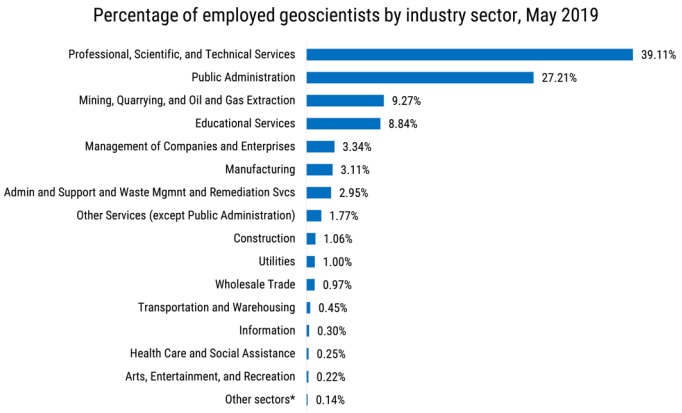
A National View of Geoscience Workforce Changes during COVID-19

Using federal data sets to examine COVID-19 impacts on the geoscience workforce

Federal datasets provide a broad view of workforce and economic trends and usually provide data on annual or quarterly granularity, although some provide monthly data. While their coarse granularity does not make them very useful for high-frequency, occupation-specific analysis, these datasets are useful for providing a baseline of longer-term trends for comparison with finer-resolution data.

For an overview of federal data related to changes in the geoscience workforce in 2020, we use a combination of data from the U.S. Bureau of Labor Statistics, U.S. Department of Labor, and the U.S. Census Bureau to provide a larger context for the results of the ongoing Geoscience COVID-19 longitudinal study.



Credit: AGI, data derived from the U.S. Bureau of Labor Statistics, Occupational Employment Statistics, May 2019

Geoscience representation across industry sectors

While geoscientists work in nearly all economic sectors, data from the most recent Occupational Employment Statistics dataset from the U.S. Bureau of Labor Statistics indicate that most geoscientists work in four sectors: *professional, scientific, and technical services; public administration; mining, quarrying, and oil and gas extraction* (often referred to only as *mining*); and *educational services*. Self-employed geoscientists are not included in this dataset.

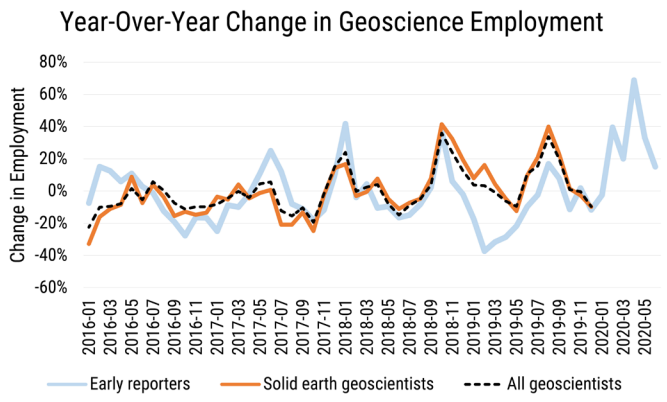
Note that "Other sectors*" in Figure 1 includes sectors with less than 0.1% of employed geoscientists. These sectors are: *Agriculture, Forestry, Fishing and Hunting*: 0.05%, *Retail Trade*: 0.01%, *Finance and Insurance*: 0.07%; and *Accommodation and Food Services*: 0.002%.

Monthly employment trends by occupation

The U.S. Census Bureau's Current Population Survey provides monthly employment data; however, only some occupational categories are reported monthly, while others are reported less frequently throughout the year. Within geoscience occupations, several occupational categories, primarily engineering and managerial positions, are reported more frequently than all other geoscience occupations. Geoscience employment as a whole and occupations within the solid-earth geosciences generally follow the trend of early reporting geoscience occupations in year-over-year changes in monthly employment.

Year-over-year changes in employment for early reporting geoscience occupations increased through April 2020 thereafter declining sharply through June 2020. Other federal datasets which provide employment and unemployment data by industry sector show a sharp inflection point in April 2020

as the impacts from COVID-19 hit all sectors. It is important to note that despite the large decline from April through June 2020, the year-over-year reported employment change for geoscience occupations is still positive relative to 2019.

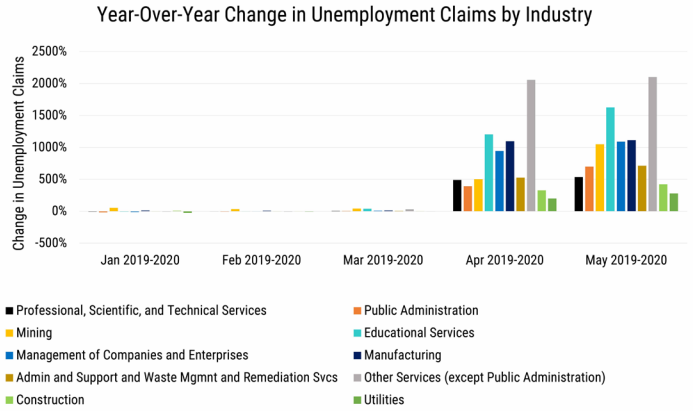


Credit: AGI, data derived from the U.S. Census Bureau, Current Population Survey

Unemployment insurance claims by industry

Data from the U.S. Department of Labor's Characteristics of Unemployment Insurance Claimants dataset show the COVID-19 pandemic impacting nearly all industrial sectors in April 2020, with some earlier impacts, especially for the *accommodation and food services* sector in March.

