

The Penn State McNair Journal

Summer 2015, Volume 20

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WELCOME

Since 1991, the Penn State McNair Scholars Program has enriched the lives of students at Penn State. The McNair Program holds a very special place in our lives, as well as in the lives of the faculty and staff who work with our students. This publication celebrates their achievements and we offer it to our readers with pride and pleasure.

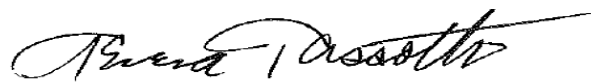
This is the twentieth issue of the Penn State McNair Journal. We congratulate the Penn State McNair Scholars and their faculty research advisors! This journal presents the research conducted in the summer of 2015 by undergraduate students from Penn State, who are still enrolled in the Penn State McNair Scholars Program.

The articles within this journal represent many long hours of mutual satisfying work by the Scholars and their professors. The results of their research are published here and have also been presented at various research conferences around the country. We are especially proud to see how these students have grown as researchers and scholars. The hard work, dedication, and persistence required in producing new knowledge through research is most evident in these articles.

We very much appreciate the guidance, expertise, caring and patience of our fine group of Penn State faculty research advisors. For their ongoing support and assistance, we thank Eric Barron, President of Penn State University; Nicholas Jones, Provost; Regina Vasilatos-Younken, Vice Provost and Dean of the Graduate School; Michael Verderame, Senior Associate Dean; Suzanne Adair, Assistant Dean, and Stephanie Danette Preston, Senior Director of the Office of Graduate Educational Equity Programs, the administrative home of the McNair Scholars Program.

We are also fortunate to have the support and encouragement of many faculty and staff members who have worked with our students as social mentors or who have presented workshops and seminars on the many aspects of graduate and faculty life. You give the most precious of gifts to our students – your time in volunteering to support, encourage and nurture our Scholars' hopes and dreams.

Lastly, we would like to acknowledge the work of five McNair scholars whose summer research is not included in this online publication. Their work has been submitted to peer-reviewed professional journals in their fields for first consideration to be published. We applaud these five scholars – Jordan Chapman, Houston Claire, Caroline Gooch, Francis Kwok, and Alyssa Palmer – for their professional journal submissions. Their faculty research advisors and social mentors are included in this journal's acknowledgements section.



Project Director

TRIO PROGRAMS ON THE NATIONAL LEVEL

Since their establishment in the mid-sixties as part of Lyndon Johnson's War on Poverty Program, the federal TRIO Programs have attempted to provide educational opportunity and make dreams come true for those who have traditionally not been a part of the educational mainstream of American society. The TRIO programs are funded under Title IV of the Higher Education Act of 1965. While student financial aid programs help students overcome financial barriers to higher education, TRIO programs help students overcome class, social and cultural barriers to higher education. There are eight TRIO programs, which include the original three – Upward Bound, Talent Search and Student Support Services. The additional programs are Educational Opportunity Centers, Upward Bound Math & Science Centers, the Ronald E. McNair Post-Baccalaureate Achievement Program, Veterans Upward Bound, and a training program for TRIO staff. McNair programs are located at 156 institutions across the United States and Puerto Rico. The McNair Program is designed to prepare participants for doctoral studies through involvement in research and other scholarly activities.

TRIO PROGRAMS AT PENN STATE

The ten TRIO Programs at Penn State comprise six of the eight TRIO programs. There is the Educational Opportunity Center serving Philadelphia, two Talent Search Programs serving select western Pennsylvania school districts and the York City school district, the Ronald E. McNair Scholars Program serving the University Park campus, two Student Support Services Programs serving the Greater Allegheny and Wilkes-Barre campuses, the Upward Bound and Upward Bound Migrant Programs serving central and southeastern Pennsylvania select school districts, and the Upward Bound Math and Science Program serving select central and southeastern Pennsylvania school districts. These programs annually serve more than 6,000 students, from 6th graders through adults, all with clear potential for academic success. Altogether, the programs operate across select Penn State campuses and in communities across the state, often linking with middle schools, high schools, and community agencies. The programs focus on helping students overcome economic, social, and class barriers so that they can pursue education beyond high school.

