



COLLABORATING TO GROW THE PATHWAY OF NATIVE AMERICANS IN STEM



INTRODUCTION

On October 5, 2016, Intel hosted Growing the Legacy of Native American Leadership in Science and Technology: A Thought Leadership Event in partnership with the National Center for Women & Information Technology (NCWIT). Key leaders in academia, government, tribal nations, non-profit organizations, and the tech industry convened to discuss the state of technology in Native American communities, identify gaps and create actionable steps for increasing Native American student participation and retention in STEM (science, technology, engineering and math) education. The resulting recommendations are outlined in this whitepaper, and these insights ultimately will be used to help shape and inform Intel's comprehensive Native American strategy.

Intel is focused on paving the way for more women and underrepresented minorities, including Native Americans, to enter the technology sector and succeed as engineers and computer scientists. Creating a pathway into STEM education is one of five strategic pillars supporting Intel's bold 2020 goal to achieve full workforce representation (when Intel's workforce reflects the market availability of talent for females and African Americans, Hispanics, and Native Americans in the U.S.).

Get more information at www.intel.com/diversity on why diversity and inclusion are important to Intel's growth strategy, the 2020 goal, and progress to date.

"We are taking on some of society's most complex issues, and showing the world that with creativity, ingenuity, and possibility thinking, there is nothing that can't be solved or changed for the better." Brian Krzanich, Intel CEO

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The Value of Collaboration.

Intel's intentional approach to affecting change is to engage subject matter experts and enlist them as long-term allies. The thought leadership event outlined in this whitepaper was designed to accelerate Intel's diversity and inclusion work by collaborating on the development of a national strategy to accelerate, broaden and amplify participation of Native American students in the computer science, information technology and engineering disciplines.

More than 40 leaders gathered for this rare opportunity to engage in critical dialogue. They actively participated in focused discussions on topics such as "developing STEM pipelines and understanding the current state of technology and education structures in Indian Country," and they identified solutions to aid in accelerating the growth of the next generation of innovators. Key speakers included:

- Leslie Aaronson, Strategic Director for K12 Initiatives, NCWIT
- Dr. Bryan Brayboy (Lumbee), ASU Center for Indian Education/ ASU Special Adviser to the President of American Indian Affairs
- Sarah Echohawk (Pawnee), CEO, American Indian Science and Engineering Society
- The Honorable Stephen Lewis (Gila River Indian Community), Governor, Gila River Indian Community
- Jacob Moore (Tohono O'odham), Assistant VP of Tribal Relations, ASU
- Dr. Traci Morris (Chickasaw), Director of ASU American Indian Policy Institute
- Belinda Nelson (Gila River Indian Community), President, Board of Directors, Gila River Telecommunications, Inc.
- Joseph Nsengimana, Director, Technology Pathway Development Initiatives, Intel Corporation
- Norris Palmanteer (Colville Confederated Tribes), Intel Native American Pacific Islander Leadership Council, HR Director of Global Stock Programs, Intel Corporation
- Jacqueline Pata (Tlingit), Executive Director, National Congress of American Indians
- Matthew Rantanen (Cree), Director of Technology, Southern California Tribal Chairman's Association
- Dr. Sally Stevens, Executive Director, Southwest Institute for Research on Women, University of Arizona
- Barbara Whye, Executive Director of Global Strategy and External Alliances, Intel Corporation

A Legacy of Scientific Achievement.

Knowledge sharing, creating a deeper awareness of the collective needs and recognizing the historical contribution of Native Americans in scientific fields were themes throughout the convening.

Although there's an undeniable shortage of Native American students currently enrolled in STEM, the collaborative solutions presented at the event represent boundless opportunities for improvement in terms of how students can be better supported for future pursuits of a STEM education and career.

Participants agreed that it's important for Native American students to see themselves in STEM fields. They come from many generations of scientists and have a long history of impressive engineering feats, but they don't typically see themselves this way. Together, we can change this paradigm for the benefit of individuals, communities and the industry alike.

"We need to instill in Native American students the belief that they come from a legacy of strategic thinkers and ancestors who have always been scientists."

