Professional and technical work is increasingly temporary, automated, offshored, and privatized. Consequently, professionals more often work in contingent employment arrangements, attain higher education, and increasingly come from abroad. While changes to professional work increase employer profits and efficiency, many professionals struggle to earn what they are worth and attain a sane work schedule.

What follows in this report is an examination of how the professional and technical workforce changed from 2004 to 2013 when broken down by occupation group. Employment projections are also briefly explored. The report then looks at how professional work is changing, including technology changes, offshoring, and privatization. Next, the report examines how the professional workforce has changed, including increases in contingent workers, adjunct faculty, temporary workers, racial and ethnic shifts, and immigration changes. Finally, the report addresses how professional and technical workers and their allied organizations are confronting the changes.

Methodology and Workforce Overview

Numerous surveys examine employment changes in the professional and technical workforce. This report will focus on the Occupational Employment Statistics (OES) survey, which surveys non-farm employers. However, the OES survey does not include farm workers, private household workers, or those who are self-employed. Therefore, this report will also look to the Current Population Survey (CPS), which surveys about 60,000 American households per month and includes all classes of workers. The years 2004 and 2013 were chosen to achieve consistency in occupation titles while ensuring the data was current and studied a lengthy period. However, the data may be affected by fluctuations in economic activity in the reported years.

The OES survey reported nearly 13 percent job growth among professional and technical workers between May 2004 and May 2013. According to the CPS, between May 2004 and May 2013, the professional and technical workforce grew by nearly 14 percent. Among non-professional and technical occupations, the OES survey showed a .6 percent decline in the period studied and the CPS survey showed a less than two percent increase in the period. Understanding the changes in the professional and technical workforce are essential to understanding future occupational opportunity.
Categorizing Employment Growth in Professional and Technical Occupations

This report begins by examining the changes in professional and technical employment in the last 10 years from the perspective of high growth occupation groups, mid-growth occupation groups, and those on the low end. The dynamics affecting growth and decline in the major occupation groups will also be explored. This section of the report also examines union density within occupation groups.

High Growth Occupation Groups

Both the CPS and OES survey reported strong growth in business and financial operations, computer and mathematical science, and healthcare practitioner and technical occupations. These three occupation groups far outpaced growth in the other seven professional and technical occupation groups.

Business and Financial Operations Occupations

Business and financial operations occupations experienced rapid growth, nearly 30 percent between May 2004 and May 2013. Occupations with at or above average growth include logisticians, management analysts, financial analysts, personal financial advisors, financial examiners, and tax preparers. With the exception of personal financial advisors, all of the high growth occupations saw wage improvements between May 2004 and May 2013 after adjusting for inflation. Despite the overall employment increases in the occupation group, median annual wages were up just 2.75 percent over 10 years after adjusting for inflation. Occupations tied to real estate and bank lending were still struggling to recover, including appraisers and assessors of real estate, credit analysts, insurance underwriters, and credit counselors.

Most occupations in business and financial operations had low union density in 2013. The exceptions were purchasing agents, logisticians, appraisers and assessors of real estate, budget analysts, and tax examiners, collectors and revenue agents.

Employment gains in the business and financial services sector were aided by more people seeking financial advice. Workers are reaching retirement age and seeking professional financial advice and others are trying to find the best way to recover from the financial blow dealt by the recession. Also, as pressure mounts to increase profits, the financial sector is beginning to spend some of the capital it sat on during and immediately after the recession.

Computer and Mathematical Occupations

Computer and mathematical occupations tell a similar story to that of business and financial occupations: 27 percent employment growth, little wage growth, and low union density. Employment of software developers specializing in applications increased 51 percent between May 2004 and May 2013, from 426,000 to 644,000, but median annual wages were only up 0.2 percent for developers specializing in applications and 3.1 percent for developers specializing in systems software after adjusting for inflation. Among all computer and math professionals,
annual median wages, after adjusting for inflation, were up just 0.8 percent from May 2004 to May 2013.7

Computer programmers and computer and information research scientists had employment declines. Due to changes in occupational classifications, comparison of other computer occupations is difficult.

Mathematical occupations fared well, including operations research analysts and statisticians, which had over 30 percent growth. However, wages for operations research analysts were flat. Operations research analysts also had the highest union density among computer and math professionals, 8.5 percent in 2013.

Growth in computer-related occupations was driven by increased spending on cloud computing, which is likely to be $131 billion worldwide in 2013 and $180 billion in 2015.8 This shift will likely hurt computer support specialist and network and computer systems administrator employment, but boost employment of cloud computing and cyber security specialists. Strong demand for mobile applications and cloud computing will also continue to fuel employment of software developers.

