



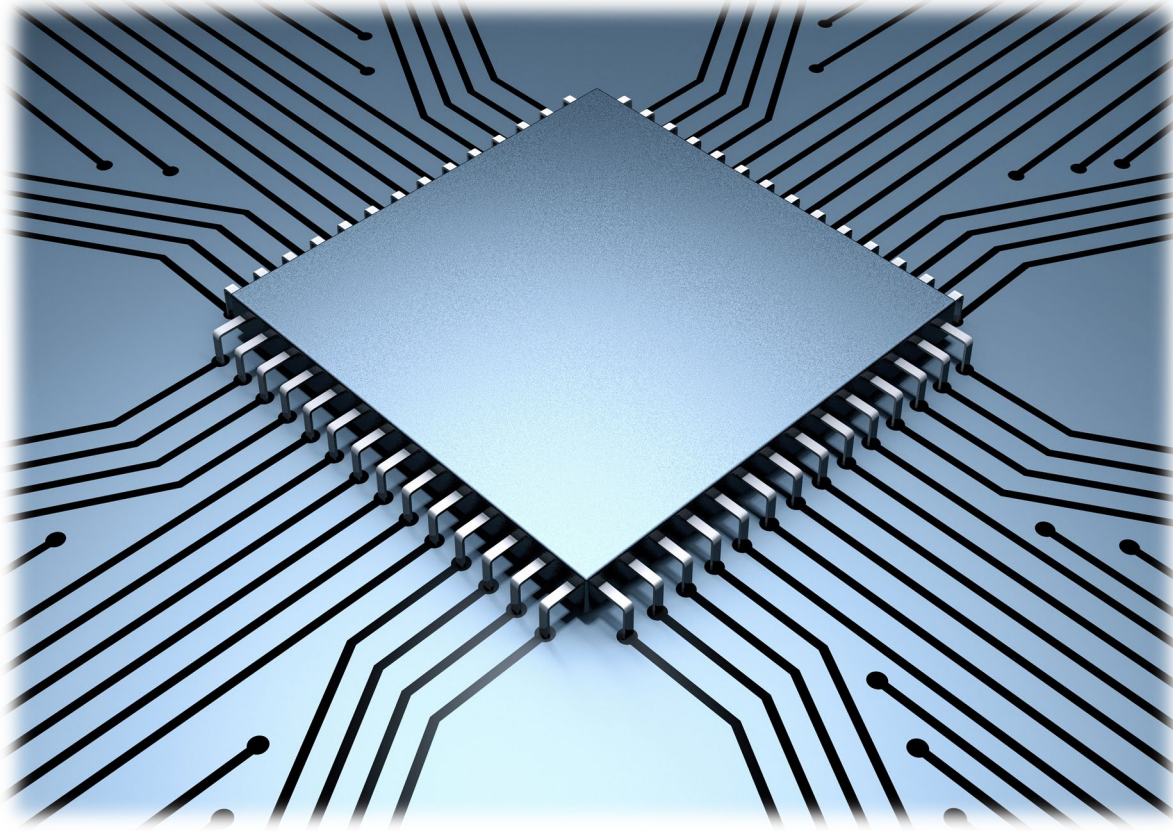
# **Harnessing disruption for change: Transforming the geosciences through innovation and collaboration**

**Leila Gonzales and Christopher Keane**  
**American Geosciences Institute**

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The results and interpretations are the views of the American Geosciences Institute and not those of the National Science Foundation.