**Jacqueline Pata,
Executive Director,
National Congress of
American Indians**

THE CURRENT LANDSCAPE OF NATIVE AMERICAN STEM EDUCATION

Most Native American students do not receive adequate STEM education throughout their formative years. Also, in situations when tribal members have an option to return to their reservation, they rarely do once they graduate, as there are few professional opportunities there to seek. Here's what the data tells us:

- Fewer than half of all Native American or Alaskan high school students have access to a full range of math and science courses at their high schools¹, and only one percent of Native American students enroll in and pass algebra in ninth grade.
- In 2014, just 126 Native students total took the AP exam in computer science.² Those who passed were in the double digits.
- Only 19 percent of Native American students who attend college or university graduate with STEM degrees³, and since the vast majority of Native Americans attend colleges off reservation, they tend to seek post-graduate professional opportunities off reservation as well.⁴

Lack of Access to STEM Education.

There are many complex and difficult challenges that currently impede Native American access to STEM education and professional opportunities.

Poverty is a key factor. Seven of the 10 poorest counties in the U.S. are in Indian Country. Thirty-nine percent of the total American Indian population living on reservations lives in poverty,⁵ and because unemployment on reservations is high and income is low⁶, many cannot afford access to telecommunications services even in the unlikely instance they are available in the first place.

Without basic telecommunications services and broadband Internet, those living within tribal communities, particularly students, are at an educational disadvantage compared with those who have access.



RECOMMENDATIONS FOR BOOSTING ACCESS TO STEM

Existing barriers can be diminished by increasing Native American students' exposure to STEM fields, particularly in grades K-12; as well as supporting and mentoring students throughout college so they're able to apply their STEM skills upon graduation.

The American Indian Science and Engineering Society (AISES), which presented at the convening, devised four strategies intended to increase STEM success in Indian Country:

1. Increase awareness of and retention in STEM in grades K-12.
2. Increase access to and success in STEM higher education.
3. Increase access to post-college leadership opportunities and professional opportunities.
4. Commit to identify the challenges and successes and work toward solutions.

The goal of October's thought leadership event was to discuss strategies and devise recommendations – acknowledging there's not a one-size-fits-all solution to the STEM issue in the Native American community.

Following are the six key recommendations selected for closer examination and potential implementation through collaboration with academia, government, tribal nations, non-profit organizations, and companies in the tech industry.

I. Improve Access to the Internet

As noted throughout the convening, the lack of educational opportunities in tribal communities is greatly affected by the lack of telecommunications infrastructure in many of these communities. Improving infrastructure that allows unlimited access to the internet is a hinge factor in improving STEM educational opportunities.

Dr. Sally Stevens, Executive Director of the Southwest Institute for Research on Women at the University of Arizona, devised one solution to this issue: If the internet isn't available bring it with you. In 2012, in conjunction with a National Science Foundation grant, Stevens and her team conducted a case study with the goal of increasing engagement of young Native American students in STEM. Their model provided one-on-one mentoring and informal science experiences to children grades 3 through 8 at three rural Native American schools in Tucson. One early obstacle, however, was the fact that there was not enough internet connectivity in place to support the program, so Stevens and her team adapted to the needs of the schools and adjusted to the constraints by providing their own wireless hot spots. With the internet connectivity issue solved, retention within the program was high; there was a waiting list to participate in subsequent iterations of the program, and school absences decreased by half because the students didn't want to miss the lunchtime workshops.

While this solution was specific to the need presented and is not a permanent fix for all situations, it does illustrate the creative solutions that can be implemented. It also provides a glimpse of what could exist with a close collaboration between schools and tribal communities, and what can happen should tribal communities gain permanent access to improved internet access.

II. Delineate an Early and Clear Pathway to Success

STEM education needs to begin early in students' educational careers and endure throughout. A heightened emphasis on STEM education should begin when children are still in early elementary school – through outreach programs such as the one implemented by Dr. Stevens, or through practical, real-life application – and that emphasis should continue throughout secondary and higher education. Children should be given the tools to think innovatively, to problem-solve and to develop solutions, and later, they should be equipped with the interpersonal connections to bring their ideas into fruition. Mentorship programs – between students and older students, students and educators, students and professionals – can prove highly beneficial. When students are able to physically see what they can become and where their skills can take them post-graduation, they are able to develop a clearer vision for the future.





III. Align Cultural Identity with STEM Necessity

Native American communities are rich in cultural history and traditions. Finding approaches to align STEM fields with existing tribal culture will make STEM fields resonate for students in a meaningful way.

Connecting solutions to everyday issues students encounter helps to teach the next generation how to help their communities develop and prosper. Matthew Rantanen, Director of Technology at the Southern California Tribal Chairman's Association, has worked with the High Performance Wireless Research Education Network to provide tribal children exposure to STEM fields through hands-on experience. Real-world application – using math and science to solve real problems – not only provided children with adequate problem-solving skills, but it stimulated a passion for STEM by showing how expertise in these fields can improve their everyday lives.