**Healthcare Practitioners and Technical Occupations**

Professionals employed in the healthcare practitioner and technical occupations category fared a little better. Overall, the occupation group grew by 22 percent from May 2004 to May 2013 and annual median wages increased by 4.9 percent over 10 years after adjusting for inflation. In May 2013, there were 40 occupations within the healthcare practitioner and technical occupations group that could be compared with historic employment data. Twenty-three of those occupations saw above average employment gains. Employment gains were across all occupation types and not concentrated among one specialty. Optometrists, physician assistants, speech-language pathologists, diagnostic medical sonographers, pharmacy technicians, respiratory therapy technicians, veterinary technicians, occupational health and safety specialists, and athletic trainers all had employment gains above 40 percent. Among that group, only annual median wages of optometrists and veterinary technicians failed to keep pace with inflation.9

Unions had strong membership density among dietitians and nutritionists, registered nurses, occupational therapists, speech-language pathologists, emergency medical technicians and paramedics, and medical records and health information technicians in 2013.10 All of these occupations experienced strong growth from May 2004 to May 2013.11

Growth in health professions was affected by several factors, including increased demand to treat an aging and increasingly sick U.S. population as well as advances in medical technology.12
Mid-Growth Occupation Groups

Three occupation groups: community and social service; legal; and life, physical, and social science had growth that was above average for the CPS or OES survey.

Community and Social Service Occupations

Growth in community and social service occupations was largely driven by counselors and healthcare-related workers. According to the OES survey, there was a 13.6 percent increase in employment between May 2004 and May 2013. The CPS put growth at 9.9 percent in the same period. Counselors specializing in substance abuse and behavioral disorders, marriage and family, and mental health had above average growth. The job category capturing all other counselors also had above average growth. Healthcare social workers, health educators, and community health workers combined in a catch-all category of all other community and social service specialists also had above average growth.13

Wages failed to keep pace with inflation among community and social service occupations from May 2004 to May 2013. Wage stagnation may be a reflection of weak government funding and/or the pressures of privatization. Wages for counselors struggled to keep pace with inflation more so than wages for healthcare-related specialties. Wages declined or were flat for substance abuse and behavioral disorder counselors, marriage and family therapists, and mental health counselors.14

Professionals in community and social service occupations are heavily unionized, about 20 percent membership in 2013 among counselors, social workers, and other community and social service specialists.15

Services provided by counselors and therapists are increasingly covered by health insurance, which is leading to greater utilization.16 Employment of health educators and community health workers is expected to grow due to increased funding for efforts to contain healthcare costs.17

Legal Occupations

Legal occupations experienced moderate growth. According to the CPS, from May 2004 to May 2013, the occupation group grew by 17 percent,18 but the OES survey only showed 8.7 percent growth from May 2004 to May 2013.19 Union density is generally low among legal professionals, with occupations averaging between three and six percent in 2013.20

Employment of paralegals and other legal assistant jobs are expected to rise as law firms shift duties away from attorneys to lower-paid professionals in an effort to cut costs.21

Life, Physical, and Social Science Occupations

Life, physical, and social science professionals had strong employment growth according to the OES survey, 18 percent, from May 2004 to May 2013,22 but weaker growth according to
Most life scientists had very strong employment growth, including animal, food, soil and plant scientists; biochemists and biophysicists; microbiologists, zoologists and wildlife biologists; conservation scientists; and medical scientists. The physical sciences had strong growth among astronomers, physicists, atmospheric and space scientists; environmental scientists and specialists; and geoscientists. In the social sciences, economists; anthropologists and archeologists; geographers; historians; and political scientists all had above average employment gains. Among technicians, biological, geological, petroleum, and forensic science technicians had better than average growth as well as social science research assistants.

From May 2004 to May 2013, median annual wages for professionals in life, physical, and social sciences failed to keep pace with inflation. Among life scientists, wages failed to keep pace with inflation. Physical scientists fared a little better as did social scientists. However, technician wages largely failed to keep up with inflation.

In 2013, strong union membership was observed among agricultural food scientists, conservation scientists and foresters, psychologists, urban and regional planners, and agricultural and food science technicians. Union membership among biological scientists and environmental scientists and geoscientists was strong, but just below 10 percent density in 2013. An evaluation of 2014 monthly union membership showed 73 percent of life, physical, and social scientist union members were employed in government; 23 percent in private for profit; and four percent were employed with nonprofits.

