



Lawrence King, Editor

Special points of interest:

- Editorial Review Board
• Black Woman Physicist
• 2016 Inductees National Inventors Hall of Fame

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STEM NEWS

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STEM NEWS Editorial Review

The responses to articles in STEM NEWS from readers across the nation and even internationally has been more that imagined when I began publishing in 2011. Primary readership is STEM professionals and educators, both K12 and higher Ed.

This is the group of educators and technologists who read STEM NEWS who will comprise our Editorial Review Board. As our articles, contributed reports, and issue summaries continually evolve to remain at the forefront of educational and career information for the STEM fields, it will be due to the support and guidance provided by these men and women. We thank them all.

- * Whitney Holt, Simulation & Software Engineer - Group Head, Integrated Lab Test Facility, Gulfstream Aerospace, Savannah, Ga.
* Dr. Cheryl Crooks, The Center for Advanced Studies in Science, Wheeler High School Marietta Georgia
* Roberto Ruiz, PhD, Chief Operating Officer, ClearSign Combustion Corp, Seattle Washington
* Dr. Ambrose Jearld, Jr., Chief Academic Programs, NOAA, Northeast Fisheries Science Center (NEFSC), Woods Hole Mass.
* Darryl Baynes, PhD, , Interactive Service Programs, Wheeling W.Va.
* Gary Farina, Executive Director, Michigan STEM Partnership

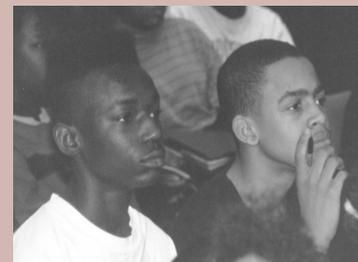
Katherine Johnson, retired NASA physicist and mathematician who calculated the trajectory of America's first space trip by hand in 1961 and who was featured in our STEM NEWS 2014, Volume 3, Issue 4 has been honored with the Presidential Medal of Freedom.

Johnson's computations have influenced every major space program from Mercury through the Shuttle program.

Gifted Black Students Shortchanged

There's a slew of research that bright students of color have a harder time getting access to gifted and honors programs. Adding to it is a new study in the American Educational Research Association's journal AERA Open finds that high-achieving black students are less than half as likely as white, Hispanic, or Asian students to be referred for gifted programs.

The study analyzed teacher referrals for gifted programs based on more than 14,000 students in a large federal longitudinal study. For students with identical high scores on standardized mathematics and reading tests, white, Hispanic, and Asian students were all statistically just as likely to be referred for gifted programs, at about 6 percent. Black students, by contrast, were 50 percent less likely to be referred, at 2.8 percent. (education week 1/25/2016)



Expanding School Curriculums and Opportunity for Professionals

The STEM Education Act of 2015, expands the definition of STEM to now include computer science programs. The new law does not add funding, but it does expand the kinds of STEM programs that can be run and funded by federal government agencies to include computer science. It also makes people who are pursuing a master's degree and those with a background in computer science eligible for **Robert Noyce Teacher Scholarships**, which support science and math graduates and professionals who hope to teach.

The STEM Education Act of 2015 also instructs the National Science Foundation to continue to fund out-of-school and informal education programs in STEM subjects. That's a boon for museums, nature centers, and other organizations that offer informal science programming.

From our perspective, there is opportunity for STEM professionals to develop collaborative partnerships with schools to attract more underrepresented students to the field.

More STEM Teachers

The National Science Foundation is one of 230+ partners supporting 100Kin10's efforts to train and retain 100,000 "excellent STEM teachers" by 2021.

The basis for the founding of 100Kin10 lies in the belief that our country needs to have more graduates ready to join the fields of science, technology, engineering, and math in this century of advancing innovation. 100Kin10 is a network of 230 corporations, foundations, universities, school districts, and museums dedicated to this goal.

For information, contact: <https://100kin10.org/>

A New Black Woman Physicist

Just 83 Black women have received a Ph.D. in physics-related fields in American history. The most recent is **Dr. Chanda Prescod-Weinstein** a theoretical astrophysicist from the physics department, at the Massachusetts Institute of Technology.

