

## **Design Projects as a Linkage Between Interests and Career Aspirations: An Examination of Underrepresented, Incoming-Freshmen STEM Students**

**Ms. Lauren A Griggs Griggs, Virginia Commonwealth University**

Lauren received her B.S. in Engineering Science, with a concentration in Nanomedicine from The University of Virginia in 2012. As a doctoral student in the Department of Biomedical Engineering at Virginia Commonwealth University, Lauren was awarded the Ruth L. Kirschstein National Research Service Award Individual Predoctoral Fellowship through the National Institute of Health. As the Program Coordinator for the VCU Louis Stokes Alliance for Minority Participation program, Lauren works to increase the number of underrepresented minority students earning baccalaureate degrees and matriculating to graduate school. Lauren's passion lies in working directly with students, serving as an advisor, inspiring others through meaningful career discussions and helping others to gain confidence as well as succeed in their chosen degree fields.

**Ms. Briana Nicole James, Louis Stokes Alliance for Minority Participation at Virginia Commonwealth University**

I am a PhD candidate in the Biochemistry and Molecular Biology Department at Virginia Commonwealth University (VCU). I am also the current program coordinator for the VCU Louis Stokes Alliance for Minority Participation (LSAMP), a program which works to increase the retention and graduation rate of underrepresented minority students in STEM majors.



# Design Projects as a Linkage Between Interests and Career Aspirations: An Examination of Underrepresented, Incoming-Freshmen STEM Students

Dr. Rosalyn Hobson-Hargraves  
Dr. Lauren Griggs  
Briana James

Virginia Commonwealth University



Louis Stokes  
Alliance for  
Minority  
Participation



# LOUIS STOKES



- Politician, civil rights attorney, and advocate
- The first African American congressman from Ohio and was
- Co-founder of the Congressional Black Caucus



# MISSION

The LSAMP program is a National Science Foundation funded program that assists universities and colleges in their efforts to significantly increase the numbers of students matriculating into and successfully completing high quality degree programs in science, technology, engineering and mathematics (STEM) disciplines.

The LSAMP Program seeks to transform undergraduate STEM education primarily through

1. Innovative, evidence-based recruitment and retention strategies
2. Relevant educational experiences in support of racial and ethnic groups historically underrepresented in STEM disciplines



# LSAMP PROGRAM PRIORITIES

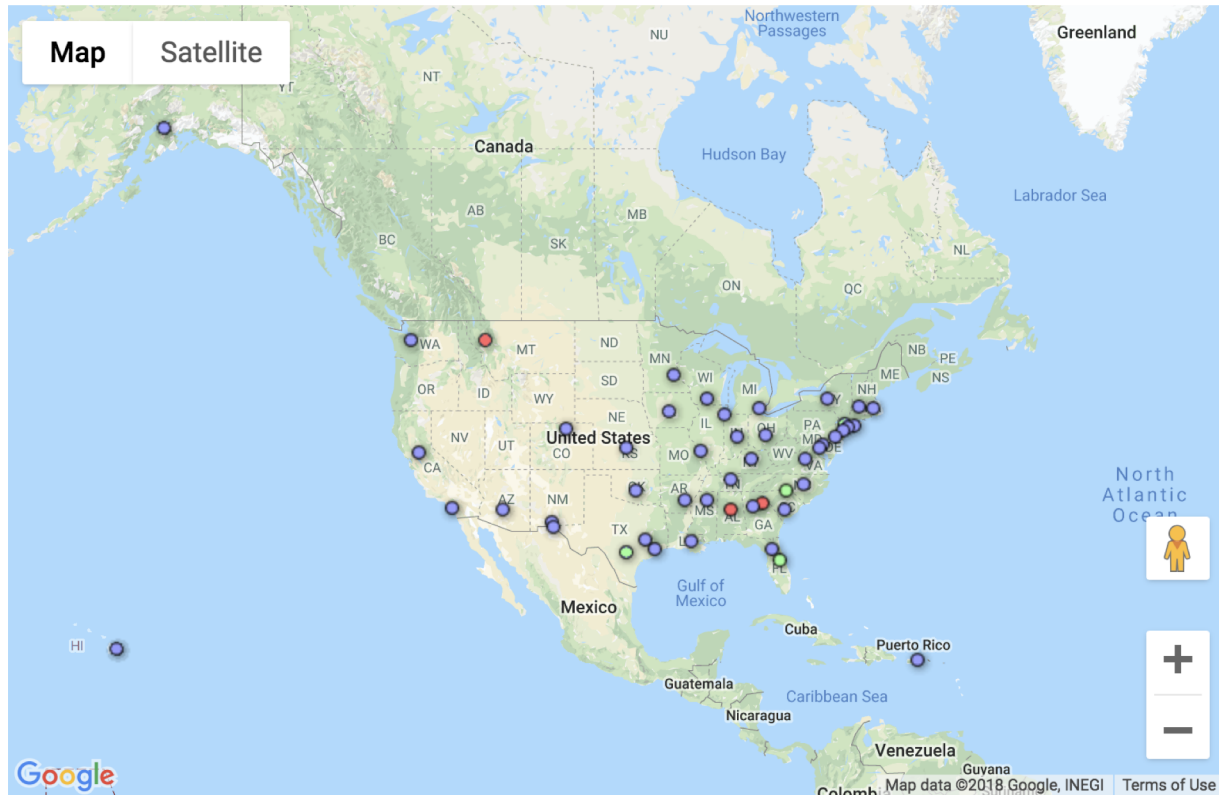
1. Increase individual student retention and progression to baccalaureate degrees for underrepresented racial and ethnic groups
2. Enable successful transfer of underrepresented students from 2-year to 4-year institutions in STEM programs
3. Increase access to high quality undergraduate research experiences
4. Facilitate seamless transition of underrepresented students into STEM graduate programs.