Employment opportunities in several life and physical sciences specialties, including medical scientists, biochemists, biophysicists, microbiologists, and others, is affected funding for the National Institutes of Health and federal funding for the sciences, generally. Employment of life, physical, and social science professionals in pharmaceutical manufacturing was down over the last 10 years due to offshoring of research and development. However, there has been strong employment growth among companies in the scientific research and development services industry, which includes firms that perform original research.

Low-Growth Occupations

Among the three occupation groups that have struggled to increase employment, one occupation group stands out: architecture and engineering. Architects and engineers fared the worst out of the three occupation groups in this lower performing category. Arts and media and education, training, and library occupations also struggled.

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\(^a\) Life, physical, and social science occupation data was adjusted by removing market research analysts from the 2004 CPS and OES survey, because this occupation was moved to the business and financial occupations group.
Architecture and Engineering Occupations

According to the CPS, architecture and engineering occupations grew six percent between May 2004 and May 2013. The OES survey pegged the growth at just 0.3 percent from May 2004 to May 2013. According to the OES survey, many engineering occupations grew, but there were big declines in drafter and engineering technician employment.

Nine out of 17 engineering occupations had growth above 11 percent. The biggest increases were seen among biomedical engineers with a 130 percent increase, industrial engineers with a 32 percent increase, mining and geological engineers with a 58 percent increase, and petroleum engineers with a 138 percent increase in employment between May 2004 and May 2013. Aerospace, agriculture, health and safety, and nuclear engineers had employment declines. Electronics engineers and marine engineers and naval architects had essentially no employment gains.

The losses were far worse for drafters and engineering technicians. Only aerospace engineering and operations technicians had employment gains out of a total of 13 drafter and technician occupations. According to the OES survey, drafter and technician occupations shed about 135,000 jobs over the last 10 years.

Among the nine out of 17 engineering occupations with big employment gains in the last 10 years, only four had wage gains after adjusting for inflation. Overall, architects, engineers, drafters, and technicians, between May 2004 and May 2013 saw a nearly four percent increase in median annual wages after adjusting for inflation.

Unions have strong membership among aerospace engineers (12.1 percent), environmental engineers (23.8 percent), and engineering technicians (16.1 percent). Unions also counted 8.6 percent of civil engineers as members in 2013. Engineering technicians have increased union density while density among drafters plunged in the last 10 years.

Among engineering technicians, offshoring and increased automation of manufacturing has led to steep employment declines. Technological changes have also affected employment of drafters as specialized design software was incorporated into the work done by engineers and technicians.

Arts, Design, Entertainment, Sports, and Media Occupations (Arts and Media)

Arts and media professionals increased by 10.2 percent according to the OES survey, but had weaker growth according to the CPS, just 7.6 percent from May 2004 to May 2013. While employment in about a third of arts and media occupations surged by more than 20 percent according to OES, many saw meager gains or losses. Sports-related employment was up, including among coaches and scouts (68 percent increase) and umpires, referees, and other sports officials (41 percent). However, wages in both of these occupation groups failed to keep pace with inflation and actually had about a 10 percent decline in wages.
Among producers and directors, music directors and composers, interpreters and translators, film and video editors, and audio and video equipment technicians employment growth was very strong, including a 161 percent increase among music directors and composers, a 93 percent increase among interpreters and translators, a 67 percent increase among producers and directors, a 39 percent increase in film and video editors, and a 41 percent increase among audio and video equipment technicians.

The increase in employment was not necessarily accompanied by strong increases in wages where annual median wages for all arts and media workers was flat from May 2004 to May 2013 after adjusting for inflation. Fashion designers, graphic designers, athletes, and sound engineering technicians had strong employment growth, but wages did not keep pace with inflation. Strong wage growth was seen among actors, music directors and composers, dancers, choreographers, and writers and authors.34

Professionals working as announcers, broadcast news analysts, editors, and writers and authors had flat or declining employment from May 2004 to May 2013. Many designer occupations also declined, including commercial and industrial designers, floral designers, and interior designers. Employment for several artist occupations also declined, including dancers, choreographers, and musicians and singers.

Unions have strong membership density among musicians, singers, and related workers (17.1 percent); actors, entertainers and performers, sports and related (25.3 percent), and broadcast and sound engineering technicians and radio operators (12 percent).

