

## Project Report

### Gender and Pay Discrepancies at Iowa Universities

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#### **1. Introduction**

Our project aims to investigate the existence of pay inequality based on gender amongst professors across three universities in Iowa. Those universities include Iowa State University, University of Northern Iowa, and The University of Iowa. This topic is an important issue to address given the persistent gender pay gap in academia, which has been documented in numerous studies, including "The Gender Pay Gap in Academia: Evidence from a Public Research University" by Bronson, Thebaud, and Kane (2009), published in the journal *Gender & Society*.

Bronson, Thebaud, and Kane's study found that female faculty members earned only eighty cents for every dollar earned by their male colleagues, on average. Additionally, the disparity was even more pronounced for female professionals in science, technology, engineering, and math subjects—where they made a mere three-quarters of what their male counterparts earned. The outcomes of the research serve as a poignant reminder to explore in depth, with immediacy and priority, whether there is an observable discrepancy between salaries based on gender among professors at the triad educational institutions operating within Iowa.

Through the analysis of variables such as employer, articles published, gender, and others listed in our data dictionary, we seek to find if there is a major disparity in academia between pay of male and females. We hope that our research will contribute to a more equitable and inclusive academic environment for faculty members of all genders.

#### **2. Data**

For our project we utilized a variety of websites to compile the necessary data to answer our question. We utilized two different sites to compile salary records for male and female professors

at the three universities in Iowa. The first site we scraped was Iowa State Employees from OpenTheBooks to gather data on professors from the universities named earlier. Scraping this website allowed us to gather our necessary data into six different CSV files as the files were separated by year and university. However, after using some data scraping tools we decided to use an additional website, *State Employee General Salary Book*. With this website we could obtain the details of name, gender, and salary between the years 2021 and 2022.

Now that all our data was collected into six files separated by university and year, we uploaded the files into R. Once all six files were uploaded, we performed an initial round of data cleaning and transformation. After all column names matched and contained the correct number of columns, we were able to merge all six files into one using ‘rbind’. With our final dataset we conducted additional data cleaning and transformation as deemed necessary before performing our analysis.

*Fig. 1 Data Dictionary*

<b>Column</b>	<b>Type</b>	<b>Source</b>	<b>Description</b>
Name	chr	Both	Name of employee
Gender	chr	Both	Gender of employee
Employer	chr	Both	University where employee works
2021 Salary	num	Iowa Universities	Salary for 2021
2022 Salary	num	Iowa Universities	Salary for 2022

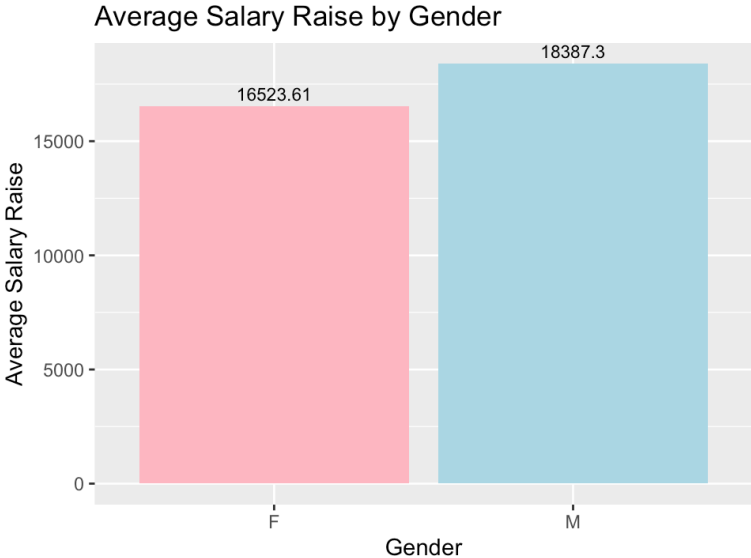
Raise	num	Iowa Universities	Salary difference between 2021 and 2022
Articles	chr	Articles	Number of articles published

### 3. Analysis

#### 3.1 Finding Average Pay Raise among Male & Female Professors

To answer our first question: What is the average pay raise among employees at the three universities? We found the average pay raise for female employees at the three universities in Iowa from 2021 to 2022 was \$16,523.61. Compared to the average pay raise for male employees at the three universities in Iowa which was \$18,387.30, indicating a gender-based salary disparity. This calls for further investigation into the factors contributing to this disparity and efforts to ensure fair compensation for all faculty members.