# ALLIANCES



LSAMP consists of over 40 lead alliances across the nation





# VIRGINIA-NORTH CAROLINA ALLIANCE

- Bennett College for Women
- Elizabeth City State University
- George Mason University
- Johnson C. Smith University
- National Radio Astronomy Observatory
- Old Dominion University
- Piedmont Virginia Community College
- St. Augustine's University
- Thomas Nelson Community College
- University of Virginia
- **Virginia Commonwealth University**
- Virginia Polytechnic Institute and State University



# VCU LSAMP PROGRAMS

## 1. Summer Transitions Program

- a. This six-week LSAMP Transition Program provides incoming VCU freshmen STEM majors with structured academic online and face-to-face programming to facilitate the high school to college transition process. Participants will learn to study effectively, work independently and collaborate with other students.

## 2. Academic Success Seminar

- a. A weekly seminar which will include professional and personal development seminars, workshops on topics such as careers in the STEM workforce, panels, guest speakers, and networking opportunities

## 3. Mentoring Program

- a. The Mentoring Program is designed to support the academic, professional, and cultural development of racially diverse students of VCU with an ultimate objective of increasing retention and graduation rates in the STEM baccalaureate degree programs





# VCU LSAMP



A primary goal of the program is to increase the number of students who are engaged in undergraduate STEM research experiences.

## VA-NC Annual Symposium

- Each year students present their research at the annual symposium
- In 2017, VCU took home 2nd and 3rd place for the poster presentations





# SUMMER TRANSITIONS PROGRAM (STP)

- Eligible freshman students participate in three online courses in mathematics, science, and study skills. **Students who successfully complete these courses are eligible for a \$300 scholarship at the beginning of the fall semester.**
- Students move into their designated residence hall one week prior to the beginning of the fall semester. For the duration of this week they:
  - familiarize themselves with the VCU campus
  - participate in classes, workshops, and community building activities
  - attend guest lectures and visit research laboratories
  - meet with advisors in preparation for the fall semester