The decline of the newspaper and periodical industry has led to employment declines among reporters and correspondents, editors, technical writers, photographers, and writers and authors. Employment of coaches and scouts has grown among elementary, secondary, postsecondary, and other instruction institutions. Employment of referees has also grown in local government and elementary and secondary schools.35

Education, Training, and Library Occupations

Education occupations had 6.4 percent growth according to the OES survey and 9.2 percent growth according to the CPS from May 2004 to May 2013. Education occupations can be divided into three categories: postsecondary, pre-K through 12th grade, and museum, library, and support occupations. Postsecondary occupations added 200,000 jobs from May 2004 to May 2013. Among pre-K through 12th grade teachers, nearly 120,000 jobs were lost in the same period. Finally, among museum, library, and support occupations, nearly 15,000 jobs were lost between May 2004 and May 2013.36

Postsecondary teachers specializing in social sciences fared particularly well with most specialties realizing at least 30 percent gains in employment. Hard science postsecondary teachers struggled, especially those in computer sciences, agricultural sciences, biological sciences, and forestry and conservation sciences; all had declining employment from May 2004 to May 2013. Wage gains were mixed among postsecondary teachers. Among 25 postsecondary
teaching specialties that had comparable wage data, nine postsecondary specialties had flat or declining wages.

Preschool through secondary school teachers struggled with employment and wages. From May 2004 to May 2013, nearly 120,000 jobs were shed and annual median wages failed to keep pace with inflation or were flat in eight out of 12 specialty areas. Preschool teachers and special education teachers in middle and secondary schools had modest wage gains as well as adult basic and secondary education and literacy teachers.37

Professionals in museum, library, and support occupations also struggled to increase employment and wages. Curators and instructional coordinators realized the biggest employment gains, but most other occupations, including librarians, library technicians, and teacher assistants had employment losses. Most of the occupations in this category had flat wages that only kept up with inflation. Librarians had a 1.6 percent loss in median annual wages after adjusting for inflation.38

Unions have strong membership among nearly all education occupations, including 17.1 percent among postsecondary teachers; 17.2 percent among preschool and kindergarten teachers; 47.7 percent among elementary and middle school teachers; 52.2 percent among secondary school teachers; 53.1 percent among special education teachers; 25.3 percent among librarians; 17.3 percent among library technicians; and 31.9 percent among teacher assistants.

Teacher employment declines have been the result of recent decreases in school funding for grades K-12. Funding cuts resulted in nearly 350,000 school district employees losing their jobs between June 2009 and November 2012. Only about 40,000 have since been hired back. Analysis of the 2013-14 school year indicates that most states are still spending less per pupil than they did before the recession. State and local governments cut school funding when the recession hit, but federal spending mostly filled the gap. Federal spending is now on the decline, resulting in steep job losses.39

Employment opportunities in most postsecondary specialties in the next 10 years are expected to go to part-time and adjunct faculty.40

Occupational Employment Projections to 2022

Employment projections are generally strong for professional and technical specialties from 2012 to 2022, with expected growth at 12.8 percent. Healthcare and education, training, and library occupations are expected to have 6.28 million job openings. These occupation groups are projected to add 2.75 million new jobs and have 3.53 million openings to replace workers who leave their profession or retire.41

In terms of percentage increase in the occupation groups, healthcare practitioners and technical occupations are projected to grow much faster than the average for all occupations from 2012 to 2022 (21.5 percent). Computer and mathematical and community and social service occupations are projected to increase faster than average, 18 percent and 17 percent
respectively. Business and financial operations (13 percent); education, training, and library (11 percent); legal (11 percent); and life, physical, and social science (10 percent) occupations are projected to grow as fast as average. Management, arts and media, and architecture and engineering occupations are all projected to have below average growth, about seven percent for each occupation group.42

**Technology Changes Professional and Technical Work**

A number of forces, driven by profit-seeking employers and cash strapped local governments, are affecting how and where professional work is performed. Technological advances have resulted in automation of some jobs and the offshoring of others, but technology can also create jobs for the high-skilled workers who engineer, build, and train workers to use new technologies. Privatization of public services has also been changing work for public service professionals.

*The End of Routine Work?*

Many of the jobs in jeopardy of being replaced by technological advancement involve routine tasks, as opposed to tasks requiring manual labor or abstract thought. Researchers have found a “hollowing out of the middle” and traced the disappearance to “occupations focused on ‘routine’ tasks—those activities that can be performed by following a well-defined set of procedures.”43 Shedding of middle-skill jobs that involve performance of routine tasks typically occurs during economic downturns.44

Loss of middle-skill jobs has led to increased polarization with more jobs concentrated in low- and high-skill occupations. Managers, professional, technical, finance, and public safety have been found to require abstract thought and tasks, and service occupations are found to require manual tasks. However, production, craft, transportation, construction, mechanical, mining, farming, machine operators, assemblers, clerical, and retail sales have been found to require routine tasks.45 For the time being, technology has not been developed that is capable of replacing large numbers of workers who perform abstract and manual tasks, jobs that employ high- and low-skill workers.

