

NASHVILLE TECHNOLOGY COUNCIL



2016 Labor and Education Alignment Program (LEAP 2.0)

Computer Scientists in the Classroom

Nashville Technology Council

IN PARTNERSHIP WITH

Nashville State Community College

Metro Nashville Public Schools

Employer Partners: Acklen Avenue Software, Asurion, Center for Medical Interoperability, Change Healthcare, Education Networks of America, CTS, Centresource, Hospital Corporation of America (HCA), HPA-Cognizant, Leankit, Nissan North America, Qualifacts

Community Partners: Alignment Nashville, Community Foundation/Nashville Digital Inclusion Fund, Leadership Tennessee, Metro Action Commission, Nashville Career Advancement Center, Nashville Chamber of Commerce, Pencil Foundation, Rocketown, Studio NPL/Nashville Public Library, Urban League of Middle Tennessee

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Funding Requested:
\$478,829

Handwritten signature of Dr. George Van Allen in black ink.

Dr. George Van Allen, President
Nashville State Community College

Handwritten signature of Sandi Hoff in black ink.

Sandi Hoff, Project Director
Nashville Technology Council

Computer Scientists in the Classroom

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SECTION 1: ABSTRACT

Between 2014 and 2024, demand for the “Top 5 IT Occupations” will increase an average of 18% in Middle Tennessee (EMSI data). In 2014 alone, Middle Tennessee added 2,200 new IT jobs and experienced an estimated 1,548 technology vacancies. A 2011 THEC study suggests a significant deficit in the supply of skilled IT workers could be filled by applicants with two years of post-secondary education; therefore, a clear path for closing the “skill gap” in technology is increasing enrollment in community college IT programs. IT courses at Nashville State Community College (NSCC) could enroll many more students. NSCC has the capacity to serve over 2,000 students, but current enrollment is only 1,600 students; therefore, at least another 400 students could become skilled workers and significantly decrease the “skills gap”. However, Nashville students who attend the STEM Academies are not enrolling at NSCC to pursue technology pathways. This is in large part attributed to their lack of success in high school technology courses.

The Computer Scientists in the Classroom project provides an educator/employer collaborative approach to support students enrolled in and teachers instructing the NSCC technology dual credit courses. Although MNPS students are enrolling in NSCC dual credit technology courses, they are not successful in passing the dual credit exam and, therefore, do not earn college credit. Their dual credit failure leaves students believing that they cannot be successful in college, when in reality the students do not have the necessary supports in place for their success.

Using Vanderbilt’s “Scientist in the Classroom” program as a model, this project strengthens the pathway between MNPS and NSCC through mentoring relationships between NSCC faculty, MNPS faculty, MNPS students, and IT professionals. This project will create long-term relationships between local school systems, higher education, and employers to increase enrollment in NSCC technology degree programs, which will result in increased numbers of IT job candidates in the local workforce.

SECTION 2: COMPUTER SCIENTISTS IN THE CLASSROOM PROGRAM PLAN

1: DEMONSTRATED NEED

In the 2015 State of the Union address, President Obama stated that there were over 500,000 IT job vacancies in the United States. That number is expected to grow to 1.4 million by 2020 with less than 400,000 new graduates to fill those jobs. Moreover, there are over seven million jobs in the United States in occupations that value computer science skills. Twenty percent of all “career track jobs” (defined as earning over \$15/hour) seek professionals with computer science skills. Furthermore, half of the jobs in the top income quartile (>\$57,000 annual income) are in occupations that require coding skills – and this is not expected to decrease. Programming jobs are growing the fastest – 50 percent faster than the market overall and 12 percent faster than the market average (Burning Glass, 2016).

In 2014, Middle Tennessee added 2,200 new IT jobs and experienced an estimated 1,548 technology vacancies. The EMSI data also projects that growth rates will increase to an average of 18% for the “Top 5 IT Occupations” in Middle Tennessee between 2014 and 2024. By looking at Middle Tennessee’s current labor market, technology job growth projections, and the ability of the educational institutions and programs to build the future technology talent, the data supports the need for the Computer Scientists in the Classroom project.

A clear path for closing the “skills gap” in technology is increasing enrollment in IT academic programs. A 2011 study published by the Tennessee Higher Education Commission documents one of the greatest current “skills gaps” is in software development (Source: *Academic Program Supply and Occupational Demand Projections: 2008-2018*). Between 2011 and 2018, this study predicts that approximately 678 new software development positions will be needed yearly in Tennessee with only 397 new graduates each year to fill those positions. While this study clearly demonstrates a significant deficit in the supply of skilled and certified workers, it also states that applicants with two years or less of post-

secondary education or training would be viable candidates to fill these positions. This suggests that an effective strategy for filling Middle Tennessee's IT vacancies would be increasing enrollment in community colleges' IT program.

IT courses at NSCC could enroll many more students. NSCC has the capacity for over 2,000 students, but current enrollment is only 1,600 students; therefore, if NSCC was operating at full capacity, at least an additional 400 students could become skilled IT workers. Moreover, students who attend the STEM Academies should be an ideal target population for NSCC's technology programs, but they are not enrolling at NSCC to pursue technology pathways. This is in large part can be attributed to their lack of success in technology high school technology courses.

The proposed Computer Scientists in the Classroom project addresses the challenge of job candidate "skills gap" by increasing NSCC technology course enrollment through supporting students enrolled in and the teachers who teach the NSCC technology dual credit courses. Although MNPS students are enrolling in dual credit technology courses through NSCC, they are not successful in passing the dual credit exam and, therefore, they do not earn college credit. Their dual credit failure leaves students believing that they cannot be successful in college, when in reality the students do not have access to the supports needed for dual credit success.

In the 2014-2015 academic year, two dual enrollment courses were offered at five MNPS high schools. No student attempted to take the Web Design exam. Twelve students attempted the Programming Logic Design exam but no students passed the exam. Not a single student was successful in 2014-2015 in receiving dual credit for a technology course through NSCC. Currently, there are four MNPS/NSCC dual credit technology courses offered at seven MNPS high schools: 1), Programming Logic Design 2) Beginning HTML, 3) Digital Imaging, and 4) Digital Editing. Although the exam results have not been reported for the most recent school year, very few students felt prepared enough to attempt the exams.

In addition to the dual credit exams, students are also provided the opportunity to take industry certification exams. Four industry certification exams are currently offered within MNPS's IT pathways: Certified Internet Webmaster, Microsoft Office, Oracle Java, and CompTia A+. For the 2015-2016 academic year, there was an abysmal 9 percent passage rate across the school district. This level of failure does not promote students into IT education and career pathways.

This project also seeks to address another critical issue inhibiting student success in technology post-secondary education programs. Students are not arriving on college campuses prepared for college-level technology programs of study. One significant contributing factor is local school systems' inability to retain technology teachers. MNPS is currently experiencing over 90 percent annual turnover for technology teachers. For example, this is the first year that MNPS has a returning Logic and Programming teacher in the five years that Logic and Programming has been offered at Overton High School. In fact, in those five years, seven teachers have been hired to teach that course. All of the teachers have been hired with very little or no experience. Inexperienced teachers need mentors to help them develop their skills and learn how to teach difficult concepts to high school students. With dedicated mentoring from experienced NSCC faculty, these teachers can be more successful which will lead to more prepared and confident students.

The Computer Scientists in the Classroom project seeks to provide an educator/employer-driven collaborative approach to address the challenge of job candidate "skills gap" by mentoring students pursuing IT education and careers and teachers who teach technology courses. The proposed project will address the challenge of job candidate "skills gap" by increasing NSCC technology course enrollment through supporting students enrolled in and the teachers who teach the technology NSCC dual credit courses.

2: PROGRAM PLAN

PROJECT GOVERNANCE AND ACCOUNTABILITY PLAN: Sandi Hoff with the NTC will serve as the Project Director. The project shall be governed by a Steering Committee that consists of technology leaders

representing the following organizations: the NTC, MNPS Career and Technical Education (CTE) Office, NSCC, Hospital Corporation of America (HCA), Change Healthcare and Asurion. The Steering Committee shall quarterly to review progress on the project metrics and make decisions regarding programming, community outreach strategies, budgeting, and sustainability.

PROJECT OVERVIEW: The Computer Scientists in the Classroom project is based on a model created by the Vanderbilt Center for Science Outreach program, “Scientist in the Classroom.” The Vanderbilt program was funded by National Science Foundation to bring university fellows and MNPS teachers together to 1) create partnerships among the teachers by collaborating one day a week throughout the school year, 2) provide professional development to the instructors throughout the academic year and summer, and 3) support, mentor and provide individual teaching time with students.

This proposal uses the “Scientist in the Classroom” program as a model to expand the technology-related academic programs at NSCC by strengthening the pathway between MNPS and NSCC through mentoring relationships between NSCC faculty, MNPS faculty, MNPS students, and local technology professionals. The primary goal of this project is to continue efforts that create long-term relationships between local school systems, higher education, and employers to increase enrollment in NSCC technology degree programs, which will increase the number of IT job candidates in the local workforce.

The Computer Scientists in the Classroom Project will enhance current academic programs by creating opportunities for meaningful interaction and alignment between technology employers, NSCC, and MNPS that result in long-term relationships through:

Building Long-Term Relationships Among Partners: Currently, there is very limited interaction between NSCC and MNPS, leading to very little sharing, collaborating or alignment between the two entities. Creating a formal program that allows for meaningful interaction and mentorship between the NSCC faculty and MNPS faculty, guidance counsellors, and students will build important long-term relationships. Those

relationships will lead to better prepared high school graduates and greater alignment between MNPS and NSCC.

Providing Support for Success: To create dedicated time for test preparation and mentorship in students' schedules, students will be placed in common Capstone classes. During the Capstone class period, the NSCC faculty will visit each high school at least twice per month. While on-site, the mentors and students will engage in test prep activities aimed at the dual credit exam and the certification exams. During these visits, NSCC faculty will meet with technology teachers as needed to provide coaching and support. NSCC faculty will also host "office hours" afterschool to provide tutoring to students as needed. Throughout the grant period, NSCC faculty will be available to both teachers and students via email and chat to assist with problems as they arise.

Computer Scientists in the Classroom will use the We Build Tech platform funded through a 2014 LEAP grant. We Build Tech is a community connection platform that connects students, educators, and the local technology industry. NSCC faculty will also provide semi-monthly video conferences through the We Build Tech platform. These 50 minute lessons will be available to students during their Capstone class period, and they will also be available to all students through their We Build Tech account. A library of these lessons will be created and cataloged. NSCC faculty will work in partnership with MNPS faculty to develop the lessons so that they support and fill gaps in the lessons taught in their technology classes. In addition, a mid-year practice test will be administered to all students to identify gaps and areas to focus study.

Increasing Employer/Student Engagement: In addition to NSCC faculty, technology professionals will mentor students seeking to take the dual credit exam and/or a certification exam. Employer involvement in classroom activities in the NSCC/MNPS dual credit courses will ensure higher student success rates on dual credit and certification exams. With increased connectivity between employers, educators, and students through the sharing of industry expertise in the classroom, the project anticipates increased student enrollment rates in post-secondary technology programs.

Providing Professional Development: Externship opportunities will be made available to MNPS and NSCC faculty to provide experiences working side-by-side with knowledgeable and skilled technology employees. Externships will be provided by local employer partners and members of the Nashville Technology Council. MNPS has an established summer program via its Academies of Nashville structure that will serve as the model for this program. The current program deploys 20 to 30 teacher teams to local business for three day externships that results in a course built around their experiences. Externship connections will be made through the We Build Tech platform.

Professional development workshops and events will be provided jointly for MNPS and NSCC faculties. Two-hour seminars and/or webinars will be provided to all educators every other month. These seminars will consist of presentations from other program personnel, guest speakers from industry, discussions concerning education methods, etc. The seminars will also be a means of following participant progress and providing reflection time for the program experience. At least one of the seminars will be a "feedback forum " to improve the program design for future cohorts and identify where additional resources are needed.

All instructors will be encouraged to attend a series of three summer workshops (3-5 days each). Summer workshops may cover several topics or may dive deeper into a single topic. Topics may include effective mentoring strategies, incorporating soft skills into curriculum, identifying and using the latest technology trends in the classroom, and integrating Microsoft Office principles into your courses. The summer workshops will also to build a sense of team and community among the participants and work on aligning curriculum between NSCC and MNPS.

Providing tools for success: Students will be provided a personal laptop to ensure their ability to complete their studies effectively. Each student will receive a computer from the Community Foundation/Nashville Digital Inclusion Fund. Studies have shown that a student's access to a computer at home not only increases his or her likelihood of high school graduation, but also increases his or her likelihood to enroll in a post-secondary program and is a strong indicator for post-secondary success. In reference to

computers being necessary for college admission and continued enrollment, Kristen Venegas suggests that “the need to use the Internet for college-related tasks will not subside. More postsecondary institutions will rely on the Internet as a form of communication, recruitment, and retention” (American Academic 2007). Additionally, Robert Fairlie and Rebecca London studied community college students who were provided with free home computers. They found that “in addition to the [positive] effects on grades, receiving a free computer may affect longer term outcomes, such as transferring to a four-year school or graduating from a community college” (Council for the Study of Community Colleges, 2011).

The Computer Scientists in the Classroom program will expand current, IT academic programs through corporate involvement, community outreach and programming in K-12 schools and will result in higher enrollment and an increased number of credentialed graduates by:

Increasing Successful TN Promise Applicants: The program includes an immediate, targeted outreach strategy to engage 11th and 12th grade students to promote IT careers to increase enrollment in IT courses at NSCC. One strategy that has proved effective is a series of “Job Shadow Day” field trips that allow students to visit technology companies and IT departments to see first-hand the variety of technology job opportunities and industry cultures available in Middle Tennessee. The “Job Shadow Day” field trips will incorporate the job sites of the industry mentors and will conclude with a visit to NSCC to discuss the education opportunities locally available through Tennessee Promise.

Additionally, this program will provide mentors from the Urban League of Middle Tennessee. The Urban League has a proven track record for working with students to unlock the potential of teenage learners who are seeking services in college preparation and post-secondary training and certification. Additional support is needed for first generation college students attempting to navigate the complicated system of college admission.

Employers with Demonstrated Need: The Computer Scientists in the Classroom project has 12 corporate partners representing more than 4,000 technology workers in Middle Tennessee. These technology industry partners will invest in this project both financially and through the engagement of their employees. These corporations will devote the time needed to work with NSCC and MNPS to build long-term relationships. The employer partners will supply volunteers to work with students, provide mentoring to students, host on-site field trips, provide guest lectures, make presentations, host internships and job shadowing opportunities, participate in career fairs, and provide case studies for classroom use.

Higher Education Institutions: The NSCC's primary role in this project is connect with MNPS in a more significant way by mentoring both MNPS students and teachers, hosting "office hours" after-school hours at MNPS high schools to tutor struggling students, and providing online learning through We Build Tech.