# The Disruptors



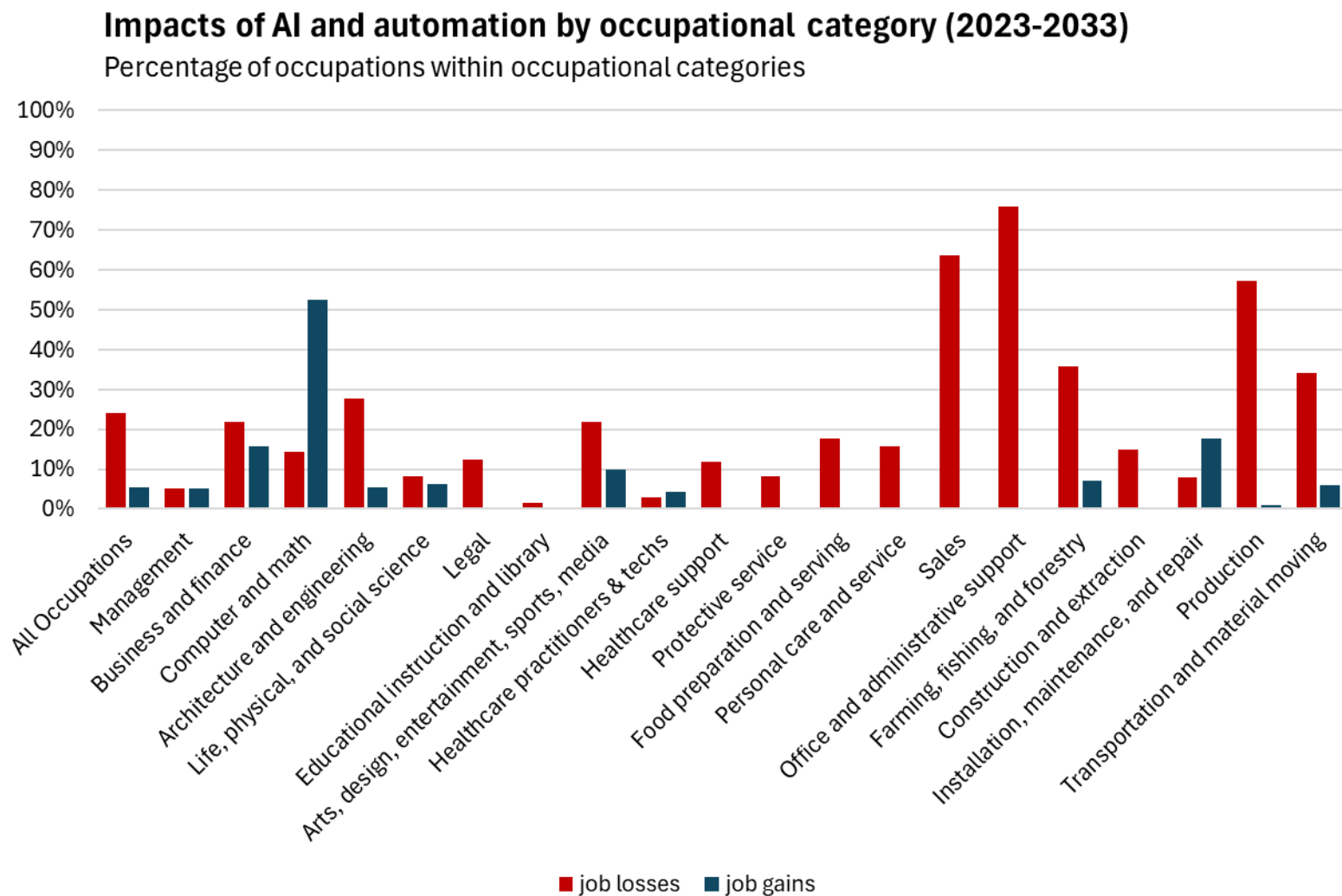
AI & Automation



Climate Change & Hazards

# The first wave: AI & automation

- Nearly all occupational groups in the US will be negatively affected by AI and automation technologies.
- Job losses due to replacement and increased efficiencies.
- Losses will be primarily in middle and low skill jobs.
- Job gains in computer, math and technology-related areas.
- Job losses in geoscience
  - Technician jobs
  - Hydrologists
- Jobs are evolving with new skillsets and application spaces.



