA2, LA3*)
- (7) Support summer student internships at NASA centers and with aerospace industry partners annually (*OSTEM 3.2*)
 - (a) Our goal is to support 3 summer internships annually.
- 2) Foster and support hands-on experiential programs for higher education students in Louisiana.
 - (1) Modernize and implement the statewide student scientific ballooning program (LaACES) on campuses around Louisiana; recruit new institutions annually (*OSTEM 2.1, 2.2, SG2, LA2*)
 - (a) Our goal is to fund between 4 and 6 LaACES teams annually.
 - (2) Encourage, organize, and financially support student participation in external hands-on workshops and development programs, like RockOn (*OSTEM 2.1, 2.2, SG2, LA2*)
 - (a) Our goal is to fund between 2 and 5 teams of 3 to participate in RockOn! annually.
 - (3) As funding permits, maintain our national student scientific ballooning program, HASP, in partnership with the NASA Balloon Program Office (*OSTEM 2.1, 2.2, 2.3, 2.4, SG2, LA2*)
- 3) Promote NASA-relevant curriculum in K-12 education by supporting professional development opportunities for educators.
 - (1) Support pre-college teachers at space science workshops, such as the LiftOff program offered annually by the Texas Space Grant Consortium (*SG5*)
 - (a) Our goal is to fund between 4 and 8 teachers to attend annually.
 - (2) Support pre-college teachers for summer professional development activities at NASA facilities (*OSTEM 1.2, SG5*)
 - (3) Support projects that involve university-middle school/high school partnerships (*OSTEM 3.1, SG5*)
 - (4) Investigate, curate, and share NASA-content suitable for K-12 classrooms (*OSTEM 3.2, SG5*)
 - (5) Investigate and implement professional development training opportunities for K-12 teachers in Louisiana (*SG5*)
- 4) Use NASA developed content to engage and educate the general public in scientific inquiry and discovery, beneficial to the Nation.
 - (1) Maintain the Mobile Astronomy Resource System (MARS) Truck for STEM outreach at student and general public events (*SG2, LA4*)
 - (a) Our goal is to participate in at least 3 public events annually.
 - (2) Develop and implement NASA-relevant activities and demonstrations for student and general public events (*OSTEM 3.1*)
 - (3) Seek additional funding and local volunteer support for STEM outreach to increase and improve the scientific literacy of the general public in Louisiana (*SG2, LA4*)
- 5) Maintain a cooperative, effective, and inclusive consortium of Louisiana institutions to encourage and support participation in NASA-related research, education, and economic development by a diverse audience.
 - (1) Maintain an open network and continue to recruit all higher education institutions across the state (*SG3*)
 - (2) Continue to identify and recruit affiliates from outside the traditional higher education community who can provide unique contributions to our network (*SG3*)
 - (3) Provide multiple opportunities for affiliates to communicate with the LaSPACE central team to ensure programmatic decisions and general policies are encouraging broad participation (*SG3*)
 - (a) Our goal is to hold at least 2 virtual and 1 in-person meeting annually for the statewide network.

ACTIVITY CONTRIBUTIONS TO PERFORMANCE GOALS (PG) AND SUCCESS CRITERIA

Response to PG 3.3.3 goes here:

LaSPACE was able to meet nearly all of our intended targets for the first year of this award, despite serious impacts from the pandemic and several large-scale weather events. We did, however, see a slightly lower proposal submission rate and several of the programs we support annually had to be drastically modified. Even still, we are funding 44 project activities across our core programmatic areas (NIFs, Hands-On Experiential, & Research) which involve up to 100 undergraduate and graduate students at 13 affiliate campuses, including one community college and two HBCUs. We also have one K-12/Outreach Project that has just been awarded and the subcontracting is in process. While complete participant details will be collected in the Fall and rolled up in January 2022 for our annual reporting, we can provide some early reporting details here.

