Geoscience COVID-19 Impacts Study Update

Impacts of COVID-19 on the Geoscience Enterprise: How Permanent Will Academic Program and Workforce Changes Be?

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Project Goals

- Assess short-term and long-term impacts of pandemic
- Establish a baseline of pre- and post-COVID-19 workplace and instructional environments
- Assess the magnitude and permanency of changes to workplace and instructional environments
- Inform response and recovery planning for future disasters and disruptions to work and instructional environments
Survey Design

Participant Consent

- Employer
- Academic Dept
- Academic faculty
- K-12 faculty
- Student
- Post-doctoral fellow
- Non-academic geoscientist
- Unemployed
- Retired

Benchmark (Feb 2020)

- Employer
- Academic Dept
- Individual

Next Update

- Employer
- Academic Dept
- Individual
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Survey Design

Multi-cohort longitudinal survey

Continuous onboarding
May 2020 – Dec 2021

Participants are not required to answer every survey

Survey sent every 2 weeks
Survey participation by major cohort

Participants by major cohort

- Academic departments: Total participants = 100, Active participants = 86
- Geoscience employers: Total participants = 122, Active participants = 98
- Individuals: Total participants = 1,626, Active participants = 1,387
Response rates

Chained response rate (CRR)

CRR = AP / C

**AP**: Number of active participants  
**C**: Total number of consents

![Bar chart showing chained response rates per major cohort](chart.png)

- Academic departments: 86%
- Geoscience employers: 80%
- Individuals: 85%
What we’ve learned…

- Impacts to departments and instructional formats
- Impacts to skills/knowledge acquisition
- Impacts to workplace environments
- What changes persist?
Departmental Budgets

Budget cuts less severe than expected.

Outlook is improving with less than 1/3 of departments expecting budget cuts for the coming academic year.

60% expecting no change in budget for the coming academic year.
Staffing Impacts

Most impacts occurred during Summer 2020 with focus on reduction in hours and furloughs of staff and non-tenured faculty.

Active hiring picked up in May 2021 and has remained at a relatively steady rate.

Hiring freezes / positions left unfilled persists for about 10% of departments.
Staffing Impacts

With vaccine availability, regulatory prohibitions on travel and field activities substantially diminished.

With Delta and Omicron surges, we see an uptick in limitations as well as faculty deciding to forgo travel and field activities.
Promotion & Tenure Guidelines

Changes in promotion and tenure guidelines focused primarily on promotion clock extension, with most departments requiring faculty to opt-in to take advantage of the accommodation.

Over 80% of faculty reported not opting to take advantage of accommodations.
Enrollments

Recent enrollment declines from:
  Contraction of oil and gas sector
  Increase in online programs
  Declines in on-campus majors

Graduate enrollment trend likely related to pandemic impacts to degree completion
Degrees

Recent declines due to:
  lower enrollments
  pandemic impacts on completion
  soft job market
Hopes for a return to normal diminished by Delta and Omicron surges.
Current expectations are in-person instruction with masking, testing, and vaccines, with some institutions planning to continue hybrid course options.
Continuing Students – Enrollment Intention

Continuing students persisting in academic studies.

Small cohorts of students delaying graduation and returning part-time to finish studies in Fall 2020 and Fall 2021.
Instructional Formats

Most departments offering *only* in-person instruction (primarily with COVID-related restrictions).

Nearly 1/4 of departments offering dual mode with a combination of in-person with either online or hybrid formats.
Instructional Formats

Half of departments now offering *only* in-person labs.

~ 20% of departments offering dual-mode instruction.
Instructional Formats

Over 90% of departments now offering in-person field instruction, primarily at local sites.

75% of departments offering only in-person field instruction.

Limitations on vehicle usage and travel persist.
Integration of Virtual Modes

Virtual instructional activities will likely be integrated as back-up sections or as supplemental activities to in-person activities.
Interest in Virtual Instruction

Students more interested in virtual learning than faculty in virtual teaching.

Most interest in virtual instruction for lecture courses.
Interest in Virtual Instruction

Workloads for virtual instruction, especially course prep activities, are still more than for in-person instruction, but this has lessened since 2020.
Increased satisfaction with quality of online content and with ability for students to work in groups.
Satisfaction with Virtual Instruction

More variability with student satisfaction.