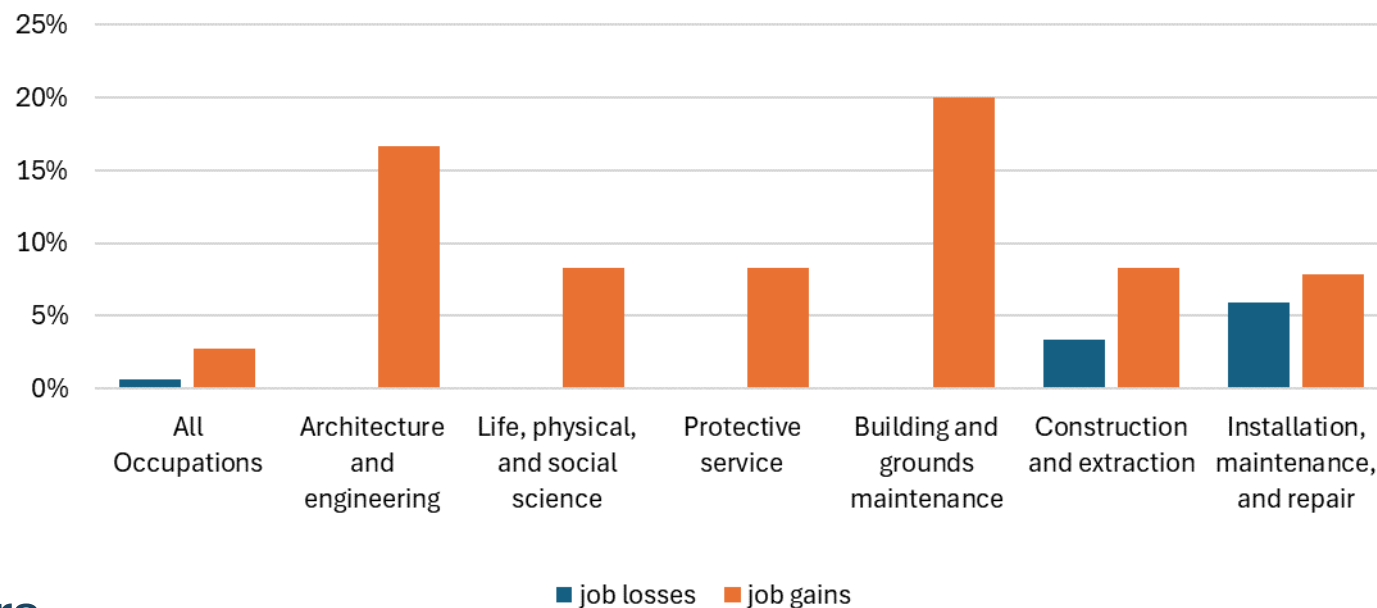
Source: US BLS Employment Projections

# The next wave: climate & sustainability

- Small number of occupational categories impacted, primarily job gains.
- Job growth focused on
  - Transition to renewable and electrified sources
  - Sustainability-related regulations
  - Hazard mitigation & preparedness
- Job gains in geoscience
  - Environmental scientists & engineers
  - Conservation scientists

**Impacts of sustainability & climate change adaptation by occupational category (2023-2033)**

Percentage of occupations within occupational categories



Source: US BLS Employment Projections



# Vectors for Change

When used together, these interdependent factors lead to solutions that promote resilience.



# First thoughts...

## The Role of Geoscience in Society

Rapid response survey to capture top of mind thoughts and responses about the geosciences now and in the future.

447 usable survey submissions

Results reported by career stage:

0-4 yr: Early career

5-10 yr: Early-mid career

10-14 yr: Mid-late career

15+ yr: Late career



Question bank of 56 questions  
Topics: career pathways, research, higher education, geoscience profession, societal relevance



30 seconds to respond per prompt



17 randomly selected prompts  
5 short responses per prompt

# Hazards as inspiration

... a shift in perspective across generations

- **Hazards spark interest and action**

Degree & career choice, research & curricula

- **Direct experience without severe impacts**

- **Focus shift from local to global**

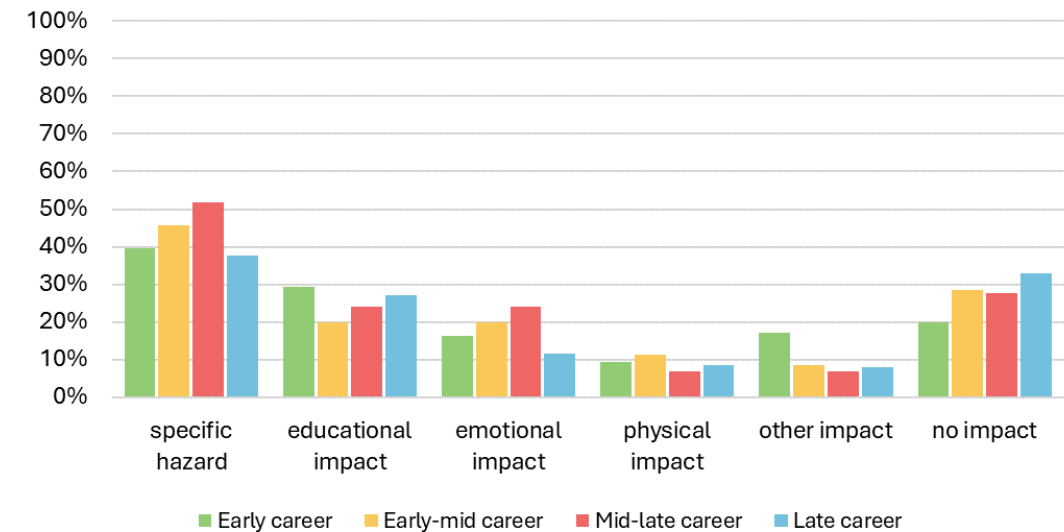
**Late career:** Mt. St. Helens eruption,  
Loma Prieta & Northridge (CA) earthquakes

**Mid-career:** Hurricanes Katrina & Sandy

**Early career:** New Zealand, Indian Ocean, and  
Nisqually (WA) earthquakes, Hurricanes Sandy & Harvey

How was your earth science education changed by a natural hazard?