In addition, NSCC has committed to build long-term relationships with local school systems and the technology industry, in order to increase the pipeline of students for their programs. Since NSCC is not currently operating at its capacity, there are numerous opportunities to increase enrollment without increasing the cost of course delivery.

K-12 Education: MNPS is a key partner for the success of this project. MNPS will promote this opportunity to both teachers and students. MNPS will select the appropriate students for the mentoring program and will schedule those students into their classes to allow for the necessary "sheltered" time for mentoring to occur. MNPS will also work with the NTC to ensure that students can participate in Job Shadow Day field trips to visit industry sites and NSCC.

4: BUDGET PLAN

The ITPC 2.0 requests \$478,829 in total funding for the 30 month grant period. Although the NTC will serve as the lead entity for the grant, NSCC will serve as the fiscal agent and will receive \$35,469 (8 percent) as the administrative cost for the grant.

SALARIES/BENEFITS/TAXES

The project will provide funding to support the NSCC faculty's participation. NSCC faculty members will earn \$2,000 per course for the development and instruction of online learning for NSCC dual credit students. They will also earn \$30 per hour for mentoring and tutoring sessions provided for dual credit students. In addition, each instructor that participates in the collaborative professional development sessions will earn \$50 per session.

PROFESSIONAL FEES

Project Staff Salaries/Benefits/Taxes: The project will be staffed with three positions. The **Project Director** (33% FTE) will lead the implementation of the grant including: providing team leadership, managing programmatic and financial reporting, ensuring proper data collection to track performance measures, managing corporate relationships, building school system relationships as needed, making community presentations, and building community partnerships. The **Program and Volunteer Coordinator** (50% FTE) will lead the project in coordination with high schools, outreach and scheduling industry volunteers, program development for K-12 students, coordination with individual schools for program delivery, and planning and executing the education/industry summits. The **Communications Director** (20% FTE) will develop all communications for the We Build Tech platform, newsletter, and branded project emails. These targeted communications will recruit additional employers as needed, promote volunteer opportunities, and communicate with students and parents to promote project activities.

Workshop Stipends: Similar to the NSCC faculty, each MNPS technology teacher that participates in the collaborative professional development sessions will earn \$50 per session.

Additional Mentorship for Tennessee Promise: The Urban League will provide mentoring to the students identified as “high need” at a rate that will not exceed \$1,000 per month for the grant period.

Faculty Professional Development: Eleven bi-monthly, 2-hour long seminars and/or webinars will be provided to all educators. In addition, a series of three summer workshops (3-5 days each) will be provided in the summer of 2017 and the summer of 2018. The estimated costs for coordination, facilitators, speakers, and meeting space is \$20,000.

We Build Tech Platform Enhancements: We Build Tech will be used to provide on-line learning to both students and teachers. The development of a “live classroom” that can capture, categorize and store these learnings will be invaluable to future cohorts. These improvements are estimated to be \$75,000.

GRANTS AND AWARDS

Project Staff Local Travel: Travel will be required for local visits to employers, community colleges, and K-12 schools. Local travel (i.e., mileage and parking expenses) will be reimbursed at the approved government rate and will not exceed \$10,000 for the grant period.

SUPPLIES/PUBLICATIONS

In addition to office supplies (e.g., paper, file folders, pens, printer cartridges, jump drives, folders), supplies for the Computer Scientists in the Classroom project include marketing and training materials related to the grant objectives. The grant will also supply the test preparation materials needed for student success. Supplies are estimated at \$25,000 over the 30 month grant period.

5: SUSTAINABILITY

The Computer Scientists in the Classroom initiative is uniquely qualified to create and sustain a

successful program because the lead entity, the NTC, has been in the workforce development business since 2008. Deploying volunteer resources, the NTC has positively impacted technology careers by broadening awareness of technology education and careers and by building relationships between K-12 and post-secondary academia and the business community.

The Computer Scientists in the Classroom program will continue to follow a similar project approach and governance structure after the initial grant period. Once the relationships created through the program are formalized over the 30 month grant period, the recurring costs will be minimal for sustainability. The significant costs going forward will be in the areas of continued volunteer coordination and continued professional development. Projected costs for the 2019-2020 academic year are less than \$50,000.

Once the program demonstrates successful results, funding will be attained through building deeper relationships with existing corporations, businesses, foundations and associations that have an affinity to technology education. The Nashville Technology Council's almost 400 corporate members will be a primary source for the Computer Scientists in the Classroom's future fund raising efforts. NTC's members, who are experiencing a shortage of qualified technologists in Middle Tennessee, understand the value proposition of investing in this project, since a \$25,000 contribution is equivalent to the recruiting fee for one .NET or Java developer. NTC's members will see find this program to be a prudent investment in building the skilled workforce pipeline.

"When these tech jobs go unfilled, it's a missed opportunity for the workers, but it's also a missed opportunity for your city, your community, your county, your state, and our nation."

- President Barack Obama, March 2015

SECTION 3: GRANT BUDGET

GRANT BUDGET				
LEAP Program Competitive Grant: Computer Scientists in the Classroom				
The grant budget line-item amounts below shall be applicable only to expense incurred during the following				
Applicable Period: BEGIN: September 14, 2016 END: March 13, 2019				
POLICY 03 Object Line-Item Reference	EXPENSE OBJECT LINE-ITEM CATEGORY ¹	GRANT CONTRACT	GRANTEE PARTICIPATION	TOTAL PROJECT
1, 2	Salaries Benefits & Taxes	67,000.00	0.00	67,000.00
4, 15	Professional Fees, Grants and Awards	351,360.00	0.00	351,360.00
5,6,7,8,9,10	Supplies, Telephone, Postage and Shipping, Equipment Maintenance and Rental, Printing and Publications	25,000.00	0.00	25,000.00
11, 12	Travel, Conferences and Meetings	0.00	0.00	0.00
18	Other Non-Personnel Expenses	0.00	0.00	0.00
20	Capital Purchases	0.00	0.00	0.00
22	Indirect Cost	35,469.00	0.00	35,469.00
24	In-Kind Expense	0.00	0.00	0.00
25	GRAND TOTAL	478,829.00	0.00	478,829.00

¹ Each expense object line-item shall be defined by the Department of Finance and Administration Policy 03, *Uniform Reporting Requirements and Cost Allocation Plans for Subrecipients of Federal and State Grant Monies, Appendix A*. (posted on the Internet at: <http://www.state.tn.us/finance/act/documents/policy3.pdf>).

² Applicable detail follows this page if line-item is funded.

GRANT BUDGET LINE-ITEM DETAIL:

SALARIES/BENEFITS/TAXES	AMOUNT
<u>Nashville State Community College Faculty</u>	
Development and participation in on-line learning targeted at MNPS dual credit students (\$2000/course)	\$40,000
Mentoring and tutoring sessions for MNPS students (\$30/hour x 100 hours per semester x 5 semesters)	\$15,000
Workshop Stipends	\$12,000
TOTAL	\$67,000

PROFESSIONAL FEE, GRANT & AWARD	AMOUNT
<u>NTC Project Staff</u>	
Project Director: \$3052/month x 30 months	\$91,560
Program/Volunteer Coordinator: \$1877/month x 30 months	\$56,310
Communications Director: \$1883/month x 30 months	\$56,490
Local Travel Costs for Project Staff	\$10,000
<u>MNPS Faculty</u>	
Workshop Stipends	\$12,000
<u>Urban League</u>	
Mentoring for student success in dual credit courses and enrolling in NSCC through Tennessee Promise	\$30,000
<u>Professional Development for Educators</u>	
Computer Scientists in the Classroom will provide workshops periodically through the academic year, but will focus professional development efforts toward the summer months.	\$20,000
<u>We Build Tech Platform</u>	
We Build Tech Platform Enhancements, including capturing all lessons from the Live Classroom	\$75,000
TOTAL	\$351,360



Nashville State
Community College

July 27, 2016

Mr. Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: Tennessee *LEAP Grant Application 2016*

Dear Mr. Johnston:

A primary challenge to the prosperity of the Middle Tennessee economy is the ability of our labor force to meet the skill and competency needs of industry. For Middle Tennessee, jobs in the information technology and healthcare technology sectors are growing and in need of increasing numbers of skilled workers. Partnerships between businesses, the workforce system, post-secondary education and local schools to increase the number of trained job seekers is of critical importance to the economic growth of the region. The partnerships established by the Computer Scientists in the Classroom will create a foundation to address the barriers faced by employers in finding qualified workers.

At Nashville State Community College, we have the capacity to serve over 2,000 students in the information technology courses. Our enrollment is 1,600. Computer Scientists in the Classroom will provide the outreach necessary to fill our classrooms – and increase the number of qualified candidates available for hire. Through this project, we will help high school students to be more successful, while also building strong relationships between NSCC faculty and MNPS students and faculty through instruction support, individual tutoring and mentoring. This project will also provide greater connectivity between technology employers and students. Local technology companies and IT departments have volunteered to participate in technology learning through mentoring, case-based learning activities, guest speaking, field trips, job shadowing and internships.

I support this project and believe that these types of public private partnerships can decrease the technology skills gap and improve student experiences.

Sincerely,

Reginald Gardner

Reginald Gardner, DM
Nashville State Community College,
Dean, Computer and Engineering Technologies



METROPOLITAN
Nashville
PUBLIC SCHOOLS

Donna G. Gilley

Director of Academies of Nashville
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2601 Bransford Ave • Nashville, TN 37204

Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830
July 19, 2016

Subject: *LEAP 2.0 Grant Application 2016*

Dear Mr. Johnston:

I am writing to express Metropolitan Nashville Public School's support of the proposed *Computer Scientists in the Classroom* project submitted by the Nashville Technology Council and Nashville State Community College.

Middle Tennessee is a rapidly growing metropolitan area. In 2015, there were over 1,600 openings that remained unfilled in Middle Tennessee due to a lack of qualified applicants. The number of IT jobs in 2015 in Middle Tennessee were almost 26,000 - an increase of over 2,000 positions in 12 months - with 2-4% annual growth across all five leading occupational job categories. Therefore, there is little doubt that there is a need for the *Computer Scientists in the Classroom* project to provide a community-based, collaborative approach to address the challenge of job candidate "skills gaps" by increasing the local information technology (IT) workforce pool for employers in Middle Tennessee.

We are truly excited about the opportunity to enhance and expand current IT academic programs through corporate involvement and a formal partnership with Nashville State Community College. Current, success rates in MNPS/NSCC IT dual credit courses is abysmal. Additionally, students' passage rate for industry certification exams in IT areas is only 9 percent on average. This new programming in MNPS STEM high schools will result in better prepared students, an increased number of students graduating with college credit, an increased number of graduates with industry certificates, and higher post-secondary enrollment.

As a partner on this project, we will promote the program, assist in selecting student and teacher participants, and coordinate the scheduling needed for the success of the program. This programming will promote technology activities in classrooms and after-school programs, as well as increase students' awareness of IT career paths.

I am pleased to partner on this exciting project, and I look forward to seeing the implementation of many of the proposed activities which will result in an increased pipeline of trained IT workers throughout the region, strengthening our presence and ability to grow our workforce in Middle Tennessee.

Sincerely,

Donna G. Gilley, Director of Academies of Nashville

ACKLEN / AVENUE

July 27, 2016

Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *LEAP 2.0 Grant Application 2016*

Dear Mr. Johnston:

I am writing to express Acklen Avenue's commitment to participate in the proposed *Computer Scientists in the Classroom* project submitted by the Nashville Technology Council, Nashville State Community College and their Middle Tennessee partners.

Acklen Avenue is a custom software development company focusing on building web apps, mobile apps and desktop apps for innovative companies.

We are proud to provide employment opportunities for individuals in the Information Technology industry and the occupations targeted by this grant. Within our organizational structure, we have 53 IT/IS employees.

Our need for well trained IT individuals continues to grow. We are planning to interview an Engagement Manager, two developers and a product owner in the fourth quarter of 2016. We have historically had trouble finding people that have a strong grasp of Agile practices and principles.

Acklen Avenue is committed to participating in the project proposed to the Tennessee Higher Education Commission during the life of the grant in the following ways:

- Encourage employees to volunteer in classroom environments to mentor students, promote IT careers and facilitate case-based learning
- Participate in Summits and Advisory Councils to provide meaningful feedback to the program's educational institutions and other partners on their curriculum and worker preparation activities.
- Host field trips for students as needed for the successful completion of this project.
- Agree to consider hiring as full-time employees qualified candidates who meet our hiring requirements, from a pool of students who have completed their education and



July 27, 2016

Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *LEAP 2.0 Grant Application 2016*

Dear Mr. Johnston:

I am writing to express Asurion's commitment to participate in the proposed *Computer Scientists in the Classroom* project submitted by the Nashville Technology Council, Nashville State Community College and their Middle Tennessee partners.

As the global leader of connected life services, Asurion provides over 290 million consumers around the world with simple, intuitive technology advice to help them get the most from their devices; support to fix their issues and connectivity crisis, and device protection to ensure they receive a replacement or repair. When a product is missing or simply doesn't work properly, our 17,000 employees are focused on solving the problem with people and processes operating 24 hours a day, seven days a week, speaking six languages, and working across any device, platform, or provider. By partnering with leading retailers, mobile carriers and pay-tv providers, we help customers enhance their lives through their technology.

Asurion Technology organization currently employees over 500 technologists in middle Tennessee. Within its Technology organizational structure, there are currently over 50 open technology positions that provide employment opportunities for individuals in the Information Technology industry and the occupations targeted by this grant. As a result of our growth, we continue to have demand for Object Oriented Developers, Mobile developers, Big Data developers, UX designers/developers, Quality Engineers, Automation Engineers, DevOps Engineers and IT Analysts.

With a growing demand for developers, engineers, and data scientists at all levels, our internal recruiting team partners closely with hiring managers to source and create long-term pipelines of both active and passive candidates. We leverage a broad array of recruitment channels ranging from Asurion website postings and employee referrals to local networking forums and niche job boards.

While we continue to improve and refine our recruitment processes and capabilities, Asurion is in continuous need to highly skilled technology talent. Filling positions with qualified candidates



CENTER *for* **MEDICAL**
INTEROPERABILITY

July 20, 2016

Mr. Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *LEAP 2.0 Grant Application 2016*

Dear Mr. Johnston:

I am writing to express the Center for Medical Interoperability's commitment to participate in the proposed *Computer Scientists in the Classroom* project submitted by the Nashville Technology Council, Nashville State Community College and their Middle Tennessee partners.

The Center for Medical Interoperability is a 501(c)(3) organization led by health systems to change how medical technologies work together. We aim to improve real-time information flow and make technology function seamlessly in the background so clinicians can excel in their jobs and achieve the best possible outcomes for patients. Our members are committed to compelling change and improving patient safety, care quality and outcomes, and reducing clinician burden and waste.

