

# THE NEXT HOT MAJOR FOR MINORITY STUDENTS

Opportunities abound for African-American and Hispanic students in computer science, a field eager to diversify. This guide will help minority students understand why they should consider computer science, how they can explore and prepare before college, what to look for in a degree program, and how to afford a degree.

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## INTRODUCTION

The fields of computer science and programming have been growing in popularity for decades, due primarily to solid financial and professional prospects, and the incalculable effect of the digital revolution on every facet of our culture and society. However, the abundant opportunities of the computer science world have, for the most part, been overlooked by most underrepresented minority students, particularly those in the African-American, Hispanic, and Native American communities. The reasons for this problem are numerous and complex, as are its solutions.

This guide is meant to act as both an introduction to the issues surrounding minority student interest in computer science, as well as a resource for those individuals considering a career in the computer science field. Included are:

- An explanation of the problem and some of the reasons for minority disinterest.
- A sampling of pre-college opportunities for prospective computer science students.
- A look at the problem of program retention and some of the ways colleges are battling it.
- A list of scholarship programs geared toward minority students specifically interested in computer science and other STEM-related subjects.
- Some useful observations and tips from education professionals and experts.

There may never be a better time than the present for minority students to enter the growing field of computer science. This guide is designed to help those individuals make the most of a great opportunity.

# THE COMPUTER SCIENCE CAREER OPPORTUNITY

” A large part of the problem with attracting minority students into computer science programs has to do with awareness. I think that if students understood the tremendous career opportunities for computer science graduates, there would be more interest.

- Hakim Weatherspoon, Assistant Professor in Computer Science,  
Cornell University

The facts are indisputable and disheartening. The computer science education revolution has left our minority communities behind. Statistics on the subject painfully bear this out. For example, data from the [National Science Foundation](#) indicates that, although 36.4 percent of the resident population of the United States is non-white, approximately only 18 percent of all bachelor's degrees in computer science in the U.S. go to non-white students. And the problem appears to be getting worse. According to recent statistics from the [College of Computing at Georgia Tech](#) regarding the Advanced Placement Computer Science A exam, the percentage of African-Americans sitting for the test in 2013 was approximately 3.7 percent, with no African-Americans at all taking it in 11 states. These numbers are not only discouraging, they have actually declined over the past few years. Similar lower-than-national-average numbers can be found for other minority groups, such as Hispanics and Native Americans.

There is no doubt that career opportunities for computer science graduates are plentiful. This is particularly true for underrepresented minority graduates, as employers continue to actively seek out them out in an effort to diversify their workforce. The problem is in convincing minority students to join up.

## WHY THE LACK OF INTEREST?

” Most states do not have any recognized standards for computing at the K-12 level. Often, computing courses do not even count as electives toward graduation. This has not encouraged students to consider computing as an option. Since many students tend to form their career preferences somewhere between the end of middle school and the start of high school, the lack of early exposure to computing makes CS a discipline that is not on most students' radars.

- Enrico Pontelli, Computer Science Professor and Department Head,  
New Mexico State University

Experts in the field have identified a number of reasons for the lack of minority participation in STEM-related college degree courses in general, and computer science programs in particular. Chief among them are:

- The general perception that computer science and STEM-related subjects are simply “too hard” and take too much the effort. This perception is found across the entire population, but is particularly reinforced among underrepresented minority groups, such as African-Americans, Hispanics, and Native Americans. The fact is that science, mathematics and engineering are difficult subjects, but this should not create an automatic barrier that prevetes students from considering careers in these fields.

- Science and engineering college programs are seen as “expensive” and “exclusive.” This is particularly true in regard to smaller, private postsecondary institutions. Here, the perception and the reality are actually different. College programs in computer science and other STEM subjects are often no more or less expensive than programs in other subjects.
- Students need to connect to the subject early on. Success in computer science and STEM-subject degree programs requires substantial pre-college education and skills development, particularly in mathematics. A lack of proper preparation and encouragement at the middle-school and even elementary levels continues to result in a lack of interest in computer science programs further along in the education process.

## PREPARING BEFORE COLLEGE

” I would suggest that a student take the initiative and do some reaching out. Contact local colleges to see if a professor would be interested in having them intern or help out with research during the summer, for example.

- Verna Miller Case, Associate Dean-Teacher, Learning & Research,  
Davidson College

” Advocate for yourself. Take STEM classes and always do your best in them. Take Calculus instead of just Pre-Calculus. Be prepared and open, and seek out information.