Percentage of cohort



# Geoscience Research Focus

... from theory to application

- **Early career cohorts focus on application**

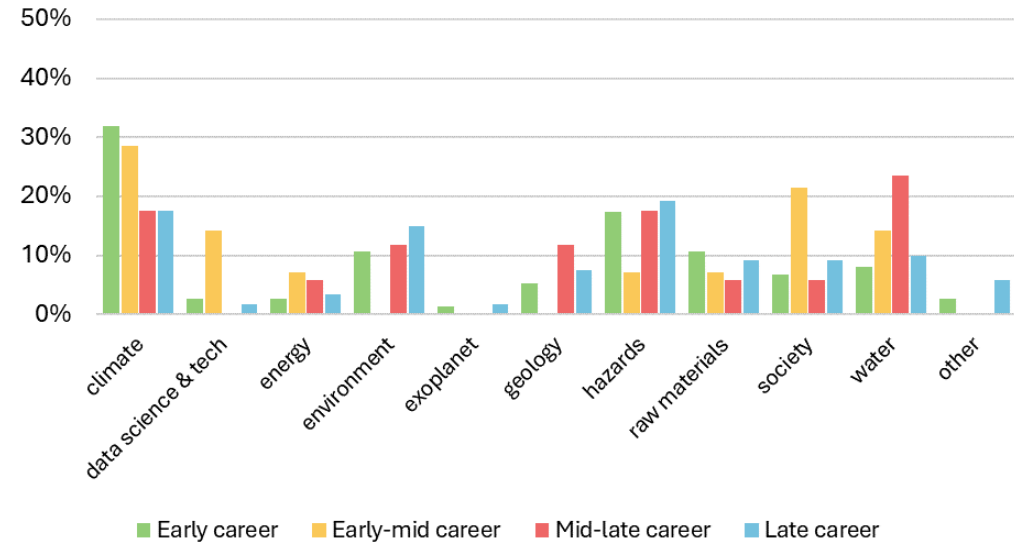
Climate impact solutions, hazard mitigation, sustainability, resource allocation, co-production of knowledge with communities

- **Mid and late career cohorts focus on theory**

Topical interest, understanding processes and mechanisms

**What are the most important topics for earth science research?**

Percentage of cohort





# New Research Horizons

... what is vs. what could be

- **Early career cohorts focus on tools to solve climate & environmental impacts**

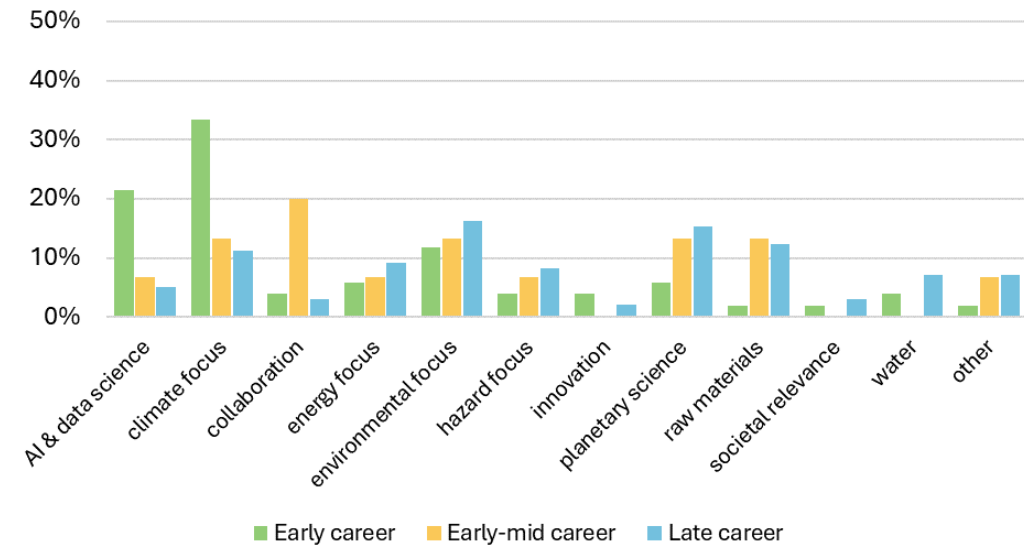
AI and technology as tools to collaboratively solve climate and environmental issues.