Our work is technical in nature and our engineers are collaborating with industry stakeholders to develop the architecture for a vendor-neutral platform that will make it easier and less expensive to access and use the data from technologies across the continuum of care. This will enable healthcare organizations to have real-time patient records that are complete and consistent, and gain greater control over the data needed to deliver safe, efficient and effective care. We are also establishing a centralized lab to test and certify that devices and enterprise applications meet members' technical requirements, thereby giving health systems confidence that the solutions purchased for patient care will work as expected, safely, and securely.

We are proud to provide employment opportunities for individuals in the Information Technology industry and the occupations targeted by this grant. We need to add more than 100 professionals to our technical staff over the next five years to achieve our

July 27, 2016
Curt Johnson
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: LEAP 2.0 Grant Application 2015

Dear Mr. Johnston:

I am writing to express Centresource's commitment to participate in the proposed Computer Scientists in the Classroom project submitted by the Nashville Technology Council, Nashville State Community College and their Middle Tennessee projects.

We are a software development company based in Nashville, TN. Over the past decade, we have created and launched over one hundred websites and mobile apps. Most recently, we have focused exclusively on helping our clients create great software with diverse, high-performing teams. Our team works in a wide variety of programming languages, with a focus on Ruby on Rails, PHP, Javascript and Angular.

We are proud to provide employ 16 individuals with a wide variety of technology experience and skillsets, much like the individuals who this grant targets. Recently we have felt the pain of the lack of development talent in the Nashville community. We hire strictly Nashville based employees, so a remote workforce is not an option for us. Over the last 18 months, we have found that hiring top tier talent has proven much more difficult, due to salary expectations and the high level of competition for this talent. We have seen a direct effect on our revenue to the extended delays in acquiring talent. We have in some instances had to turn away or defer business due to this issue.

Centresource is committed to participating in the project proposed to the Tennessee Higher Education Commission during the life of the grant. We greatly enjoyed our participation this year and look forward to continuing supporting these efforts the following ways:

- Encourage employees to volunteer in classroom environments to mentor students, promote IT careers and facilitate case-based learning.
- Participate in Summits and Advisory Councils to provide meaningful feedback to the program's educational institutions and other partners on their curriculum and worker preparations activities.
- Host field trips for students as need.
- Agree to consider hiring full-time employees who meet our hiring requirements, from a pool of students that have participated in this program.

We are pleased to be part of this project, and look forward to implementing many of the proposed activities which will result in an increased pipeline of trained IT workers throughout the regions, strengthening our presences and ability to grow our workforce in Middle Tennessee.

Sincerely,

Ann Howard

Managing Partner



3055 LEBANON PIKE, SUITE 1000
NASHVILLE, TN 37215

July 27, 2016

Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *LEAP 2.0 Grant Application 2016*

Dear Mr. Johnston:

I am writing to express Change Healthcare's commitment to participate in the proposed *Computer Scientists in the Classroom* project submitted by the Nashville Technology Council, Nashville State Community College and their Middle Tennessee partners

Change Healthcare is a leading provider of software and analytics, network solutions and technology-enabled services that optimize communications, payments and analytics by leveraging our Intelligent healthcare network. We are the single largest financial and administrative network in the United States healthcare system.

We're a dynamic organization that helps healthcare entities connect, transact and communicate. Our Intelligent Healthcare Network connects payers, providers, pharmacies and patients so they can more effectively and efficiently interact with each other. We help providers and pharmacies get paid by payers and patients quickly and completely. On the flip side, for payers and patients, we help deliver their payments while helping them reduce their risk of overpaying.

In addition to helping all of the stakeholders in the care continuum move data from point A to point B, we also translate, edit and analyze that data when needed, and then help mine that wealth of information to improve healthcare through insights. We do all of this using a combination of technology and services.

We are proud to provide employment opportunities for individuals in the Information Technology industry and the occupations targeted by this grant. Within our organizational structure, we have over 700 IT/R&D employees.

The demand for highly talented, skilled resources with a technology background continues to grow. For our company in particular, it is critical that our workforce consist of experienced hires as well as employ a consistent influx of entry-level talent. However, finding resources with



COMPUTER TECHNOLOGY SOLUTIONS, INC.
5000 MERIDIAN BOULEVARD
SUITE 370
NASHVILLE, TN 37067
615.224.0455
www.askcts.com

July 27, 2016

Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *LEAP 2.0 Grant Application 2016*

Dear Mr. Johnston:

I am writing to express CTS, Inc.'s commitment to participate in the proposed *Computer Scientists in the Classroom* project submitted by the Nashville Technology Council, Nashville State Community College, and their Middle Tennessee partners.

CTS is a regional software consulting firm founded in 1993 that specializes in solving complex IT problems with creative and customized solutions. With our full-time employee base of over 300, we deliver software development, business intelligence, quality assurance, and application support solutions to enterprise clients across the Southeast, including office locations in Nashville, Atlanta, Birmingham, Charlotte, Chattanooga, and Mobile. Each of our offices acts as a local delivery center, providing technical services to our clients in that area.

CTS employs approximately 30 people in the Nashville area, 90% of whom are software developers. We have hired over 25 developers during the last 5 years and plan to continue offering employment opportunities in the years ahead as our Nashville office is growing at a faster pace than any other CTS office. We are proud to provide employment opportunities for individuals in the Information Technology industry and the occupations targeted by this grant. CTS is always recruiting both experienced software developers and new graduates with Computer Science, Management Information Systems, and related degrees. We have multiple positions open today, but since it is so difficult to find these individuals, CTS will hire a good candidate any time, whether or not we have a position available. CTS's revenue comes from billing our employees' time to develop custom software solutions, so we cannot grow if we cannot find talent.

CTS is committed to participating in the project proposed to the Tennessee Higher Education Commission during the life of the grant in the following ways:

- Encourage employees to volunteer in classroom environments to mentor students, promote IT careers and facilitate case-based learning. CTS provides our employees with 40 hours per year to volunteer in classrooms promoting the technology profession.
- Participate in Summits and Advisory Councils to provide meaningful feedback to the program's educational institutions and other partners on their curriculum and worker preparation activities.
- Host field trips for students as needed for the successful completion of this project.
- Agree to consider hiring as full-time employees qualified candidates who meet our hiring requirements,



618 Grassmere Park Drive, Suite 12
Nashville, TN 37211
tel: (615) 312-6000
fax: (615) 312-6099
www.ena.com

July 19, 2016

Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: Nashville Technology Council's LEAP 2.0 Grant Application 2016

Dear Mr. Johnston:

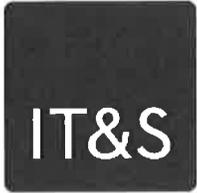
I am writing to express Education Networks of America's (ENA) commitment to participate in the proposed Computer Scientists in the Classroom project submitted by the Nashville Technology Council, Nashville State Community College and their Middle Tennessee partners.

ENA is the leading provider of managed Infrastructure as a Service (IaaS) solutions to K-12 schools and libraries. In 1996, ENA lead the creation of the ConnectTEN network, bringing high quality Internet access to all schools in the state of Tennessee. ConnectTEN was one of the first statewide K-12 networks in the U.S. and as ENA has grown its footprint to serve education in 32 states, we have earned a reputation as experts in the design, deployment, and management of broadband, Wi-Fi/LAN, voice, and video solutions. ENA manages multiple statewide and district-wide networks, including 15 of the largest school systems in the country, successfully serving approximately 5,000 sites, 570 school districts, and 280 libraries.

We are proud to provide employment opportunities for individuals in the Information Technology industry and the occupations targeted by this grant. Within our organizational structure, we have about 110 employees, greater than 50% of our workforce, in the IT/IS space. We've seen an increase in demand for the skill sets we are recruiting and less availability of people with those skills making the recruiting process longer than we would like, budgets increase to keep up to be able to offer competitive pay, and often have to relocate someone to this area to ultimately fill an opening which is added transition time and cost.

ENA is committed to participating in the project proposed to the Tennessee Higher Education Commission during the life of the grant in the following ways:

- Continue to encourage employees to volunteer in classroom environments to mentor students, promote IT careers and facilitate case-based learning



July 27, 2016

Mr. Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: Tennessee *LEAP Grant Application 2016*

Dear Mr. Johnston:

I am writing to express HCA Information Technology and Services' (IT&S) commitment to participate in the proposed computer Scientists in the Classroom project submitted by the Nashville Technology Council, Nashville State Community College, and its Middle Tennessee partners.

HCA is one of the nation's leading providers of healthcare services whose mission is dedicated to the care and improvement of human life and strives to deliver high quality, cost effective healthcare in the communities it serves. Approximately 5% of all US hospital services happen at an HCA facility, and HCA continually seeks ways to improve and expand care, investing \$2.4 billion in new services in those communities in 2015.

HCA IT&S supplies IT systems and services to thousands of healthcare businesses across the US and UK, supporting HCA's portfolio of business. Boldly focused on improving patient care and business operations and leading the transformation of healthcare into a new era of quality and connectivity, we are a unique IT company comprised of a workforce inspired by our noble cause.

Though we have won a number of awards over the years, we are perhaps most proud of those that recognize the kind of workplace we espouse to have, the contribution to society and patient care, and the scale at which we operate in the industry. Since 2009, IT&S has been recognized as one of the Best Places to Work in IT by Computerworld, which bases a ranking on how HCA IT&S employee responses compare to other IT companies on a comprehensive questionnaire about benefits, diversity, career development, training, and retention. Our most notable differences include our mature programs for year-around community involvement, flexible and abundant professional development opportunities, and ongoing wellness activities.

As an Honors Program Laureate, IT&S has been recognized for a number of years for the positive changes that technology has had on business and society through technology projects such as applications for clinical trial research, tools that help cancer patients navigate the continuum of care, flood relief exchange website and most recently a research database for MRSA studies.

Since 2011, we've won the Most Wired award, which is an industry-standard benchmark study that evaluates and recognizes the steady growth and change in the adoption of information technology in US hospitals and health systems.

As we continue to grow and invest in technology it has become apparent that we need to invest in our community and education systems to ensure we grow, retain and attract the most talented technology professionals to Tennessee. HCA IT&S is committed to being part of that journey.

HPA, A Cognizant Company

July 27, 2016

Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *LEAP 2.0 Grant Application 2016*

Dear Mr. Johnston:

I am writing to express HPA, A Cognizant Company's commitment to participate in the proposed *Computer Scientists in the Classroom* project submitted by the Nashville Technology Council, Nashville State Community College and their Middle Tennessee partners.

HPA, A Cognizant Company is a fully owned subsidiary of Cognizant based exclusively in Nashville. HPA is an advanced robotic staffing solution. While traditional Robotic Process Automation (RPA) sells technology based products, HPA is the only company which sells robots as a service. HPA robots are hired the same way that human staff are hired. The result is a faster, higher quality, and lower cost solution than traditional outsourcing.

Despite the challenges of hiring Robotics Engineers, Robotics Business Analysts, and Robotics Production Support, HPA has 20 full time staff. These positions are uncommon both in university, trade schools, or other business training settings. As a result, HPA hires directly out of college, the military, or provides direct job retraining. It is worth noting that our 20 staff are augmented by over 1,000 robotic staff employed internationally on a full-time basis.

HPA's hiring model is non-traditional. We prefer to hire staff with less formal technology backgrounds. Our primary goal is to hire employees with strong problem solving skills that can train our robots to perform manual work.

Our approach to hiring is to provide a simple development challenge that is similar to the type of work that they would be performing. Our challenge can be completed using information readily available on the Internet and candidates are encouraged to even ask HPA staff for help. This approach fosters an understanding of problem solving and communication.

The classic hiring model must be modernized for us to hire more efficiently. Specifically, classic hiring and recruiting is focused primarily on project based experience. The future hiring paradigm is defined by continual change and the ability for individuals to make those changes with confidence.



July 27, 2016

Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *LEAP 2.0 Grant Application 2016*

Dear Mr. Johnston:

I am writing to express Leankit's commitment to participate in the proposed *Computer Scientists in the Classroom* project submitted by the Nashville Technology Council, Nashville State Community College and their Middle Tennessee partners.

Leankit is a software development company based in Franklin, Tenn. that provides visual project management and forecasting tools designed to help people manage work more effectively. We are proud to provide employment opportunities for individuals in the Information Technology industry and the occupations targeted by this grant. Within our organizational structure, we have 56 IT employees.

Leankit will consider participating in the project proposed to the Tennessee Higher Education Commission during the life of the grant in the following ways:

- Encourage employees to volunteer in classroom environments to mentor students, promote IT careers and facilitate case-based learning
- Participate in Summits and Advisory Councils to provide meaningful feedback to the program's educational institutions and other partners on their curriculum and worker preparation activities.
- Host field trips for students as needed for the successful completion of this project.

We are pleased to be part of this project, and look forward to implementing many of the proposed activities which will result in an increased pipeline of trained IT workers throughout the region, strengthening our presence and ability to grow our workforce in Middle Tennessee.

Sincerely,

A handwritten signature in black ink that reads "Amy Henderson".

Amy Henderson
VP, Organizational Development

NISSAN

NISSAN NORTH AMERICA, INC.

Corporate Office
P.O. Box 685001
Franklin, TN 37068-5001
Telephone: 615.725.1000

July 27, 2016

Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *LEAP 2.0 Grant Application 2016*

Dear Mr. Johnston:

I am writing to express Nissan North America's commitment to participate in the proposed *Computer Scientists in the Classroom* project submitted by the Nashville Technology Council, Nashville State Community College and their Middle Tennessee partners.

Nissan's vision for the marketplace is to deliver "Innovation that Excites." Nissan continually focuses on and creates new technologies that drive customer excitement. Nissan's three production plants in the United States produce about 1,000,000 vehicles annually, offering our customers new technology and innovations such as Nissan Safety Shield Technology, Brake Override Technology, and the all-electric Nissan LEAF. Nissan's innovation in the areas of design, environment, safety and technology continue to drive our ability to be a market leader.

At Nissan North America, we are proud to provide employment opportunities in Middle Tennessee (Williamson, Rutherford and Franklin counties) for individuals in the Information Technology industry and well as other advanced technology areas targeted by this grant. Within our organizational structure, we have approximately 350 IT/IS employees and another 350 contract staff augmenting our team. As technological advances in the automotive industry continue at a rapid pace, our need for a highly and advanced skilled workforce is at the highest level ever. Not only are we hiring staff to work directly in our IS/IT organizations, but we are also hiring technology staff within our business areas to leverage and maximize technology to be a strategic differentiator to support the performance of Nissan North America and its 1,100 dealers as well as to exceed our customers' expectations and demands. Our ability to locate, attract and retain skilled human resources, particularly in technology and engineering fields, is essential to our continued growth in the future. In order to fill open positions over the past 3 years, we have been required to reach outside Tennessee for talent to fill our technology positions due to lack of local skills and talent.

