

Report - May 2021

Preparing New Yorkers for the Tech Jobs Driving NYC's Pandemic Economy

Despite widespread job loss and economic turmoil due to the pandemic, demand for tech occupations has remained strong. In this report, CUF examines which roles are in demand and what it will take to get more New Yorkers access to the quality tech jobs fueling NYC's economic recovery.

by Sarah Amandolare, Eli Dvorkin, and Charles Shaviro

- The following is an excerpt from *Preparing New Yorkers for the Tech Jobs Driving NYC's Pandemic Economy*
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New York City ended 2020 with roughly 600,000 fewer jobs than it had when the COVID-19 pandemic began. But even amid the economic carnage of the past year, some employers in New York have been hiring. While new jobs are being created in fields from warehousing and delivery to healthcare, technology positions are growing the fastest.

This analysis of data on New York City job postings collected by Burning Glass Technologies reveals that technology jobs lead all other occupations in total hiring demand during the pandemic. Despite the pandemic-fueled surge in healthcare hiring, there were more job openings in tech roles (67,923) than in healthcare occupations (60,266) between April and November 2020. Demand for tech hiring was also more than double that of finance, more than triple that of marketing, and almost five times larger than demand for hospitality or for education. In total, nearly one in five (18 percent) of all jobs posted from April to November was for a tech position.

The total number of openings for software developers/engineers from April to November (21,268) exceeds that of any other occupation and is more than double every other job except for physicians (12,899). But developers are far from the only tech role in high demand. Tech roles comprised 11 of the top 50 most in-demand positions, including IT project manager (4,104), network engineer/architect (3,066), web developer (2,678), cyber/information security engineer/analyst (2,670), computer

support specialist (2,541), computer systems engineer/architect (2,438), data mining analyst (2,182), systems analyst (1,939), and UI/UX designer/developer (1,921).

Importantly, tech is also fueling demand for well-paying jobs. Tech occupations account for a bit more than 18 percent of total job postings but make up a whopping 40.1 percent of demand for roles that pay an average starting salary of $80,000 or more. In fact, 41 of the 138 occupations that pay $80,000 or more were in tech.

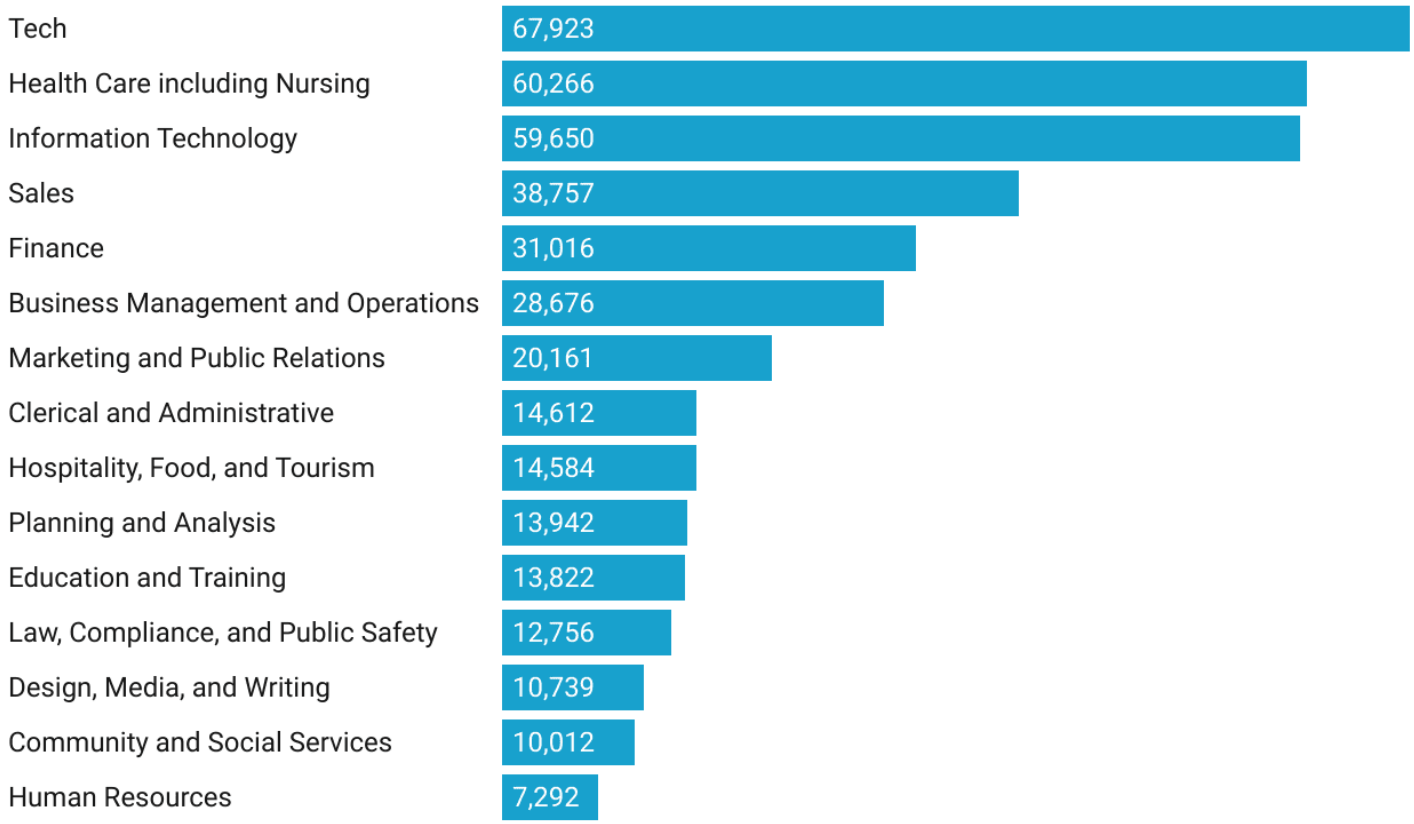
This analysis also finds a greater range of different occupations with significant hiring demand in tech than in any other field. For instance, 19 tech occupations registered at least 1,000 job openings from April to November, compared to 14 healthcare occupations, 10 in finance, 6 in hospitality, and just 4 in clerical and administrative roles.

