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**Advancing Minorities and Women to the PhD in Physics and Astronomy**

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We briefly review the current status of underrepresented minorities in physics and astronomy: The underrepresentation of Black-, Hispanic-, and Native-Americans is an order of magnitude problem. We then describe the Fisk-Vanderbilt Masters-to-PhD Bridge program as a successful model for addressing this problem. Since 2004 the program has admitted 110 students, 90% of them underrepresented minorities (50% female), with a retention rate of 90%. The program has become the top producer of African American master's degrees in physics, and is now one of the top producers of minority PhDs in astronomy, materials science, and physics. We summarize the main features of the program including its core strategies: (1) replacing the GRE in admissions with indicators that are better predictive of long-term success, (2) partnering with a minority-serving institution for student training through collaborative research, and (3) using the master's degree as a deliberate stepping stone to the PhD. We show how misuse of the GRE in graduate admissions may by itself in large part explain the ongoing underrepresentation of minorities in PhD programs, and we describe our alternate methods to identify talented individuals most likely to succeed. We describe our mentoring model and toolkit which may be utilized to enhance the success of all PhD students.