- Shawna Young, Executive Director, Office of Engineering Outreach Program,  
Massachusetts Institute of Technology

One of the best ways for a student interested in a college degree or career in computer science to explore the field is to attend a pre-college course, internship, summer camp, or other related program. These programs are typically presented by college or university computer science departments, whose goal is to excite and encourage students of all ages and educational levels to consider a career in computers. The following is a list of some of the most popular pre-college programs, but it is far from exhaustive. Students should contact their local postsecondary institutions for programs offered in their area.



### [American Indian Science and Engineering Society \(AISES\) Pre-College Programs](#)

The AISES offers a variety of programs to ensure students are exposed to first-rate STEM subject-related experiences and events. The programs support early childhood through high school education, and include the Native American Science and Engineering Fair, the Science Bowl, Power-Up Workshops, as well as national and regional conferences.



### [Cornell Engineering: CATALYST Academy](#)

Presented by Cornell University's College of Engineering, the Catalyst Academy is a one-week summer residential program geared toward African American, Latino, and Native American high school sophomores, juniors, and seniors. Its mission is to advance diversity in engineering. At the academy, faculty and graduate students lead attendees in classes, lab sessions, and project research in the STEM subjects.



### [Howard University CEACS Pre-College Outreach Service and Programs](#)

Howard University's College of Engineering, Architecture and Computer Sciences (CEACS) offers a series of summer pre-college engineering orientation and other outreach programs. These include the Minority Scholars Program, in which students receive college credit for a computer programming course, and a five-week pre-college program sponsored by NASA and coordinated by the Department of Electrical and Computer Engineering.



### [Leadership Education and Development \(LEAD\)](#)

The LEAD Computer Science Institute Program is designed to provide ninth, tenth, and eleventh graders with the opportunity to explore the world of computer science. Participating universities each develop their own unique curriculum pairing active learning with specific programming topics. Participating institutions include the University of Virginia, the California Institute of Technology, and Stanford University.



### [Minority Engineering Advancement Program \(MEAP\)](#)

Presented by the School of Engineering and Technology at Purdue University, the MEAP is a week-long summer non-residential camp for minority students in grades 6-12 with an interest in mathematics and science. The program introduces students to exciting educational opportunities in engineering- and technology-related fields and includes a focus on computer instruction in the areas of hardware, software and graphics.



### [Minority Introduction to Engineering and Science \(MITES\)](#)

Sponsored by the Massachusetts Institute of Technology School of Engineering, MITES is a rigorous six-week summer academic enrichment program for high school juniors interested in exploring career opportunities in engineering, science and entrepreneurship. Participants develop critical problem-solving skills, build confidence in academic and leadership abilities, gain an introduction to the scope and possibilities of a career in engineering, science and entrepreneurship, and more. MITES is one of five programs offered by MIT's Office of Engineering Outreach Programs.



### [Saint Mary's University First Generation Initiative \(FGI\)](#)

The FGI program at Saint Mary's University of Minnesota reaches students seeking to become the first in their families to attend college in any number of fields, including computer science. FGI sponsors a range of events and activities, including Countdown to College, in which students spend two weeks at Saint Mary's each summer for four years to be exposed to the college experience.



### [University of Florida Student Science Training Program](#)

The University of Florida's Center for Precollegiate Education and Training offers a seven-week residential research program for selected high school juniors and seniors considering careers in a number of fields, including computers. Students engage in research with a faculty-mentor, attend lectures, and participate in a UF honors seminar class.



### Young Women in Computing

Young Women in computing is an outreach initiative of New Mexico State University with the goal of increasing the participation in computer science activities and exposure for students in New Mexico. Young Women in Computing sponsors a variety of events and activities including in-school presentations, after-school and summer programs, state-wide competitions, and more.

## WHAT TO LOOK FOR IN A COLLEGE PROGRAM?

// Computer science coursework, like that of other STEM subjects, is not just perceived as difficult, it is difficult. I tell my students that success in computer science is hard work. You won't learn everything you need to in the classroom, you will have to apply yourself to study and practice outside of class as well.

- Rob Gordon, Asst. Professor of Computer Science,  
Saint Mary's University

Once a minority student enrolls in a college computer science program and begins his or her studies, the problem of retention emerges. That is, preparation in STEM-related subjects prior to entering a college program is not enough to guarantee success at the college level. A student must continue to be motivated and supported throughout his or her college career to ensure the successful completion of a degree program. Recognizing this need, many schools have implemented strategies to retain students in computer science and other STEM subject-related degree programs. Among them:

- Faculty/peer mentoring.
- Campus support groups and career-related student clubs and organizations.
- Improved comprehension through research opportunities.
- Courses and tutoring to improve study, note-taking, and time-management skills.

