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Scientific Accomplishments:

Dr. Burger is recognized for (1) the development of sensor-based instruments for identifying radioactive materials in the field; (2) materials research leading to the emergence of improved semiconductors for astrophysics and medical imaging applications; (3) discovery of new II-VI semiconductor crystals for solid-state photonic detectors; (4) inventing a new scintillator material that has the best demonstrated performance and potential to supersede all other commercial scintillators, and (5) for inventing a new growth process for wide band gap semiconductor crystals for neutron detection and potential replacement of the ^3He gas filled tube detectors. He has authored more than 300 publications, edited 13 books, holds 8 patents, and is a Fellow of the SPIE.

Mentoring and Diversity Impact:

Dr. Burger is the co-director and co-founder of the Fisk-Vanderbilt Masters-to-PhD Bridge program. Since its inception in 2004, the program has attracted 109 students in astronomy, biology, chemistry, materials science, and physics. 69 MS degrees have been awarded, 56 in Physics, 9 in Biology, and 4 in Chemistry. Currently, there are 30 students in the MS phase. The students are a diverse group: 59% are African-American, 23% Hispanic, 4% Native American or Pacific Islander, and 14% are white or other non-minority. Approximately half of the students are women. Most are from traditionally underserved populations, such as veterans, first generation students, low-income families, or students with physical or learning disabilities. With an overall retention rate of 95% and a PhD retention rate of 87%, Fisk has achieved the distinction of being the top awarder of MS degrees in physics to African Americans, and Vanderbilt is one of the top awarders of PhDs to under-represented minority students (URMs) in astronomy, physics, and materials science. 26 students have earned PhDs, and 100% of them are employed as faculty, postdocs, staff scientists, or scientists in industry. The program is on pace to continue producing 4-6 PhDs per year representing 5-20 times the national institutional average. Even with these successes, Burger is not satisfied with just making a local improvement, he is actively pursuing the dissemination of this experience to other predominantly white institutions and minority institutions. The Fisk-Vanderbilt Masters-to-PhD Bridge Program is a national model of a graduate mentoring program that has so far been emulated, with NSF support, by the University of Michigan, Massachusetts Institute of Technology and Columbia University.