In total, U.S. universities awarded over 1,700 physics Ph.D.'s in 2013. The number of African-American faculty at U.S. physics departments remains similarly low; only two percent are Black, according to a report issued in 2014 by the American Institute of Physics, and half of those faculty members are employed by historically Black colleges and universities (HBCUs).



Prescod-Weinstein recounts teaching herself calculus and physics when her high school ran out of classes at her level. When teachers don't have capability to push an inquisitive youngster like Prescod-Weinstein, students might be discouraged from pursuing science.

A lot of her achievement had to do with her own experience of getting an education as a new immigrant to the United States. As a Black Caribbean immigrant, she was treated pretty badly at her school when she first came to the U.S., and was given the impression that she couldn't really do math.

Dr. Prescod-Weinstein is part of a vanguard, a small but growing number of African-American women with doctorates in physics.

The Presidential Awards for Excellence in Mathematics and Science Teaching (**PAEMST**) are the nation's highest honors for teachers of mathematics and science (including computer science).

Awardees serve as models for their colleagues, inspiration to their communities, and leaders in the improvement of mathematics and science education.

The 2016 Awards will honor mathematics and science (including computer science) teachers working in grades K-6. Nominations close on April 1, 2016. Teachers: Apply Online

But first, please review the 2015–2016 Application Packet
(<https://s3.amazonaws.com/paemst.files/2015-2016%20PAEMST%20Application%20Packet.pdf>)

Applications must be completed by May 1, 2016.

NEW BRITISH STEM EDUCATION APPROACH

One of our readers in the UK, **David Thomas (Partner, Advanced Problem Solving Partnership)** has shared a STEM development in Great Britain. The New Model in Technology & Engineering (**NMiTE**) is Britain's first purpose-built university in 30 years. The **NMiTE** team are working with the world-leading University of Warwick and Olin College of Engineering, with advice from the University of Bristol.

The school is located in the City of Hereford and will be opening doors to its first students in 2017/18, building to 5,000 undergraduates over the decade. The school will specialize in teaching engineering and initially creating high quality graduates for sectors including Defense, Security & Cyber, Agri-Technology, Advanced Manufacturing, and Green and Renewable Technologies. Instructional approach will apply the Boston Mass, Olin College's pioneering real world problem based teaching methods that emphasize teamwork, design, collaboration, inter-disciplinary processes, and innovation to develop leadership and entrepreneurial skills as well as high academic standards.



The approach being used for the **NMiTE** learning methodology was originally created and refined by a global UK company specializing in manufacturing, inventory management and distribution, procurement and logistics in the automotive sector. This model was drawn from nearly 100 company developed training courses all of which were accredited by national organizations and covered a holistic range of subjects both behavioral and technical.

As the refinement of K-12 and higher education in the US continues to broaden its impact and sharpen its focus, the ideas of our neighbors, customers, competitors, and collaborators across the globe will be reflected in the end product.

Among the 16 inventors scheduled to be inducted at the **Smithsonian** into the **National Inventors Hall of Fame (NIHOF)** during May 4—5, 2016 are two women and one African American male.

- Victor Lawrence** : Born in Ghana, recognized for his invention of signal processing in telecommunications making modern internet transmission possible which enabled the development of the Internet.
- Radia Perlman**: being recognized for her creation of Robust Network Routing and Bridging essential to computer network design
- Harriet Strong**: honored because of her development of water storage and flood control systems

CS is a Basic Skill



Computer science has become a new basic skill, essential in order to excel in an increasingly computational and data-intensive world. However, access to computer science (CS) at the K-12 levels remains limited. CS is taught in less than 25 percent of US high schools. Rural and high-need schools are even less likely to offer it. The awareness and implementation however remains elusive for rural districts that share the burdens of few trained teachers, lack of funding, and their distance away from high tech employment hubs. Moreover, in schools that do offer CS, students of color and girls often participate in very low numbers.

NSF is committing \$120 million over five years to accelerate its efforts to enable rigorous and engaging CS education in schools across the nation. These funds will support the development of prototypes of instructional materials, assessments, scalable and sustainable professional development models, and teacher resources, along with research to study their effectiveness.