In addition, our analysis finds strong demand in a number of other occupations that are not exclusively tech roles but have a major tech component or are widespread in the tech sector. These include business development/sales manager (6,837, 5th highest demand), marketing manager (6,762, 6th overall), business/management analyst (6,208, 8th overall), product manager (3,531, 18th overall), and recruiter (2,046, 42nd overall), among others. Among all New York City job openings posted from April to November, fully 55 percent require strong digital skills.

Although tech occupations outpaced all other sectors in job postings during the pandemic, tech hiring in New York was not nearly as robust as it was in the pre-pandemic economy, an indication that tech firms were not immune to the challenges of the pandemic and also a testament to the remarkable growth in technology jobs in the years leading up to 2020. Between April and November of 2020, the number of technology job postings was down 37 percent compared to the same months of 2019. This is on par with the decrease in hiring demand for other leading occupation groups like sales (down 40 percent), finance (down 37 percent), and marketing (down 38 percent). Among the city's ten largest occupation groups, only healthcare saw relatively stable demand (decreasing just 2.2 percent from 2019 to 2020).

20 Occupation Groups Still Hiring in NYC Since COVID-19

The top 20 occupation groups with the highest demand for new hires from April to November 2020



Source: CUF analysis of job posting data provided by Burning Glass

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Despite this overall slowdown in hiring, demand for tech positions continued to drive growth in multiple industries during the pandemic—not just the tech sector, but in healthcare, finance, marketing, and education, among others. For instance, our review of active job postings in New York City listed on the jobs portal Indeed in March 2020 shows 4,083 open positions for "software developers" and 2,111 for "cloud engineers"—including multiple openings at financial firms, media companies, hospitals, airlines, logistics companies, universities, and charter schools, among many other employers outside the tech sector.

An analysis of job placements in 2020 for alumni of Per Scholas, a nonprofit provider of training for careers in technology, underscores the growing demand for tech talent across a range of different industries. The total number of job placements among Per Scholas alumni fell just 16 percent compared to 2019, even as the city lost hundreds of thousands of jobs. Our analysis of more than 300 tech-focused job placements for Per Scholas graduates in 2020—out of several hundred in total—found that nearly 7 percent were in educational institutions, while 13 percent were in hospitals and other healthcare organizations. Recent alumni have been hired to provide help desk and software rollout support for hospitals and to deploy iPads and Chromebooks with remote learning software for the New York City Department of Education.