Students are well advised to inquire about the existence of, and access to, retention programs for computer science majors at the specific colleges and universities they are considering.

## AFFORDING A COMPUTER SCIENCE DEGREE

As discussed above, the expense of attending college is tremendous and can be prohibitive without the assistance of a student loan, grant or scholarship. Fortunately, there are countless financial resources available to all students, including dozens of scholarship programs specifically tailored to help minority students. The following list provides information on a number of the most popular scholarship programs geared toward individuals interested in computer science, technology, and programming, as well as other STEM-related subjects.



### [Accenture](#)

The Accenture Scholarship Program for Minorities awards \$1,500 scholarships to students enrolled full-time in pursuit of degrees in engineering, computer science, and a variety of other programs related to information systems and decision or management sciences. The scholarship program is directly targeted towards African American, Hispanic, Asian American, and Native American undergraduate students.



### [American Indian Science & Engineering Society \(AISES\) Google Scholarship](#)

The AISES Google Scholarship awards \$10,000 to American Indian, Alaska Native, Native Hawaiian AISES members who are pursuing full-time undergraduate or graduate degrees in the computer science, computer engineering, or information management systems fields. Applicants must have a 3.5 or better GPA.



### [Blacks at Microsoft Scholarships](#)

Blacks at Microsoft (BAM) is a company-sponsored employee network that awards two \$5,000 renewable scholarships to outstanding high-school seniors interested in pursuing a career in technology. To be considered for a BAM scholarship, an applicant must, among other requirements: be a high-school senior of African descent; plan on attending a four-year college or university in the fall of the upcoming school year; and plan to pursue a bachelor's degree in a technology- or business-related field, such as computer science.



### [ESA Foundation](#)

The ESA Foundation Scholarship Program offers up to 30 \$3,000 scholarships annually to women and minority students pursuing degrees leading to careers in computer and video game arts. The application period runs from March 1 through May 15 for the following academic year.



### [Ford Motor Company Tribal Scholars Program](#)

The Ford Motor Company Tribal Scholars Program awards scholarships of up to \$3,000 to Native mainstream university students studying one of a variety of subjects, including computer science. Applicants must have a 3.0 or better GPA. Applications are available January 1 through May 31.



### [The Gates Millennium Scholars Program](#)

The goal of the Gates Memorial Scholars Program (GMS) is to provide an opportunity for outstanding minority students with significant financial need. GMS offers 1,000 good-through-graduation scholarships that can be used at any college or university of the recipient's choice. Application deadline is usually in January.



### [Great Minds in STEM/HENAAC Scholars Program](#)

The HENAAC Scholars Program awards one-year scholarships for STEM-related degrees (including computer science) in the \$1,000 to \$10,000 range to approximately 100 students annually. Applicants must be of Hispanic descent and/or must significantly participate in and promote organizations and activities in the Hispanic community. The application deadline is typically April 30.



### [Hispanic Scholarship Fund](#)

The Hispanic Scholarship Fund provides over 5,100 scholarships to Latino students annually in all subject fields, including computer science and computer technology. Requirements vary by scholarship, but in general, students must have a minimum 3.0 GPA, be a U.S. citizen or legal permanent resident, plan to apply for federal financial aid, and plan to enroll as a full-time undergraduate or graduate student at an accredited U.S. institution.



### [Microsoft Minority Scholarships](#)

Microsoft Minority Scholarships are available to African American, Hispanic, and Native American candidates. To be eligible, an applicant must be enrolled full-time in a computer science, computer technology, or related discipline bachelor's degree program at a four-year college or university in the United States, Canada, or Mexico. Recipients must apply for a summer internship with Microsoft and, if an internship is offered, complete the salaried internship at Microsoft Corporation in Redmond, Washington.



### [NASA/Motivating Undergraduates in Science and Technology Project \(MUST\)](#)

MUST provides scholarships and internships to undergraduates pursuing degrees in all STEM-related fields, including computer science. One-year competitive scholarships are awarded to approximately 100 students annually in amounts of up to one-half of tuition, not to exceed \$10,000. Additionally, students who maintain the required minimum GPA will be eligible for a paid internship at a NASA center.



### [National Action Council for Minorities in Engineering \(NACME\)](#)

The NACME Pre-Engineering Scholarship Program awards \$2,500 scholarships to African American, American Indian, and Latino high school seniors with a commitment to science and engineering as a career goal. Requirements include a minimum 3.0 GPA and participation in an Academy of Engineering or other pre-college or high school program focused on math, science and engineering. The deadline for application is typically April 1.