Industries shown in Figure 3 below are those where at least 1% of employed geoscientists work (see Figure 1). The *professional, scientific, and technical services, public administration, mining,* and *educational services* sectors are where 84% of geoscientists work.



Credit: AGI, data derived from the U.S. Department of Labor Employment & Training Administration, Characteristics of the Unemployment Insurance Claimants

The hardest hit sectors in April 2020 that showed year-over-year increases in unemployment insurance claims in excess of 1000% were *accommodation and food services; other services (except public administration); arts, entertainment and recreation; healthcare and social assistance; retail trade; educational services;* and *manufacturing*. In May 2020, there were an additional three sectors showing year-over-year increases in unemployment insurance claims in excess of 1000%, and these were *transportation and warehousing, management of companies and enterprises,* and *mining* (which includes oil and gas operations).

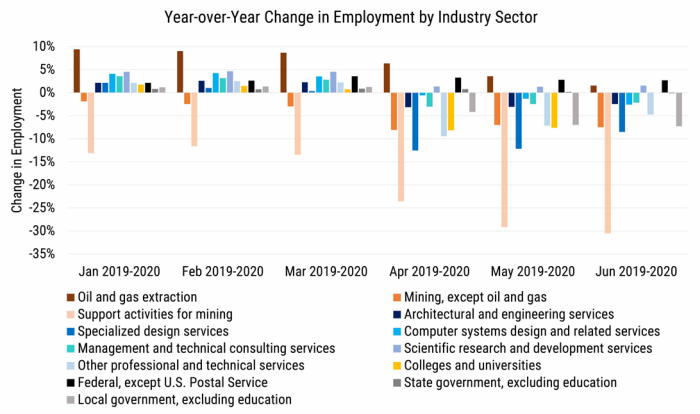
The four sectors in which most geoscientists work (*professional, scientific, and technical services; public administration; mining;* and *educational services*) historically comprise 9-12% of total monthly unemployment claims. In April and May of 2020, these sectors comprised 6% and 7% respectively of total unemployment claims. Of these four sectors, the *educational services* and *mining* sectors showed the largest year-over-year increases in unemployment claims during April and May 2020. This federal dataset does not provide sufficient granularity to evaluate subsector impacts during this period.

Employment trends by industry

The U.S. Bureau of Labor Statistics' Current Employment Statistics dataset provides monthly employment data by both broad and detailed industry sectors. In Figure 4 below, we focus on the four main industry sectors within which most geoscientists work. Employment impacts are seen across nearly all of these sectors in April 2020, with an exception of *oil and gas, scientific research and development services,* and *federal* and *state government*. In April 2020, the largest year-over-year declines in employment were in the *support activities for mining sector* (-24%), which includes *support activities for oil and gas operations*, and in the *specialized design services* sector (-13%).

While employment trends in many industry subsectors either stabilized or began to show signs of rebounding from April's declines in May and June, declines in employment continued for four industries: *oil and gas extraction, support activities for mining, computer systems design and related services,* and *local government*. Employment in the *oil and gas extraction* sector, although having a positive year-over-year employment change from 2019, declined from 9% in March 2020 to 2% in June 2020.

The *support activities for mining* sector provides services for mining and quarrying of minerals and for oil and gas extraction activities, and this also includes exploration activities such as geophysical surveying and mapping, core sampling, and geological investigations at prospective sites. Year-over-year employment declines in this sector began in August 2019 at -4% and further declined to -12% in December 2019. This pattern may indicate impacts from declines in oil prices that started the end of 2019 which is likely compounded by impacts from the COVID-19 pandemic.



Credit: AGI, data derived from U.S. Bureau of Labor Statistics, Current Employment Statistics

Within the *professional, scientific, and technical consulting* sector, the largest employment declines were in the *specialized design services* (-13%) and *other professional, scientific and technical services* (-9%) subsectors, both of which are not typically industries within which geoscientists work.

Employment declines in the *coal mining* sector drove the overall declines in the *mining, except oil and gas* sector, with year-over-year declines in this subsector between 19% and 14% between April and June 2020. The *metal ore mining and nonmetallic mineral mining and quarrying* sector had declines of only 4-5% over this same period.

We will continue to provide current snapshots on the impacts of COVID-19 on the geoscience enterprise throughout the year. For more information, and to participate in the study, please visit: https://www.americangeosciences.org/workforce/covid19

Funding for this project is provided by the National Science Foundation (Award #2029570). The results and interpretation of the survey are the views of the American Geosciences Institute and not those of the National Science Foundation.