Nissan North America is very active in the Middle Tennessee community. Nissan is made up of a richly diverse group of people, as reflected in the company's leadership team and the numerous community outreach programs in which we participate. Nissan sponsors, supports and participates in a number of workforce development/education/community outreach activities.



July 27, 2016

Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *LEAP 2.0 Grant Application 2016*

Dear Mr. Johnston:

I am writing to express Qualifacts Systems Inc's commitment to participate in the proposed *Computer Scientists in the Classroom* project submitted by the Nashville Technology Council, Nashville State Community College and their Middle Tennessee partners.

Qualifacts is a leading provider of Software-as-a-Service and web-based Electronic Health Records (EHR) for the behavioral health and human services market. Our team helps over 50,000 behavioral healthcare providers and staff realize improved billing and clinical operations, increased agency revenue, faster payment and better client and staff satisfaction.

We are proud to provide employment opportunities for individuals in the Information Technology industry and the occupations targeted by this grant. Within our organizational structure, we have over 75 IT/IS employees. Historically, our company has faced persistent IT/IS staffing capacity issues and as we grow, our hiring needs for skilled software engineers, architects, quality assurance specialists, project managers, business analysts, implementation specialists and related IT/IS professionals grows.

Qualifacts is happy to participate in the project proposed to the Tennessee Higher Education Commission during the life of the grant in the following ways:

- Encourage employees to volunteer in classroom environments to mentor students, promote IT careers and facilitate case-based learning
- Participate in Summits and Advisory Councils to provide meaningful feedback to the program's educational institutions and other partners on their curriculum and worker preparation activities.
- Host field trips for students as needed for the successful completion of this project.
- Agree to consider hiring as full-time employees qualified candidates who meet our hiring requirements, from a pool of students who have completed their education and training programs via the community colleges in Middle Tennessee or other industry certification providers identified in the grant. Occupations may include: software engineer, quality assurance specialist, business analyst, support technician, and may include others based on need.



CONNECTING
GENEROSITY WITH NEED

July 26, 2016

Mr. Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *IT Pathway Collaborative 2.0 LEAP Grant Application 2016*

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David Williams, II

Dear Mr. Johnston:

I am writing to express The Community Foundation of Middle Tennessee's support for the proposed *Computer Scientists in the Classroom* project submitted by the Nashville Technology Council, Nashville State Community College, and their partners. We are particularly interested in programs which include students from families below the federal poverty line interested in programs such as this but who lack access to computer and internet connectivity.

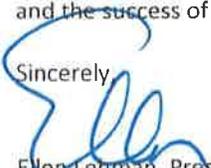
Middle Tennessee is a rapidly growing metropolitan area but in 2015, there were over 1,600 openings that remained unfilled in Middle Tennessee due to a lack of qualified applicants. The number of IT jobs in 2015 in Middle Tennessee were almost 26,000 - an increase of over 2,000 positions in 12 months - with 2-4% annual growth across all five leading occupational job categories. There is little doubt that there is a need for programs like *Computer Scientists in the Classroom* to provide a community-based approach to address the challenge of job candidate "skills gaps" by increasing the local information technology (IT) workforce pool for employers in Middle Tennessee.

The Community Foundation of Middle Tennessee oversees funds for many charitable purposes. One, the Nashville Digital Inclusion Fund, supports nonprofits working on wiping out Digital Exclusion. We focus on making grants to nonprofits providing four things: a device, connectivity, training and support. Applications for support for this work are vetted and then approved or rejected by our volunteers. Recently we awarded the Nashville Technology Council assistance for one of its programs and continue to invite them to submit applications for future efforts, obviously, with no guarantee or certainty of approval.

The Community Foundation of Middle Tennessee (CFMT) supports, among others, the goals of The *Computer Scientists in the Classroom* project:

- Creating opportunities for meaningful interaction and alignment among technology employers, Nashville State Community College, and Metropolitan Nashville Public Schools,
- Increasing the number of credentialed graduates, especially including K-12 students who currently fall below the federal poverty level, and
- Providing internships to keep students enrolled and prepare students for entry into the workplace.

I am pleased to offer support of this project to enhance the employability of our neighbors and the success of our economy.

Sincerely,

Ellen Lehman, President

The Community Foundation of Middle Tennessee



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The Honorable Megan Barry, Mayor
Metropolitan Nashville

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Alignment Nashville

July 19, 2016

Mr. Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *IT Pathway Collaborative 2.0 LEAP Grant Application 2016*

Dear Mr. Johnston:

I am writing to express Alignment Nashville's support for the proposed *Computer Scientists in the Classroom* project submitted by the Nashville Technology Council, Nashville State Community College, and their partners.

Middle Tennessee is a rapidly growing metropolitan area. In 2015, there were over 1,600 openings that remained unfilled in Middle Tennessee due to a lack of qualified applicants. The number of IT jobs in 2015 in Middle Tennessee were almost 26,000 - an increase of over 2,000 positions in 12 months - with 2-4% annual growth across all five leading occupational job categories. Therefore, there is little doubt that there is a need for *Computer Scientists in the Classroom* project to provide a community-based, collaborative approach to address the challenge of job candidate "skills gaps" by increasing the local information technology (IT) workforce pool for employers in Middle Tennessee.

The *Computer Scientists in the Classroom* project's goals are three-fold:

- To enhance current academic programs by creating opportunities for meaningful interaction and alignment between technology employers, Nashville State Community College, and Metropolitan Nashville Public Schools that results in long-term relationships,
- To expand current, IT academic programs through corporate involvement, community outreach and programming in the K-12 schools that results in higher enrollment and an increased number of credentialed graduates.
- To provide internships to keep students enrolled and prepare students for entry into the workplace, and

Established in 1999, the NTC is a technology-focused local economic development agency representing almost 400 member organizations and 21,500 individuals. With a mission to develop, connect, and promote the technology community in Middle Tennessee, the NTC is committed to driving the economic success of our region through technology and a skilled technology workforce. I believe that the NTC is uniquely qualified to be the lead entity on this proposal due to position in the community as the intersection between technology industry and education.

Alignment Nashville is a 501c3 not-for-profit organization that works to align the community's resources in support of public education and children's health. We convene 16 community-based Alignment Teams ("A-Teams") that meet monthly to collaborate and engage the broader community in solving our community's most pressing issues.

Alignment Nashville will support the implementation of this initiative in the following ways:

- The Alignment Nashville Learning Technology A-Team, composed of business, school, and community representatives, will provide input and support the goal of expanding academic programming in IT through corporate and community involvement
- The Alignment Nashville Elementary, Middle, and High School A-Teams will also integrate the goals of the *Computer Scientists in the Classroom* project into their ongoing work to support K-12 students

We are pleased to support this exciting project, and I look forward to seeing the implementation of many of the proposed activities which will result in an increased pipeline of trained IT workers throughout the region, strengthening our presence and ability to grow our workforce in Middle Tennessee.

Sincerely,

Melissa Jagers
President & CEO



LEADERSHIP TENNESSEE

Leaders Working Together for a Stronger Tennessee

July 27, 2016

Mr. Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *IT Pathway Collaborative 2.0 LEAP Grant Application 2016*

Dear Mr. Johnston:

I am writing to express Leadership Tennessee's support of the proposed *Computer Scientists in the Classroom* project submitted by the Nashville Technology Council, Nashville State Community College, and their partners.

Middle Tennessee is a rapidly growing metropolitan area. In 2015, there were over 1,600 openings that remained unfilled in Middle Tennessee due to a lack of qualified applicants. The number of IT jobs in Middle Tennessee were almost 26,000 - an increase of over 2,000 positions in 12 months - with 2-4% annual growth across all five leading occupational job categories. Therefore, there is little doubt that there is a need for *Computer Scientists in the Classroom* project to provide a community-based, collaborative approach to address the challenge of job candidate "skills gaps" by increasing the local information technology (IT) workforce pool for employers in Middle Tennessee.

Leadership Tennessee, an initiative of the College of Leadership & Public Service at Lipscomb University, is the only statewide leadership program in the state. With its Signature Program, Leadership Tennessee brings together leaders from all geographic regions and many professional sectors around the state to discuss issues of state importance, such as education, economic development and health and wellness. By creating a network of leaders committed to addressing challenges that affect all of Tennessee, Leadership Tennessee is moving conversations forward regardless of where it starts. In 2015, Leadership Tennessee was awarded a Bill & Melinda Gates Foundation grant to expand the network and conversations to areas and citizens of the state not previously reached.

The *Computer Scientists in the Classroom* project's goals are three-fold:

- To enhance current academic programs by creating opportunities for meaningful interaction and alignment between technology employers, Nashville State Community College, and Metropolitan Nashville Public Schools that results in long-term relationships,
- To expand current, IT academic programs through corporate involvement, community outreach and programming in the K-12 schools that results in higher enrollment and an increased number of credentialed graduates.
- To provide internships to keep students enrolled and prepare students for entry into the workplace, and

Established in 1999, the NTC is a technology-focused local economic development agency representing almost 400 member organizations and 21,500 individuals. With a mission to develop, connect, and promote the technology community in Middle Tennessee, the NTC is committed to driving the economic success of our region through technology and a skilled technology workforce. I believe that the NTC is uniquely qualified to be the lead entity on this proposal due to position in the community as the intersection between technology industry and education.

an initiative of



lipscomb.edu/leadership

One University Park Drive
Nashville, TN 37204-3951
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leadershiptennessee.org

MEGAN BARRY, MAYOR



METROPOLITAN GOVERNMENT OF NASHVILLE AND DAVIDSON COUNTY

Cynthia L. Croom, Ed.D.
Executive Director

METROPOLITAN ACTION COMMISSION
800 2nd Avenue North
Nashville, Tennessee 37201
Mailing Address: P.O. Box 196300
Nashville, TN 37219-6300
Phone (615) 862-8860
Fax (615) 862-8881

July 27, 2016

Mr. Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *IT Pathway Collaborative 2.0 LEAP Grant Application 2016*

Dear Mr. Johnston:

I am writing to express the Metropolitan Action Commission's support of the proposed *Computer Scientists in the Classroom* project submitted by the Nashville Technology Council, Nashville State Community College, and their partners.

Middle Tennessee is a rapidly growing metropolitan area. In 2015, there were over 1,600 openings that remained unfilled in Middle Tennessee due to a lack of qualified applicants. The number of IT jobs in 2015 in Middle Tennessee was almost 26,000 - an increase of over 2,000 positions in 12 months - with 2-4% annual growth across all five leading occupational job categories. Therefore, there is little doubt that there is a need for *Computer Scientists in the Classroom* project to provide a community-based, collaborative approach to address the challenge of job candidate "skills gaps" by increasing the local information technology (IT) workforce pool for employers in Middle Tennessee.

The Metropolitan Action Commission is the designated community action agency for Nashville and Davidson County. Our agency is responsible for eliminating barriers to poverty for families with low incomes in our community. This summer, we partnered with the Nashville Technology Council to host our first youth summer technology camp for teens ages 14-17 years old. In order to qualify to apply for the camp, the youth had to be a sibling of Head Start and Early Head Start child. Head Start and Early Head Start provide early childhood education to families with low income children from birth to five. Our multigenerational approach to impacting poverty allowed us to impact the older children in the home by introducing them to an industry that could lead to employment that would allow them to be economically secure as well as provided them an opportunity to have access to technology which impacts the skill gaps which are known to be at a higher rate within families with low incomes. The youth in the program are from area middle and high schools within our local school system, the Metropolitan Nashville Public Schools.

I am pleased to support this exciting project, and I look forward to seeing the implementation of many of the proposed activities which will result in an increased pipeline of trained IT workers throughout the region, strengthening our presence and ability to grow our workforce in Middle Tennessee.

Sincerely,


Cynthia Croom, Ed.D.
Executive Director



The community action agency for Nashville and Davidson County



Community Action changes people's lives, embodies the spirit of hope, improves communities, and makes America a better place to live.
We care about the entire community and are dedicated to helping people help themselves and each other.

July 27, 2016

Mr. Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *IT Pathway Collaborative 2.0 LEAP Grant Application 2016*

Dear Mr. Johnston:

The Nashville Career Advancement Center (NCAC) is pleased to provide this letter of support for the Nashville Technology Council working through the Nashville State Community College, for their proposal of *Computer Scientists in the Classroom*. NCAC is the administrative entity for the Middle Tennessee Workforce Development Board and is a partner in the American Job Centers.

Middle Tennessee is a rapidly growing metropolitan area. In 2015, there were over 1,600 IT openings that remained unfilled in Middle Tennessee due to a lack of qualified applicants. The number of IT jobs in 2015 in Middle Tennessee was almost 26,000 - an increase of over 2,000 positions in 12 months - with 2-4% annual growth across all five leading occupational job categories. As a workforce partner, it is vital that we focus on existing and emerging in-demand industries that will have sustained growth, will eliminate skill gaps and lead to self-sufficiency. The proposed project, *Computer Scientists in the Classroom* with its focus to expand current IT academic programs through corporate involvement, community outreach and programming in the K-12 schools will result in higher enrollment and an increased number of credentialed graduates.

I look forward to seeing the implementation of many of the proposed activities which will result in an increased pipeline of trained IT workers throughout the region, strengthening our presence and ability to grow our workforce in Middle Tennessee.

Sincerely,



Paul Haynes
Executive Director



July 27, 2016

Mr. Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *IT Pathway Collaborative 2.0 LEAP Grant Application 2016*

Dear Mr. Johnston:

I am writing to express the Nashville Area Chamber of Commerce's support of the proposed *Computer Scientists in the Classroom* project submitted by the Nashville Technology Council, Nashville State Community College, and their partners.

Middle Tennessee is a rapidly growing metropolitan area. In 2015, there were over 1,600 openings that remained unfilled in Middle Tennessee due to a lack of qualified applicants. The number of IT jobs in 2015 in Middle Tennessee were almost 26,000 - an increase of over 2,000 positions in 12 months - with 2-4% annual growth across all five leading occupational job categories. Therefore, there is little doubt that there is a need for *Computer Scientists in the Classroom* project to provide a community-based, collaborative approach to address the challenge of job candidate "skills gaps" by increasing the local information technology (IT) workforce pool for employers in Middle Tennessee.

The Nashville Chamber is a nonprofit, membership organization dedicated to facilitating community leadership to create economic prosperity. The Nashville Area Chamber is Middle Tennessee's largest business federation, representing more than 2,000 member businesses in 15 counties (Davidson, Cannon, Cheatham, Dickson, Hickman, Macon, Maury, Montgomery, Robertson, Rutherford, Smith, Sumner, Trousdale, Williamson and Wilson). Through a wide variety of programs and initiatives, the Chamber works to positively impact the economic vitality and enhance the quality of life in the region, while supporting the growth and prosperity of our area businesses.