- **Mid to late career look to resource management and theoretical research**

Water, raw materials, earth processes, exoplanets for harvesting and habitation

What will be the new horizons for earth science research in 2035?

Percentage of cohort



# AI Impacts on Geoscience

... adoption & aversion ...

- **Positive expectations**

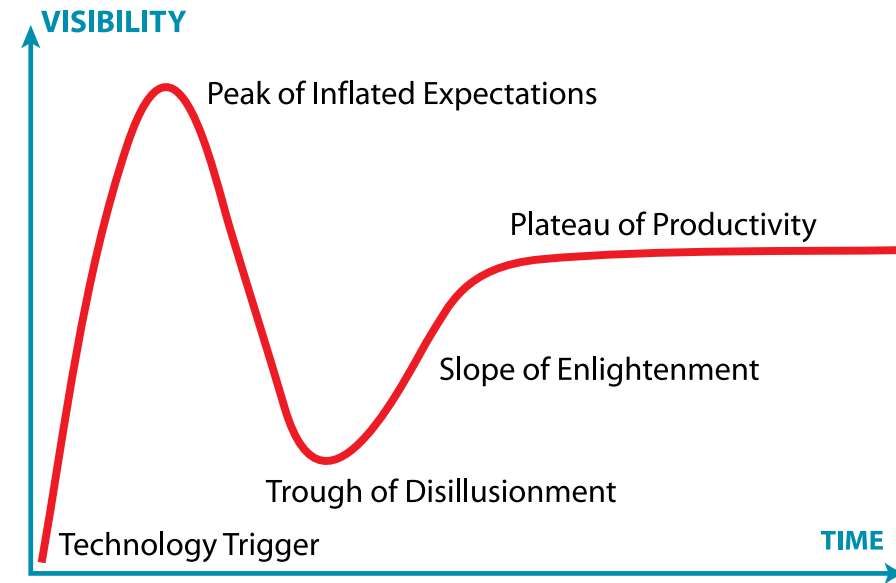
Recognition of the potential of AI to expand research and create jobs

- **Application spaces**

Information discovery, data analysis & processing, automation & efficiency, communication, reproducibility, idea generation, hazard prediction, visualization

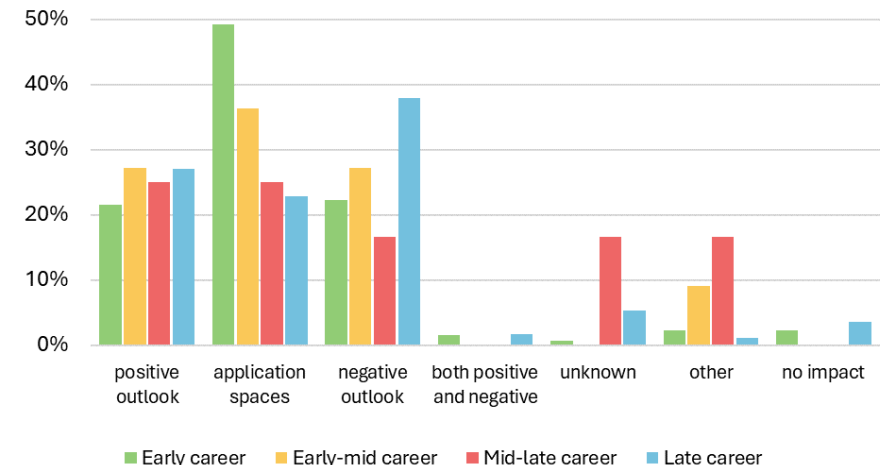
- **Concerns and fears**

Bias, black box, flawed, fraudulent, invasive, mistrust, not accurate, overblown, risky, scary



Source: [https://en.wikipedia.org/wiki/Gartner\\_hype\\_cycle](https://en.wikipedia.org/wiki/Gartner_hype_cycle)