# STP SCHEDULE

| Time     | Sunday August 13th          | Monday August 14th  | Tuesday August 15th  | Wednesday August 16th  | Thursday August 17th   | Friday August 18th  | Saturday August 19th   |   |
|----------|-----------------------------|---|--|--|--|---|--|---|
| 7:00 AM  |                             |   |  |  |  |   |  |   |
| 8:00 AM  |                             | Breakfast Provided<br>8:00 am - 9:00 am                                   | Chemistry<br>8:00 am - 9:30 am<br>Eng W Room 103   | Chemistry<br>8:00 am - 9:30 am<br>Eng W Room 103                   | Chemistry<br>8:00 am - 9:30 am<br>Eng W Room 103   | Chemistry<br>8:00 am - 9:30 am<br>Eng W Room 103                        | Oral Presentation:<br>9:00 am - 11:00 am<br>Larrick Court End Ballroom B<br>Lunch<br>11:00 am - 12:00 pm<br>Poster Symposium<br>12pm - 2pm |   |
| 9:00 AM  |                             | Ropes Course<br>9:00 am - 11:00 am<br>Cary Street Gym - MAC Exercise Room |  |  |  |   |  |   |
| 10:00 AM | Check-in 10:00 am - 2:00 pm | PreCalculus:<br>9:30 am - 11:00 am<br>Computer Lab: Eng W Room 103        | PreCalculus:<br>9:30 am - 11:00 am<br>Computer Lab: Eng W Room 103   | PreCalculus:<br>9:30 am - 11:00 am<br>Computer Lab: Eng W Room 103 | PreCalculus:<br>9:30 am - 11:00 am<br>Computer Lab: Eng W Room 103   |   |  |   |
| 11:00 AM |                             | Go back to Dorms to shower/change<br>11:00 am - 12:00 pm                  | CareerServices<br>11:30 am - 12:00 pm<br>Eng W Room 103  | Well Center<br>11:00 am - 12:00 pm<br>Eng W Room 103               | OMSA Presentation<br>11:00 am - 12:00 pm<br>907 Floyd Ave Rm 215   | Middle School Presentations<br>11:00 am - 12:00 pm<br>Eng W Room 103    |  |   |
| 12:00 PM |                             | Lunch<br>12:00 pm - 1:00 pm   | Lunch<br>12:00 pm - 1:00 pm  | Lunch<br>12:00 pm - 1:00 pm  | Lunch<br>12:00 pm - 1:00 pm  | Lunch<br>12:00 pm - 1:00 pm   |  |   |
| 1:00 PM  |                             | Library Tour/Patents<br>1:00 pm - 2:00 pm<br>Cabell Library               | Division of Consolidated Laboratory Services (DCLS) Tour<br>1:00 pm - 3:00 pm<br>600 N 5th St, Richmond, VA 23219<br>(Leave by 12:45 pm and return by 3:15 pm) | Academic Advising<br>1:00 pm - 2:30 pm<br>ENG E Rm 1232            | School of Engineering Tour Eng W Undergraduate Recruitment Office<br>Rm 233A/Science labs tours<br>1:00 pm - 3:00 pm | Forensic Science Tour<br>1:00 pm - 3:00 pm<br>Harris Hall South Rm 2019 |  |   |
| 2:00 PM  |                             | PreCalculus:<br>2:00 pm - 3:30 pm<br>Computer Lab: Eng E Room 1232        |  |  |  |   |  |   |
| 3:00 PM  |                             |   | Chemistry<br>3:30 pm - 5:00 pm<br>Eng E Room 1232  | Financial Aid<br>3:15 pm - 4:00 pm<br>Eng E Room 1232              | Undergraduate Research<br>3:00 pm - 4:00 pm<br>Eng E Room 1232   | Dr. Triplett<br>3:00 pm - 4:00 pm<br>Eng E Room 1232                    |  | Undergraduate Panel<br>2:30 pm - 4:00 pm<br>Eng E Room 1232   |
| 4:00 PM  |                             | Welcome Orientation Dinner<br>4:00 pm - 6:00 pm<br>103 West Hall          |  | Study Skill Course<br>4:00 pm - 5:00 pm<br>Eng East Room 2214      | Study Skill Course<br>4:00 pm - 5:00 pm<br>Eng East Room 2214  | Study Skill Course<br>4:00 pm - 5:00 pm<br>Eng East Room 2214           |  | Study Skill Course<br>4:00 pm - 5:00 pm<br>Eng East Room 2214 |
| 5:00 PM  |                             |   | Dinner<br>5:00 pm - 6:00 pm  | Dinner<br>5:00 pm - 6:00 pm  | Dinner<br>5:00 pm - 6:00 pm  | Dinner<br>5:00 pm - 6:00 pm   |  | Dinner<br>5:00 pm - 6:00 pm                                   |
| 6:00 PM  |                             |   |  |  |  |   |  |   |
| 7:00 PM  |                             | Study Hall - Redcap Survey<br>6:00 pm - 9:00 pm<br>Eng E Hal Rm E1238     | Study Hall<br>6:00 pm - 9:00 pm<br>Eng E Hal Rm E1239  | Study Hall<br>6:00 pm - 9:00 pm<br>Eng E Hal Rm E1239              | Study Hall<br>6:00 pm - 9:00 pm<br>Eng E Hal Rm E1239  | Study Hall<br>6:00 pm - 9:00 pm<br>Eng E Hal Rm E1239                   | Study Hall<br>6:00 pm - 9:00 pm<br>Eng E Hal Rm E1239  |   |
| 8:00 PM  |                             |   |  |  |  |   |  |   |
| 9:00 PM  |                             |   |  |  |  |   |  |   |