Recognizing that today's students are tomorrow's workforce, the Nashville Area Chamber of Commerce has made improvement of public education its number-one priority. We work closely with Metropolitan Nashville Public Schools to develop initiatives geared toward helping students graduate from high school college and career ready. The overarching mission of the Chamber's education department is to help ensure 100 percent success for all Metro public school students.



July 27, 2016

Mr. Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *IT Pathway Collaborative 2.0 LEAP Grant Application 2016*

Dear Mr. Johnston:

I am writing to express PENCIL Foundation's support of the proposed *Computer Scientists in the Classroom* project submitted by the Nashville Technology Council, Nashville State Community College, and their partners.

Middle Tennessee is a rapidly growing metropolitan area. In 2015, there were over 1,600 openings that remained unfilled in Middle Tennessee due to a lack of qualified applicants. The number of IT jobs in 2015 in Middle Tennessee were almost 26,000 - an increase of over 2,000 positions in 12 months - with 2-4% annual growth across all five leading occupational job categories. Therefore, there is little doubt that there is a need for *Computer Scientists in the Classroom* project to provide a community-based, collaborative approach to address the challenge of job candidate "skills gaps" by increasing the local information technology (IT) workforce pool for employers in Middle Tennessee.

PENCIL Foundation's mission is to link community resources with Nashville public schools to help young people achieve academic success and prepare for life. We have had the opportunity to work collaboratively with the Nashville Technology Council at several schools and have experienced first-hand their commitment to providing meaningful experiences for students and teachers. Likewise, we know that MNPS is incredibly excited about this proposed project and how it would significantly impact student achievement and workforce readiness.

The *Computer Scientists in the Classroom* project's goals are three-fold:

- To enhance current academic programs by creating opportunities for meaningful interaction and alignment between technology employers, Nashville State Community College, and Metropolitan Nashville Public Schools that results in long-term relationships,
- To expand current, IT academic programs through corporate involvement, community outreach and programming in the K-12 schools that results in higher enrollment and an increased number of credentialed graduates.
- To provide internships to keep students enrolled and prepare students for entry into the workplace

Established in 1999, the NTC is a technology-focused local economic development agency representing almost 400 member organizations and 21,500 individuals. With a mission to develop, connect, and promote the technology community in Middle Tennessee, the NTC is committed to driving the economic success of our region through technology and a skilled technology workforce. I believe that the NTC is uniquely qualified to be the lead entity on this proposal due to position in the community as the intersection between technology industry and education.

I am pleased to support this exciting project, and I look forward to seeing the implementation of many of the proposed activities which will result in an increased pipeline of trained IT workers throughout the region, strengthening our presence and ability to grow our workforce in Middle Tennessee.

Sincerely,

A handwritten signature in blue ink that reads "Angie Adams". The signature is written in a cursive, flowing style.

Angie Adams
President & CEO



ROCKETTOWN ↑

615.843.4001

601 4TH AVENUE SOUTH

NASHVILLE, TN 37210

WWW.ROCKETTOWN.COM

July 18, 2016

Mr. Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *IT Pathway Collaborative 2.0 LEAP Grant Application 2016*

Dear Mr. Johnston:

I am writing to express Rockettown of Middle Tennessee's support of the proposed *Computer Scientists in the Classroom* project submitted by the Nashville Technology Council, Nashville State Community College, and their partners.

Middle Tennessee is a rapidly growing metropolitan area. In 2015, there were over 1,600 openings that remained unfilled in Middle Tennessee due to a lack of qualified applicants. The number of IT jobs in 2015 in Middle Tennessee were almost 26,000 - an increase of over 2,000 positions in 12 months - with 2-4% annual growth across all five leading occupational job categories. Therefore, there is little doubt that there is a need for *Computer Scientists in the Classroom* project to provide a community-based, collaborative approach to address the challenge of job candidate "skills gaps" by increasing the local information technology (IT) workforce pool for employers in Middle Tennessee.

Rockettown of Middle Tennessee serves youth between 12 and 18 years of age of all races, religions, and socio-economic backgrounds. Rockettown's mission is to offer hope to the next generation through Christ's love. All young people are welcome at Rockettown and our staff and highly trained mentors regularly interact with those who are underserved, unsupported, disconnected, and feel isolated and hopeless. Rockettown believes young people grow and learn more readily in a community that is welcoming, diverse and challenges them to think.

Rockettown offers many programs and services through the year focused on health and wellness. Our approach to programming is unique because it is holistic, with activities focusing on physical, emotional/intellectual and spiritual health. Rockettown after-school programs are provided at absolutely no cost to participants. Rockettown has served over 1,000,000 children since inception in 1994.

The *Computer Scientists in the Classroom* project's goals are three-fold:

- To enhance current academic programs by creating opportunities for meaningful interaction and alignment between technology employers, Nashville State Community College, and Metropolitan Nashville Public Schools that results in long-term relationships,
- To expand current, IT academic programs through corporate involvement, community outreach and programming in the K-12 schools that results in higher enrollment and an increased number of credentialed graduates.
- To provide internships to keep students enrolled and prepare students for entry into the workplace, and

Established in 1999, the NTC is a technology-focused local economic development agency representing almost 400 member organizations and 21,500 individuals. With a mission to develop, connect, and promote the technology community in Middle Tennessee, the NTC is committed to driving the economic success of our region through



Studio NPL
Nashville Public Library

July 27, 2016

Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *LEAP 2.0 Grant Application 2016*

Dear Mr. Johnston:

I am writing to express Studio NPL at Nashville Public Library's commitment to participate in the proposed *Computer Scientists in the Classroom* project submitted by the Nashville Technology Council, Nashville State Community College and their Middle Tennessee partners.

Studio NPL is an innovative, technology driven learning environment where Nashville teens participate in daily, mentor-led programming that focus on 21st century digital skills, STEM practices, and college and career readiness. Funded by private donors through the Nashville Public Library Foundation and public funds through Nashville Metro, Studio NPL hosts free, daily workshops for middle and high school students at a variety of libraries, schools, and community centers.

Our staff is made up of metro employees, volunteers, and dedicated staff mentors from a variety of technology and artistic fields. It is very important to our mission to bring people working in exciting and emerging fields into our spaces to expose our patrons to the types of college and career pathways that they will find relevant and valuable to their future. All of our mentors are asked to incorporate technology into their workshop, so that no matter the medium, patrons are learning to navigate and utilize the digital environment they are increasingly emerged in. Our program saw an incredible degree of success in our first year, and we are quickly expanding our operations, with generous funding. We have -in some sense- struggled to hire for the mentor and teen mentor positions, and have had up to four part-time vacancies at one time in the past eight months. Coding, engineering, game and web design positions are currently vacant, and we are reassessing our promotion and hiring processes for the future of our program.



**Urban League
of Middle Tennessee**

Empowering Communities.
Changing Lives.

July 27, 2016

Mr. Curt Johnston
Tennessee Higher Education Commission
404 James Robertson Parkway, Suite 1900
Nashville, TN 37243-0830

Subject: *IT Pathway Collaborative 2.0 LEAP Grant Application 2016*

Dear Mr. Johnston:

I am writing to express The Urban League of Middle Tennessee support of the proposed *Computer Scientists in the Classroom* project submitted by the Nashville Technology Council, Nashville State Community College, and their partners.

Middle Tennessee is a rapidly growing metropolitan area. In 2015, there were over 1,600 openings that remained unfilled in Middle Tennessee due to a lack of qualified applicants. The number of IT jobs in 2015 in Middle Tennessee were almost 26,000 - an increase of over 2,000 positions in 12 months - with 2-4% annual growth across all five leading occupational job categories. Therefore, there is little doubt that there is a need for *Computer Scientists in the Classroom* project to provide a community-based, collaborative approach to address the challenge of job candidate "skills gaps" by increasing the local information technology (IT) workforce pool for employers in Middle Tennessee.

The Urban League of Middle Tennessee is considered a convener, organizer and action oriented nonprofit focusing on the issues of education and employment of any person in need. From our inception, we have worked with African Americans seeking assistance. We now serve any person in need.

ULMT is recognized by employers for providing focused training based on employer needs when recruiting and preparing clients to enter the workforce.

The education programs of ULMT focus their energy on ensuring that youth are reading at or above grade level in the elementary grades, staying on track in the middle years and unlocking the potential within teenage and adult learners who are seeking services in college preparation, GED attainment or post-secondary training and certification. ULMT is also engaged in helping parents and community leaders to understand key education reform elements and supporting the organization of parents and leaders so that they can better advocate for high quality education for our children.

We are dedicated to serving those individuals who seek more opportunities through better education or employment and to ensuring that there is accessibility to high quality educational experiences.

SECTION 8: DATA LIST

“Beyond Point and Click: The Expanding Demand for Coding Skills.” (June 2016)

Available at: <http://burning-glass.com/research/coding-skills/>

Copy Attached

Fairlie, Robert and London, Rebecca. (2011) “The Effects of Home Computers on Educational Outcomes: Evidence from a Field Experiment with Community College Student.”

Available at: www.cscconline.org/files/7314/3103/6508/butte22.pdf

Technology Employment Spotlight: Nashville. (2015)

Developed for the Nashville Technology Council. Prepared by Career Builder using EMSI data.

Available at <https://technologycouncil.com/wp-content/uploads/2016/02/natechcouncilemploymentv342015.pdf>

Copy Attached

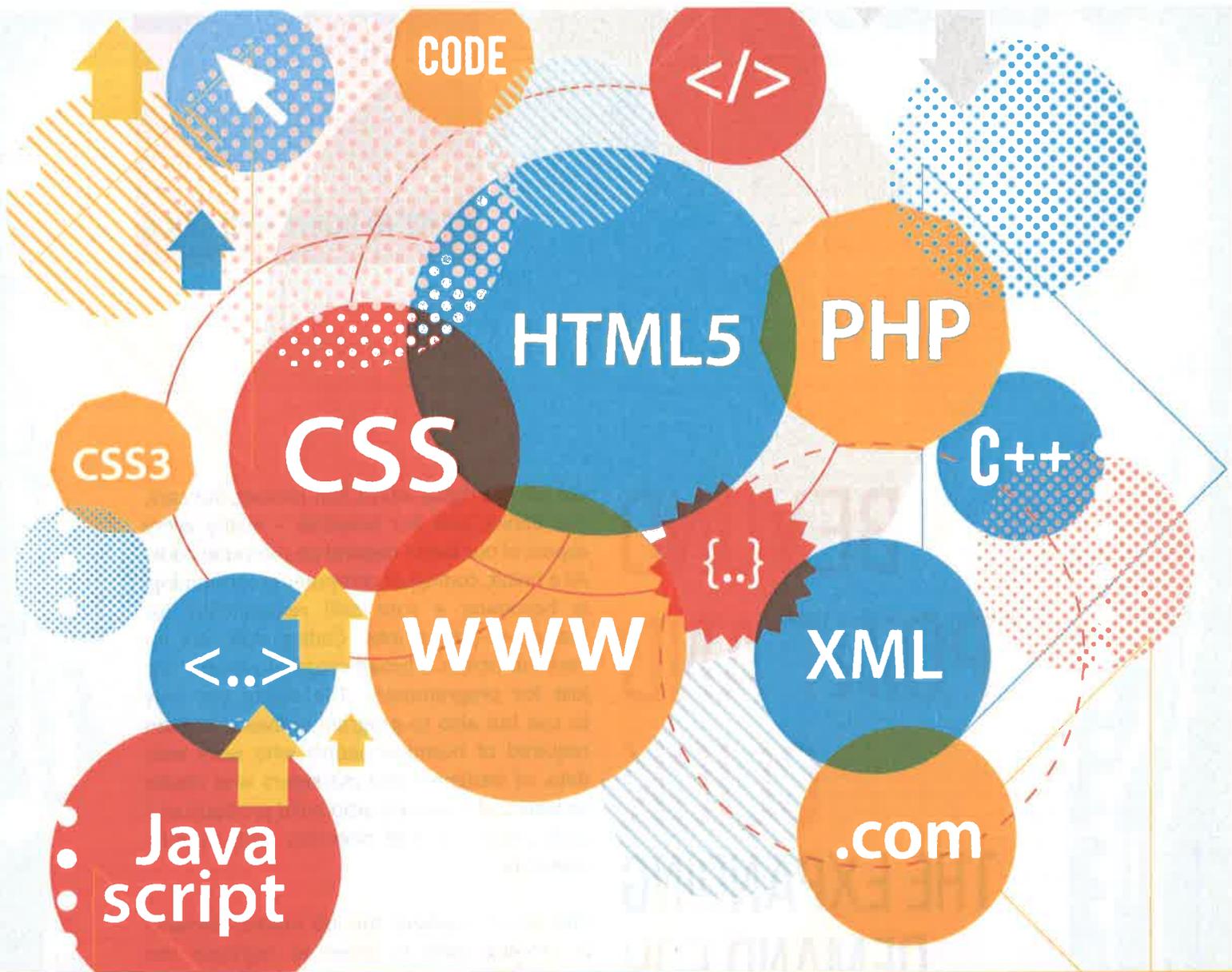
Tennessee Higher Education Commission. (2011) “*Academic Program Supply and Occupational Demand Projections: 2008-2018.*”

Venegas, Kristen. (2007) “The Internet and College Access: Challenges for Low Income Students.” *American Academic*, vol. 3

Available at: http://www.academia.edu/475471/The_internet_and_college_access_Challenges_for_low-income_students

Vanderbilt University, Center for Science Outreach, Scientist in the Classroom

Available at: <http://www.vanderbilt.edu/cso/scp/>



BEYOND POINT AND CLICK

THE EXPANDING DEMAND FOR CODING SKILLS

BURNING GLASS TECHNOLOGIES
JUNE 2016

ORACLE[®] ACADEMY

 **burningglass**
CAREERS IN FOCUS

BEYOND POINT AND CLICK THE EXPANDING DEMAND FOR CODING SKILLS

BURNING GLASS
JUNE 2016

We live in a digital world. Our phones, our cars, our banks, and our hospitals – nearly every aspect of our lives – depend on computer code. As a result, coding, or computer programming, is becoming a core skill requirement for many well-paying jobs. Coding skills are in-demand across a broad range of careers, not just for programmers. The ability not only to use but also to program software is often required of business people who work with data, of designers and marketers who create websites, of engineers who build products and technologies, and of scientists who conduct research.

This report analyzes the job market demand for coding skills in order to highlight the breadth and magnitude of employer demand for these skills and the range of opportunities that learning to code can open for students. The intent of this research is to showcase for school counselors and K-12 students alike the importance of learning to code and the value these skills will have in the job market.

The data contained in this report are drawn from 26 million U.S. online job postings collected in 2015 and have been analyzed to determine the specific jobs and skills that employers are seeking.

KEY FINDINGS

BASED ON AN ANALYSIS OF MILLIONS OF JOB POSTINGS ACROSS THE UNITED STATES, WE FOUND:



CODING SKILLS ARE IN HIGH DEMAND

Seven million job openings in 2015 were in occupations which value coding skills. This corresponds to 20% of “career track” jobs, defined as those which pay a national living wage of at least \$15/hour.