### [The National Gem Consortium \(GEM\) Fellowships](#)

GEM provides graduate fellowships on the MS and PhD levels coupled with paid summer internships. There are three fellowship programs: MS Engineering Fellowship; PhD Engineering Fellowship; and PhD Science Fellowship. The application cycle for these programs is July 1 - November 15.



### [National Society of Black Engineers \(NSBE\)](#)

The NSBE offers a variety of corporate-sponsored scholarships to collegiate undergraduate and graduate students who are members of the Society. Scholarship packages range in value from \$500 to \$10,500 and are available to those studying a number of engineering-related subjects including computer engineering and computer science. Application deadlines vary by scholarship.





### [Society of Hispanic Professional Engineers \(SHPE\) Foundation](#)

The SHPE Foundation Scholarship Program supports Hispanic students pursuing degrees in all STEM subjects, including computer science. Merit- and need-based scholarships are available in amounts from \$1,000 to \$5,000 to students who demonstrate significant motivation and aptitude in the STEM fields. Recipients must be enrolled in a full-time program and be members of the SHPE.



### [Xerox Technical Minority Scholarship](#)

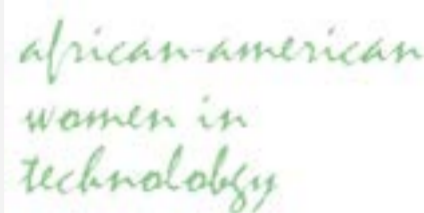
The Xerox Technical Minority Scholarship program awards scholarships in amounts from \$1,000 to \$10,000 to qualified minority students in a technical degree program at the bachelor level or higher. Scholarships are available to students in a wide range of technical fields, including computer science. Deadline for application is typically at the end of September, but make sure to check the scholarship site.

## ADDITIONAL RESOURCES



### [American Computer Science League \(ACSL\)](#)

The ACSL is a non-profit organization devoted to computer science education at the secondary school level. The league sponsors and administers computer science contests for junior and senior high school students, awards prizes to winning students and schools at local and regional levels, and publishes a newsletter announcing contest results.



### [African-American Women in Technology \(AAWIT\)](#)

The AAWIT is a non-profit organization dedicated to the education, support and advancement of African-American women in the information technology field. The AAWIT is committed to attracting African-American women into the field by actively looking for networking, training, and career advancement opportunities. Programs include the Big Sister Network, which provides women mentors, and the AAWIT resume bank, where members can post their resumes and apply for jobs.



### [Codecademy](#)

Codecademy is an online interactive resource that provides free coding courses and labs in programming languages such as Python, PHP, Java Script, HTML/CSS, Ruby, and APIs. Codecademy also offers a forum for coders and other enthusiasts to network and share knowledge. All coding classes are provided free of charge.



### [The Computing Research Association \(CRA\)](#)

The CRA's membership consists of over 200 North American academic departments of computer science, computer engineering, and related fields. Its mission is to "enhance innovation by joining with industry, government and academia to strengthen research and advanced education in computing." As part of this mission, the CRA facilitates the development of diversity in the field by supporting a number of student-related programs and events.



### [Khan Academy](#)

The Khan Academy is a non-profit educational website with the stated mission of providing a “free world-class education to anyone, anywhere.” The Khan Academy offers thousands of online educational resources in dozens of subject areas, including computer science and, particularly, computer programming. All resources are available free of charge.



### [National Society of Black Engineers \(NSBE\)](#)

The NSBE is a non-profit association dedicated to the academic and professional success of African-American engineering students and professionals, including those in the computer science field. The society boasts over 29,000 members and more than 240 collegiate, 70 professional, and 82 pre-college chapters in the United States and overseas. The NSBE sponsors a wide range of activities in support of its goals, including scholarships, competitions, and programs such as the NSBE Jr. Pre-College Initiative.



### [The Urban Massachusetts Louis Stokes Alliance for Minority Participation \(UMLSAMP\)](#)

Funded by the National Science Foundation, the UMLSAMP works primarily with low-income, underrepresented minority students to help them access, persist at, and complete a post-secondary education in STEM-subject degree programs. UMLSAMP alliance institutions include UMass Lowell, UMass Dartmouth, Wentworth Institute of Technology, Bunker Hill Community College, Roxbury Community College, Middlesex Community College, and Bristol Community College.