*Fig. 2 Average Raise by Gender*



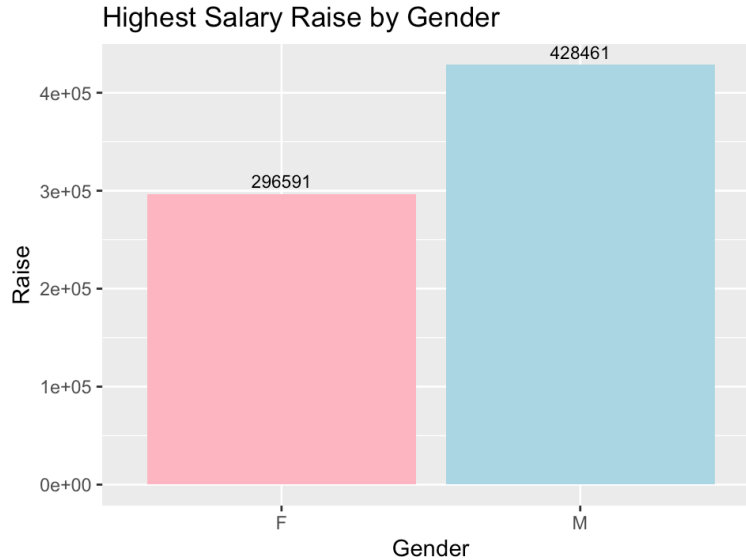
#### 3.2 Gender Serving as Significant Predictor of Salary

We also looked at whether gender serves as a significant predictor of salary levels among professors. On average, male employees still had a higher salary than female employees in the three universities we analyzed. For example, Andrew Pugely was the highest earning male employee in 2022 at \$1,742,425. While the highest earning female employee in 2022 was Marta Jane Hemmingson-Van Beek at \$880,274. This is a difference of \$925,758 in salaries between the highest male and female earners in 2022 at the three universities in Iowa.

For additional context let us compare these numbers to the highest earning male and female employees for 2021. Again, we have Andrew Pugely as the highest earning male employee in 2021 at \$1,476,387 and Marta Jane Hemmingson-Van Beek as the highest earning female employee at \$816,667. This is a difference of \$659,720 in salaries between the highest male and female earners in 2021. In one year, the income gap between the highest male and female employees increased by \$266,038, so instead of closing the wage gap it is only increasing.

Going even further to analyze this question, we examined our data to see the difference in raise amounts between male and female employees at the three universities. The results of this analysis are shown in figure two. We found the difference between the highest raise amount earned by a male and female employee to be \$131,870. The highest raise amount earned by a male was Mohammad Bashir at \$428,461. Compared to the highest raise amount earned by female employee Fabiola Kestelman at \$296,591. This means there is a difference of \$202,431 for the highest raise amount earned between male and female employees at the three universities in Iowa.

*Fig. 3 Highest Raise Amount by Gender*



### 3.3 Highest & Lowest Salary at 3 Universities in Iowa

There was very little variation between the highest salary amounts among the three universities in Iowa. There was also very little change between the years 2021 and 2022 for highest salary amounts amongst the three universities. However, what we did find during our analysis was raise amount appeared to vary significantly between the universities.