- LaSPACE Undergraduate Research Awards (LURA): 11 Direct Student Awards at 6 Affiliate Campuses
 - 1 at Louisiana State University (LSU); 1 at McNeese State University (MSU); 4 at Louisiana Tech (LaTech); 1 at Southeastern Louisiana University (SELU); and 4 at University of Louisiana at Lafayette (ULL)
 - 55% women (6/11); 27% (3/11) Underrepresented Minority in STEM
- Graduate Student Research Assistance (GSRA): 5 Direct Student Awards at 3 Affiliate Campuses
 - 2 at Louisiana State University (LSU); 2 at Louisiana Tech (LaTech); 1 at Tulane University
 - 40% women (2/5); 20% (1/5) Underrepresented Minority in STEM
- HBCU Institutional Scholars (HIS) Program: 2 Institutional Awards at 2 Campuses. Student data will not be submitted until the project closes. However, proposed student numbers were included for each.
 - Southern University and A&M College: Proposed 20-40 undergraduates
 - Southern University at New Orleans: Proposed 4-5 undergraduate students
- LaACES Student Ballooning Program: 4 Institutional awards were made to support participation in the LaSPACE/LSU-based ballooning program, which also supports students at LSU who serve as peer mentors while working on more advanced ballooning projects.
 - LSU Ballooning: with total current student participation of 5 Undergraduates.
 - Delgado Community College with proposed student participation of 10 Undergraduates.
 - Loyola University with proposed student participation of 12 Undergraduates.
 - Northwestern State University with proposed student participation of 5 Undergraduates.
 - Southeastern University with proposed student participation of 4 Undergraduates.
- Senior Design Support Program: 10 proposals were awarded at 5 affiliate campuses with a total proposed student participation level of 43 Undergraduates.
 - 4 Awards at LSU with total proposed student participation of 25 Undergraduates.
 - 1 Award at LaTech with proposed student participation of 4 Undergraduates.
 - 2 Awards at McNeese with total proposed student participation of 7 Undergraduates.

- 2 Awards at Southeastern with total proposed student participation of 4 Undergraduates.
- 1 Award at University of New Orleans with proposed student participation of 3 Undergraduates.
- Research Enhancement Award (REA) Program: 7 proposals were awarded at 3 campuses with planned student researcher participation included in 6 projects.
 - 3 Awards at LSU with planned student participation of 3 Graduate and 4 Undergraduate Students.
 - 3 Awards at LaTech with planned student participation of 3 Graduate and 8 Undergraduate Students.
 - 1 Award at Louisiana Health Sciences Center in Shreveport with planned participation of 2 Undergraduate Students.

Response to PG 3.3.4 and/or PG 3.3.4 Success Criteria goes here:

LaSPACE works on an evaluation, competitive model for funding our programs. We provide highly specific project requirements and guidelines for proposals submitted for consideration. We provide a written evaluation along with letters of both award and declination evaluating the major criteria of each proposal. These criteria include, for example, relevance to the NASA mission and goals, scientific and technical merit, clarity of implementation plan, degree of student involvement, and appropriateness of the proposed budget. We check in with our institutional representatives and our funded PIs periodically throughout the award period to ensure they are on track, an especially necessary consideration during the pandemic. We collect final reports which are also guided through highly specific instructions and formatting. And we typically hold a two day in person meeting in the Fall semester and have a mix of speakers talk to all our program areas representing both experienced and newly funded faculty, staff, and students. Additionally, the management team is available via appointment, email, and virtual meetings. We also share opportunities and resources via our email listervs. Finally, we roll up collected materials from our affiliates and funded PIs and submit data to NASA several times a year.

Response to PG 3.3.5 and/or PG 3.3.5 Success Criteria goes here:

Contributing to NASA: The majority of our funding is awarded competitively under the major program areas and subcomponents discussed above (NIFs, Experiential, Research, Outreach). While all projects have some requirements unique to that program, **all** proposed projects are required to show alignment to a specific NASA MD and to identify specific research priorities their project supports. Proposals for active projects showed alignment per program area below, followed by one project highlight for each. Project highlights were selected to offer a broad representation of campuses, disciplines, and MD alignments.