Providing the opportunity to do hands-on work increases enthusiasm for the work, particularly when it provides practical solutions that will positively impact their lives. Real-world, problem-solving educational experiences can result in positive attitudes and behaviors towards new STEM experiences.

“Math applied to life is the past and future way of learning for Native American students.” Matthew Rantanen, Director of Technology, Southern California Tribal Chairman's Association

IV. Engage Parents and Teachers in STEM Education

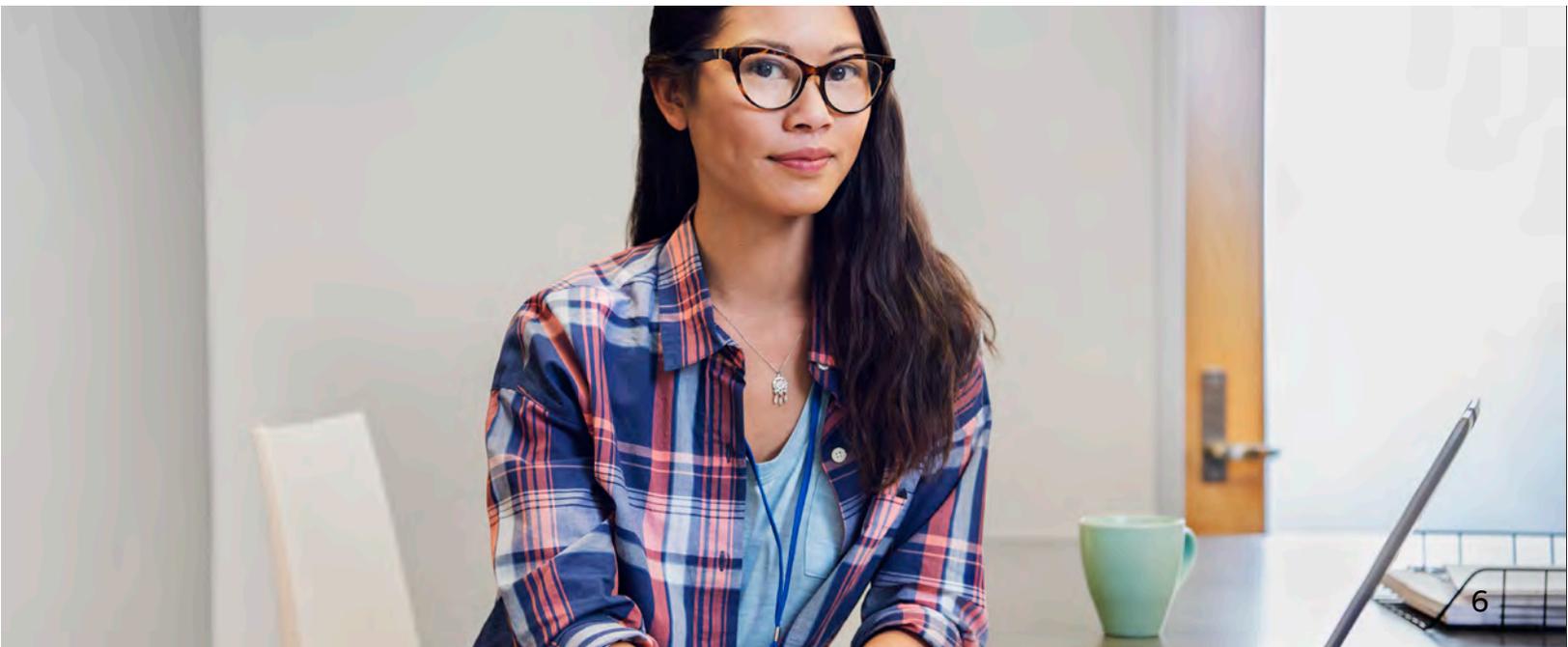
For improved STEM education to exist and prosper, parents must have an awareness and understanding of its impact and importance to their children and community. To help gain traction in Native communities, basic education geared toward parents about the importance of STEM and how it can contribute to cultural preservation will assist them in encouraging their children to pursue STEM-related careers. Parents can share about their tribe's particular scientific legacy and how they can also use science to empower themselves. By providing specific cultural examples – from hydrology and engineering to fishery and forest management to agricultural and astronomy practices – parents play an essential role in guiding their children to seek technical entrepreneurial careers, and creating learning and entrepreneurial opportunities.