CODING SKILLS ARE NOT JUST FOR PROGRAMMERS

Coding skills are of value to candidates across five major job categories:

- Information Technology (IT) workers
- Data Analysts
- Artists and Designers
- Engineers
- Scientists



CODING JOBS PAY MORE

Jobs requiring coding skills pay \$22,000 per year more than jobs that don't: \$84,000 vs \$62,000 per year. (This analysis includes only “career track” jobs.)



CODING SKILLS PROVIDE AN AVENUE TO HIGH-INCOME JOBS

Half of jobs in the top income quartile (>\$57,000 per year) are in occupations which commonly require coding skills from job applicants.



CODING JOBS ARE GROWING FASTER THAN THE JOB MARKET

Programming jobs are growing fastest, 50% faster than the market overall. In general, programming jobs are growing 12% faster than the market average.



INTRODUCTION

BEYOND POINT AND CLICK

In a wide range of careers, having only point-and-click computer skills are as limiting to a job seeker as hunt-and-peck typing skills would have been a few decades ago. Demand for programming or coding skills is large, growing, and not just for IT jobs. Coding skills are now demanded of business people who work with data, of designers and marketers who create websites, of engineers who build products and technologies, and of scientists who conduct research. Many of these are positions that would never be considered science or technology (STEM) jobs in the traditional sense. More than half of set designers, for example, are expected to use 3D modeling software such as AutoCAD, the same tools used to design an iPhone or a new car.

Despite increasing demand for programming skills in the job market, not enough students get an early start in computer science courses. Only 2% of all students in the College Board's AP program took computer science in 2015 and only 22% of those students were female.¹

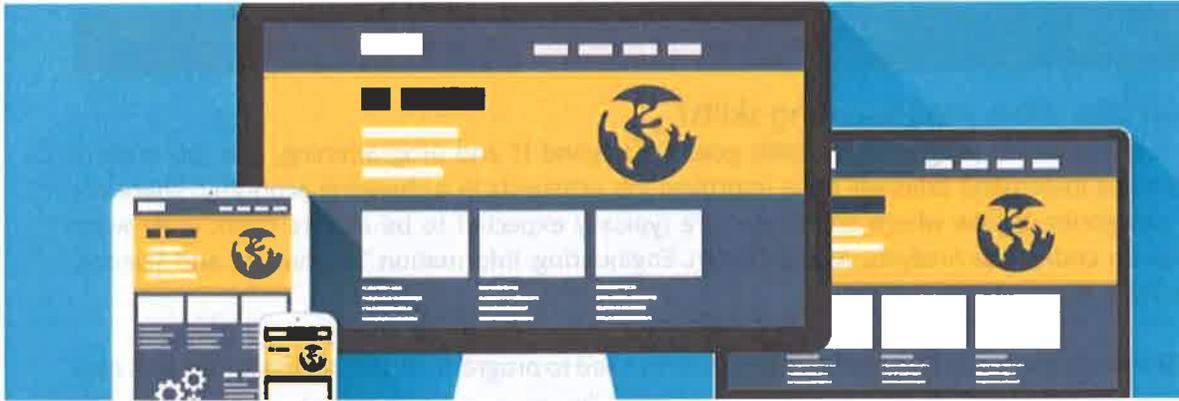
The good news, however, is that awareness of the importance of these skills is growing. Computer science was the fastest growing AP test between 2014 and 2015, with the number of test takers up 25%.² Online programs have made it easier for people to develop coding skills outside of formal schooling. In recognition of the opportunities associated with coding skills, the Obama administration has launched Computer Science for All, a \$4 billion initiative to expand computer science education.³

This paper is designed to equip school counselors and others offering educational and career advice with the data and information to encourage students to develop these critical 21st century skills by describing the kinds of opportunities that computer science skills make possible. This paper places particular emphasis on programming skills, the part of the computer science discipline which is most directly and broadly sought by employers.

1 CollegeBoard (2015), AP Program Participation and Performance Data 2015: Program Summary Report. Retrieved from <https://secure-media.collegeboard.org/digitalServices/pdf/research/2015/Program-Summary-Report-2015.pdf>.

2 Ibid.

3 <https://www.whitehouse.gov/blog/2016/01/30/computer-science-all>



ABOUT THIS ANALYSIS

How do you define coding skills?

In this analysis, we define coding skills as the use of a computer program where users are writing instructions to a computer as opposed to using pre-written applications to perform prestructured tasks. The programming languages we studied include JavaScript and HTML for building websites, statistical programs such as R and SAS, AutoCAD programs for engineers, and general purpose computer programming languages such as Java, Python, and C++.

How do you define coding jobs?

We define coding jobs as those in any occupation where knowing how to write computer code makes someone a stronger candidate and where employers commonly request coding skills in job postings. In some cases, coding is a prerequisite skill for the role, such as for Database Administrators. In other cases, such as Graphic Designers, knowing how to code may not be required in all cases, but job seekers with relevant programming skills will typically have an advantage. As jobs are typically becoming increasingly technical, and a greater share of jobs required technical expertise, developing coding skills is a way for students and job seekers to “futureproof” their skills.

In this report we compare coding jobs to other “career track” jobs, which we define as the set of occupations where the median wage is greater than \$15 an hour. MIT researchers have determined this pay scale represents a living wage for a family of two adults and two children.⁴

What is the source of the data?

The data in this report, except where noted otherwise, are drawn from Burning Glass’s database of online job postings. We examined the complete set of 26 million unique job postings collected in the United States in 2015. Burning Glass analyzed job postings to determine the occupation, or type of job, requested, the specific skills and credentials required, and the salary offered.

To determine the total number of openings for each occupation, Burning Glass’s team of economists used a combination of job postings and other data from the Bureau of Labor Statistics to estimate the number of available open positions in 2015.

The projected job growth figures are from the Bureau of Labor Statistics.

⁴ See <http://livingwage.mit.edu/>

FINDINGS

What jobs value programming skills?

The job market for programming skills goes far beyond IT and programming, and job seekers with these in-demand skills will have improved job prospects in a changing economy. There are five categories of jobs where employees are typically expected to be able to proficiently write computer code: Data Analysts, Arts & Design, Engineering, Information Technology, and Science. (See Table 1.)

While it is not a surprise that Software Developers need to program, coding skill requirements may be a less obvious in other jobs. Increasingly, graphic designers must be able to design for the web as well as print; over half (51%) of graphic designers require at least one web development skill. Many jobs in business or scientific research require workers to query data from large databases or conduct research using a statistical software package such as R, SAS, or Stata.

These job categories were identified by analyzing the skill requirements that employers advertise in online job ads. Those jobs which are most likely to require coding skills were included in this analysis.

It is important to note that the categories below represent occupations where coding skills are often valued by employers. For any given position, however, coding skills may not be specifically required. Possessing these skills does provide an advantage to job seekers looking for jobs today, and helps them “futureproof” themselves as employers look for workers with increasingly sophisticated technical skills.

TABLE 1: OVERVIEW OF CODING JOBS

Role Type	Description	Common Jobs
Data Analysis	Data Analysts use computer programming to analyze data and solve problems in business and finance. Common coding tasks include estimating how much money a company will earn or determining how many of a particular item a store should put on the shelves.	Business Analyst Financial Analyst Data Analyst
Arts & Design	Designers use digital tools to create websites and design the physical products we buy.	Graphic Designer User Experience Designer Web Designer
Engineering	Engineers use programming to design and test new products and conduct research on how to solve practical technology problems.	Mechanical Engineer Civil Engineer Engineering Technician

Information Technology	Computer programmers and IT professionals write software which can be used to create websites, build computer networks, help doctors treat patients, or even drive a car.	Software Developer Network Administrator Computer Support Specialist
Science	Scientists use computer programming to analyze the results of their experiments and create simulations of real world events.	Medical Researcher Chemist Environmental Scientist

What is the demand for programming skills?

Coding jobs represent a large and growing part of the job market. There were nearly 7 million job openings in the U.S. last year for roles requiring coding skills. This represents 20% of the total market for career-track jobs that pay \$15 an hour or more. Jobs with coding skills are projected to grow 12% faster than the job market overall in the next 10 years. IT jobs are expected to grow even more rapidly: 25% faster than the overall market.¹

Programming skills are in demand across a range of industries. Half of all programming openings are in Finance, Manufacturing, Health Care, and other sectors outside of the technology industry. Programmers are in every industry and, as a result, job prospects and job security are no longer as closely tied to the ups and downs of the tech sector. This has spread demand for these skills throughout the country, beyond the regions usually considered technology centers.

TABLE 2: DEMAND AND GROWTH OF CODING JOBS

Role Type	2015 Openings <small>(Source: Burning Glass)</small>	Projected 10-Year Growth <small>(Source: BLS)</small>
Information Technology	3,747,340	8.8%
Data Analysis	1,452,446	7.7%
Engineering	938,126	2.9%
Science	330,896	6.3%
Arts & Design	300,323	8.2%
All coding jobs	6,769,131	7.2%
Other jobs (occupations paying >\$15/hr)	30,759,008	6.4%

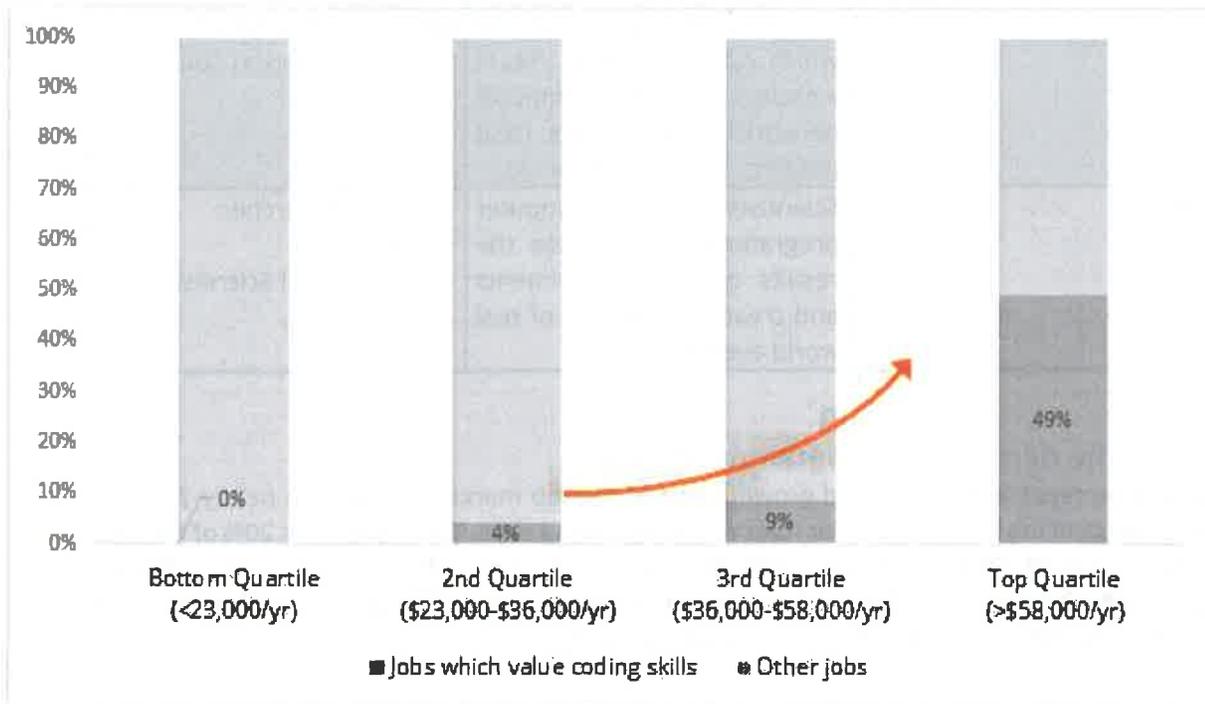
How much do programming skills pay?

Coding skills represent a clear avenue for students to enter well-paying jobs. Jobs valuing coding skills pay \$22,000 per year more, on average, than jobs that don't: \$84,000 vs \$62,000 per year. The value of these skills is striking and, for students looking to increase their potential income, few other skills open the door to as many well-paying careers. Slicing the data another way, 49% of the jobs in the top wage quartile (>\$58,000/yr) value coding skills.

Looking at pay by role type, coding skills are valued in all categories. In each case, jobs valuing

¹ Projections data are from the Bureau of Labor Statistics' Employment Projections program. <http://www.bls.gov/emp/>

PERCENTAGE OF JOB OPENINGS THAT VALUE CODING SKILLS, BY INCOME LEVEL



The demand for coding skills rises with income. Coding skills are almost nonexistent in the lower income quartiles, but half of all top-quartile jobs require the ability to code.

coding skills have average salaries at or above the average for all jobs. The wages associated with each role type correspond with the intensity of programming skill requirements. The highest earning roles are in IT, with an average advertised salary of \$90,000, descending to \$61,000 for Science roles.

TABLE 3: AVERAGE ADVERTISED SALARIES OF CODING JOBS

Role Type	Average Advertised Salary
Information Technology	\$90,000
Data Analysis	\$79,000
Arts & Design	\$78,000
Engineering	\$74,000
Science	\$61,000
All coding jobs	\$84,000
Other jobs (occupations paying >\$15/hr)	\$62,000

What skills should students learn?

Each job category calls for a distinctive set of coding skills based on the computing tasks required. As a starting point, it's most important that students learn the principles of coding, since learning additional languages becomes easier once students have a strong grasp of fundamentals. The coding skills in highest demand are generally programming languages with broad applicability. As students begin to hone in on their career aspirations, they can begin to develop coding skills in line with those career goals, as shown in Table 4.

TABLE 4: TOP CODING SKILLS

Skill	Common Use
SQL	Databases
Java	General purpose programming
Javascript	Web development
Linux	Computer system operations
XML	General purpose programming
C++	General purpose programming, especially in Engineering
C#	General purpose programming
Python	General purpose programming
.NET	General purpose programming

Additionally, certain job categories have more intense coding requirements. Requirements are highest in IT where jobs, by definition, call for a high level of coding proficiency. In other job categories, such as in Science, coding skills are often required, but not necessarily in every job, and coding is typically an ancillary function that may not be a core part of the day-to-day work.

To sort out the proficiency required in different jobs, we calculated the “programming intensity” of coding requirements in various roles. Programming intensity was calculated using an algorithm which accounts for the level of sophistication of programming skills required, the frequency with which those skills were requested in job postings, and the total number of coding skills requested in job postings.

Interestingly, the intensity of programming skill requirements in a role corresponds to salary, with the IT group having both the highest programming intensity and highest salaries, followed by Data Analysis, Arts and Design, Engineering, and Science.