Technological changes and automation have affected work performed by professionals. Drafters and engineering technicians have seen employment declines due to specialized software now used in the drafting and designing of engineering projects. These professionals typically earned between $50,000 and $60,000 per year in 2013. Employment of camera operators is on the decline due to automatic camera systems. Other technicians in arts and media professions have been affected by technological changes that have reduced the number of skilled professionals.

*Offshoring has the Potential to Deplete High-Skill Employment*

While most professional work requires abstract tasks, technology can still lead to professional work being offshored. Offshoring, the relocation of work in the U.S. to a different
Offshoring of manufacturing jobs has been happening for decades. Offshoring of services is relatively new and has been enabled by the low cost of communication and cheap, educated labor abroad.

In 2007, the U.S. Bureau of Labor Statistics (BLS) found that offshoring of high-skilled service-sector jobs was possible in 160 occupations that employed 30 million U.S. workers. Unfortunately, current government data is unable to trace how many jobs have already been offshored or how many of the high skilled service jobs that are offshorable are likely to go abroad. Professional and technical jobs susceptible to offshoring included those in computer and mathematics, architecture and engineering, business and financial operations, life, physical, social science, and legal occupations.

The financial feasibility of offshoring is largely dependent on the quality and cost of foreign labor. If wages for foreign engineers and computer professionals increase (by a certain percent compared to U.S. labor), then companies are likely to lose the financial incentive to offshore work to developing countries. Reports indicate that wages for high skilled English speakers in developing countries, like India and China are on the rise.

Employment declines in architecture and engineering occupations, particularly among technicians and drafters, were in-part due to the offshoring of manufacturing. However, some experts now believe that fewer jobs are being sent abroad and some jobs are being brought back to the United States. Companies, including General Electric and General Motors, influenced by the need for intellectual property protection, shipping costs, and the need for innovation, are bringing skilled jobs back to the United States.

**Privatization of Public Services**

Privatization plays an important role in the changing professional and technical workforce since for-profit entities put downward pressure on wages and benefits and fiercely fight unionization. Privatization also weakens pension funds for the remaining public-sector workers. Communities feel the impact of privatization to since lower wages mean workers have less money to spend.

Determining how many professional public-sector jobs have already shifted to the private for-profit sector is difficult to quantify. U.S. Census Bureau data shows that there has been significant employment shifts among professionals in community and social service occupations and education and library occupations—traditionally public-sector occupations.

In 2004, private for-profit companies employed 10.2 percent of counselors, social workers, librarians, library technicians, secondary school teachers, and elementary and middle school teachers. In 2012, for-profit employment density of these occupations was up to 14.4 percent. Overall, there was a 54.6 percent increase in private for-profit employment among these occupations from 2004 to 2012.
From 2004 to 2012, among counselors, social workers, elementary and middle school teachers, secondary school teachers, librarians, and library technicians about 620,500 jobs were added. Among those, 367,300 were in the private for-profit sector; 200,400 were in the not-for-profit sector; 39,100 were among the self-employed; and government employment increased by just 13,700 jobs.49

While private for-profit employment of librarians declined by 10.4 percent, private for-profit employment of library technicians grew 92.4 percent as for-profit libraries were increasingly staffed with lower-skilled and lower-paid library technicians.50

The privatization wave among the selected occupations has struck traditionally red and blue states. From 2004 to 2012, among counselors, social workers, librarians, library technicians, and elementary through secondary school teachers Connecticut had a 115 percent increase in private for-profit employment; Illinois a 49 percent increase; New York a 39 percent increase; Pennsylvania a 44 percent increase; Florida had a 137 percent increase; Georgia 151 percent; Indiana 89 percent; Missouri 82 percent; and Texas had a 57 percent increase in private for-profit employment among the selected occupations.

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b This data set, the 2012 American Community Survey, does not capture recent employment cuts in education.
Workforce data for community and social service workers by class of worker over the last 10 years show a decrease in local government employment and an increase in private for-profit employment. The transition from public to private sector employment for these traditionally public service occupations has meant lower pay and benefits for many, which may make it difficult to attract and retain highly trained professionals.

A Changing Professional Workforce

Professional and technical workers are increasingly working on a self-employed, freelance, contract, or temporary basis. The shift in the way professionals work is typically dictated by employers who enjoy the flexibility of a contingent workforce. However, some workers choose to avoid a traditional full-time job in favor of contingent work. The demographics of the professional and technical workforce are also changing, with large increases in the number of Asian and Hispanic professionals.

Contingent Workers

A standard work arrangement is one in which a person works full-time or part-time for one employer for an indefinite period of time. Contingent workers are employed in non-permanent positions as independent contractors, temporary workers, contract workers, on-call workers, consultants, freelancers, or are self-employed.