The following are maximum raises given by their respective university between 2021 and 2022:

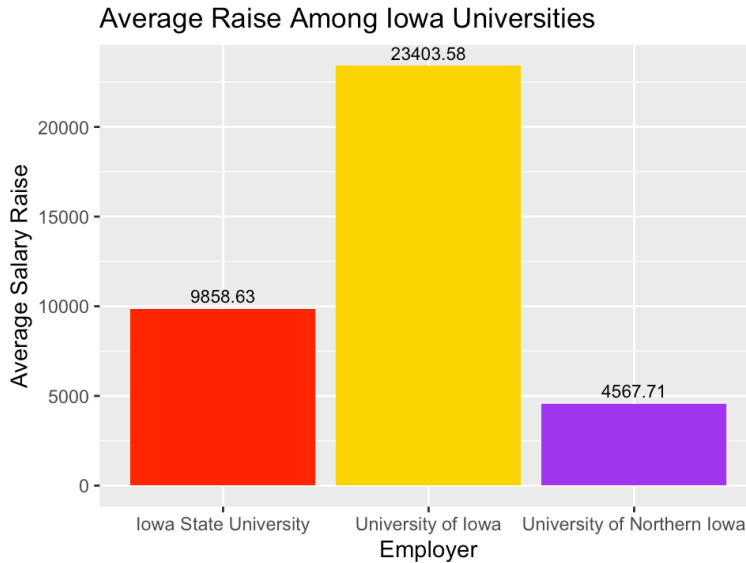
- Iowa State University: \$193,317
- University of Iowa: \$428,461
- University of Northern Iowa: \$99,917.81

The following are average raises given by their respective university between 2021 and 2022:

- Iowa State University: \$9,858.63
- University of Iowa: \$23,403.58
- University of Northern Iowa: \$4,567.71

Analyzing the numbers, it makes sense that The University of Iowa had the highest average raise at \$23,403.58 since the university also gave the maximum raise amount of \$428,461, which was about 2.22% higher than the maximum raise given by Iowa State University and about 4.29% higher than the University of Northern Iowa.

*Fig. 4 Average Raise Among 3 Universities*



### 3.4 Articles Disparities Analysis

Professors from universities in Iowa have dedicated years of work towards building their expertise in their respective fields. In order to better understand potential mediation variables that could cause differences in raises, we conducted an analysis of the number of articles published by each professor, regardless of gender. To obtain this information, we used Google Scholar, a reliable website that provides extensive information on professors' experiences. However, due to the websites limitations on accessing professor profiles, we randomly selected sixty professors, evenly split between females and males. Using this data, we ran an analysis in R, which yielded the following results.

When we performed our analysis, we found the following results shown in figures five and six. While we originally selected sixty professors, we had to complete data cleaning and transformation

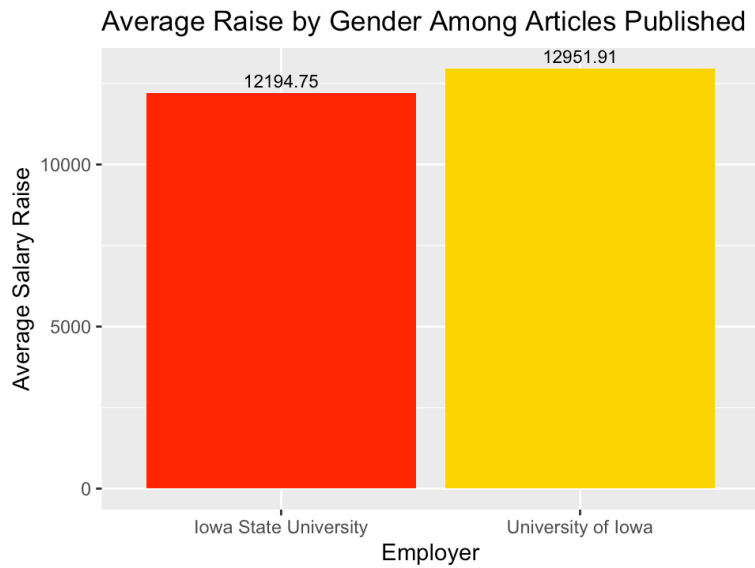
in R prior to our analysis which took our selection down to forty. Figure five shows the top 15 professors with the number of articles they published and figure six shows the average raise amount for professors who published articles. When completing our calculations in figure six we made sure to exclude any 'NA' values to not impact our results. With the results in figure six we can see that professors at The University of Iowa earn a slightly higher raise for publishing articles compared to those at Iowa State University.