TABLE 5: CODING SKILL REQUIREMENTS IN EACH JOB GROUP

Role Type	Importance of Programming Skills	Common Programming Skill Requirements
Information Technology	Very High	General Programming Languages (Java, C++) Database & Business Intelligence (SQL, Oracle) Web Development (Javascript) Data Science (Hadoop, NoSQL, R)
Data Analysis	High	Data Management (Excel including Visual Basic and Macros) Database & Business Intelligence (SQL, Oracle) Data Science (Hadoop, NoSQL Data, SAS, R)
Arts & Design	High	Design Software (Photoshop) WebDevelopment(Javascript,HTML5)

Engineering	Moderate	Engineering Design (Computer Aided Design) Computer Aided Manufacturing (Programmable Logic Controllers, Computer Numerical Control machines) General Programming Languages (C++, Java)
Science	Moderate/Low	Statistical Software (SAS, R) Mathematical Computing (Python, C++)

Do students need to go to college to get a coding job?

Coding jobs are more common at the bachelor's degree level, but they are accessible to job seekers with sub-baccalaureate credentials as well. Overall, 89% of coding jobs typically require at least a bachelor's degree, compared to 44% of all career-track jobs. For those students looking to utilize coding skills in roles that require short-term credentials, Computer User Support (such as help desk roles), Engineering Technicians, and Drafters are options with considerable demand.

TABLE 6: CREDENTIAL REQUIREMENTS FOR CODING JOBS

Role Type	A.A. or Technical Training Number of 2015 Openings (% of type)	Bachelor's or Master's Number of 2015 Openings (% of type)
Data Analysis	64,005 (4%)	1,388,441 (96%)
Information Technology	400,664 (11%)	3,346,676 (89%)
Science	40,774 (12%)	290,122 (88%)
Arts & Design	40,048 (13%)	260,275 (87%)
Engineering	185,764 (20%)	752,362 (80%)
All coding jobs	731,255 (11%)	6,037,876 (89%)
Other jobs (occupations paying >\$15/hr)	56%	44%

METHODOLOGY

To provide the information contained in this report, Burning Glass has mined its comprehensive database of 26 million online job postings collected in 2015. Burning Glass's spidering technology extracts information from close to 40,000 online job boards, newspapers, and employer sites on a daily basis and de-duplicates postings for the same job, whether it is posted multiple times on the same site or across multiple sites. Burning Glass's proprietary data is supplemented and contextualized by additional indicators from the Bureau of Labor Statistics and other published sources. All data is sourced Burning Glass except where indicated. All Burning Glass data in this report reflects all job postings collected in the United States in 2015.

ABOUT ORACLE ACADEMY

Oracle Academy advances computer science education globally to drive knowledge, innovation, skills development, and diversity in technology fields.

Each year, Oracle Academy reaches more than 2.5 million students in 106 countries, delivering nearly US\$3.3 billion in resources to help prepare students for life and work in our modern technology-driven global economy.

Oracle Academy leverages Oracle's global technology leadership to offer a complete portfolio of computer science education resources to secondary schools; technical, vocational, and two-year colleges; and four-year colleges and universities, with the goal of helping students become college and career ready.

ABOUT BURNING GLASS TECHNOLOGIES

Burning Glass Technologies delivers job market analytics that empower employers, workers, learners, and educators to make data-driven decisions. The company's artificial intelligence technology analyzes hundreds of millions of job postings and real-life career transitions to provide insight into labor market patterns. This real-time strategic intelligence offers crucial insights, such as which jobs are most in demand, the specific skills employers need, and the career directions that offer the highest potential for workers.

Based in Boston, Burning Glass is playing a growing role in informing the global conversation on education and the workforce, and in creating a job market that works for everyone. For more information, visit burning-glass.com.

BURNING GLASS TECHNOLOGIES

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CAREERS IN FOCUS



TECHNOLOGY EMPLOYMENT SPOTLIGHT: NASHVILLE

Developed for the Nashville Technology Council

Brought to you by:



TECHNOLOGY EMPLOYMENT SPOTLIGHT: NASHVILLE AREA

MESSAGE FROM THE PRESIDENT

It is an exciting time to be in a technology career or business in Middle Tennessee. Our community has incredible assets for technology companies and IT departments to grow their businesses. Our businesses are making investments to not only attract but also grow talent in this region.

This year's report shows that our technology sector has grown by over 2,200 workers. Annual openings have increased from 872 to 1,548. Our region is aggressively competing seen by the 9% of annual postings. Although already a key resource for reducing the skills gap, area schools have the capacity to engage more students (see page 11). Recruiting students to acquire new skills or obtain degrees and certificates will be key for the development of our technology workforce.

As you review cities across the state and cities of peer size, it is important that this region continues to invest in education so that workforce supply meets business demand.

The growth of our technology workforce and investment of the businesses' is driving regional economic development. Middle Tennessee businesses are investing in long-term solutions to the IT skills gap. Regional businesses came together to support the NTC's IT Pathway Collaborative for 300 paid internships totaling over \$1.6m over two years. The IT Pathway Collaborative and the NTC's leadership with the White House's Tech Hire Initiative will build this region's high-quality technology talent pool.

Finding this scarce talent entails knowing where they are. That's why the Nashville Technology Council has partnered with CareerBuilder and Economic Modeling Specialists International (EMSI), a CareerBuilder company. Together, we provide you access to in-depth data on the current and future state of the technology workforce in our community, delivered in this comprehensive report. From this report, you will get an in-depth look at the state of Nashville's current technology labor market, be able to identify the top educational institutions and programs for future technology talent and compare technology job growth projections within various markets.

As your partner, Nashville Technology Council is committed to delivering data and resources to help you position your business for competitive growth. Use this information to inform your recruiting strategy, get involved to build the talent locally and create a plan to invest in your business' greatest asset – your people.



Sincerely,

BRYAN HUDDLESTON
President and CEO,
Nashville Technology Council

HOW DOES THE NASHVILLE IT WORKFORCE BREAKDOWN?

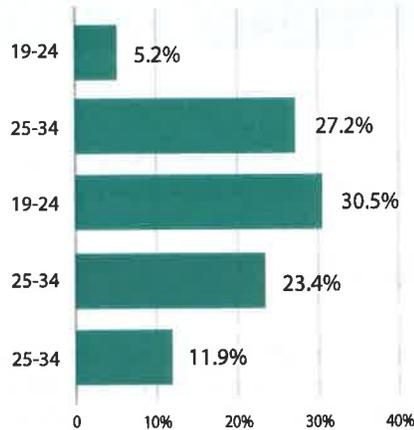
"Nashville is a unique amalgamation of entrepreneurial energy and established enterprises, fueled by the power of technology in our "can-do" city. The Nashville Technology Council is at the nexus of these two worlds, and must maintain its robust involvement, advancing the healthy balance of emerging talent and tools necessary for smart, sustainable growth."

Brian Lapidus

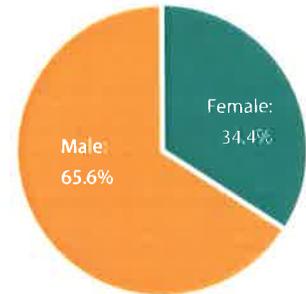
Practice Leader Identity
Theft and Breach
Notification, Kroll Advisory
Solutions



Age



Gender

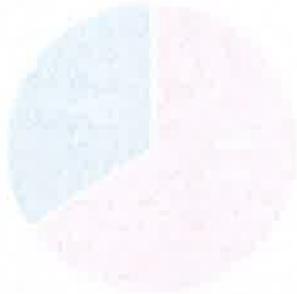


IT JOBS IN NASHVILLE METROPOLITAN AREA (MSA)

23,398
IT jobs in 2014

1,548
2014 Openings

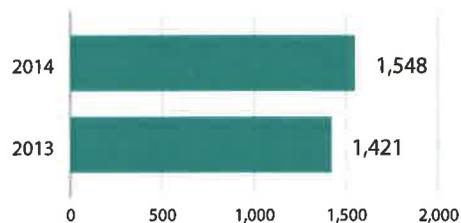
822
2013 Completions
"Educational Supply"



The 23,398 IT Jobs in the Nashville Area comprises several different job categories. Here are some highlights that illustrate how the market is changing.

Annual Change in Jobs

Annual Openings is defined as the estimated employment change and turnover for an occupation over the course of a given year. This is EMSI's estimate of labor market demand for an occupation, and when combined with Related Completions gives a picture of the supply and demand for the occupation in the region. Note that in one year, the growth in IT jobs is almost 9%.



Educational Supply

The 822 Related Completions is the number of people who received either a degree or certificate related to the occupations in 2013, the most recently reported year. This represents the educational supply for an occupation, and when combined with Annual Openings gives a picture of the supply and demand for the occupation in the region.

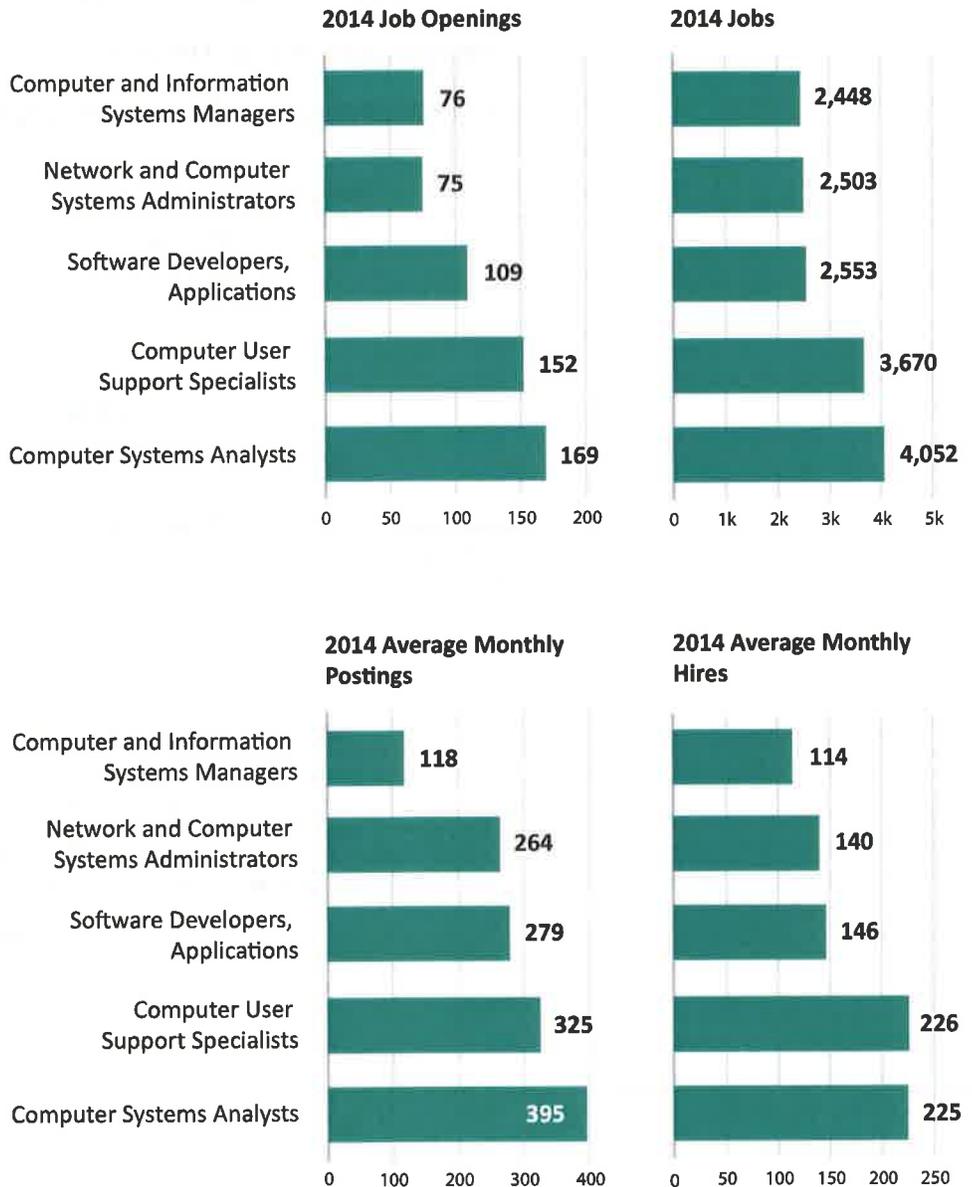
IS THE SUPPLY OF IT WORKERS MEETING THE DEMAND?

Top 5 IT Occupations in Nashville, Jan 2014 - Feb 2015

Here is a look at the top 5 IT jobs in Nashville from January 2014 to February 2015 by number of job openings, jobs, average monthly postings and average monthly hires.

"Nashville remains one of the nation's leading hubs for technology innovation and employment growth. Although attracting top IT talent can be a challenge in the current recruitment landscape, leading area organizations are separating themselves by offering a simple, candidate-friendly pre-hire experience. And corporations that stand out are focused on developing their employment brand, sharing positive workplace culture, offering challenging projects and career development opportunities."

Chuck Branding
Careerbuilder

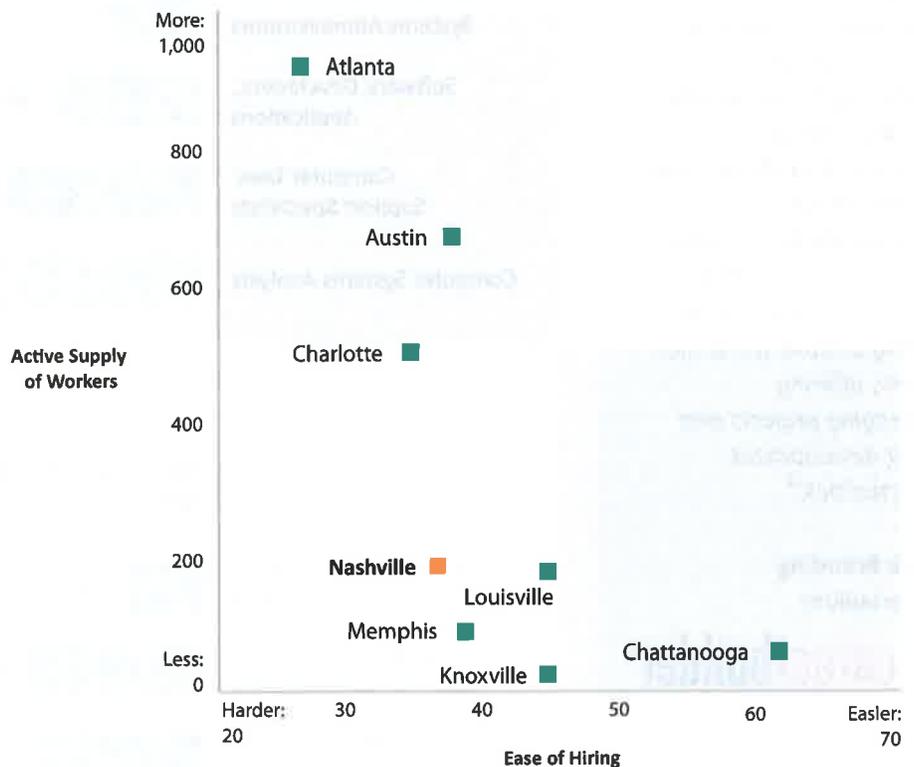


WHAT DOES THE SUPPLY AND EASE OF HIRING LOOK LIKE FOR COMPUTER SYSTEMS ANALYSTS?

