



Linking A Woman's Geoscience Career to Gender Equity Progress

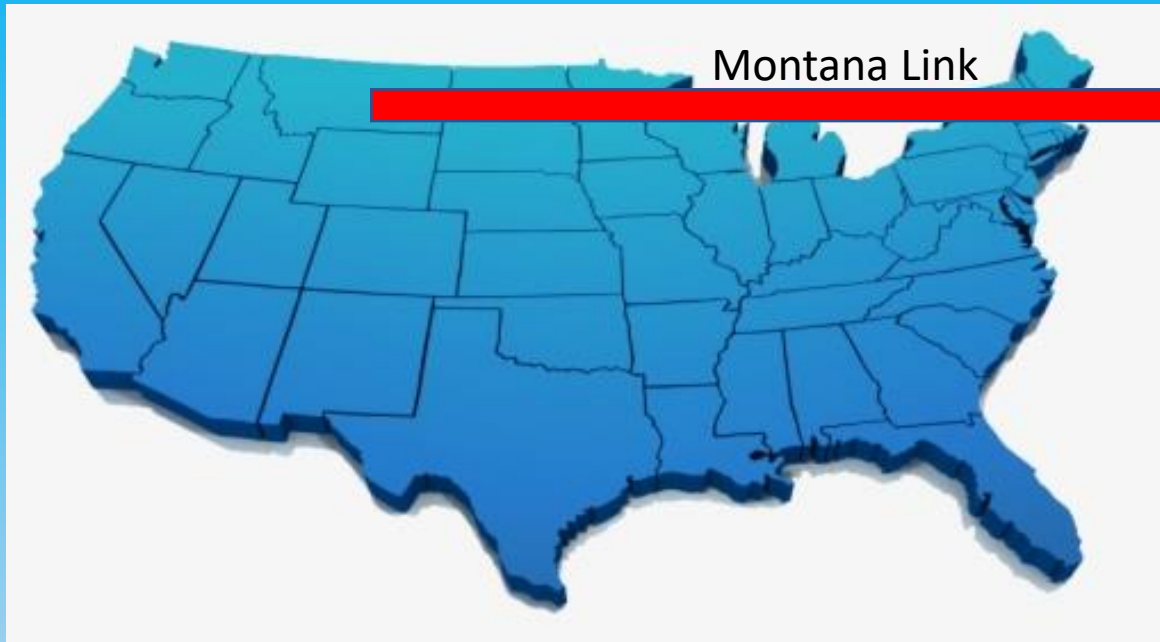


My Career – Deb Hanneman

Time Line: mid 1970's to present

My professional life in the earth sciences includes academics, government, and the private sector:

- Academics: Mount Royal College in Calgary, Alberta, Montana Tech of the University of Montana, in Butte, MT, and Montana State University, Bozeman, MT.
- Government: U.S. Forest Service in Wisdom, MT, U.S. Geological Survey out of Denver, CO office, Montana Department of Natural Resources and Conservation, Helena, MT.
- Private Sector: Whitehall Geogroup, Inc., Whitehall, MT.



- My academic/professional experience is largely in the USA, and in particular in Montana, but a I've also spent some time in western Canada.

However, throughout my career, it's been painfully apparent that the geosciences fields have not been a haven for gender equality. In fact....

"Despite investment by the National Science Foundation (NSF) and other agencies in recruiting diverse students to geosciences in the United States, this discipline has remained one of the least diverse fields in the nation among science, technology, engineering, and math (STEM) fields over the last 40 years.."

