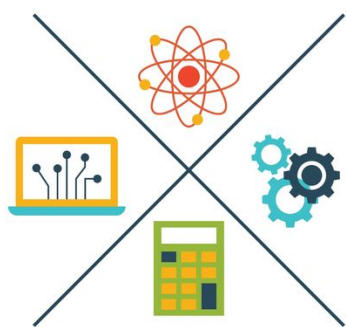


Projecting the future: STEM job prospects will boom

Dr. Malcolm D'Souza 1:38 p.m. EDT May 9, 2016



(Photo: Getty Images/iStockphoto)

Job prospects in the fields of science, technology, engineering and mathematics are expected to expand twice as fast as other professions by 2022, according to projections from the U.S. Bureau of Labor Statistics. There are projected to be more than 9 million STEM jobs by then, an increase of about 1 million job over 2012 employment levels.

Colleges and universities have a responsibility to make sure their students are ready to handle the rigors of today's working world. Employers also want a global perspective – diversity in race, gender and ethnic background strengthens the cross-functional and entrepreneurial aspects of this STEM-driven economy.

Wesley College, a minority-serving institution in Dover with a primarily undergraduate liberal arts mission, is having great success helping its students find a career in STEM. Our students are qualified, energized and in demand. Eighty-five percent of Wesley STEM students go on to graduate school.

But surprisingly, many of them started out thinking a career in STEM was out of their reach. More than 40 percent of Wesley's students are the first in their families to attend college. A significant number benefit from the federal Pell grant program.

Backed by foundation, federal and state grant support, Wesley has used the power of collaboration to develop a supportive student atmosphere and purposeful structured learning experiences. Wesley STEM students have interned at Nemours and Christiana Care Health System. They have presented at national American Chemical Society conferences and prestigious events like the Posters on the Hill event on Capitol Hill in Washington, D.C.

Thanks to state and federal funding, several initiatives across Delaware ensure a supply of well-prepared students are entering the STEM workforce. Federally funded programs like Delaware INBRE (IDeA Network of Biomedical Research Excellence) by the National Institute of General Medical Sciences, the National Science Foundation's ESPSCoR program (Experimental Program to Stimulate Competitive Research), the NSF's Scholarships in STEM program and the NASA Delaware Space Grant program have engaged the state's higher education institutions, industrial partners, state agencies and hospitals to develop inter-institutional partnerships that reshape programs and escalate research capacities. This work is further supported by funding from the Delaware Economic Development Office.

How do these programs make a difference? They support students like New Jersey native Brian Mahon, a first-generation student who came to Wesley to play football. He did that, but also joined the INBRE-supported direct research program and majored in biological chemistry. While here, his undergraduate research work resulted in four journal publications and four national American Chemical Society awards.

He took a job in pharmaceutical industry after graduation, then moved to the University of Florida School of Medicine. This month, Mahon graduates with his Ph.D – after mentoring seven undergraduates, including two who eventually went on to medical school.

This is how the research pipeline is built, one student at a time.

Meeting the needs of this growing STEM economy also requires a fresh look on a larger scale at how educators can best support students and foster integrative learning opportunities.

In 2014, after much research, Wesley adopted a progressive, four-year, liberal arts core-curriculum model. It includes student-support programs and small class sizes. Integrative undergraduate research opportunities can be found throughout the typical college experience, from Living-Learning Communities – where students with common academic pursuits and interests live together – to the interdisciplinary first-year seminars that encourage students to be active learners.

Wesley also recognizes that STEM students have to be good at more than just math and science. Intellectual capacity, critical reading and analytical writing skills also must be developed. To that end, composition and literature courses are coupled with writing-intensive instruction that engages a variety of sources. Sophomore and junior core levels are designed to empower students as they explore, understand and develop global awareness and citizenship values.

With the NSF's S-STEM support, Wesley established the Cannon Scholar program in 2014. This Living Learning Community project plays an important role in addressing gaps in the regional and national approach to strengthening the STEM workforce pipeline.

The program, with an eye on attrition issues affecting students, offers scholarships and a comprehensive package for personal and professional academic growth. A multi-tiered mentoring approach provides the more than two dozen Cannon Scholars with meaningful experiences that increase student recruitment, campus integration, retention and success.

Further one-on-one guidance for Wesley students is available through an intensive, grant-sponsored, 10-week summer internship program. During their sponsored internships, students interact with internal and external experts who conduct seminars and workshops on ethics, academic and career success and graduate school placements.

With this support, Wesley students are doing impressive work with regional and national impact. Student projects using cheminformatics – which involves the use of computer and informational techniques to address chemistry problems – have created online and commercial pharmaceutical drug databases, provided evidence for drug labeling changes as well as developed a prototype mobile application for a Delaware fertilizer database.

Tick ecology projects have examined the distribution of the deer tick and Lone Star tick in Delaware, of particular interest given the state's high rate of tickborne illnesses. Informatics projects found age and educational attainment reduced the risk of obesity in Delaware's adult population, but also that adult obesity rates in Sussex and Kent counties were increasing at much higher proportions than the national average.

Wesley STEM students are increasingly collaborating with faculty, giving them an early look at the world of academic research. In the last decade, there have been 54 peer-reviewed scientific publications with 60 undergraduate co-authors. Students have participated in more than 300 national and regional conference presentations, resulting in 93 undergraduate awards and certificates.

Recently, several Wesley educators and I shared our school's transformative experiences in an [article](http://www.cluteinstitute.com/ojs/index.php/TLC/article/view/9632/9723) (<http://www.cluteinstitute.com/ojs/index.php/TLC/article/view/9632/9723>) published in the Journal of College Teaching & Learning. We described how Wesley revamped its curriculum and how early signs, like the greater than 90 percent retention rate of Cannon Scholars, suggest its success.

These are impressive outcomes, to be sure, but perhaps one of the best indicators of how Wesley is faring in educating its STEM students can be seen in the annual Scholars Day program. The program showcases student scholarship through posters, creative projects and oral presentations. Our most recent event, held last month, included more than 100 students – many of them STEM students presenting their undergraduate research posters.

Students aren't required to participate. They do it because they are proud of the work they have done. They want to share it with others. They want to make larger connections.

STEM employers, take note – this is your future job applicant pool. They are driven, engaged and more than able to keep this economy growing.

Dr. D'Souza is associate dean of interdisciplinary/collaborative sponsored research at Wesley College. He was recently honored by Delaware Bioscience Association as Higher Education Educator of the Year.

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