The absence of specific government data on the contingent workforce is a significant limitation when researching the professional contingent workforce. The U.S. Census Bureau, through the Current Population Survey (CPS), released a regular supplemental survey on the contingent workforce, but the supplement was discontinued in 2005. This report largely relies on the CPS survey, but the CPS survey only tracks self-employment and traditional employment. Thus, workers employed on short- or long-term contracts are difficult to track.

Self-Employment

In June 2014, there were just over 7 million professional and technical workers in the U.S. who reported being self-employed in their main job. Overall, 12.2 percent of the management, professional, and related U.S. workforce was self-employed in June 2014. Another nearly 300,000 professionals reported being self-employed in a second job.51

Among the management, professional, and related occupational groupings, three had a concentration of self-employed workers that was well above the national average: management

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51 Defined by the U.S. Bureau and Labor Statistics to include management; business and financial operations; computer and mathematical; architecture and engineering; life, physical, and social science; community and social service; legal; education, training, and library; arts, design, entertainment, sports and media; and healthcare practitioners and technical. This author also uses “professional and technical occupations” to refer to the same occupational grouping.
occupations (22 percent self-employed); legal occupations (18 percent); and arts and media occupations (27 percent self-employed). All other management, professional, and related occupation groups had a concentration of self-employed workers that was between two and 11 percent.52

The self-employed professional and technical workforce declined by 2.2 percent between June 2003 and June 2014. At the same time, the professional and technical workforce grew by 16.4 percent. With one exception, all professional and technical occupation groups had a decrease in the concentration of self-employed workers between June 2003 and June 2014. The exception was the arts and media occupation group, which also had the highest concentration of self-employed workers among the professional and technical occupations in June 2014.53

The arts and media occupation group includes designers, athletes, musicians, announcers, news analysts, and photographers among others. There are 18 occupations in the broad arts and media occupational category and 10 of those occupations saw an increase in the concentration of self-employed workers from 2003 to 2013.54

![Arts and Media Occupations with an Increase in Concentration of Self-Employment, 2003 - 2013](chart)


d Management occupations include: chief executives; general and operations managers; public relations and fundraising managers; lodging managers; purchasing managers; farmers, ranchers, and other agricultural managers; and construction managers.

e Self-employment is high in legal occupations, because many lawyers start their own law firms.
From 2003 to 2013, among all workers in arts and media occupations, employment grew by 13 percent. Self-employment in arts and media occupations grew by 17 percent during the same period. While the concentration of self-employed workers in all arts and media occupations grew by just one percent from 2003 to 2013, 10 out of 18 arts and media occupations had increases between two and 24 percent.55

While self-employment may not have seen big increases across occupation groups, workforce data does not easily capture contingent work. In addition to self-employed workers, temporary and contract workers are also present in the professional workforce, but difficult to track since many are paid directly by an employer, but not necessary in full-time permanent positions.56

Adjunct Faculty

Contingent employment has long been on the rise among adjunct faculty. Estimates placed the size of the adjunct workforce at 1.4 million in 2011.57 Many adjuncts are employees of the college or university, but on a short-term or contract basis. Adjuncts may have an implied or explicit contract to teach one or more semesters for a college or university, but the adjunct has little job security and limited access to retirement or health benefits.58

Historically, full-time tenure or tenure-track faculty made up a large percentage of college and university faculty. This faculty was well paid, had access to pension and health benefits, and had the academic freedom to apply rigor in the classroom. Typically, full-time faculty teach two to six courses per year.59 In 1975, 45 percent of college and university teachers were full-time tenured or tenure-track faculty. In 2011, just 31 percent were full-time tenured or tenure track.60 Nearly 70 percent of postsecondary faculty was ineligible for tenure by 2011.61

Most part-time faculty want full-time work. A June 2012 survey of part-time adjunct faculty found that nearly 75 percent of respondents were looking for full-time tenure-track positions or would accept a full-time tenure-track position with their current college or university employer.62 While the cohort was characterized as “part-time faculty,” nearly 30 percent of respondents reported teaching three or more courses in a semester.63

Temporary Workers

Temporary help workers are paid by a temp agency, but perform work at an employer’s worksite. The flexible nature of these working arrangements has meant that many workers are hired when the U.S. economy is expanding, but steep job losses result during economic contraction.64

BLS projected in July 2014, that there were 2,856,000 workers employed in the temporary help services industry.65 The temp industry grew by 46 percent between 2009 and 2013, adding 830,000 jobs. This growth accounted for 43 percent of all job growth in the U.S. from 2009 to 2013.66 However, the industry is susceptible to sharp downturns. For example,
from 2007 to 2009, employment in temporary help services declined by nearly 780,000 jobs or 30 percent.\textsuperscript{67}