# DEMO

Have members break into teams and perform a brainstorming activity similar to that which was done during the design challenge so that the audience can gain a deeper understanding of the experience



# STP | DESIGN PROJECT

Students are exposed to idea generation, design, research and prototyping an invention while considering their career path in the STEM fields.

The week concludes with an oral and poster presentation in which students present their inventions to STEM faculty, parents and friends.





# STP | DESIGN PROJECT - SYLLABUS

| Sunday  | Monday   | Tuesday  | Wednesday   | Thursday   | Friday   | Saturday   |
|---|--|--|---|--|--|--|
| <p>Introduction to project &amp; Synopsis of Design Process</p> <p>Invention ideation and group brainstorming</p> <p>Library visit and librarian research support presentation (Monday)</p> | <p>Form teams and continue ideation</p> <p>Clearly define project "need" as a team.</p> <p>Identify Scientific Concept</p> <p>Provide materials list (\$20 budget)</p> | <p>Research topic, create/draft potential design</p> <p>Evaluate solutions in teams</p> <p>Present design sketches to instructors and peers for feedback</p> <p>Prototype construction</p> | <p>Prototype construction and testing</p> <p>Optimize Design and Provide any additional materials within budget</p> <p>Determine intellectual property percentage attribution</p> <p>Complete First Draft of Scientific paper</p> | <p>Begin creating Poster</p> <p>Continue prototype construction and testing</p> <p>Pitch Project</p> <p>Begin draft of presentation (time permitting)</p> <p>Finalize poster for printing due at midnight</p> <p>Finalize Paper and Summarize to Peers</p> | <p>Begin working on Ignite presentation</p> <p>Print poster</p> <p>Practice poster presentation</p> <p>Practice ignite presentation with group</p> <p>Complete Presentation, practice and feedback (peer reviewed)</p> | <p>set up Poster Ignite presentation and demonstration of final design</p> <p>Oral Poster Presentation</p> |



# DESIGN PROJECT IMPACT | VIDEO TESTIMONIALS





# SURVEY

## Example Questions

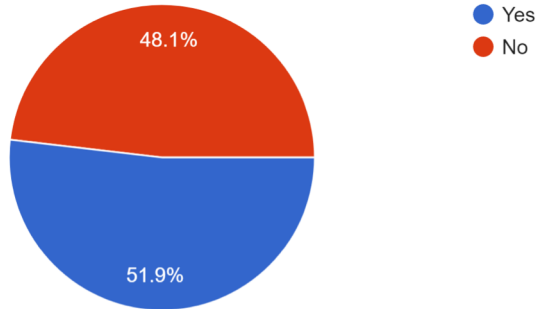
- Have you been active in LSAMP after your first semester of freshman year?
- Have you participated in any undergraduate research opportunities or engaged in any project innovation?
- To those who said yes above...Did participation in the LSAMP STP play a role in your decision to to pursue undergraduate research?
- Do you feel that the Design Challenge prepared you for your undergraduate discipline?
- Are you interested in attending graduate/professional school?
- Have you applied to graduate/professional school?