Another key to reducing systemic barriers is to focus on educator development and retention. Reservation schools in particular would benefit significantly if high quality STEM educators were hired and retained in reservation schools. If there is an implicit understanding that STEM learning is critical to the long-term success of tribal communities, teachers can also respond to this need by incorporating more of an emphasis on STEM education in their existing curricula.

V. Ensure Tribal Leadership Involvement

Widespread community involvement can empower communities to develop and own solutions for improving STEM involvement. However, change is difficult to sustain, and case studies have illustrated that change implementation is more successful when those in key tribal leadership positions fight for it. When tribal leaders take an interest in providing actionable solutions to community-wide issues, those solutions can be successful.

A case in point: Thirty years ago, the Gila River Indian Community in Phoenix had limited to no reliable telecommunications infrastructure within its community. Community leaders made it a priority to fix this and took a risk in creating their own telecommunications company, which still exists today as Gila River Telecommunications, Inc. It provides phone and broadband service to the community. This company exists because tribal leaders within this community were willing to take a leap into the unknown, and it serves as evidence that when tribal leaders make the commitment to evoke change in their communities they can make a significant positive impact.





VI. Leverage Private Sector Programs and Resources

There are a wide range of actions the private sector can take to ensure Native American students have access to and succeed in STEM programs, including mentorships, internships, and direct support to build STEM curricula. Some companies have already implemented these types of programs. Last year Intel — in collaboration with code.org and Cisco — launched a program to support computer science education at three Navajo high schools in Arizona. The program includes a computer lab donation, teacher training, and telepresence infrastructure at each school to allow the corporate sponsors/mentors to interact with teachers and students. These types of corporate investments in infrastructure and training, coupled with mentoring and internship opportunities, can help students succeed in STEM education and stimulate interest in STEM careers.

The Big Ideas.

To sum up the recommendations, participants were asked “What’s the one big idea that would result in creating momentum and real change?” Here are some common answers:

- Get better internet access and more computers and other hardware into Native American students’ hands.
- Provide STEM education that’s highly adaptable and highlights cultural relevance. Recognize the legacy of Native American scientists, engineers, and mathematicians.
- Identify areas we can collectively engage on. Respect for each tribe’s autonomy as a sovereign entity and a recognition of basic cultural values is key.
- Support a long-term study to gather data on Native Americans and STEM in partnership with local universities and organizations.
- Enlist a commitment from corporations to work in collaboration with other institutions to provide a lasting interest in STEM education and careers.



SUMMARY

The Importance of STEM Education.

STEM education is important for the growth of the nation as a whole, Native communities, the technology industry, and corporations that rely on a highly-skilled technical workforce. STEM education also benefits individuals: STEM employees earn higher salaries than those in non-STEM fields, and job opportunities in STEM fields are projected to grow at a faster rate than the growth projected for non-STEM employment.⁷

Intel's commitment to promoting STEM education and careers and achieving its workforce diversity goals comes from a conviction that a critical mass of women and underrepresented minorities in its workforce brings ample benefits that are far reaching.

In order for Native Americans to thrive in this space, action must be taken to ensure they receive the proper educational opportunities that lead to professional success. In addition to providing better professional opportunities and higher incomes, mastery in STEM fields can grow the legacy of science in Native American communities.



Intel Corporation

Intel makes possible the most amazing experiences of the future. You may know us for our processors. But we do so much more. Intel invents at the boundaries of technology to make amazing experiences possible for business and society, and for every person on Earth.

Harnessing the capability of the cloud, the ubiquity of the Internet of Things, the latest advances in memory and programmable solutions, and the promise of always-on 5G connectivity, Intel is disrupting industries and solving global challenges. Leading on policy, diversity, inclusion, education and sustainability, we create value for our stockholders, customers and society.

Advancing Diversity in Technology: We are investing \$300 million in our Diversity in Technology Initiative to achieve full representation of women and underrepresented minorities at Intel by 2020, through funding, training, hiring, and retention.



National Center for Women & Information Technology

The National Center for Women & Information Technology is a 501(c)(3) non-profit organization chartered in 2004 by the National Science Foundation. NCWIT is a “collective impact” effort, a community of more than 850 prominent corporations, academic institutions, government agencies, and non-profits working to increase girls’ and women’s participation in technology and computing. NCWIT helps organizations recruit, retain, and advance women from K-12 and higher education through industry and entrepreneurial careers by providing support, evidence, and action. NCWIT is the only national organization focused on women’s participation in computing across the entire ecosystem: K-12 through college education, and academic to corporate and entrepreneurial careers.

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