Computer science education is getting something of a fresh look from state and local policymakers, with many starting to push new measures to broaden K-12 students' access to the subject. Seventeen states and the District of Columbia now have policies in place that allow computer science to count as a mathematics or science credit, rather than as an elective, in high schools—and that number is on the rise. Wisconsin, Alabama, and Maryland have adopted such policies since December, and Idaho has a legislative measure awaiting final action. In January, Texas lawmakers approved legislation that would allow students to take a computer science course to satisfy a foreign-language requirement. In addition, some large urban districts with majority minority populations are getting in on the action.

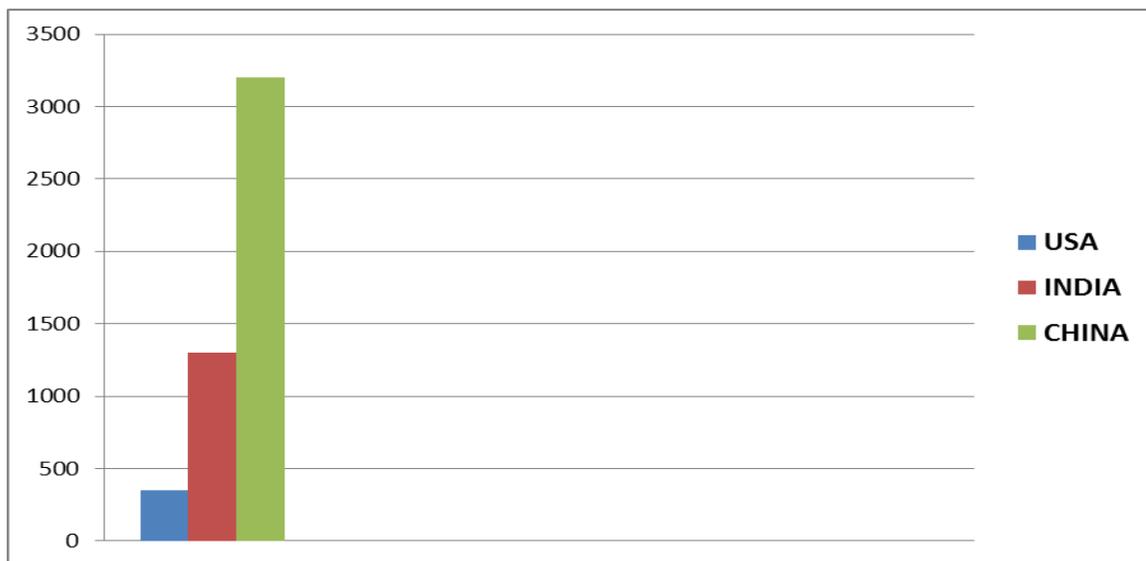
Can the US win STEM without under-represented minorities?

As our education and corporate complex struggle to blend what should be done with what can be done, the populations of our major competing nations should bring some reality considering what it represents to our national security and economic vitality. The disproportional representation of certain minorities in our science and engineering disciplines is growing increasingly problematic.

USA population 350 million

India population 1.3 billion

China population 3.2 billion



Since our K12 student population is now majority minority, let's look at the data.

- Over half of students in Americas schools are minorities
- Only 65,000 Black, Latino, and Indigenous students in our 10th grades perform in the top 25% of all students in math
- Graduation requirements are being relaxed
- State governments are assuming control over poor performing schools, of which the majority are in urban districts with majority minority student populations
- Less than one-third of Black students are attempting the take AP math courses
- Minority share of our science and engineering workforce has remained disproportionately low compared to the overall population. (the shortage is approximately 400,000 minority engineers alone)
- Underrepresented minorities earn less than 16 percent of the degrees in science fields and less than 13 percent of degrees in physical sciences and engineering
- Women make up nearly half the work force but have less than a quarter of science, technology, engineering or math jobs and in the IT field the percentage is equally low
- Minorities still enroll in engineering, science and math programs in college but fewer of them earn a degree in those programs in five years because they have not been prepared for the rigor of education at that level
- Schools that serve minority and lower-income students tend to employ teachers with fewer years of experience, with less specialized training, and are under-resourced in math and science