- **LaSPACE Undergraduate Research Awards (LURA): 11 Awards**
 - 4 Aligned with HEOMD
 - 1 Aligned with HEOMD, ARMD
 - 2 Aligned with HEOMD, ARMD, STMD
 - 2 Aligned with HEOMD, STMD
 - 1 Aligned with SMD
 - 1 Aligned with STMD

LURA Program Highlight:

Development of an AI based deep generative design framework and topology optimization for spacecraft radiation shielding, LSU, PI: Jeff Chancellor, Student Researcher: Haley Pellegrin, Discipline: Medical Physics, NASA MDs: HEOMD, STMD

Project Abstract from Proposal: In this project, we are developing a novel paradigm to design radiation shielding for spacecraft that is of lower mass and more biologically protective than designs obtained from current approaches. An Artificial Neural Network (ANN) framework will use deep generative design integrated with topology optimization and generative models to explore novel shielding mitigation strategies. Generative design is an AI driven method for design exploration that is performed by a parametric variance of the geometry followed by a performance assessment of the output designs. It uses topology optimization, allowing for numerous design geometries to be created in parallel with high performance computers (HPCs). The framework will be integrated with the computational dosimetry methods to identify shielding profiles that can minimize the ion species of the GCR spectrum identified as being most deleterious to human health outcomes.

- **Louisiana Graduate Student Research Assistance (GSRA): 5 Awards**
 - 4 Aligned with HEOMD
 - 1 Aligned with ARMD

GSRA Program Highlight:

The role of DNA polymerase epsilon during ionizing radiation exposure, Tulane University, School of Medicine, PI: Zachary Pursell, Graduate Student: Vivian Park, Discipline: Molecular Biology, NASA MDs: HEOMD

Project Abstract from Proposal: The research proposed in this application will address the Human Exploration and Operations Mission Directorate, with the goal to better understand and thus enable human exploration and sustained presence in space. Environmental exposure to ion radiation during space flight, and its subsequent short and long term effects on astronaut DNA is a significant source of concern. Traditionally, cancer causing mutations in DNA have been attributed to inherited and environmental factors. However, recently, a third factor, mutations associated with DNA replication processes, were also shown to account for a significant proportion of mutations in cancer driver genes. To this end, our lab generated a mouse model to study the effects of mutated DNA polymerase epsilon, one of the main determinants of DNA replication fidelity. Indeed, patient and mice tumors with mutations in DNA polymerase epsilon are characterized by the highest mutation burdens. Our model would enable study of the effects of two of the most relevant factors that cause DNA damage during spaceflight: 1) environmental and 2) DNA replication errors. Specifically, this proposal will provide valuable insight into how biological organisms respond to ionizing radiation exposure in the context of DNA replication fidelity. Additionally, our model provides an accelerated mutagenesis in vivo model that is currently lacking in the field of space exploration research. We propose to expose mice deficient in replication fidelity to ionizing radiation, perform high-depth sequencing of high-turnover tissue (bone marrow, intestine) and tumors, analyze mutational signatures, and determine DNA damage response.

- **HBCU Institutional Scholars (HIS) Program: 2 Awards**
 - 1 Aligned with SMD
 - 1 Aligned with STMD, HEOMD

HIS Program Highlight:

2020 Space and Planetary Science at the Timbuktu Academy (2020 SPS-TA), Southern University, PI: Terrence Reese, Discipline: Transdisciplinary, NASA MDs: SMD, OSTEM

Project Abstract from Proposal: During the 2020-2021 academic year, we propose to implement the 2020 Space and Planetary Science at the Timbuktu Academy (2020 SPS-TA). This project expects to engage 20 - 40 undergraduate science, technology, engineering, and mathematics (STEM) scholars on the campus of Southern University and A&M College in Baton Rouge (SUBR), Louisiana. Eight (8) to 12 scholars will receive direct support from the project. The 2020 SPS-TA Project will engage these minority students in space and planetary science activities. These activities will support NASA's goal to recruit, engage, and retain our future scientists in NASA related science, technology, engineering, and mathematics (STEM) fields. Our US Presidential Award Winning Ten-Strand Systemic Mentoring model of the Timbuktu Academy practically guarantees the exemplary training and mentoring of these participants. The objectives of the project are (1) to produce well-trained STEM BS degree holders, over half of whom are expected to pursue the Ph.D., and (2) to produce and to disseminate, through presentations and publications, new knowledge with the research of these scholars and some of their faculty advisors, mentors, or research supervisors at NASA Field Centers or other laboratories.