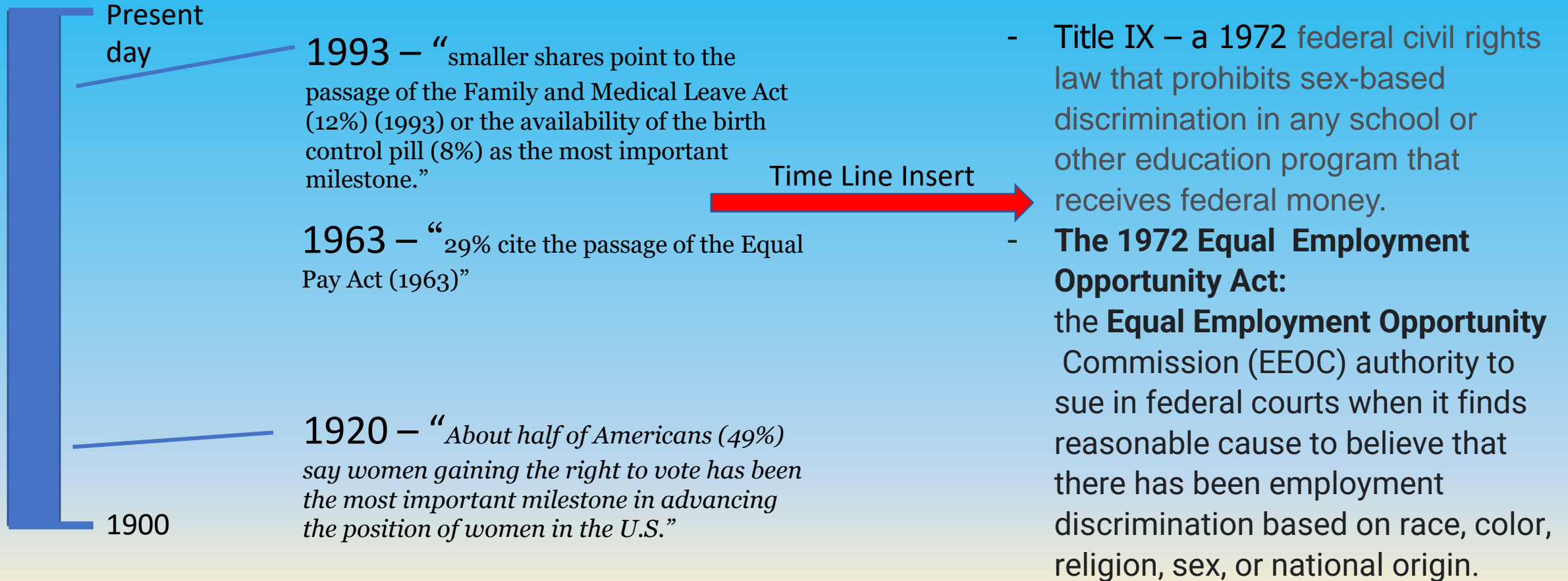
- *From:* Anne-Marie Núñez, Jessica Rivera & Tyler Hallmark (2020) Applying an intersectionality lens to expand equity in the geosciences, Journal of Geoscience Education, 68:2, 97-114, DOI: 10.1080/10899995.2019.1675131, To link to this article: <https://doi.org/10.1080/10899995.2019.1675131>

WHY???

I think that one needs to think about a geosciences career path in a larger, societal context...

To try to gain some insight into the gender equality issue in the geosciences, I'm going to track my career in respect to U.S. legislation regarding gender equality. In general, according to 2020 Pew Research Center data, there are 3 main milestones recognized in advancing the position of women in the U.S.:

ALSO:



<https://www.pewresearch.org/social-trends/2020/07/07/a-century-after-women-gained-the-right-to-vote-majority-of-americans-see-work-to-do-on-gender-equality/>

Academics: 1970s

Basically no recruitment/mentoring of women geoscientists:

My educational institutions: Miami Univ, Univ Toledo (3 years as undergrad and then came west), University Calgary as grad student.

- Number of Geoscience undergrad/grad women students - Then: (same # in grad)... remember 3 out of about 20

Now: Investments in the recruitment of women into the geosciences started in the 1980's. In 1985, 26% of geoscience undergraduate degrees and 24% of geoscience graduate degrees were conferred to women. In 2017, those percentages increased to 43% for geoscience undergraduate degrees and 39% for geoscience graduate degrees. From: AGI Geoscience Currents: www.americangeosciences.org/geoscience-currents Data Brief 2019-015; November 15, 2019 Written and compiled by Leila Gonzales

- Number of Women Faculty

Undergrad/grad: Female faculty **Then:** no female faculty

Now: USA female faculty: The overall percentage of women in geoscience faculty positions at four-year institutions continues to slowly increase from 17% in 2015 to 20% in 2017. From: AGI Currents No. 136, 2019, <https://www.americangeosciences.org/sites/default/files/currents/Currents-136-WomenResearchFields.pdf>



Then:

Gender Equality in the mid 70's in western Canada

- couldn't go to Petroleum Club to present my MSc. project – couldn't even enter some bars by same door!

Stayed in Calgary after MSc. And taught for year at Mount Royal College (now Mount Royal University) – my supervisor wanted part of my salary... My immigration status was tenuous and thus I was vulnerable to a supervisor's pressure, so this gives me some insight into today's immigration problems!