Analysis of employment growth or decline among temp agencies requires analysis of the whole employment services industry. The temporary help services industry falls within the employment services industry. Temporary help services accounted for about 80 percent of employment within the employment services industry in 2013. Professional and technical workers made up 17 percent (about 561,000 workers) of the employment services industry workforce. Employment among professionals in the employment services industry rose 26 percent between 2003 and 2013. The professional and technical occupation group with the greatest number of workers was healthcare practitioners and technical occupations with 126,620 employed in employment services in 2013.\textsuperscript{68} The occupation groups with the largest increases in the employment services industry were business and financial services and computer and mathematical occupations.\textsuperscript{69}

\textit{Racial and Ethnic Gains and the Impact of Immigration}

The professional and technical workforce is increasingly diverse and will become even more so. In June 1994, 84 percent of the professional and technical workforce was made up of non-Hispanic Whites. In June 2014 that was down to 73.3 percent. Hispanics, Blacks, and Asians have realized big gains in the professional and technical workforce. Asians increased their density from 3.1 percent in June 1994 to 7.3 percent in June 2014. Blacks increased from 7.6 percent to nine percent and Hispanics grew from 4.7 percent to 8.9 percent in the same period. Unlike other races and ethnicities, the majority of the Asian professional workforce was not born in the U.S.\textsuperscript{70}

In June 2014, Hispanic professionals were highly concentrated in just a few states. Nearly 50 percent of Hispanic professionals reside in just two states: California and Texas. Within education, training, and library occupations in June 2014, Hispanics were 27 percent of the workforce in California and 29 percent of the workforce in Texas.\textsuperscript{71} Hispanic professionals also had strong representation in Arizona, Colorado, Florida, Nevada, and New Mexico. The U.S. Census Bureau anticipates that the Hispanic and Asian populations in the U.S. will more than double from their 2012 numbers by 2060.\textsuperscript{72}

Increases in the Hispanic population arise from births, as opposed to immigration. Among Hispanics in the professional and technical workforce in June 2014, 69 percent were native born. However, rapid increases in the Asian population are the result of immigration. Only 29 percent of Asians in the professional workforce in June 2014 were born in the U.S.\textsuperscript{73}

In June 1994, naturalized citizens and guest workers were eight percent of the U.S. professional and technical workforce. By June 2014 that had risen to 12.8 percent. However, naturalized citizens and guest workers in professional and technical jobs are disproportionately concentrated in computer and mathematics (21 percent of the workforce); life, physical, and social sciences (19.7 percent); architecture and engineering (17.8 percent); and healthcare
practitioner and technical occupations (13.9 percent). With the exception of computer and mathematical occupations, the majority of the immigrants in these occupations are naturalized citizens who have greater bargaining power in the workplace due to their permanent status.  

**Education Attainment**

The professional and technical workforce is an increasingly educated workforce. Advanced education is a way for professionals to remain competitive in the job market, but the advanced education comes at a high cost for most.

Between June 1994 and June 2014, the professional and technical workforce shifted towards higher education attainment. The percentage of workers reporting their highest degree earned was a bachelor’s degree increased from 34.1 percent to 36.8 percent and master’s degree holders increased from 14.7 percent to 19.6 percent. The concentration of workers with only a high school diploma or equivalent dropped from 14.2 percent in June 1994 to 10.8 percent in June 2014 and those with some college but no degree declined from 16.6 percent to 12.9 percent.

Advanced education and training is critical for new entrants to the professional and technical workforce as well as for those who want to remain competitive in the job market. While the need for advanced education and training rises, so does the cost of that education and training. Some professionals, already in the workforce, obtain full or partial reimbursement from employers for advanced schooling. However, many professionals enter the workforce after taking on a large amount of debt. The average student loan debt load was around $30,000 in 2013 and the high debt burden makes it less likely the indebted graduate will work in a public interest occupation, such as teaching.

**Confronting the Changing Workplace and Workforce**

Professional and technical workers must actively work to shape the workplaces of the future, whether it be the traditional workplace, a home office, or temporary employment. The most effective way to improve wages, hours, and working conditions for professionals in a traditional office environment is to join with their colleagues to form a union. The power of collective action was realized by 5.73 million professionals in 2013. In occupation groups with above average union density, median weekly wages for union members were between 15 and 28 percent higher than non-union members.