A further analysis we performed in R was to see which professors who had published articles had the highest raise amount compared to the number of articles they published. We found that Adrien Aertsens, a male, had the highest raise amount at \$69,156.66 with four published articles. In addition to this, we found the lowest raise amount to be \$650 with \$650 Craig Adcock, also a male, with seventy-two articles published. While this section of our project did not include the entire data set, it is still surprising to see large gaps among professors who publish articles and their raises. Especially the gap between Craig who published seventy-two articles and received the lowest raise between 2021 and 2022 and Adrien who published only four articles and had the highest raise. Obviously, this is only a subset of our data, but it does provide evidence that the number of articles published is not the only factor that impacts a professor's raise.

*Fig. 5 Employees with the Most Articles Published (Top 15)*

	Name	2022 Salary	2021 Salary	Raise	Articles	Gender	Employer
1	ALEXANDER, DAVID	NA	NA	NA	500	M	Iowa State University
2	ADAMS, HAROLD P	NA	NA	NA	440	M	University of Iowa
3	ABBOUD, FRANCOIS	NA	NA	NA	397	M	University of Iowa
4	ABDEL-MALEK, KARIM	NA	NA	NA	227	M	University of Iowa
5	AJJARAPU, VENKATARAMANA	224636.2	210100.10	14536.08	180	M	Iowa State University
6	AHN, DONG UK	104927.4	99504.00	5423.36	133	M	Iowa State University
7	ABRAMOFF, MICHAEL DAVID	32217.0	30204.00	2013.00	89	M	University of Iowa
8	AHN, BENJAMIN	119118.8	99082.89	20035.95	81	M	Iowa State University
9	AJMERA, BEENA	NA	NA	NA	76	F	Iowa State University
10	ADCOCK, CRAIG	109042.0	108392.00	650.00	72	M	University of Iowa
11	ADEAGBO, OLUWAFEMI	NA	NA	NA	68	M	University of Iowa
12	AIT-AISSA, KARIMA	66837.0	57301.00	9536.00	66	F	University of Iowa
13	ALLBAUGH, RACHEL A	159542.0	153812.04	5730.00	56	F	Iowa State University
14	ADAMS, LORI	99266.0	98379.00	887.00	41	F	University of Iowa
15	AFIFI, REMA	199138.0	193180.00	5958.00	31	F	University of Iowa

Fig. 6 Average by Gender for Number of Articles Published



## Conclusion

Our analysis found that the university where a faculty member is employed at in Iowa does impact their salary. The University of Iowa, being the largest research university, employs the most professors and pays them more on average compared to Iowa State University and the University of Northern Iowa. However, it is important to note that this is only the average, and finding the median may provide a more accurate understanding of how professors at these universities are compensated.

Factors such as gender bias, occupational segregation, and lack of transparency in salary negotiations contribute to this disparity as proven by our data. Of course, progress has been made in recent years but there is still work to be done to fix the gender pay gap in academia and ensure that women receive equal pay for equal work. This requires action from universities, policymakers, and individuals to promote gender equality and fairness in the workplace.



A Potential limitation of this study could be the accuracy of the data we got from our datasets. Data collection is critical to having accurate outputs of the data models and visualizations we built. Since we only looked at three universities in Iowa, we probably should not generalize our findings to all universities. To improve our project in the future, we could find different data sets from different universities in the United States.

## Works Cited

Iowa Legislative Services Agency. (n.d.). *Iowa Legislature - State Employee Salary Book*. <https://www.legis.iowa.gov/publications/fiscal/salaryBook>

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