



# Gender Disparity In STEM

ANLY 503: Final Project Portfolio

*By: Kajal Tiwary, Clare Garberg, Elise Rust, Clara Richter*

# Introduction

**Background:** Gender discrimination in STEM is a human rights issue that manifests itself via:

- Job segregation
- Employment inequity
- Pay gap
- Lack of freedom in career choice

**Portfolio Goal:** Examine how gender inequities vary by location and evolve over time to see underlying factors, causes, and solutions:

- Education
- Workplace entrance
- Labor force
  - Participation
  - Wage
  - Technical Skills

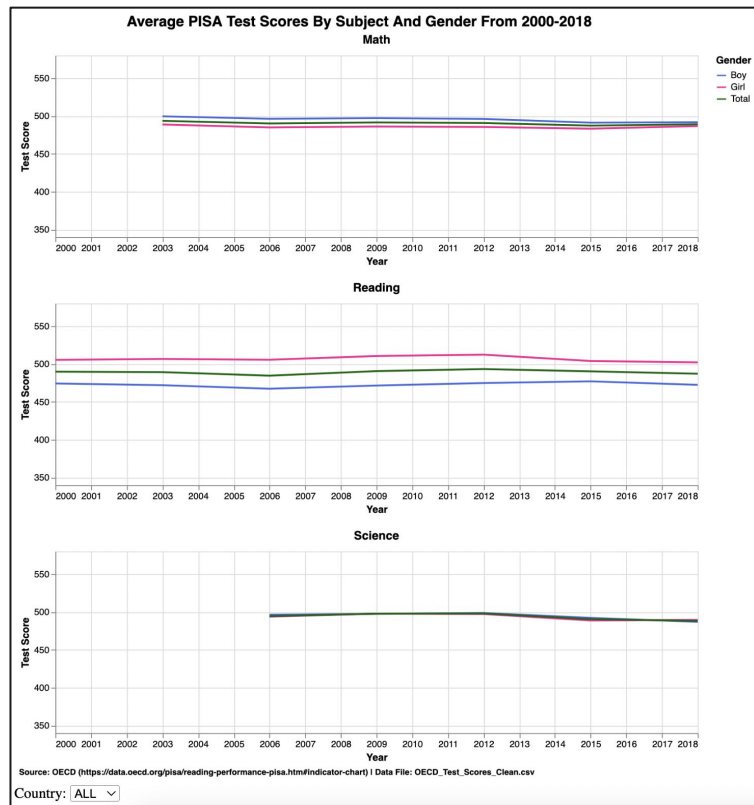
**Audience:**

- Students
- Women
- Policy-makers
- Stakeholders



Source: <https://nationalmortgageprofessional.com/news/64161/study-pinpoints-gender-disparity-home-equity>

# Visualization 1: Education



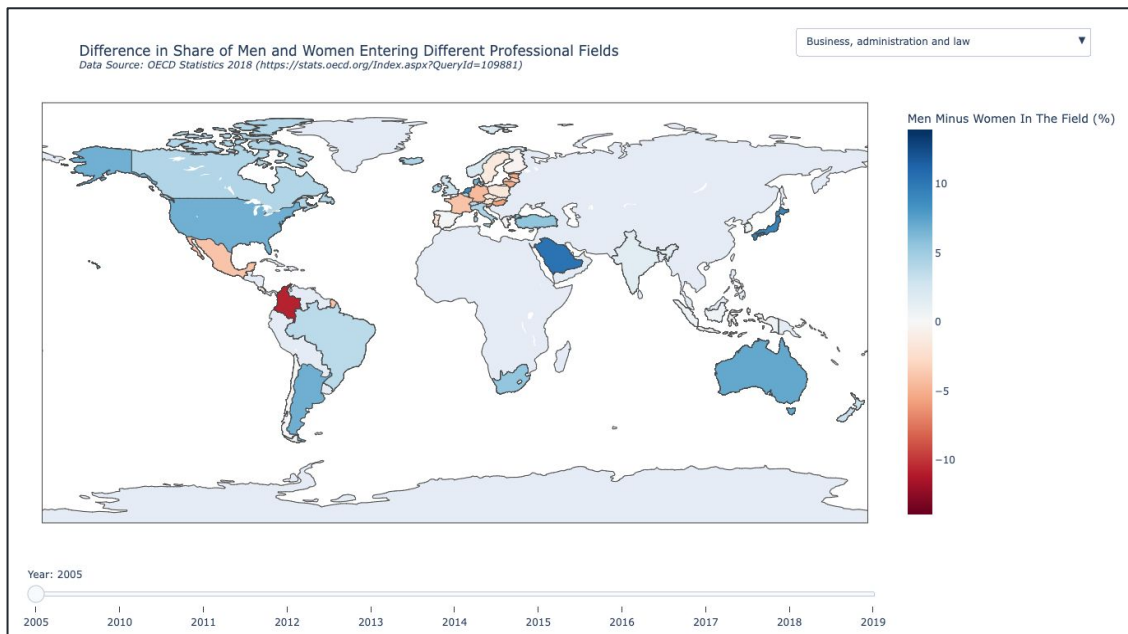
## Method / Data Prep:

- Data was examined for outliers, missing values, cleaned, and converted into tidy format
- Country rank variable was derived
- Countries with less than four years of data were removed
- Visualization developed via Python - Altair library

## Results / Key Takeaway(s):

- Women have historically performed poorer in STEM fields than men
- Men have historically performed worse in non-STEM fields than women
- Paradigms and trends in educational realm are changing, dissolving, and reversing

# Visualization 2: Entrance Into Labor Force



## Method / Data Prep:

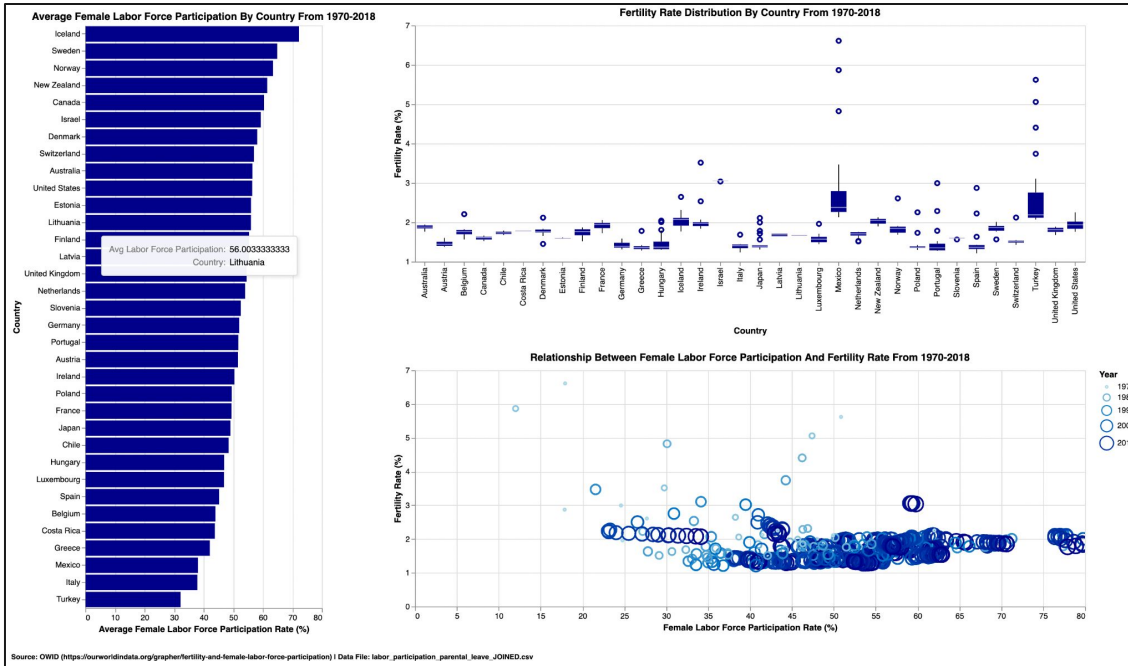
- Feature Generation:
  - Calculated “*Difference*” between share of men and women joining each field
- Visualization developed with Plotly Express and Plotly Go

## Results / Key Takeaway(s):

- STEM fields tend to have more graduating men than women entering
- Trends are not completely linear
  - I.e. Female entrance into Engineering etc. rose in 2011, 2016, 2019
- Engineering, manufacturing, and construction has the worst female representation

NOTE: This is NOT “Difference in % of the workplace represented by men vs, women”

# Visualization 3: Labor Force - Participation & Fertility



## Method / Data Prep:

- Data was examined for outliers, missing values, cleaned, and converted into tidy format
- Filtered for OECD countries
- Visualization developed via Python - Altair library

## Results / Key Takeaway(s):

- Turkey and Mexico have had noticeably higher fertility rates
- Iceland has largest average female labor force participation from 1970-2018 while Turkey has the lowest
- Female labor force participation has increased over time while fertility rate has slightly decreased