Increased satisfaction with group work, engagement with instructors and quality of online course content.
Benefits of Virtual Instruction

Largest benefit of virtual instruction is flexibility it provides especially to students for reviewing content and taking courses at their own time / pace.
Challenges with Virtual Instruction

Issues with student engagement and diminished course quality are top issues with virtual instructional activities.
Cancelled Instructional Activities

Cancellation of field components to courses and field courses primarily due to pandemic impacts.

Cancellation of lecture and labs in 2021-2022, primarily due to low enrollments.
**Student Impacts**

Overall percentage of departments reporting impacts is lessening.

However, there has been an increase in departments reporting students experiencing project delays.

Project re-design more prevalent in 2020-2021 AY.

Impacts to field instruction persist.
Student Impacts

Delays in thesis, dissertation and capstone projects is the top reported issue.

Impacts to field instruction especially during 2021 field season.

Increase in students reporting changes to project design.

Students also delaying defense / graduation due to project delays and availability of field instruction.
Student Impacts

Course topics were primarily field methods, but also included mineralogy, sedimentology, and structural geology.
Departmental Actions

- Continuing students
  - Acceptance of substitutions for courses
  - Waivers for pre-requisites, make-up courses / directed studies
  - Spaces in 2021-2022 field courses offered first to students who were unable to take prior year’s course
  - Postponed degree progress

- Graduating students
  - Waived field course requirements
  - Delay of graduation until students could take in-person field course
  - Make-up courses / independent studies to fulfill field course requirement
Most graduates acquiring skills via self-taught instruction or via on-the-job training.
Workplace policies

Just over half of departments offer remote-first policies for faculty and staff.
Changes in work policies

In-office work policies available to faculty and staff

Remote work policies available to faculty and staff

Change in remote work policies to more of a focus on limited remote-work
Most faculty now working in the office at least half time. Work location appears to be responsive to pandemic situation.
Work-at-home assistance

Most departments provided equipment and training for faculty and staff.

![Bar chart showing work-from-home assistance provided for faculty and staff.](chart)
Remote teaching / learning adaptations

Students more likely to have a shared workspace for remote learning, but this has decreased since 2020.
Remote teaching productivity

General increase in productivity across all categories except for teaching.

Faculty: Productivity level with remote work activities
Remote learning productivity

General decrease in productivity across most categories, possibly due to graduating cohort of 2020-2021.
Student recruitment and retention is an increasing concern, as are budgets and staffing.
Workplace safety and academic rigor of programs continue as a pandemic-related concern. Job security is top non-pandemic concern for faculty.
Workplace safety and employment opportunities continue as top pandemic-related concerns. Employment opportunities are also top non-pandemic related concern.
Pandemic-related restrictions

Restrictions for facilities and field activities have substantially lessened.

Limitations on staffing and access still persist for some students and faculty.
Pandemic-related restrictions

Restrictions related to health and safety are still in place for most faculty and students.

Most common restrictions are related to masking, vaccines, and social distancing.
Restrictions for travel and meetings have lessened.

Restrictions on in-person meetings and travel limitations are most common restrictions.
Ongoing questions

- Which instructional modes will be integrated long-term?
  - Will departments provide direction or will it up to faculty?
  - How widespread will be the adoption of virtual lab and field components? What factors will lead to their adoption?
  - Will virtual instruction be used as recruiting tools?
- Will pandemic-related accommodations to promotion and tenure influence career trajectories for faculty?
- Will degree requirements change for majors?
  - New skill requirements based on employer needs?
  - More flexibility in completion requirements (substitutions, duration of program)
Employment Trends

Steady decline from Aug 2019 - Feb 2021
Pandemic shocks and oil & gas sector contraction
Employment resiliency

Professional services shows the most resiliency

Education services
  - Campus closures
  - Layoffs
  - Declining enrollments

Mining & oil and gas
  - Softening of market in 2019
  - Exodus of workers
  - Reduced demand & travel

Labor supply & demand:
  ratio of experienced unemployed to job openings

High supply relative to demand
Low supply relative to demand

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Employer financial performance

Financial outlook improved markedly with the release of vaccine programs and economic reopening during 2021.