Now:

Note: A number of legal instruments exist in **Canada** to protect **equality for women**. ...

The **Canadian Human Rights Act** of 1977 states that all **Canadians** have the **right to equality, equal** opportunity, fair treatment, and an environment free of discrimination on the basis of sex, sexual orientation, marital status and family status.



ADVANCEGeo
@ADVANCEGeo



African Association of Women in Geosciences
@Geoscientists



PROWESS
American Association of Petroleum Geologists Professional Women in the Earth Sciences



American Astronomical Society Committee on the Status of Women in Astronomy
@AAS_Women



Baltic Consortium on Promoting Gender Equality in Marine Research Organisations
@BalticGender



Black Geoscientists
@BlackGeoRocks



GeoLatinas
Latinas in Earth and Planetary Sciences
@GeoLatinas



GAIA
Network for women in Earth Sciences



Me Too Mining Association
Working for Safe, Inclusive and Respectful Workplaces for Everyone!
@metoomining



Geoscience Alliance
Broadening participation of Native Americans in Geoscience



Women in Aerospace (WIA)
@WomeninAero



MPOWER
Mentoring Physical Oceanography Women To Increase Retention
@MPOWER



Association for Women Geoscientists



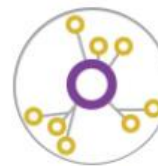
MANRRS
Minorities in Agriculture, Natural Resources and Related Sciences
@NationalMANRRS



Mentoring **Then:** None
Now: MANY Network organizations/professional societies: AWG, Earth science womens network (<https://eswnonline.org/welcome/who-we-are/>) – list of network links: https://eswnonline.org/it-takes-a-village/org_network_list/



SWISE
Society of Women in Space Exploration
@SWISEofficial



Women in Earth & Environmental Science Australasia
@WOMCESA



Women-Water Nexus
Environmental & Water Resources Institute, American Society of Civil Engineers
@womenwaternexus



Pride in Polar Science Network
@PridePolar



Women Geoscientists in Canada
@WIM_WGC



Women in Environmental Sciences, University of Manchester
@in_sciences



SEG Women's Network
Society of Exploration Geophysics
@SEG_Women



International Association for Geoscience Diversity (IAGD)
Creating access and inclusion for persons with disabilities in the geosciences
@AccessibleGEO



Women in Marine Science (WiMS)



National Technical Association (NTA)



SOLESS
Society of Latinx/Hispanics in Earth and Space Sciences
@GeoSpaceLatinx



Women in Coastal Geoscience & Engineering
@WomeninCoastal

Continuing on with my professional experience mixed with some back-to-school time, and of course, all in regards to gender equality tracking...

Worked for several organizations as a geoscientist from the latest 1970's until the early 1990's – US Forest Service, US Geological Survey, MT Department Natural Resources, and taught at MT Tech (now of the University of Montana). I was at the bottom of the professional ladder at all organizations, so for **MOST** of the time I had no awareness of any issue with gender inequality.

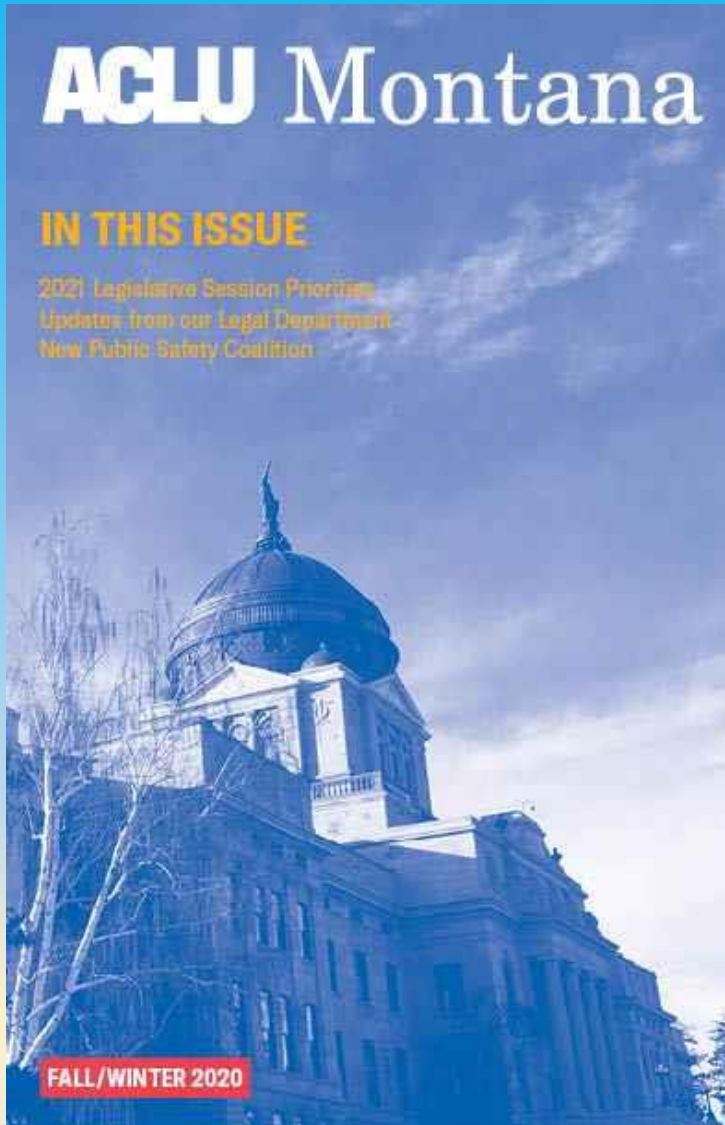
A few stats regarding gender equality in the overall workforce during that time:

- *“The percentage of women (age 25 to 54) who are employed from 1970 to 2018 rose continuously until ~2000 when it reached its highest point to date of 75%; it was slightly lower at 73% in 2018.”*
- Pay equality: *“Examining the hourly pay of those aged 25 to 54 who are employed full-time, we found that the ratio of women's to men's pay increased from 0.61 to 0.83 between 1970 and 2018, rising especially fast in the 1980s, but much slower since 1990..”*

From: Progress toward gender equality in the United States has slowed or stalled. Paula Englanda, Andrew Levinea, and Emma Mishela
<https://www.pnas.org/cgi/doi/10.1073/pnas.1918891117>, 6990–6997 | PNAS | March 31, 2020 | vol. 117 | no. 13.

? Looking Good For
Gender Equality???

Not so fast....



Then:

I decided to take a leave of absence from teaching at MT Tech and go back to school for my Ph.D. in geology (1986-1987)...

- I was granted leave, but when I asked for some, or any, monetary support, the Vice President of MT Tech told me that any available support money was going to a man with a family to support. I let the issue go...
 - When I came back to MT Tech after my year's absence, there was a new Dean for Mining and Geology at Tech. He decided to upgrade my position, along with an associated pay raise. But – he also decided that he wanted a male in that position – one who had a family to support so he would be more amenable to whatever the Dean wanted done.
- **The American Civil Liberties Union – Montana came to my defense, and we used both the Equal Pay Act and the Equal Opportunity Act to win my case of equal pay/workplace discrimination. I did not, however, stay on at Tech.**

THEN:

I did finish my Ph.D., and it coincided with having my first child. Bad timing, one might think? Yep, apparently so. It was hard to find a professional position while carrying around a few months old child! One colleague at the MT Bureau of Mines and Geology bluntly told me that I just killed my professional career...

NOW:

So my experience with having children mixed with building a professional career took place in 1989-1991 (We have 2 kids!). I missed the Family and Medical Care Act by 3 years – had I procured a position before becoming pregnant!!



Family and Medical Leave Act

1993 – First major legislation signed into law of the Clinton Administration

So – after all my dealings with gender inequality, I just said the heck with this (actually, I think I probably said many other words), and started my own earth science consulting company – Whitehall Geogroup, Inc. I've been doing projects as Whitehall Geogroup, Inc. since 1991 and continue to this day.