- **NASA Summer 2021 Internships**
 - 1 Aligned with SMD at NASA HQ
 - 1 Aligned with ARMD at Stennis Space Center

NASA Summer Internship Highlight:

Placement at NASA HQ, SMD, Earth Applied Sciences Disaster Program. Student Intern: Kaitryana Michelle Leinbach, LSU, Industrial Engineering Undergraduate.

Student Application for Funding Statement: am driven and motivated by the opportunity to provide a lasting impact on the organization that I am a part of – and the opportunity to continue this internship with the Disaster's Program at NASA's Headquarters is an opportunity to do just that! As a Louisianan, the program's mission is impactful to me. The Disasters program uses Earth-observing data and applied research to improve the prediction of, preparation for, response to, and recovery from hazards and disasters around the world. Before, during, and after disasters strike, the program coordinates with decision makers and local governments to provide actionable data to recover from disaster impacts and build resilient communities. Our state is constantly effected by natural disasters and my involvement in this program brings me a sense of pride knowing that the work I do will directly benefit my community in their times of need. As an Industrial Engineer, the project is exciting to me. The primary goal of my project is to provide a system that enables the program to work more efficiently and collaboratively so that, when a disaster strikes, they can respond even more rapidly to provide as many resources as possible to the communities affected. With an emphasis on collaboration, problem solving, and process design, I can apply the skills learned in the classroom to improve processes and make a meaningful impact – an Industrial Engineer's dream! As a student, the opportunities for professional growth are invaluable to me. Going beyond the classroom is critical to the professional success of a student. By continuing my work, I can finish creating a necessary tool that will be used by the entire program while also further developing relationships with members of NASA centers across the country. With roots firmly placed in Louisiana, the lessons learned, professional development, and networking opportunities will not only directly benefit me, but this state as a whole as well.

- **LaACES Student Ballooning Program: 4 Awards**
 - 4 Aligned with SMD

LaACES Program Highlight:

DemonSats-2: Continuation of student payload design program at Northwestern State University of Louisiana, Northwestern State University of Louisiana, PI: Anna C. Dugas, Discipline:

Transdisciplinary, NASA MDs: SMD, OSTEM

Project Abstract from Proposal: The primary goal of the DemonSats-2 project is to continue an active payload design program at Northwestern State University of Louisiana (NSULA) and to continue the STEM collaboration with the Louisiana School for Math, Science and The Arts (LSMSA). To achieve this primary goal, the principal investigator has two NSULA and one LSMSA team members from DemonSat-1 returning to the project in the fall, and she has officially scheduled a course for the fall with plans to instruct a lab course in the spring. She has arranged for an experienced undergraduate student to be a TA for the course and to manage the team in project work.

For this second LaACES project of NSULA/LSMSA collaboration, the team plans to construct a payload to be launched by atmospheric sounding balloon, while measuring atmospheric temperature, pressure and humidity. The students will use the data to explore humidity and altitude and compare it with models. This proposal outlines a budget which includes better laboratory testing equipment still needed, direct labor costs for an undergraduate teaching assistant, travel to LSU for thermal/vacuum testing, and travel to CSBF for the payload launch in May 2021. If funded, this project will be a significant improvement to the “hands-on” design experience that the interested students from NSULA and LSMSA receive. So far, the students joining the team are majoring in Electrical and Industrial Engineering Technology, Biology or in high school at LSMSA.

- **RockOn! Workshop Participation**

- 1 Aligned with SMD

2021 Project Participants: LaSPACE is supporting 5 teams of 3 from 4 campuses (LSU, McNeese, Northwestern, & ULL). Each team is led by a faculty or staff member with two student participants. Teams will participate virtually this year via guided video tutorials, office hours, and mailed payload kits.

