

## **Promoting academic and career success for Raleigh Future Scholars at NC State**

### **Dr. Cheryl Cass, North Carolina State University**

Cheryl Cass is a teaching assistant professor in the Department of Materials Science and Engineering at North Carolina State University where she has served as the Director of Undergraduate Programs since 2011. Her research focuses on the intersection of science and engineering identity in post-secondary and graduate level programs.

### **Prof. Leda Lunardi, North Carolina State University**

Leda Lunardi received the BS and MS from University of São Paulo (USP), São Paulo, Brazil, and Ph.D. degree from Cornell University. After graduate school she spent several years in industry before joining academia in 2003. Currently she is a professor in the Electrical and Computer Engineering Department at North Carolina State University in Raleigh. Her teaching and research interests include electronics, optoelectronics, and engineering undergraduate student retention and graduation improvement. Her research has been mainly sponsored by the National Science Foundation (NSF). She is a Fellow of the IEEE, member of the SWE and the ASEE, and active in the engineering education community, including serving as volunteer for panels and scholarships reviews. From 2005 to 2007 Dr. Lunardi served as Program Director for the Electrical, Communications and Cyber Systems (ECCS) Division in the Engineering Directorate of the National Science Foundation in Arlington, VA.

### **Miss Olivia Christine Gordon, North Carolina State University**

An undergraduate student in Chemical and Biomolecular Engineering at North Carolina State University, Olivia Gordon has aided in student and event organization for this program since January, 2014. She also conducts research on liquid metals through NCSU and has presented her work at the undergraduate research symposium.

# Promoting Academic and Career Success for Raleigh Future Scholars at North Carolina State University

## **Abstract**

The NCSU STEM Scholarship Program sponsored by the National Science Foundation creates a career-readiness pathway for the academically talented and economically disadvantaged local Raleigh student population, increasing their opportunities for success. The scholarship program offers several development activities in which these students have participation priority. These activities include career readiness training, vocational mentoring, and educational incentives that have proven to be very successful in improving matriculation rates. Survey data have been collected on students' attitudes, beliefs, and expectations with regard to both their major and program. Assessment results from the first three years of the program indicate that all students within a cohort tend to participate in extracurricular activities, graduate within four years from their admission, and pursue post graduate degrees or have full employment in their career of choice.

## **Major Goals**

The major goal of this program is to create an academic support system for economically disadvantaged students who are living in the Raleigh geographic area and interested in pursuing degrees in engineering and statistics disciplines to successfully graduate from North Carolina State University<sup>1</sup>. The program offers a comprehensive provision package of financial aid (translated as 75% of in-state tuition cost at NC State), mentoring, and career preparation to undergraduate students. Some of the scholarship program events provide career-building activities such as industry visits with partner companies and mock job interviews that bolster students' professional confidence and better prepare them for their jobs. For students interested in research, the scholarship program connects them with research faculty on campus (during the academic year) and undergraduate research programs, thus allowing them to further explore their interests<sup>2,3</sup>. At the end of the third year of the project, our results indicate that the program has effectively increased the rate at which STEM scholars earn their degrees in addition to building a more diverse and inclusive student population that interacts with and helps recruit new students.

## **Application and Selection**

The budget includes funding for scholarships at \$6,500 (translated as 75% of in-state tuition costs) per student per year with no specific allocations within specific disciplines, assuring that the recipients are of highest academic quality with demonstrated financial-need. Admitted students are invited to apply on-line if they meet the pre-requisite requirements:

- Demonstrated financial need through FAFSA<sup>4</sup>
- Matriculated into engineering or statistics
- Full-time enrollment in engineering or statistics
- Demonstrated academic merit, with GPA of 3.0 or higher
- U.S. citizen, national, or aliens admitted as refugee at time of consideration
- Raleigh permanent address

Transfer students from community colleges are also considered for the program. For example, Wake Technical Community College has a 2+3 program (i.e., students complete two years at a community college, followed by three years at a university) with NC State from which most of the NCSU STEM Scholarship Program's transfer students originate. Applications are filed through the program web site, which collects applicants' demographic, personal information, future career plans, interests and any relevant information prior to the face-to-face interview. Applicants are screened for pre-requisites fulfillment (minimum GPA, residence status, disciplines) and invited for a face-to-face interview with the program coordinators.

