

The Penn State McNair Journal

Summer 2017, Volume 22

The Penn State McNair Journal is published annually and is the official publication of the Ronald E. McNair Scholars Program at Penn State. No responsibility for the views expressed by the authors in this journal is assumed by the editors or the Ronald E. McNair Scholars Program.

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The program is funded annually by a \$311,538.01 Ronald E. McNair Post-Baccalaureate Achievement Program grant from the U.S. Department of Education.

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U.Ed. GRD118-24

THE PENN STATE MCNAIR JOURNAL

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Volume Twenty-Two

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Welcome

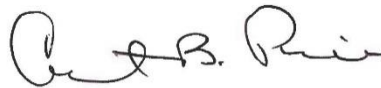
Since 1991, the Penn State McNair Scholars Program has enriched the lives of students at Penn State. The McNair Program holds a very special place in our lives, as well as in the lives of the faculty and staff who work with our students. This publication celebrates their achievements and we offer it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

This is the twenty-second issue of the Penn State McNair Journal. We congratulate the Penn State McNair Scholars and their faculty research advisers! This journal presents the undergraduate research conducted by participants in the Penn State McNair Scholars Program during the summer of 2017. In addition, the journal presents research conducted by McNair Scholars from the summers of 2015 and 2016 whose research papers were under consideration for publishing in another peer journal.

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 within the journal and will also be 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 advisers. For their ongoing support and assistance, we thank Eric Barron, President of Penn State; Nicholas Jones, Executive Vice-President and Provost; Regina Vasilatos-Younken, Vice Provost for Graduate Education and Dean of the Graduate School; Michael Verderame, Senior Associate Dean; Suzanne Adair, Associate Dean for Graduate Student Affairs, and Stephanie Danette Preston, Assistant Dean for Graduate Educational Equity, 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.



Curtis B. Price
Program Director-Ronald E. McNair Scholars Program

TRIO Programs at the National Level

Federal TRIO Programs (TRIO) are outreach and student services programs designed to identify and provide services for individuals from disadvantaged backgrounds. TRIO programs are targeted to serve and assist low-income individuals, first-generation college students, and individuals with disabilities to progress through the academic pipeline from middle school to post-baccalaureate programs. The history of TRIO is progressive. It began with Upward Bound, which emerged out of the Economic Opportunity Act of 1964 in response to the administration's War on Poverty. In 1965, Talent Search, the second outreach program, was created as part of the ***Higher Education Act***. In 1968, Student Support Services, which was originally known as Special Services for Disadvantaged Students, was authorized by the Higher Education Amendments and became the third in a series of educational opportunity programs.

Over the years, the TRIO Programs have been expanded and improved to provide a wider range of services and to reach more students who need assistance. The Higher Education Amendments of 1972 added the fourth program to the TRIO group by authorizing the Educational Opportunity Centers. ***Amendments in 1986 added the sixth program, the Ronald E. McNair Post-Baccalaureate Achievement Program***. Additionally, in 1990, the Department created the Upward Bound Math/Science program to address the need for specific instruction in the fields of math and science.

TRIO Programs at Penn State University

There are eight TRIO programs housed at Penn State including the McNair Scholars Program. ***Educational Opportunity Centers (EOC)*** provides counseling and information on college admissions to qualified adults who want to enter or continue a program of postsecondary education. Penn State EOC serves 1,000 students in the cities of Reading and York, Pa. ***Student Support Services (SSS)*** provide opportunities for academic development, assist students with basic college requirements, and motivates students toward the successful completion of their postsecondary education. The SSS programs at the Penn State Greater Allegheny and Wilkes-Barre campuses combined serve over 330 students. ***Education Talent Search (Talent Search)*** provides academic, career, and financial counseling to participants and encourages graduation from high school and to continue to and complete their postsecondary education. Talent Search serves over 1,900 students among their program located in school districts in southwestern Pennsylvania and York, Pa. ***Upward Bound Programs (UBP)*** which consists of Upward Bound, Upward Bound Migrant, and Upward Bound Math and Science; provides opportunities for participants to succeed in their precollege performance and ultimately in their higher education pursuits. UBP serves about 250 students from six school districts throughout the Commonwealth of Pennsylvania.

The 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 doctoral degrees. 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 288 students earn their baccalaureate degrees. Of these graduates, 245 (85 percent) have gone on to attend graduate school. 59 graduates (26 percent) have earned their academic or professional doctorates; and 31 graduates also earned their master's degrees prior to the doctorate. Another 161 (66 percent) have now earned their master's degrees. Currently, there are 52 (21 percent) who are still enrolled in graduate programs. Among the institutions McNair alumni have attended or currently 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, University of California-Berkeley, University of California-Davis, University of California-Los Angeles, 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 University.