- **Senior Design Support Program: 10 Awards**

- 3 Aligned with ARMD
- 4 Aligned with STMD
- 1 Aligned with SMD, STMD
- 1 Aligned with HEOMD, ARMD, STMD
- 1 Aligned with HEOMD, STMD

Senior Design Program Highlight:

Designing an Efficient AC/DC Converter For The Space Power and Energy Storage

System, McNeese State University, PI: Hamzeh Davarikia, Discipline: Transdisciplinary, NASA MDs: SMD, STMD

Project Abstract from Proposal: The main goal of this capstone senior design project is to design and build an efficient DC/AC power converter for the space power and energy storage system that can be used in various space missions. To this end, different technologies for power electronic equipment will be investigated. After obtaining the required technical data, a computer simulation by MATLAB/Simulink, will assist the design process and validation. Following achieving the best design combination, a prototype DC/AC converter will be built at the McNeese Power Laboratory. The new system will be used adjacent to the LaSPACE funded space power and storage system built at

McNeese and we will convert the produced DC power to the AC. At the final stage, the performance of the designed system, including harmonics, flicker, and efficiency will be studied. Senior students from electrical engineering, computer science and mechanical engineering will form a multi-disciplinary team for the design project. The senior design team will have weekly meetings with the Capstone Committee. The team is required to have a project binder to document everything. In addition, they will have monthly reports and monthly presentations. A final report will be submitted to LaSPACE. Additionally, students will publish the design work and findings at the IEEE conference. The proposed project is beneficial to students because it not only provides hands-on applications but also integrates theories learned in multiple courses to a real research challenge. Working in a multi-disciplinary team, students will improve their communication skills, teamwork, leadership, project management and report writing skills.

- **Research Enhancement Award (REA) Program: 7 Awards**

- 3 Aligned with HEOMD
- 1 Aligned with HEOMD, SMD
- 2 Aligned with SMD
- 1 Aligned with STMD

REA Program Highlight:

Microbial Spore Diversity in Hypersaline Environments, Louisiana Tech University, PI: Rebecca Giorno, Discipline: Space Biology, NASA MDs: HEOMD, SMD

Project Abstract from Proposal: Limiting interplanetary transport of microorganisms is essential to the integrity of scientific research of celestial bodies (NASA Policy: NPD 8020.7). Spacecraft hardware undergoes biological control processes to reduce the forward contamination of celestial bodies with microorganisms from the spacecraft as well as backward contamination of the Earth from returned missions. Spores, highly resistant dormant cells of *Bacillus* and *Clostridium* species, are capable of surviving almost any environmental assault and presumably survive space travel if protected against solar irradiation. Spores can be reactivated in the presence of nutrients by a process called germination. There is a fundamental gap in our knowledge of spore-forming microorganisms that can persist and possibly thrive in hypersaline environments similar to Mars and other celestial bodies. Thereby, spores associated with hypersaline environments are a concern for forward and backward contamination. Our long-term goal is to identify and characterize spore-forming bacteria that can live in extreme environments: the salt dome at Avery Island in south Louisiana and the cold seep at Atwater Valley lease block 340 in the northern Gulf of Mexico. This proposal will pursue the following objectives: 1) isolate and identify spore-forming bacteria from high-salinity locations and 2) determine germination rates of spores from various *Bacillus* species in high-salinity environments. The proposed work aligns with NASA's mission to expand our knowledge of the distribution of life on Earth, will provide training for both undergraduate and graduate students, establish a collaboration with JPL, and produce preliminary data for federal grant applications to NASA and NSF.

Success Criteria (Publications & Presentations): Our funded projects are almost all 12-month projects, which means year one projects are still in progress and details about publications and presentations will not be shared until award close-out. Also, most academic presentations and publications take a lot of time to come about, especially peer-reviewed journal articles. It is not likely that we will have this data until the next reporting cycle. We will include this year's publications and presentations in the year two report.

BASE AWARD ACCOMPLISHMENTS: (250 – 500 words)

LaSPACE was able to meet nearly all of our intended targets for the first year of this award, despite serious impacts from the pandemic and the necessary mitigation efforts for the previous grant's subawards while initiating new programs under this award. All of our subprograms except three (NASA Summer Interns; RockOn!, & Liftoff) are full calendar year programs with subawards usually spanning a Fall, Spring, Summer semester period of performance. As such our year-one projects are either still in progress or will be starting up in June. As planned, we updated our proposal guidelines and solicited competitive proposals in the Spring of 2020, reviewed and issued subaward contracts to affiliates in the summer, and projects got underway in August or September of 2020.