Over the past decade, the tech sector was one of the fastest-growing parts of New York's economy and the city's most reliable source of new middle- and high-wage jobs. The continued strength of tech hiring during the pandemic suggests that tech has become even more pivotal to the city's economy and will likely be one of the main engines of New York's job growth in the post-pandemic economy. It's also clear that technology fields present a crucial opportunity to get New Yorkers back to

work.

Demand for Tech Jobs During the Pandemic

20 largest tech occupations, by April-November 2020 demand

Occupation	Sub-Industry	2020 Demand (April - November)	2020 Average Market Salary
Software Developer / Engineer	Software Development	21,268	$106,749
IT Project Manager	IT Managers	4,104	$110,917
Network Engineer / Architect	Network and Systems Engineering	3,066	$110,536
Web Developer	Software Development	2,678	$99,345
Cyber / Information Security Engineer / Analyst	Network and Systems Engineering	2,670	$105,353
Computer Support Specialist	Network and Systems Support	2,615	$56,257
Computer Systems Engineer / Architect	Network and Systems Engineering	2,438	$112,719
Data / Data Mining Analyst	Data Analysis and Mathematics	2,182	$85,123
Systems Analyst	Network and Systems Engineering	1,939	$93,799
UI / UX Designer / Developer	Front-End Application Design	1,921	$104,458
Database Administrator	Database Specialists	1,845	$95,475
Software QA Engineer / Tester	Software Development	1,729	$89,691
Computer Programmer	Software Development	1,579	$95,862
Business Intelligence Architect / Developer	Business Intelligence	1,485	$99,831
Data Scientist	Data Analysis and Mathematics	1,401	$118,250
Business Intelligence Analyst	Business Intelligence	1,270	$96,595
Network / Systems Administrator	Network and Systems Support	1,210	$81,811
Data Engineer	Database Specialists	1,201	$117,798
Database Architect	Database Specialists	1,046	$113,683
Mobile Applications Developer	Software Development	810	$107,524

Source: CUF analysis of data provided by Burning Glass

Created with Datawrapper

“Tech jobs not only weathered the pandemic most successfully but will continue to thrive in an increasingly digital post-pandemic world,” says Will Markow, managing director at Burning Glass Technologies. “This means tech jobs in New York will rebound faster than other career areas, but it will also give rise to a new generation of tech-enabled workers in all corners of the economy—from retail and hospitality to maintenance and healthcare. This will create hybrid jobs that blend digital and

non-digital skills in new ways."

To seize this opportunity and ensure an equitable recovery, city policymakers will need to ramp up investments in workforce development programs that are geared towards technology roles. Indeed, our research finds that much more is needed to prepare New Yorkers for tech openings
and to create viable pathways into these growing occupations for displaced workers across the five boroughs.

A study published in February 2020 by the Center for an Urban Future and Tech:NYC found that New York City's network of tech training and education programs lacks the scale and reach to make the city's tech workforce significantly more inclusive. While the report pointed out that the city's tech training and education ecosystem has come a long way in recent years, it also revealed striking programming gaps, geographic disparities, and capacity challenges that limit the effectiveness of city efforts to diversify the tech workforce and develop a pipeline of local talent for New York's tech companies.

However, our new data analysis of tech hiring trends finds that workforce development organizations also have work to do. We find that the city's tech skills-training and workforce development programs will have to adjust their services to meet post-pandemic employer needs, including by supporting upskilling for alumni and advanced training for their own staff.

Tech Hiring: The Occupations Most in Demand

Even as overall demand for tech positions—like most roles in the city's economy—saw decreases compared to 2019, certain occupations fared better than average, posting relatively small declines. For example, computer programmer hiring demand was down just 18 percent (from 1,929 to 1,579); computer scientist was down only 22 percent (from 150 to 117), and cyber/information security engineer/analyst was down 25 percent (from 3,890 to 2,914). Moreover, a few tech occupations actually saw a modest increase: for example, demand for biomedical equipment technicians increased from 140 to 144 openings, video game designers increased from 15 to 19, and robotics engineers increased from 26 to 28.