Unions also advocate for legislation important to their members, including offshoring, privatization, trade, and immigration. In the collective bargaining process, many unions negotiate for employer-provided professional development, but many unions also offer their own professional development programs. The American Federation of Teachers, for example, provides research-based content for teaching professionals on an ongoing basis for its members. “AFT collaborates with leading education researchers to synthesize reliable findings on best practice and translate them into a user-friendly format that connects the research to its applications in the real world of classrooms and schools.”
Outside of the traditional workplace, a number of unions use a hiring hall model, which connects qualified workers to employers. While hiring halls are typical among the construction trades, several unions representing professional and technical workers also use hiring halls. The International Alliance of Theatrical Stage Employees utilizes a hiring hall model for some of its skilled members in live theater, motion pictures, at trade shows, and concerts among other locations.80 International Federation of Professional and Technical Engineers ESC Local 20 in California operates a hiring hall for professional and technical workers seeking temporary employment with Pacific Gas & Electric.81 Without hiring halls, these skilled professionals working on a short-term basis would not have the advantage of a union negotiated contract that ensures good wages, health insurance, and retirement.

Actors have gained significant workplace protections and benefits through collective power and action. The Screen Actors Guild (now SAG-AFTRA) was founded in 1933 in response to the exploitative Hollywood studio system. At the time, some actors were under exclusive contracts to studios and others were freelancers, former contract players, and supporting actors; none had many rights or power on the film set. Forming a union and bargaining with producers won actors better hours and working conditions and later retirement and health benefits.82

While some professional unions long ago adopted organizing models aimed at contract or temporary labor, there are growing efforts to organize workers in the contingent workforce. For example, the American Federation of Teachers is working on innovative ways to organize adjunct professors who teach at multiple schools with a regional organizing approach.83

Another way many professionals network and keep abreast of changes in their profession is through membership in a professional association. While professional associations may recommend minimum salaries and training for a profession, they do not negotiate wages or benefits for professionals. However, many professional associations hold annual conferences where professionals can network, learn about new research in their field, and further develop their professional skills. Many professional associations have developed accreditation programs where members receive continuing education credits that establish a record of training and accomplishments.

In the last 10 years, employers have increasingly used short-term contract workers to perform work like website design, research, writing, editing, and software development. Freelancers, self-employed, and temporary professionals working in a non-traditional work setting are finding this work through networking, self-marketing, and websites like freelancer.com, elance.com, and oDesk.com. Wages, in some cases, are driven down by the global nature of the labor supply, which is a point of frustration for some using websites to bid on jobs. In Europe, freelancers are using the power of collective action to legitimize the freelancer marketplace, gain access to government services, and have a voice at the table when policy decisions are made that affect freelancers.84
While websites connect professional workers to work, many workers have to find alternative avenues to obtain medical insurance, retirement benefits, professional development, and networking. Some of the sites provide training to workers and are exploring whether to provide insurance, retirement, and other benefits. The Freelancers Union is one way some freelancers and the self-employed are able to obtain those benefits. The Freelancers Union was created in 1995, under a model similar to the AARP, to provide needed benefits to its members. The Freelancers Union had grown to 243,000 members by 2014.

Conclusion

Most professional and technical occupation groups have realized solid employment gains in the last 10 years despite the recession. However, employment gains did not mean wage gains for most professionals in the last 10 years. A number of factors have aided employers in keeping wages flat, including automation, offshoring, and privatization. But many employers are increasingly altering their relationship with labor by hiring contingent and freelance workers and relying on guest workers, mostly in computer-related occupations.

Many professional and technical workers are turning to unions and allied organizations to win better wages and working conditions. Unions are actively using traditional and non-traditional organizing models to bring professionals in both traditional and non-traditional employment arrangements into the labor movement. Unions will likely continue to adapt their policy and organizing agendas to fit the changing professional and technical workforce.
35 Ibid.
36 Ibid.
37 Ibid.
38 Ibid.
42 Ibid.
44 Ibid.
48 U.S. Census Bureau, DataFerrett, American Community Survey, Public Use Microdata Sample, 2004 and 2012.
49 Ibid.
50 Ibid.
52 Ibid.
53 Ibid.
55 Ibid.
56 Department for Professional Employees, “Professionals in the Contingent Workforce,” January 2014.
59 The Coalition on the Academic Workforce, “A Portrait of Part-Time Faculty Members.” June 2012.
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63 Ibid.
75 Ibid.
80 See http://iatse.net/about-iatse
83 Snyder, Susan, “A union push to organize Philly-area college adjuncts,” The Inquirer, December 17, 2013.
84 European Freelancers Movement, http://freelancers-europe.org/#manifesto
86 See www.freelancersunion.org.
87 Ibid.