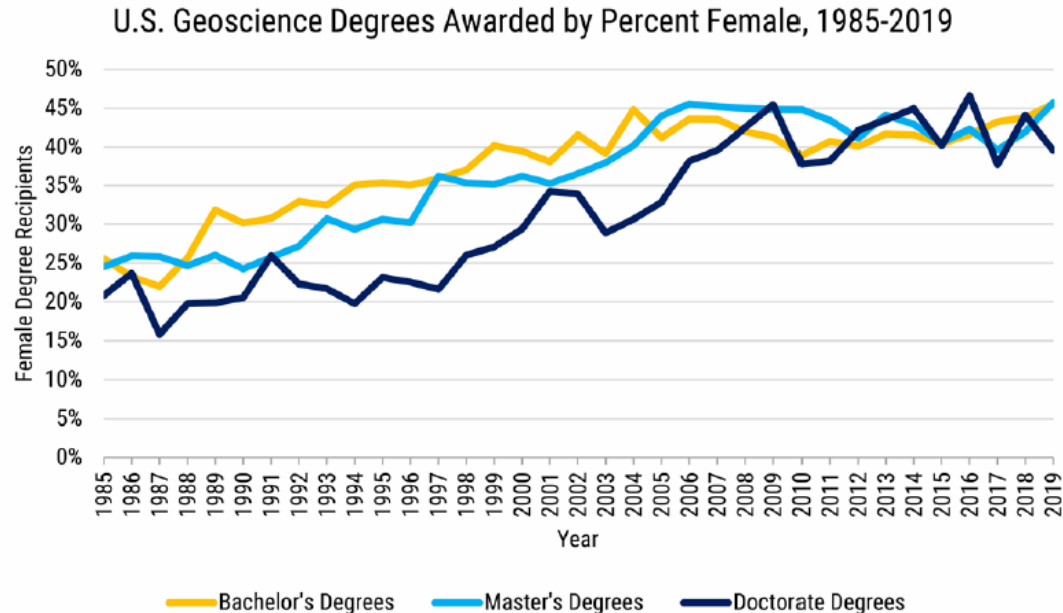
Personally, that was a good move as I –

- Could select from a variety of project types,
- Could choose who to work with (and I was selective!),
- Could set my own schedule,
- Could set my own pay scale,
- Could be politically active, and
- Could spend more time with organizations such as
AWG (served on Board of Directors, Rocky Mountain delegate: 2007-2013, was part of the Gaea Editorial Board, was International Member Liaison from 2010 – 2017, and am/was on various committees including the Professional Excellence Award, the Sand Travel Grant Award, the Takken Travel Grant Award, and co-led/organized the southern Canadian Cordilleran 2014 field trip).



Running even a very small company comes with its own headaches, but it has been worth it.

There are more data available for women in the geosciences during the 2000's, so let's look at how we're doing:



Credit: AGI, data from AGI's Directory of Geoscience Departments

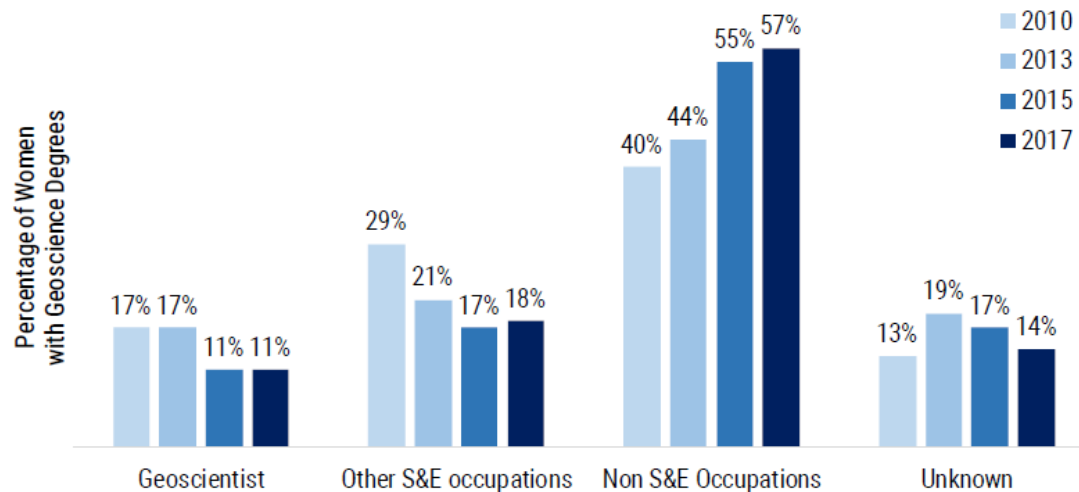
AGI Geoscience Currents:
www.americangeosciences.org/geoscience-currents Data Brief
2020-023; October 19, 2020 Written and compiled by Leila Gonzales
and Christopher Keane, AGI

"The participation of women in geoscience academic programs has steadily increased over this period (1985-2019), albeit with some fluctuations over time. In 2019, 44% of undergraduate geoscience students and 46% of graduate geoscience students were women. Furthermore, in 2019, 46% of geoscience bachelor and master's degrees and 40% of geoscience doctorates were conferred to women."