Strong demand for software developers and engineers has continued through the pandemic, with these roles seeing more hiring demand (21,268 openings) than the entire group of occupations
in the hospitality sector (14,584 openings).

"Software engineering is always going to be the biggest nut to crack for us," says Brendan Collins, campus outreach manager at Google in New York. "The need for CS and engineering majors is virtually limitless."

But many other tech occupations also experienced high demand, according to our analysis. And our conversations with recruiters, hiring managers, and tech workers suggest that a good portion of these positions are in companies outside the tech sector. For instance, one program manager working in the financial industry says the percentage of software jobs in finance is "now a larger share of hiring than before the pandemic." "I didn't necessarily expect to land in finance," says Joary Lizardo, a 2018 Per Scholas graduate recently hired in cybersecurity at Barclays, a global financial services firm. "But then this opportunity presented itself—and finance is more tech-dependent than anything nowadays."

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- Read the full report (PDF)

This analysis makes it clear that tech jobs will be key to New York's economic recovery, but also that new city investments in tech skills-building programs are needed to ensure that the New Yorkers most impacted by the pandemic are able to access these in-demand jobs. To create a tech sector that reflects the diversity of New York while greatly expanding access to economic opportunity, city leaders should set ambitious goals and commit to a set of investments that help expand and improve the tech skills-building ecosystem. City government officials should consider the following ten policy recommendations:

1. **Scale up tech training with a focus on programs that develop in-depth, career-ready skills.** While there is much city policymakers can do to train New Yorkers for opportunities in tech, one clear starting point should be to double or triple the capacity of the specific type of tech training programs that are in short supply today: multi-week, in-depth training programs focused on applied technical skills and real-world career readiness—and informed by specific employer needs—that consistently lead to employment, retention, wage gains, and career advancement. Today, New York City is home to a wide variety of workforce development programs and other skills-building initiatives focused on basic computer and technical skills. But relatively few free and low-cost adult training programs are focused on career-ready tech skills, and the programs that do are serving from a few dozen to a few hundred New Yorkers each year. To help more working adults access opportunities in the tech sector, policymakers should focus on scaling up the relatively small number of intensive, in-depth tech training programs that consistently lead to employment in technical occupations and provide opportunities for career advancement.
2. **Develop and fund links from the numerous computer literacy and basic digital skills-building programs to the in-depth programs that can lead to employment.** Although working adults have numerous options for acquiring basic computer skills and digital skills training, very few of these programs have connections across the broader skills-building ecosystem. To better leverage the ecosystem that already exists, New York City needs to incentivize and fund partnerships across the continuum of skills-building offerings, from basic computer skills to in-depth, career-oriented programs. For instance, new city RFPs should incentivize partnerships between libraries and other training providers focused on basic digital skills and entry-level, career-oriented training programs aligned with employer needs. These linkages can help ensure that New Yorkers have a logical next step in their skills-building pathway and support outreach efforts by career-focused training providers into low-income communities.
3. **Expand the number of bridge programs to provide crucial new on-ramps to further tech education and training for New Yorkers with fundamental skills needs.** Today, more than 1.1 million adults in New York City lack a high school diploma, and more than 1.8 million speak English less than very well. Due to these and other skills barriers, no matter how much the city does to grow the number of high-quality, career-focused tech training programs, hundreds of thousands of New Yorkers will remain unable to access them. The city should invest at least $70 million annually in bridge programs that can serve as key on-ramps into effective education and training programs for New Yorkers with lower levels of skills and formal education.
4. **Close the geographic gaps in tech education and skills-building programs.** Although New York City's tech skills-building ecosystem is larger than ever, serious geographic gaps exist across the city. It's understandable that a large concentration of programs exists in Manhattan, for reasons including proximity to employers and accessibility across multiple transit lines. But for both K–12 and adult workforce programs to reach more low-income New Yorkers, more needs to be done to place programs in communities with few, if any, options for tech skills-building today. Efforts could include grants for existing organizations to create new program locations in underserved locations and co-location of programs in community-based infrastructure like libraries and schools.
5. **Establish dedicated funding streams for workforce development programs.** Last November, San Antonio began reallocating a small percentage of sales tax to go to workforce development, including job training and scholarships. Massachusetts has a Workforce Training Fund, funded by a small state payroll tax. New York City doesn't have anything like this. Funding for workforce development programs is

largely discretionary, which leaves out too many programs and potential participants. Skills-training and workforce development providers need a more reliable and sustainable funding source in order to be responsive to the needs of workers and employees in an ever-shifting post-pandemic economy.