**The impact of artificial intelligence on earth science research.**  
Percentage of cohort



# Collaboration needs many perspectives

... and is made possible with technology

- **Diverse perspectives**

Institutions, industries, countries, communities,  
co-produced, equitable, cross-disciplinary

- **Technological integrations**

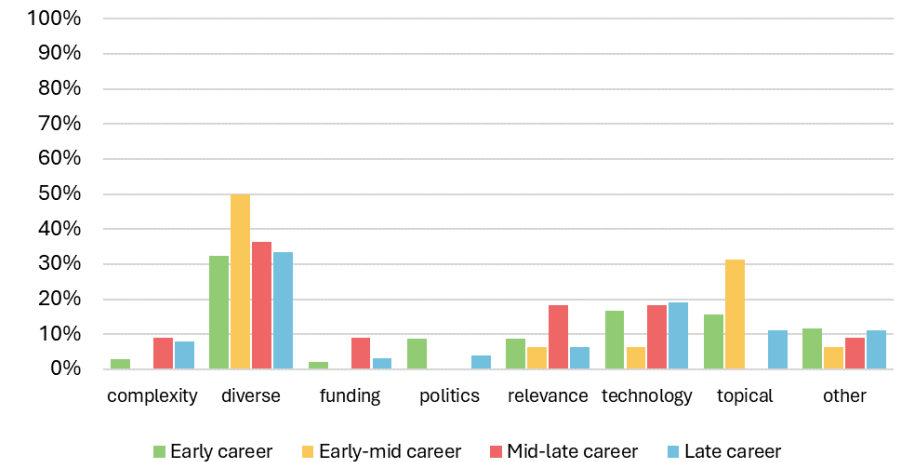
Virtual platforms, AI, data-rich projects

- **Topically focused & societally relevant**

Climate, hazards, environment, energy, raw materials

What will collaboration on academic research projects look like in 2035?

Percentage of cohort



# Application Spaces

New application spaces open when we leverage current technologies to think differently about challenges and identify possible solutions.





# Does Hazard Risk Influence Your Career Choice?

## Natural Hazards & Job Choice game

<https://hazardgame.americangeosciences.org>

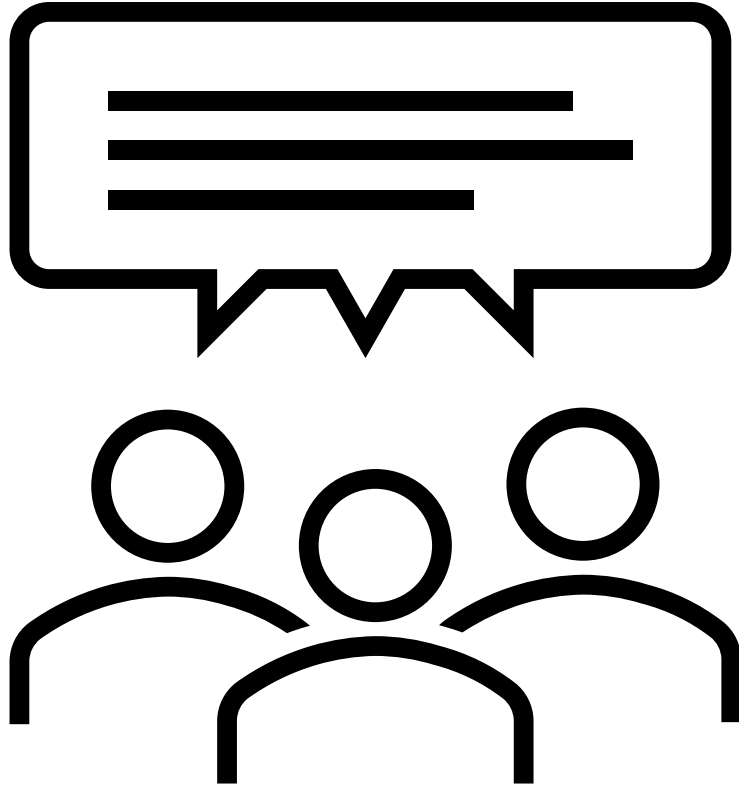


What factors are important to you in deciding where to live and work?

How influential is hazard risk to your decisions?



# Questions?



**AGI's GRANDE project data**

<https://grande.americangeosciences.org/data>



**Natural Hazards & Job Choice Game**

<https://hazardgame.americangeosciences.org>

**Contact us directly**

[lmg@americangeosciences.org](mailto:lmg@americangeosciences.org)

[keane@americangeosciences.org](mailto:keane@americangeosciences.org)