## **Renewal**

Since the start of the program, the coordinators have been productive working together and continuously improving the recruitment and selection of candidates as well as organizing activities for the scholars. At the end of each academic semester, the scholars complete an online survey used in their review for renewal consideration; students must meet the following conditions:

- Maintain minimum GPA of 3.0.
- Complete at least 30 credit hours each academic year (university minimum is 24)
- Change to next higher student classification each year
- Make demonstrated progress towards engineering or statistics degree
- Maintain positive student image consistent with academic scholars
- Continue demonstrated financial need (i.e., FAFSA eligible)
- Maintain Raleigh permanent address
- Continue full-time enrollment in engineering or statistics
- Continue involvement in campus student or professional organizations, or active participant in STEM Scholar-related activities (e.g., serving as an ambassador for the STEM program to recruit new students and updating e-portfolio)

Consistent with current procedures for engineering and statistics scholars, students may remain in the program while on academic probation for up to one academic semester.

## **Program Activities**

Program activities foster interdisciplinary cooperation, thus enhancing the students' academic maturation through additional team management and mentoring efforts. These programs also give scholars the capability to make an even greater impact in corporate America or through graduate school. STEM scholars who participate in our student services and development activities are assisted in developing interpersonal skills and gain satisfaction within the community by serving as high-achieving mentors to their peers within the program.

The orientation session at the beginning of the fall semester is a social event so the scholars can meet each other face-to-face for the first time and receive an overview of the program. In addition, students review their e-portfolios and obligations, and, if new to the program, complete

a pre-program survey. Given that our students have varied academic schedules, each scholar selects and prioritizes three activities from a set menu to tailor the cohort’s offering to their interests and facilitate coordination. For example, communication skill development seminars, workshops, and mock interviews were coordinated prior to events like the Engineer Career Fair whereas visits to local industries were scheduled later in the semester to avoid overlap with midterm exams and research activities.

## Findings

The demographic profile of the participants for each semester is listed in Table 1. During the first three years of the program, a total of 29 scholars have been awarded 54 scholarships, with a student population that is 62% white, 28% African-American, and 10% Hispanic. Within the program, there are more males (62%) than females (38%).

**Table 1: Participants’ Gender and Demographic Profile since the program started.**

<b>RACE/ ETHNICITY</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>
<b>White, non-Hispanic</b>	5	6	13	13
<b>Hispanic</b>	1	1	1	2
<b>Black, non-Hispanic</b>	0	4	7	6
<b>Gender</b>	4 M	7 M	12 M	13 M
	2 F	4 F	7 F	8 F
<b>Total</b>	<b>6</b>	<b>11</b>	<b>19</b>	<b>21</b>

Of the 21 students in the present year, 3 are incoming freshmen, 14 are rising juniors, and 4 are seniors, all with majors in the College of Engineering or statistics. A fraction of the participants pursue double majors. Each cohort has had at least three scholars that were transfer students from community colleges. Seven scholars from our program have already graduated: all in four years, with six students pursuing graduate degrees in their field of undergraduate studies, and the seventh student working as an electrical engineer in an industrial setting. Of those that graduated, five participated in co-op or internship programs while earning their degrees.

The STEM scholarship program is not without challenges for both coordinators and students. Even after selection and counseling, we found that two scholars were not eligible to continue in the program after the first initial semesters. One of these students changed their career path to a non-STEM discipline while another accepted a full time job in a local industry and left the university. Within the current cohort of STEM scholars, all students have been involved in extracurricular activities: seven have been undergraduate research assistants on campus (two completed off-campus REU programs), four have participated in

co-ops/industry internships, one completed a study abroad, and two have been counselors or elected in leadership societies. A set of survey instruments has been chosen to collect program evaluation responses. However, we do not yet have sufficient final data to report. We intend to report our final data at the end of the program<sup>5</sup>. An encrypted numeric ID (privy only of the program support assistant and destroyed at the end of the program) is created for each participant and is used to log their data while maintaining anonymity.

## **Conclusions**

This scholarship program for undergraduate students in engineering and statistics will be in its final year at the time of this report, and the results indicate that our financial support system with designed career focused activities encourages 4-year graduation. While the results are still preliminary, most of the students indicated feelings of career-readiness and reported being confident that the program increased their chances of completing their degree program and finding a technical job in their chosen major.

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## **References**

1. NC State STEM Scholars <https://www.ece.ncsu.edu/stem/>
2. Office of undergraduate research at NC State: <https://undergradresearch.dasa.ncsu.edu/>
3. Summer Research Programs: <https://www.nsf.gov/crssprgm/reu/>
4. Free Application for Federal Student Aid (FAFSA) <https://fafsa.ed.gov/>
5. "Assessing Women and Men in Engineering (AWE)," at [www.engr.psu.edu/adapt](http://www.engr.psu.edu/adapt). Sign on at [www.AWEonline.org](http://www.AWEonline.org)