6. **Prioritize long-term investments in K–12 computing education.** With thousands of New Yorkers out of work amid a fast-changing job market, immediate investment is needed to scale up the city's limited supply of in-depth training programs aligned with tech careers. But this urgent response to the current economic crisis should be accompanied by continued long-term investment in expanding and improving K–12 computing education. While New Yorkers of all ages can benefit from tech skills-building initiatives, long-term investments in computing education are essential in order to tackle the city's persistent opportunity gap at the root. By ensuring that every student has access to effective, age-appropriate computing education—including the core concepts of computational thinking—New York City can greatly expand the pipeline into tech careers by building skills, interests, and confidence from the earliest years of a New Yorker's life.
7. **Provide support for upskilling both within programs and for alumni for years to come.** Skills-training and workforce development providers need to offer upskilling to help alumni and current students break into tech and stay competitive through economic turbulence. The shifting needs of tech employers demand that training programs have the resources they need to be flexible and adaptable. The city should work with the private sector to fund and scale these kinds of efforts to help more New Yorkers enter the job market and stay in their chosen careers over the long term.
8. **Offer capital/infrastructure dollars for technology.** Providing tech skills training is expensive, and the vast majority of provider revenue goes to programming needs, like instructor salaries and alumni support. This leaves almost nothing extra for investments in crucial capacity-building infrastructure. The city should invest in that infrastructure, such as lendable technology and hot spots, as well as provide support for building out training facilities for when in-person programs resume.
9. **Boost support for non-tuition barriers like childcare, Internet access, and MetroCard costs.** Cost barriers interfere with New Yorkers' ability to access continuing education and workforce development programs—even ones that are tuition-free. CUNY offers great continuing-education programs "that people can't afford," says Weinstock of LaGuardia Community College, noting that little aid is available for continuing education. "People can't even pay for a free program," she says. "We've lost people from free bridge programs because they couldn't take the time away from childcare." The city should step up its support for skills-training and workforce development providers, including within CUNY, to help New Yorkers overcome the many non-tuition roadblocks to career advancement, from lack of childcare or at-home WiFi to the cost of transportation.

   Many New Yorkers who are searching for a job face similar barriers, particularly lack of connectivity and technology, that stymie their progress. In 2019, 30 percent of NYC households overall, 44 percent of low-income households, and 30 percent of Black and Hispanic households did not have broadband internet access. The city made good progress toward achieving universal access last year by launching and further investing in the Internet Master Plan, and recently pushed 5G companies to expand connectivity in neighborhoods hit hardest by COVID. These and other efforts should continue, with an emphasis on closing the broadband access and affordability gaps in low-income communities and among older adults.
10. **Increase funding for professional development for teachers, trainers, and nonprofit staff.** To help address New York City's technology skills-building needs at scale, the city's educators—including K-12 teachers and the staff of community-based workforce development organizations—need access to high-quality professional development. We heard from nonprofit organizations whose staff have master's degrees, but struggle to use and discuss fundamental digital tools. Likewise, K-12 teachers need professional development as well, in order to embed the principles of computing education in every classroom—not just those schools with dedicated computer science programs. In addition, instructors at workforce development organizations need access to continuous industry-relevant career education as well, to ensure that upskilling initiatives remain effective and current. Furthermore, training providers tell

us that while they want to bring alumni back as instructors, they struggle to compete with tech-sector salaries. The city can help address these challenges by investing in professional development and setting ambitious goals for the Department of Education, which can help expand the pool of capable educators and instructors from pre-kindergarten through adult-focused career training.

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Center for an Urban Future is a leading New York City-based think tank that generates smart and sustainable public policies to reduce inequality, increase economic mobility, and grow the economy.

For more than twenty-five years, **Per Scholas** has advanced economic equity through rigorous training for tech careers, and connecting diverse and skilled graduate talent to leading businesses.

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CENTER FOR AN URBAN FUTURE
120 Wall Street, 20th Floor, New York, NY 10005

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