Expectations for financial performance: current calendar year relative to prior year and pre-pandemic

- Employers' expectations for financial performance:
  - April 2021: 82%
  - May 2021: 72%
  - June 2021: 71%
  - July 2021: 83%
  - August 2021: 82%
  - September 2021: 75%
  - October 2021: 92%
  - November 2021: 72%
  - December 2021: 75%

Legend:
- Similar to higher than prior year
- Similar to higher than pre-pandemic
Employer productivity

Most employers continue to report full or excess workloads relative to staffing.
Operational impacts

While impacts are lessening overall, supply chain disruptions continue for ~ 1/3 of employers.

Supply shortages also impacting employers. 2020 – PPE; 2021 – IT supplies.
Staffing expectations

Impacts from Delta variant in staffing expectations in late 2021, but expectations improve again before Omicron wave begins.
Hiring and Job Openings

Hiring picked up in mid-2021 and then again in late 2021.

Job openings remained relatively steady, with an increase in late 2021.
Challenges finding and hiring talent

Increases in the percentage of employers reporting no challenges with finding and hiring talent.

Recruitment continues to be an issue for employers.

Onboarding new staff, especially into remote working environments, remains a challenge.
Workplace policies

While in-office work increased thru 2020, remote work options declined only slightly.

The small percentage of employers offering lab access is reflective of the limited number of companies with lab facilities.
Changes in work policies

Employers have increased work option flexibility, especially for in-office work.
Work location

Employee distribution across work environments has diversified during the pandemic and has adjusted in response to the pandemic situation.
Employer support for remote work

Most employers provided equipment for employees as well as software and office supplies.

Over half of employers have reduced their active office space usage due to remote work.
Proficiency with virtual skills

Increased proficiency across all categories.

Most improvement in project collaboration.
Benefits to remote work

Top benefits include the improved use of virtual technologies, and flexibility for employees.
Challenges to remote work

Biggest challenge remains the lack of in-person interactions which fosters relationships, community, and new idea generation.

Drawbacks to how work and research has been conducted during the pandemic:
- Lack of in-person interactions
- Concerns over health & safety
- Less effective communication with others
- Impacts to collaboration
- Decreased productivity
- Impacts to research / work activities
- Work-at-home environment is not optimal for employees
- Issues with managing childcare for employees
- Delays in workflows, logistics, and/or supply chains
- Increased employee turnover
- Lack of maintenance of physical infrastructure
- Decreased work / life balance for employees
- Other
Employer hiring

Employers mostly hire at the Bachelor’s and Master’s levels.

With what degree levels do you hire full-time geoscience new hires?

- Bachelor’s: 90%
- Master’s: 80%
- Doctorates: 50%
New hire required / preferred skillsets

Top required skills:
- field skills
- proficiency with virtual platforms

Proficiency with virtual platforms is becoming increasingly important.

~20% of employers have changed what they are looking for in new hires, with most looking for candidates that can work with minimal to no supervision.
Ongoing questions

• Will remote work and remote-first policies become permanent?
  • Will remote work enable a more geographically distributed workforce?
  • Will employers continue financial and logistical support for remote work?

• Will employers reduce their operational footprint?
  • What will be the impacts to labs and advanced computing capabilities?

• Will preferred / required skills for new hires be different than pre-pandemic?

• How will employers address skills / knowledge gaps for new hires that were students during the pandemic?
Study participant employment

Over 90% of participants who began study employed, remained employed.

43% of participants who started study as unemployed, found work, went back to school, or retired.

Those who remained unemployed comprise 2% of total participants.
Recent Graduates

Over half of recent geoscience graduates are employed.

Highest unemployment is among those who graduated during the pandemic.
Lower percentage of more recent graduates working in non-geoscience positions. Possibly reflects taking jobs until they find a geoscience job.
Recent Graduates

~1/3 of unemployed recent graduates are seeking work both in the geosciences and in other professions.
Recent Graduates

Top reasons for seeking work outside of the geosciences includes lack of geoscience job options, and not having adequate skills or education.
Ongoing questions

- Will pandemic impacts to academic studies impact the types of jobs new graduates pursue?
- Will remote work make jobs more available to new graduates?
- Will more pandemic graduates move into geoscience occupations over the coming year?
Ongoing reporting

- To date – published 57 data briefs through AGI’s Geoscience Currents
  www.americangeosciences.org/geoscience-currents

- Presentations to AGU/AGI Heads & Chairs community

- GSA 2021 Annual meeting presentation
Thank you!

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