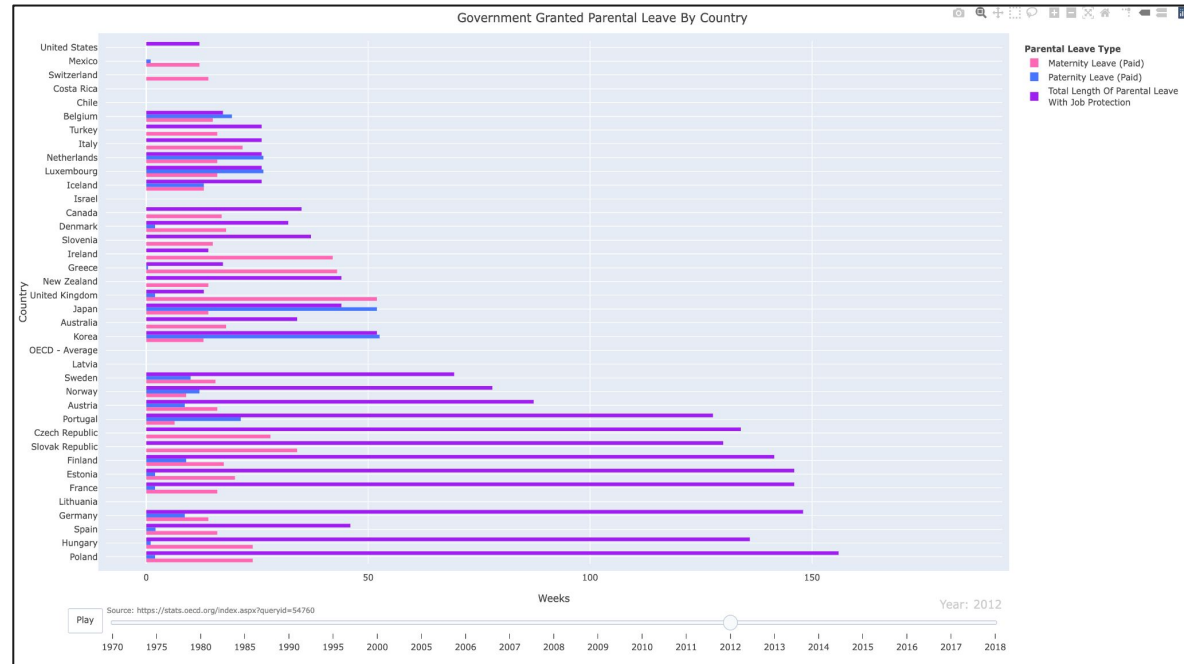
# Visualization 4: Labor Force - Parental Leave Policy

## Method/Data Prep:

- Joined to the labor force participation dataset on year and country
- Created in R with the plotly library

## Results/Key Takeaway:

- Parental leave increases over time
- The majority of countries have an average length of maternity leave greater than the average length of paid father-specific leave
- However, the gap between these two metrics seems to decrease for most countries over time



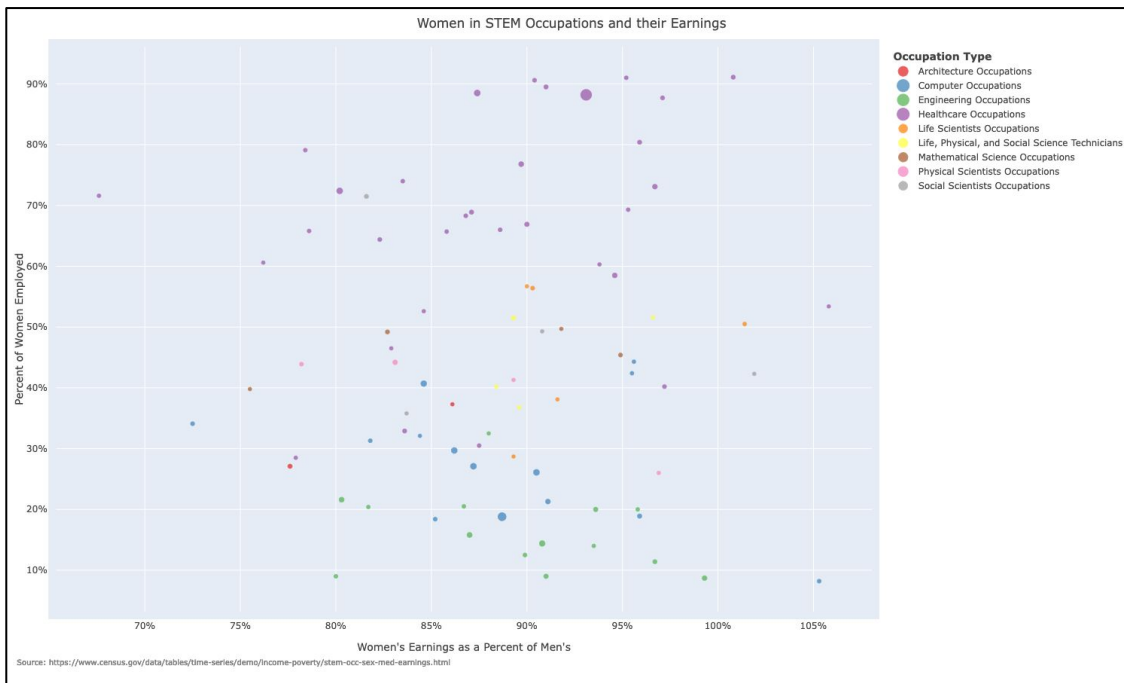
# Visualization 5: Labor Force - Occupations & Earnings

