

Scholarships for Advanced Bachelor- and Master of Science Students in Chemistry

This project will contribute to the national need for well-educated scientists, mathematicians, engineers, and technicians by supporting the retention and graduation of high-achieving, low-income students with demonstrated financial need at Middle Tennessee State University (MTSU), an R2 institution with an intentional Master of Science (MS) degree in Chemistry. Over its six-year duration, this project will fund scholarships for up to 60 unique MS students, and up to 90 full time junior and senior students who are pursuing Bachelor of Science (BS) degrees in Chemistry or Biochemistry. The selected eligible scholars will receive scholarships to fulfill unmet need for one to four years each, depending upon the desired terminal degree.

The project aims to increase student persistence in STEM fields by linking scholarships with proven effective supporting activities, including faculty and peer mentoring, research experiences, professional development courses, graduate school and employment preparation, and participation in discipline-specific conferences. With the help of mentors and advisors, the Scholars will create individual plans for career goals and steps toward achieving those goals. Because MTSU has a high population of underrepresented students, including first generation college students (FGCS) and Middle Eastern and North African (MENA) students, this project has the potential to broaden participation in STEM fields. The project team will investigate the effect of mentoring and career development activities and support, and the role of cultural and scientific identity and belonging on retention, graduation, and career directions in these student populations.

Graduating Scholars will be employment-ready and destined for high growth employment fields in Chemistry that were identified in an employment outlook analysis based on data from the Bureau of Labor Statistics. Evidence-based mentoring and other support for Scholars could be life-changing due to the expected economic and social mobility that will include their extended families. Scholars will serve as inspiring examples to other historically underserved students, many of whom emerged from the pandemic worse off economically and academically.

The overall goal of the project is to increase timely degree completion for low-income, high-achieving MS and BS students with demonstrated financial need. The specific aims of the project are to deliver *high impact* scientific and professional development opportunities to Scholars. Cohort, curricular and co-curricular activities are designed to maximize recruitment, retention, learning, graduation, and placement of these students. For example, the BS Scholars will follow Chemistry or Biochemistry major curricula and be encouraged to select two credits of research per year or paid summer research. The MS Scholars will follow the existing curriculum and complete a thesis project. Other cohort support includes faculty and peer mentors, and professional advisors to address research, career, curriculum, and life issues. The project team will hold two retreats and additional monthly cohort meetings to guide the cohort while creating a learning community. Co-curricular activities such as networking with industry professionals and alumni, engaging with employers at the career fair, seminars, literature discussions, and other departmental events will be encouraged. The project team will collect and analyze qualitative and quantitative research data on academic success, student engagement, and self-efficacy/confidence to discover how to support and prepare low income and underrepresented Scholars for their next career steps. The evaluator will utilize the collected data, along with surveys to obtain more information about the effectiveness of the project at meeting the evolving needs of Scholars as they advance. Guided by project evaluations and the theory of change model, iterative improvements are expected to keep Scholars on track to graduate and obtain STEM employment or admission to graduate programs.

Documentation and dissemination of the project elements that contribute to Scholar success, in the education literature and through conference presentations, will benefit other intentional MS and BS STEM undergraduate programs seeking to develop strategies for effective and sustainable interventions designed for low income and other underrepresented students.

This project is funded by NSF's Scholarships in Science, Technology, Engineering, and Mathematics program, which seeks to increase the number of low-income academically talented students with demonstrated financial need who earn degrees in STEM fields. It also aims to improve the education of future STEM workers, and to generate knowledge about academic success, retention, transfer, graduation, and academic/career pathways of low-income students.