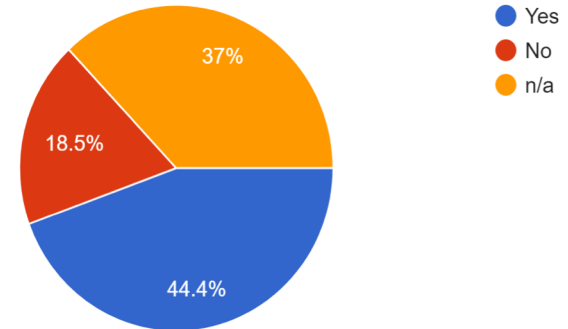


# SURVEY RESULTS

Were you aware of undergraduate research opportunities prior to participating in the LSAMP Summer Transitions Program?



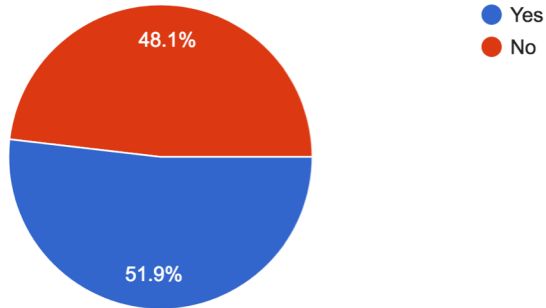
If yes, did you plan to seek an undergraduate research opportunity prior to participating in the LSAMP Summer Transitions Program?



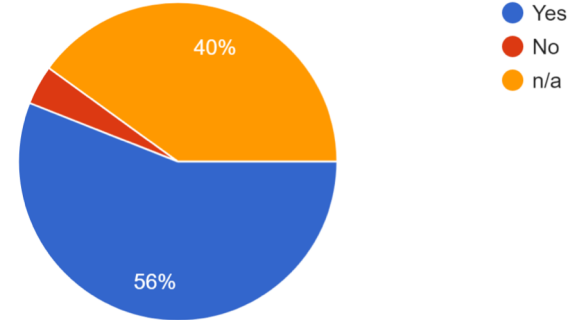


# SURVEY RESULTS

Have you participated in any undergraduate research opportunities or engaged in any project innovation?



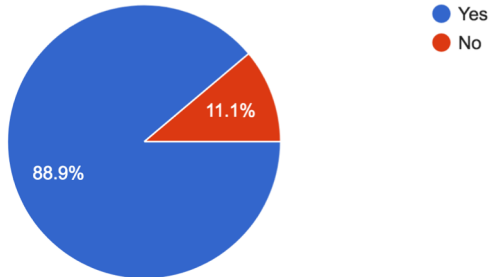
Did participation in the LSAMP STP play a role in your decision to to pursue undergraduate research?



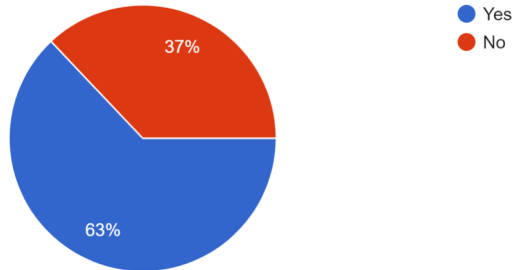


# SURVEY RESULTS

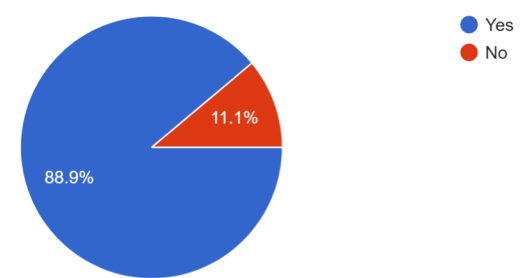
Do you feel that the Design Challenge prepared you for your undergraduate discipline?



Did the Design Challenge include any elements of your personal interests or career aspirations?



Are you interested in attending graduate/professional school ?





# DISCUSSION



# ACKNOWLEDGEMENTS



National Science Foundation



Virginia-North Carolina Alliance for Minority Participation



Institutional Review Board Grant: HM20013327