## Method/Data Prep:

- Categorized each occupation type in the dataset
- Created in R with the plotly library

## Results/Key Takeaway:

- Women are paid significantly less than men in almost every STEM job
- The hard sciences like CompSci and Engineering have significantly less woman



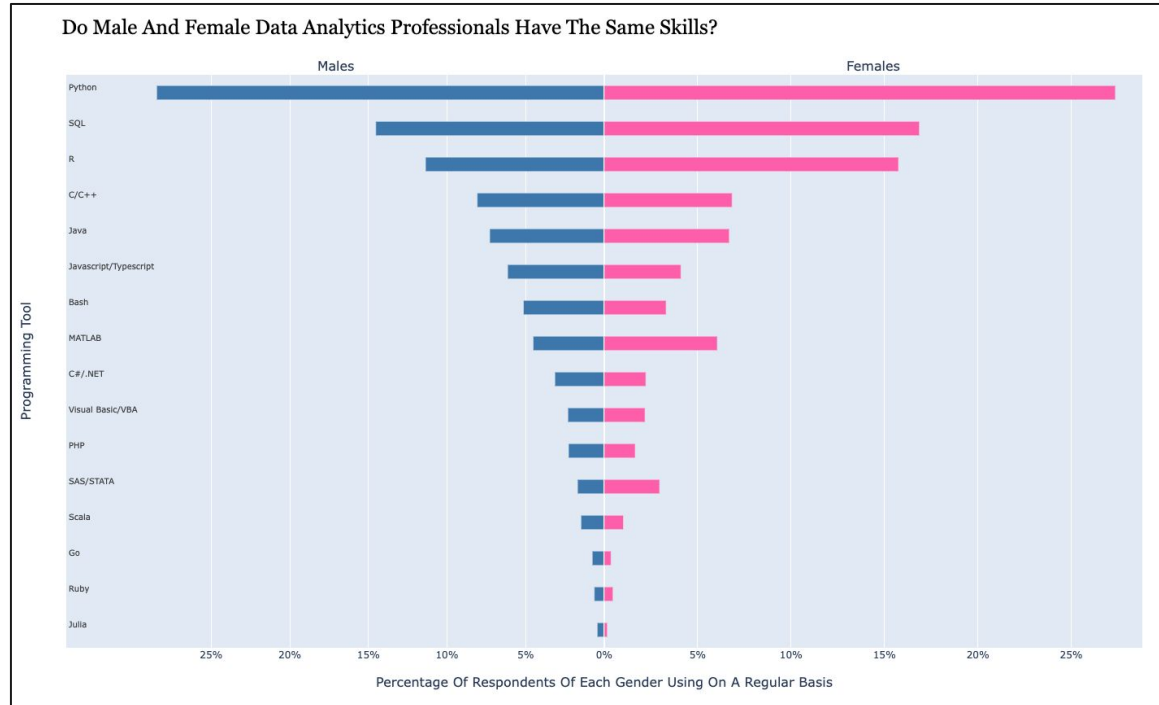
# Visualization 6: Labor Force - Technical Skills

## Method/Data Prep:

- Ratios of those using each programming tool were taken with the totals for each gender
- Developed with the plotly library in Python

## Results/Key Takeaway:

- Male and female data analytics professionals are using the same tools
- They have very similar skills overall
- Python, SQL, and R are the three most common tools for males and females in the field to be using on a regular basis





# Conclusion

## *Gender divides are still present but appear to be diminishing!*

### Education:

- Gender disparities have narrowed in the reading, math, and science fields.
  - Women are performing better in math and science
  - Men are performing better in reading

### Labor Force Entrance:

- Gender disparities in entrance into fields improve over time but remain higher in STEM fields than non-STEM fields

### Labor Force:

- Female labor force participation has increased while fertility rate has decreased.
- Male and female analytics professionals have the same technical skills and use the same programming tools regularly.
- Women are paid significantly less than men in almost every STEM job.





**Thank You!**

---

**Questions or Feedback?**