While there were obvious challenges associated with the pandemic, there were also opportunities to grow and improve our programs. In fact, two of our most successful changes were born of COVID-restrictions. Instead of expecting institutional leads for our statewide ballooning program to each individually create a virtual roll out of the lectures and guided activities, we offered centralized instruction via zoom twice a week for the full Fall Semester and the first few weeks of the Spring Semester. These zoom sessions were recorded, uploaded to our YouTube channel, and links were posted alongside the curriculum materials on our [LaACES website](#). This approach was so successful, we intend to keep it as our delivery method moving forward. The second activity enabled by the new virtual workplace, was the highly successful joint Space and Sea Grant Meeting we held in Louisiana in March. This was the culmination of many meetings and discussions and ultimately what we think anchored the success is that our Louisiana researchers were joined by about a dozen scientists and administrators from both NASA and NOAA, as well as a handful of researchers and managers in other Space/Sea Grant jurisdictions. Several interjurisdiction collaborations are being seriously investigated, stakeholders from Agencies and States have requested membership in a joint email listserv, and LA Space & Sea Grant management are in the process of developing joint funding opportunities for undergraduate students in our state.

Locally, we have begun offering webinars focused on student-involvement. Mitch Krell of Stennis Space Center presented at both of our sessions so far. The first was on NASA Fellowships with about 15 people attending. This event led us to realize we needed a way to communicate directly with students, so we set up a student listserv. Our second session on internships was attended by 147 unique participants! Finally, as the Communications Working Group Co-Chair for the national network, Colleen Fava established a new monthly infosession called Promising Programs & Practices (P³), which features presenters from the national community sharing successful programs and approaches with the whole network. Sessions have been held monthly since last October on the second Monday at 3 pm Eastern, and typically see over 50 attendees from at least half of all the jurisdictions.

NCAS AND SPACE GRANT PILOT ACCOMPLISHMENTS (If applicable): (250 – 500 words)

N/A

BIG Idea FY2020 ACCOMPLISHMENTS (If applicable): (250 – 500 words)

N/A

FIRST NATIONS LAUNCH (If applicable): (250 – 500 words)

N/A

ACTIVITY IMPROVEMENTS MADE IN THE PAST YEAR:

As detailed in the Base Award Accomplishments section, LaSPACE made serious improvements to the delivery of our statewide ballooning curriculum, and significantly improved communications with our statewide network. We also improved the depth of support for our ballooning and outreach programs with the hire of a recently graduated LSU Physics Masters student, Aaron Ryan. Ryan serves as the lead instructor for LaACES, as well as support for HASP ballooning and the National Eclipse Ballooning Project under the direction of Doug Granger. Ryan will also serve as the primary outreach coordination once pandemic restrictions allow such activities. Finally, we made very significant improvements in support of the Space Grant network, both at the jurisdiction and national levels. Our new student listserv and webinars, collaborations with Sea Grant, and development of a regular professional development info series for the national network are proving valuable to our stakeholders. An additional improvement directly in response to the COVID-19 pandemic was our creation of PowerPoint templates and virtual meetings to track accommodate impacts on all of our affiliates. We will collect another set of these reports during the month of April. Finally, LaSPACE successfully obtained additional funding, external to OSTEM, to support our advanced, national ballooning program. During 2020, we submitted a proposal to NASA Science Mission Directorate – Astrophysics Division to directly support the HASP program for five years through 2025. The value of this mission directorate funding is \$160,000 per year (\$800,000 total) and, coupled with support from the NASA Balloon Program Office, the National Space Grant College and Fellowship program, plus the Louisiana Space Grant, we can successfully maintain the HASP system, provide technical support to student teams from across the U.S. and the world, and fund the annual integration trips and high altitude balloon flights.

ACTIVITY PARTNERS AND ROLE OF AFFILIATES IN ACTIVITY EXECUTION:

Consortium members (see list below) include colleges/universities [Research Intensive (RIU); Research Active (RAU); Four-year institutions (4YI); Community Colleges (CC), HBCU's], business/industry partners (B/I), state education boards (Ed), and nonprofit organizations (NPO) structured as Active Members (AM), Inactive Members (IM), and New Members (NM); the latter are members that signed since our last APD. Affiliates designated by the U.S. Department of Education as a Minority Institution or eligible for Title III and Title V programs are marked with an asterisk (“*”). Affiliates in **boldface** received direct funding from LaSPACE during this award year. Each member has an institutional representative/coordinator. When that position becomes vacant, the institution becomes Inactive until a new representative is appointed. As an open consortium, joining LaSPACE is simple, requiring a letter of interest submitted to LaSPACE by an authorized institutional representative, which designates an institutional coordinator. Overall, it is the Institutional Coordinators that have the responsibility for recruiting students on their campuses, publicizing LaSPACE opportunities, and building an aerospace component to the campus activities, utilizing methods that work locally.