Still have: 19% female and 81% male geoscientists in faculty positions at U.S. universities in 2015. (Wilson, C., 2016 - Data from Geoscience Workforce 2016, Alexandria, VA: AGI).

Graduation to occupation retention

Women with Geoscience Degrees by Occupation, 2010-2017



Credit: AGI; data derived from the NSF National Survey of College Graduates

From: AGI Geoscience Currents:

www.americangeosciences.org/geoscience-currents Data Brief 2020-023; October 19, 2020 Written and compiled by Leila Gonzales and Christopher Keane, AGI

"Since 2010, the percentage of women with geoscience degrees working as geoscientists declined from 17% to 11%, and those working within other science and engineering occupations declined from 29% to 18%.

- Since 2010, the percentage of women with geoscience degrees working in non-science and engineering occupations increased from 40% to 57%. This increase was driven by the increases in women with geoscience degrees working in sales and marketing occupations in 2015 and 2017, and those working as non-science and engineering managers in 2017."*

Equal Pay

Overall workforce:

“Examining the hourly pay of those aged 25 to 54 who are employed full-time, we found that the ratio of women’s to men’s pay increased from 0.61 to 0.83 between 1970 and 2018, rising especially fast in the 1980s, but much slower since 1990.”

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2018 - in geosciences, atmospheric and ocean sciences, the figures were \$65,500 for women and \$71,000 for men. **From: Gender pay gap persists:** US male PhD holders earn more than female counterparts across nearly every scientific field. *From: Nature* 553, 241 (2018)
doi: <https://doi.org/10.1038/d41586-018-00113-6>.

Overall Gender Equality: “*In sum, there has been dramatic progress in movement toward gender equality, but, in recent decades, change has slowed and on some indicators stalled entirely.*”*From:* Progress toward gender equality in the United States

has slowed or stalled. Paula Englanda,1, Andrew Levinea, and Emma Mishela, <https://www.pnas.org/cgi/doi/10.1073/pnas.1918891117> 6990–6997 | PNAS | March 31, 2020 | vol. 117 | no. 13.

NOW: Covid Recession for Women???

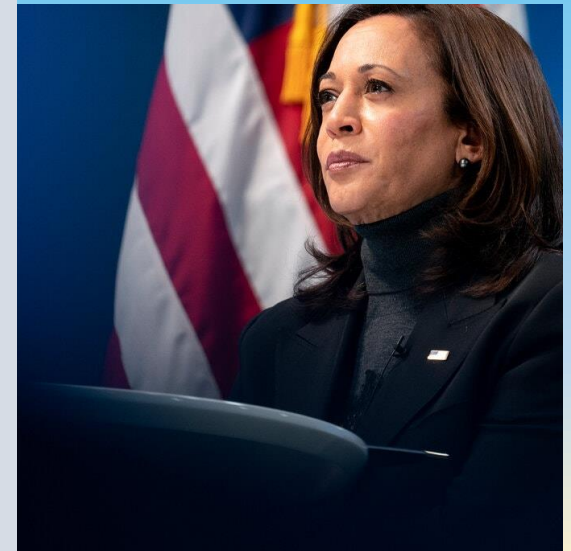
“In early October, the United States Labor Department reported that women were leaving the workforce at four times the rate of men. A few months earlier, a report from McKinsey Global revealed that while women made up 43 percent of the workforce, they had borne 56 percent of COVID-related job losses. This data — and much more — led one news source to call this moment “America’s First Female Recession.” From: <https://www.aclu.org/news/womens-rights/how-covid-19-is-setting-working-women-back/> (11/13/2020).

Listen to Colleen Ammerman in a podcast on At Liberty - *How Covid-19 is Setting Women Back* - <https://soundcloud.com/aclu/how-covid-19-is-setting-working-women-back/s-A0Xsu36Shi9>

2.5 Million Women Left the Work Force During the Pandemic. Harris Sees a 'National Emergency.'

“In one year,” Vice President Kamala Harris said, “the pandemic has put decades of the progress we have collectively made for women workers at risk.” From: Katie Rogers, New York Times, <https://www.nytimes.com/2021/02/18/us/politics/women-pandemic-harris.html>

“On a video call with women’s advocacy groups and lawmakers on Thursday [2/18/2021], the vice president painted a dire picture of the situation that millions of American women are facing during the coronavirus pandemic.” Credit...Stefani Reynolds for The New York Times



Summary:

- Be passionate about profession
- Network
- Be aware of and use legal tools!