MCNAIR SCHOLARS PROGRAM AT PENN STATE

Designed for low-income and first-generation college students, and students from groups underrepresented in graduate education, the McNair Scholars Program at Penn State encourages talented undergraduates to pursue the doctoral degree. The program works closely with these participants through their undergraduate career, encourages their entrance into graduate programs, and tracks their progress to successful completion of advanced degrees.

The goal of the McNair Program is to increase graduate degree attainment of students from the above-mentioned underrepresented segments of society. McNair Scholars are presented with opportunities to study and do research in the University's state-of-the-art facilities in order to hone those skills required for success in doctoral education. Through both academic year and summer program components, McNair Scholars are required to complete a series of steps that lead to their application and enrollment in a graduate program of their choice.

Since 1991, the McNair Scholars Program at Penn State has helped 279 students earn their baccalaureate degrees. Of these graduates, 226 or 85 percent have gone on to graduate school at institutions across the country and overseas. As of March 2016, 59 or 26 percent have earned their academic or professional doctorates. Of this group, 31 also earned their master's degrees prior to the doctorate. Another 131 or 53 percent have now earned at least their master's degrees. Currently, there are 65 or 23 percent of alumni, who are still enrolled in graduate programs. Among the institutions McNair alumni have attended or now attend are: Arizona State, Boston University, Columbia, Cornell, Harvard, Howard University, Indiana University, Iowa State, Johns Hopkins, New York University, Ohio State, Penn State, Purdue, Stanford, Temple, Texas A&M, UC-Berkeley, UC-Davis, UCLA, University of Chicago, University of Florida, University of Illinois-Urbana Champaign, University of Maryland-College Park, University of Michigan, University of North Carolina-Chapel Hill, University of Pennsylvania, University of Texas, University of Wisconsin and Yale, to name just a few.

Summer 2015 McNair Scholars and Program Staff



Summer 2015 Penn State McNair scholars and program staff gather together during the 2015 Penn State McNair-SROP Summer Research Symposium held July 27-28, 2015 at University Park.

ABOUT RONALD E. MCNAIR

Dr. Ronald Erwin McNair, the second African American to fly in space, was born on October 21, 1950, in Lake City, South Carolina. In 1971, he received a Bachelor of Science degree, magna cum laude, in physics from North Carolina A&T State University. He continued his education at the Massachusetts Institute of Technology (MIT) where, in 1976, he earned his Ph.D. in physics.



While at MIT, McNair performed some of the earliest development of chemical and high-pressure CO lasers. He went on to study laser physics at E'cole D'ete Theorique de Physique in Les Houches, France. He was well published and nationally known for his work in the field of laser physics through the Hughes Laboratory.

In 1978, McNair realized his dream of becoming an astronaut when he was selected from a pool of several thousand applicants to be included in the first class of thirty-five applicants for the space shuttle program. Ronald McNair and six other astronauts died on January 28, 1986 when the space shuttle *Challenger* exploded after launching from the Kennedy Space Center in Florida.



McNair was an accomplished saxophonist; held a sixth-degree, black belt in karate; and was the recipient of three honorary doctorates and a score of fellowships and commendations. He was married to the former Cheryl Moore and is the father of two children, Reginald Ervin and Joy Cheray. After his death, Congress approved funding to honor the memory of McNair by establishing the Ronald E. McNair Post-Baccalaureate Achievement Program, which became the sixth program funded under the TRIO Programs umbrella.

“Historians, who will write about McNair, the man, will discover that there was much more to him than his scholastics achievements. Friends who knew him, say he walked humbly and never boasted about his achievements. They say his commitments were to God, his family and to the youths he encouraged to succeed.” (Ebony, May 1986)

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