The demand for Computer Systems Analysts in Nashville totaled **548 unique job postings** with **compensation ranging between \$73-100k**.

The Top 3 industries for Computer Systems Analysts within 50 miles of Nashville over the past 2 years are:

1. **Colleges, Universities and Professional Schools**
2. **General Medical and Surgical Hospitals**
3. **Other Aircraft Parts and Auxiliary Equipment Manufacturing**



WHAT DOES THE SUPPLY AND EASE OF HIRING LOOK LIKE FOR WEB DEVELOPERS

The demand for Web Developers in Nashville totatled **1,141 unique job postings** with **compensation ranging between \$80-99K**.

The Top 3 industries looking for Web Developers within 50 miles of Nashville over the past 2 years are:

1. Computer Systems Design Services

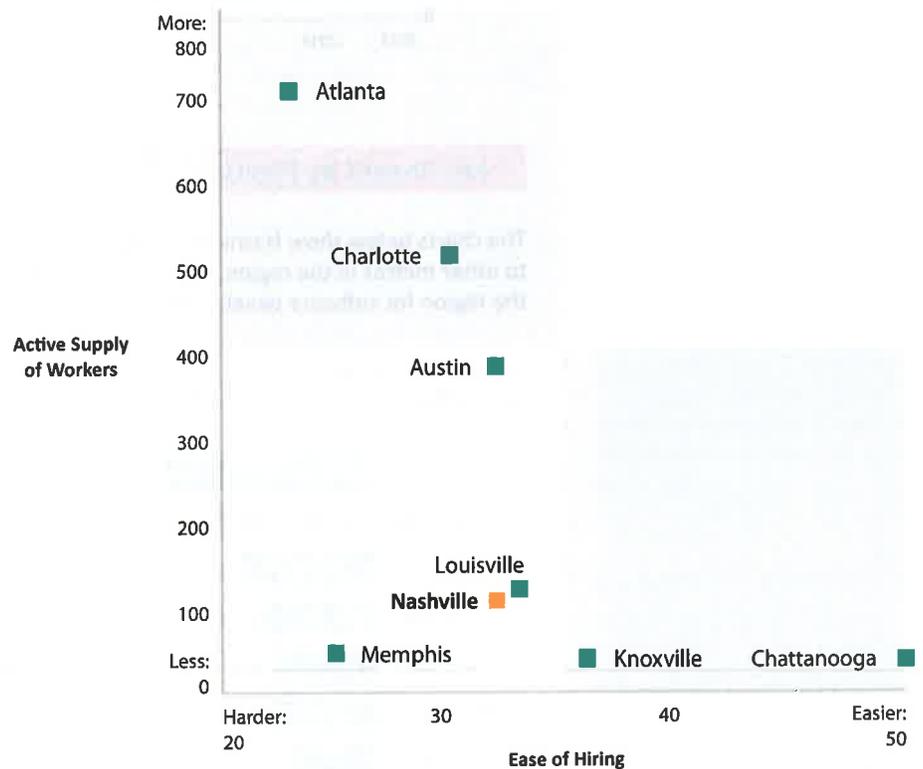
Establishments primarily engaged in planning and designing computer systems that integrate computer hardware, software, and communication technologies.

2. All Other Professional, Scientific, and Technical Services

Establishments primarily engaged in the provision of professional, scientific, or technical services.

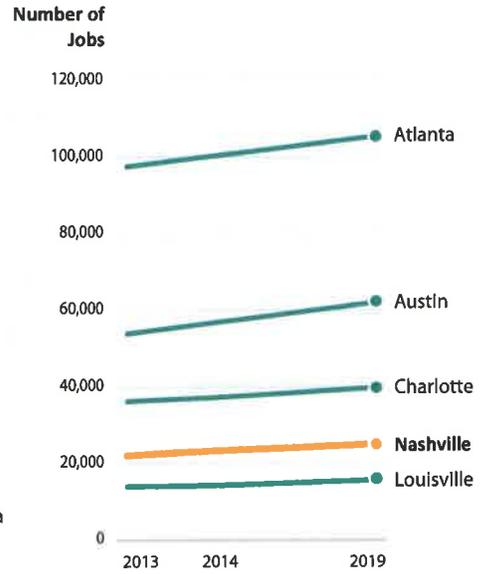
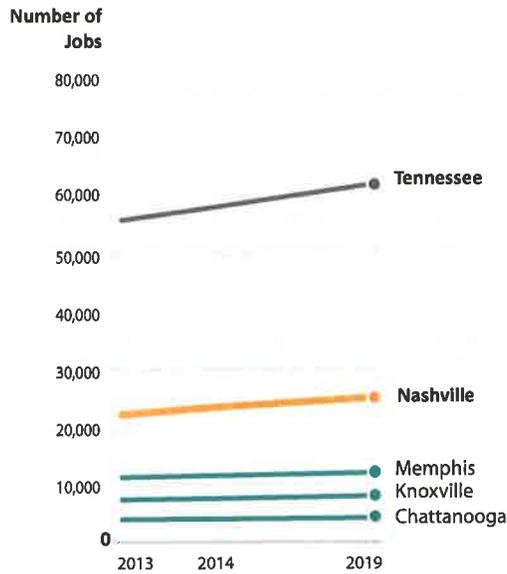
3. Custom Computer Programming Services

Establishments primarily engaged in writing, modifying, testing, and supporting software to meet the needs of a particular customer.



HOW DOES NASHVILLE IT EMPLOYMENT GROWTH COMPARE?

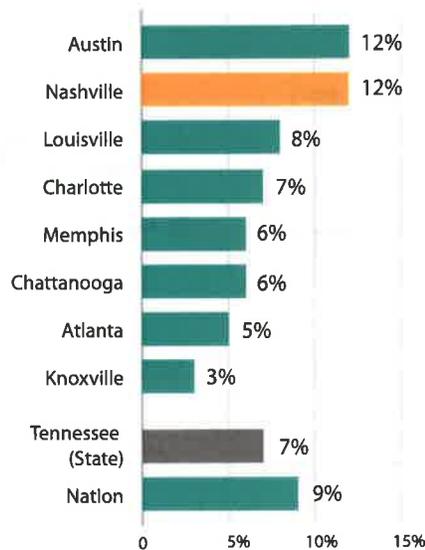
Nashville represents a significant portion of IT employment job growth in Tennessee, projecting 8% growth by 2019 compared to 7% for the state. However it is smaller compared to the larger cities of Louisville (10%) and Austin (10%) as seen in the chart on the far right.



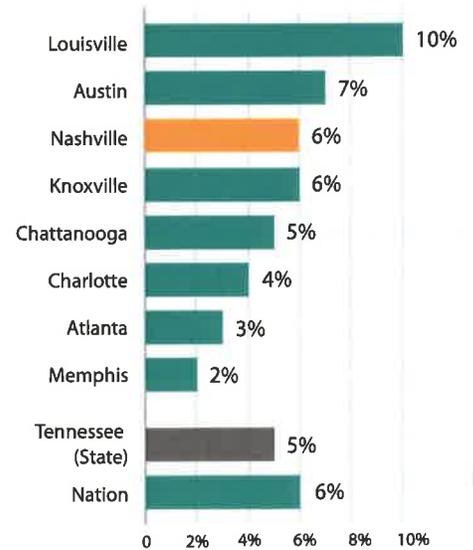
Job Growth by Position

The charts below show Nashville's employment gains in various IT occupations compared to other metros in the region. Note that Nashville is tied for the highest growth rate in the region for software developers.

Computer and Information Systems Managers



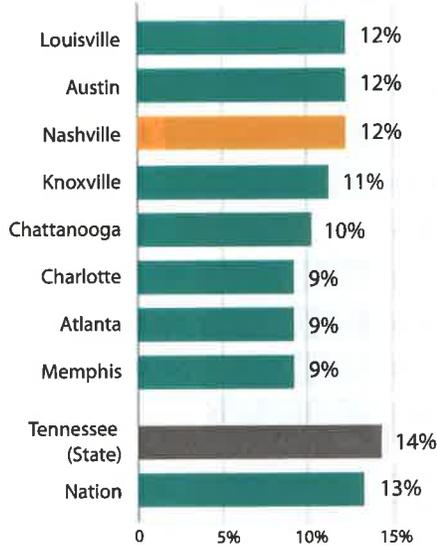
Network and Computer Systems Admin



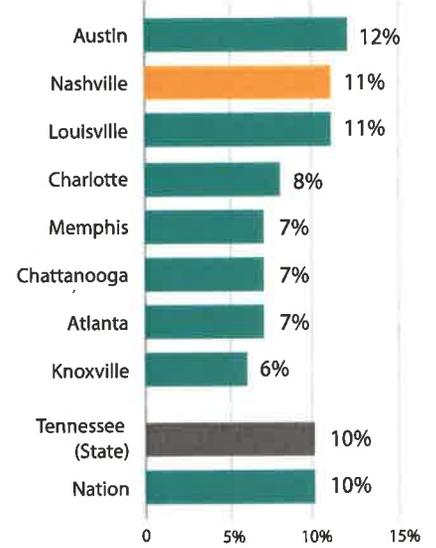
HOW DOES NASHVILLE IT EMPLOYMENT GROWTH COMPARE?

(Continued)

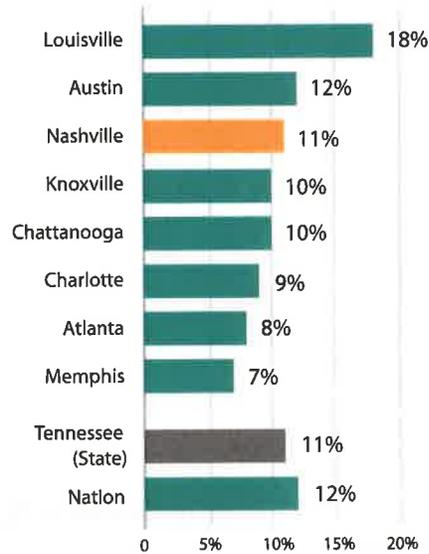
Software Developers, Applications



Computer User Support Specialists



Computer Systems Analysts



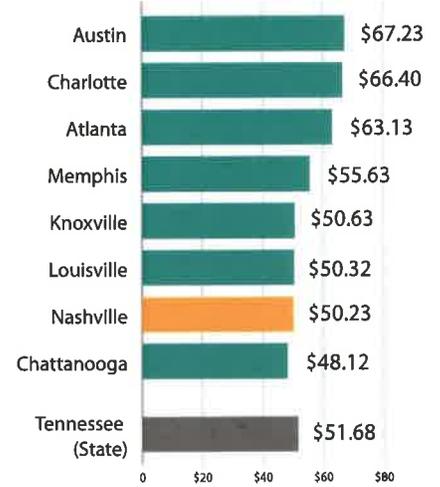
HOW DOES NASHVILLE COMPARE IN TERMS OF COMPENSATION?

The following charts show the top 3 highest paying IT occupations in the Nashville Metro Area with comparisons cities in Tennessee and Nationwide (by 2013 average hourly earnings).

Computer Network Architects



Computer and Information System Managers



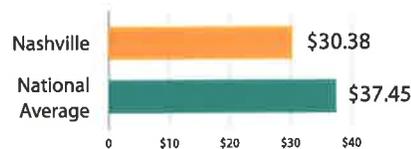
Software Developers, System Software



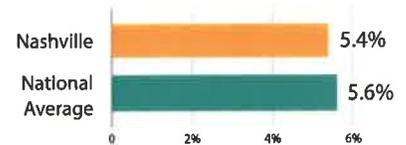
Comparison to National average, 2014 - 2017

In terms of hourly wages and the change in the workforce, note how Nashville IT jobs compare to the national averages over three years.

Hourly Wages



Percent Change in Workforce

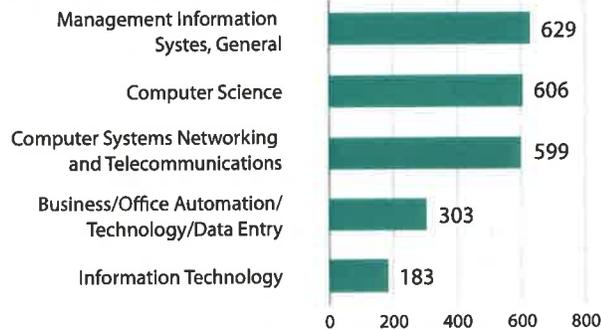


HOW ARE LOCAL UNIVERSITIES SUPPORTING LOCAL IT JOB GROWTH?

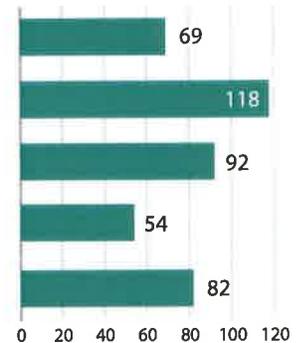
"Nashville has a fantastic opportunity to lead the country in STEAM (Science, Technology, Engineering, Art, Math) workforce; that need continues to grow with the number of cranes in our skyline. Our Nashville Technology Council's leadership has never been more needed than today, as we continue on this upward trajectory."



5 Year Completions by Job (Certificate and Graduates)



2013 (Certificate and Graduates)



Completions by Job and Institution - 2013

	Certificates	Degrees	Total Completions
Computer Systems Networking & TC			
ITT Technical Institute - Nashville	0	58	58
Nashville State Community College	0	34	34
Management Information Systems, General			
Middle Tennessee State University	0	45	45
Tennessee College of Applied Technology - Nashville	18	0	18
Belmont University	0	6	6
Computer Science			
Vanderbilt University	0	54	54
Middle Tennessee State University	0	44	44
Tennessee State University	0	14	14
Lipscomb University	0	0	0

TECHNICAL SKILLS

DATA SOURCES

CareerBuilder's Supply & Demand Portal, October 2014

2014.3 – QCEW Employees, Non-QCEW Employees, and Self-Employed for all data points except “Demographics (Existing Workforce) – Gender” and “Demographics (Existing Workforce – Age) taken from 2014.2 – QCEW Employees, Non-QCEW Employees, and Self-Employed.

ADDITIONAL INFORMATION

Information on the President's TechHire Initiative:
<https://www.technologycouncil.com/president-techhire>

IT Pathway Collaborative:
<http://www.technologycouncil.com/education-workforce-development>

SPONSORS