Summer 2017 McNair Scholars and Program Staff



Penn State McNair scholars and program staff gather during the 2017 Penn State McNair-SROP Summer Research Symposium held July 24-25, 2017 at University Park, Pennsylvania.

About Ronald E. McNair

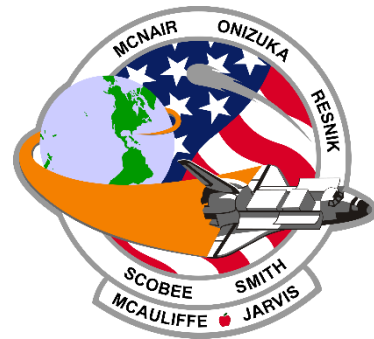
“Whether or not you reach your goals in life depends entirely on how well you prepare for them and how badly you want them.” -Ronald E. McNair



Ronald Erwin McNair was born on October 21, 1950, in Lake City, South Carolina. McNair displayed an early aptitude for technical matters, earning the nickname "Gizmo." His interest in space was piqued by the launch of the Russian satellite Sputnik in 1957, and boosted by the appearance of *Star Trek* on TV years later, its multi-ethnic cast pushing the boundaries of what was possible for a small-town African-American boy.

An outstanding student at Carver High School, McNair starred in baseball, basketball and football and played saxophone for the school band. He graduated as valedictorian of the class of 1967, earning a scholarship to attend North Carolina Agricultural and Technical State University (NC A&T). After initially considering majoring in music at NC A&T, McNair eventually came back around to his love for science, graduating magna cum laude in 1971 with a B.S. in physics.

From there, it was on to the Massachusetts Institute of Technology as a Ford Foundation fellow. Adjusting to the new environment proved a challenge for McNair. He later faced a potentially career-altering obstacle when two years of specialized laser physics research for his doctorate was stolen, but he managed to produce a second set of data in a year, and earned his Ph.D in physics in 1976. Additionally, he was highly skilled in karate and won the 1976 AAU Karate Gold Medal and five regional championships, eventually achieving the rank of fifth-degree black belt.



By this point, McNair was a recognized expert in the fields of chemical and high-pressure lasers. He went to work for Hughes Research Laboratories in Malibu, California, where he focused on such tasks as the development of lasers for isotope separation and conducted research on electro-optic modulation for satellite space communications.

McNair was a member of several organizations during his professional career, including the American Association for the Advancement of Science, the American Physical Society and the North Carolina School of Science and Mathematics Board of Trustees. Among his many honors, he was named a Distinguished National Scientist by the National Society of Black Professional Engineers in 1979 and received the Friend of Freedom Award 1981. He also garnered honorary doctorates from NC A&T State University, Morris College, and the University of South Carolina.



In 1978, McNair was selected as a mission specialist astronaut by NASA. He, along with Guion S. Bluford, Jr., and Frederick Gregory, were the first African Americans selected as astronauts. His first spaceflight was on the STS-41B mission. McNair operated the shuttle's robotic arm to move a platform on which an astronaut could stand. This method of placing an astronaut in a specified position using the robotic arm was used on subsequent shuttle missions to repair satellites and assemble the International Space Station.

McNair was then assigned to the STS-51L mission of the space shuttle *Challenger* in January 1985. The primary goal of the mission was to launch the second Tracking and Data Relay Satellite (TDRS-B). It also carried the Spartan Halley spacecraft, a small satellite that McNair, along with mission specialist Judith Resnik, was to release and pick up two days later using *Challenger's* robotic arm after Spartan observed Halley's Comet during its closest approach to the Sun.

Tragically, *Challenger* launched from Cape Canaveral on January 28, 1986, but the orbiter *disappeared in an explosion just 73 seconds after liftoff*. McNair and the six other astronauts in the crew did not survive. Shortly after his death, the Ronald E. McNair Post-Baccalaureate Achievement Program was created through an act of Congress. The program prepares low-income and first generation students, and underrepresented students in graduate education for doctoral study. Currently, there are 187 McNair projects across the nation serving more than 5,200 students.



Left to right are Christa McAuliffe; Gregory Jarvis; Judith A. Resnik, Dick Scobee, Ronald E. McNair, Mike J. Smith, and Ellison S. Onizuka,

Special Acknowledgements

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