List of Louisiana Space Grant Consortium Members (Alphabetical)

Baton Rouge Community College (BRCC): AM, CC,*

BREC: Highland Road Park Observatory: AM, NPO

Cain Center for STEM Literacy: AM, NPO

Delgado Community College (DCC): AM, CC,*

Dillard University (Dillard): AM, HBCU, 4YI,*

Grambling State University (GSU): AM, HBCU, 4YI,*

Louisiana Arts and Science Museum / Pennington Planetarium (LASM): IM, NPO

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 Public Broadcasting (LPB) AM, NPO
Louisiana State University and A&M College (LSU) (Co-founding/ Lead Institution): AM, RIU
Louisiana State University Health Sciences Center in Shreveport (LSUHSC-S): AM, RAU
Louisiana State University Alexandria (LSU-A): AM, 4YI,*
Louisiana State University Shreveport (LSU-S): AM, 4YI,*
Louisiana State University Agricultural Center (LSU-Ag): IM, RIU
Louisiana Tech University (LaTech): AM, RAU
Loyola University (Loyola): AM, 4YI
McNeese State University (McNeese): AM, 4YI,*
National Center for Biomedical Research & Training (LSU-NCBRT): IM, NPO
Nicholls State University (Nicholls): AM, RAU,*
Northshore Technical Community College (NTCC): AM, CC
Northwestern State University of Louisiana (NWSU): AM, 4YI,*
Nunez Community College (NCC): AM, CC*
River Parishes Community College (RPCC): AM, NM, CC,*
SciPort Louisiana's Science Center (SciPort): IM, NPO
Southeastern Louisiana University (SELU): AM, 4YI,*
Southern University and A & M College (SUBR) (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,*

The Council (comprised of all institutional reps and the central management team at LSU) is the primary oversight and advisory board for LaSPACE. The Council meets annually for a formal two-day meeting during the fall semester at one of our affiliate's campuses with webinar meetings held during the other 3 quarters of the calendar year. This year we have adapted to virtual meetings, including a session devoted entirely to discussing COVID impacts on affiliate campuses. General administration and management is the responsibility of the LaSPACE Management Team at LSU.

CURRENT AND PROJECTED CHALLENGES:

Most of the challenges LaSPACE has faced over the last year have been in response to COVID-19 impacts. Some of our programs are simply unable to proceed without access to NASA facilities; participation in LaACES & HASP balloon flights and the RockOn! annual workshop have been especially impacted, but also some of our supported research projects require visits to NASA Centers or travel to professional conferences and meetings. LaSPACE Management has been

encouraging our partners and PIs to reprogram funding and find ways to accomplish deliverables in spite of these obstacles. We continue to be impressed by the resiliency, commitment, and support of our stakeholders and partners at NASA, LA Board of Regents, and our lead institution, LSU. We will continue to communicate regularly with our funded participants to ensure steadfast support.

Another challenge to our productivity is an increase in reporting requirements. Jurisdictions are now required to produce a 6-month and annual progress report, complete annual student demographic data sheets, enter extensive award data into OEPM annually, produce monthly COVID-19 impact reports, and participate in semi annual site visits. In addition to the *increase* in reporting, the report format and requirements keep changing. For example, this annual report took *far* longer to compile, because of the unfamiliar format and sections, as well extremely sparse instructions. OEPM was due 16 days earlier than expected this year and we have been told we will report into a whole new system next January, but have been given no guidance as to how different that system might be or if any new data will be expected. Maintaining and improving administration of our programs is extremely difficult with such onerous, ephemeral expectations from HQ, especially when we never receive any feedback on the reports we file beyond a confirmation of receipt. Fewer reports, more detailed guidance, advance notice of change, and feedback on submissions would help exponentially.

REFERENCES (optional – include only if needed):

N/A