Data Analytics for Increasing Diversity in STEM Education

Vedi Raval, YSP Student, *Milford High School*

David Kaeli, Electrical and Computer Engineering, *Northeastern University*

Abstract

The field of engineering has suffered from a lack of diversity, both in terms of race and gender. Some colleges have made progress in creating a more diverse learning environment for engineering students. This project is focused on understanding what factors are responsible for these positive changes so that they can be shared with the broader engineering community. Through our analysis of data from the Integrated Postsecondary Education Data System (IPEDS), we have identified schools that have made significant progress in terms of recruitment and retention of women in engineering. Our ongoing work is focused on identifying factors, such as federal funding grants, that influence these positive changes.

Experimental Methods

Data Cleaning → School Selections → Matplot Modeling → Correlation → Analysis

Award Obligations in STEM Education from 2019-2023

Award Obligations in STEM Education from 2019-2023
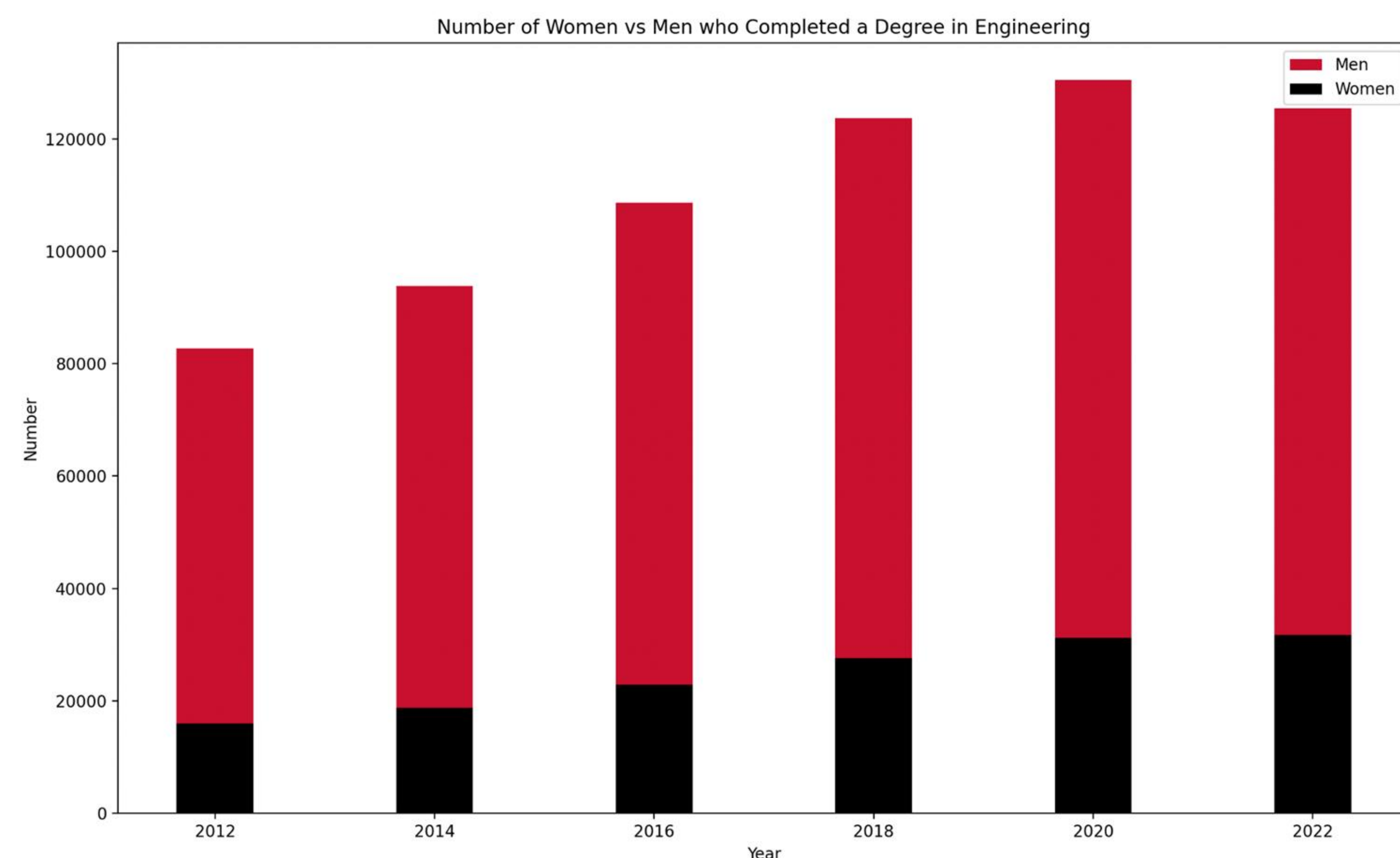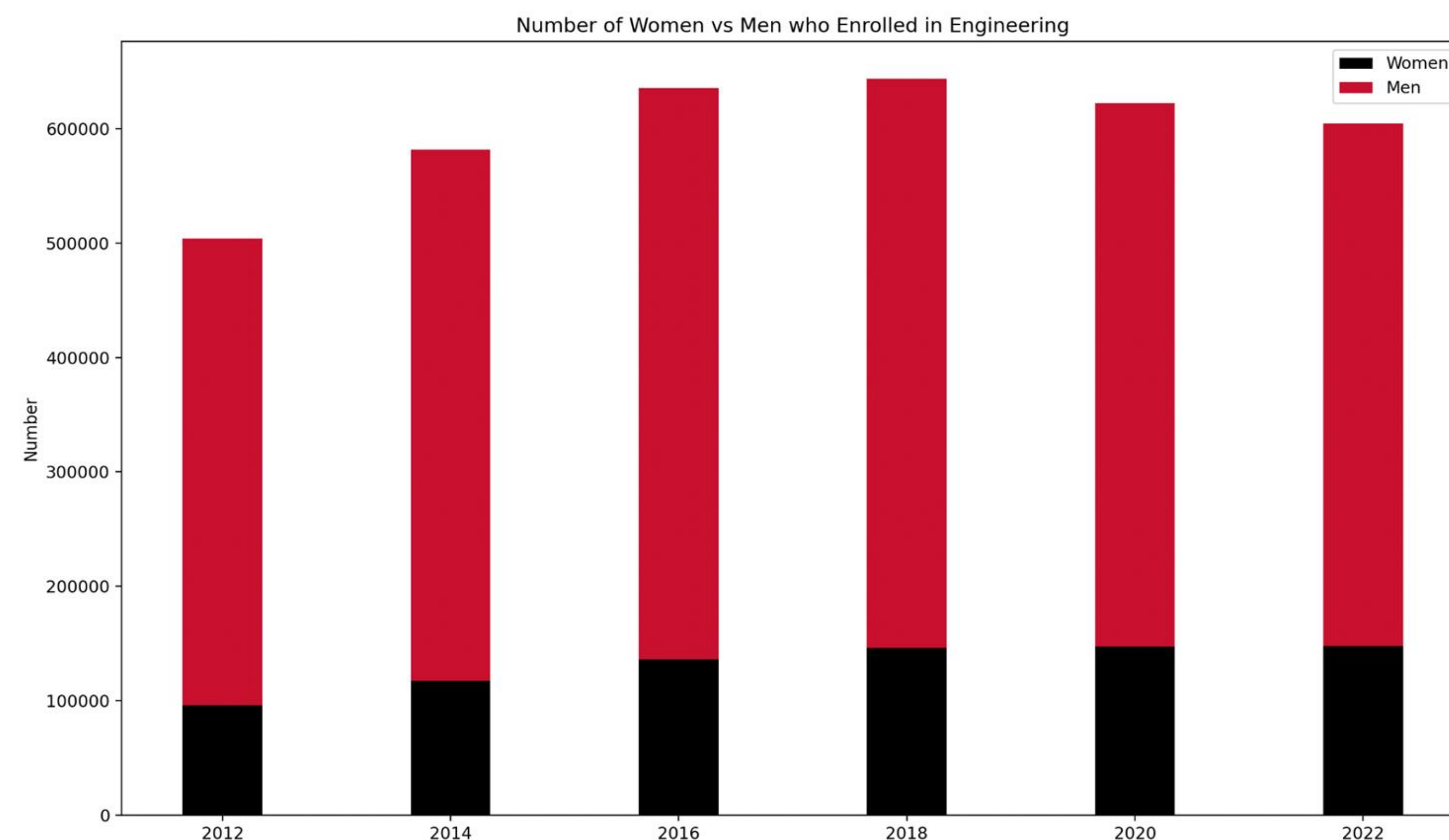
Conclusion and Future Steps
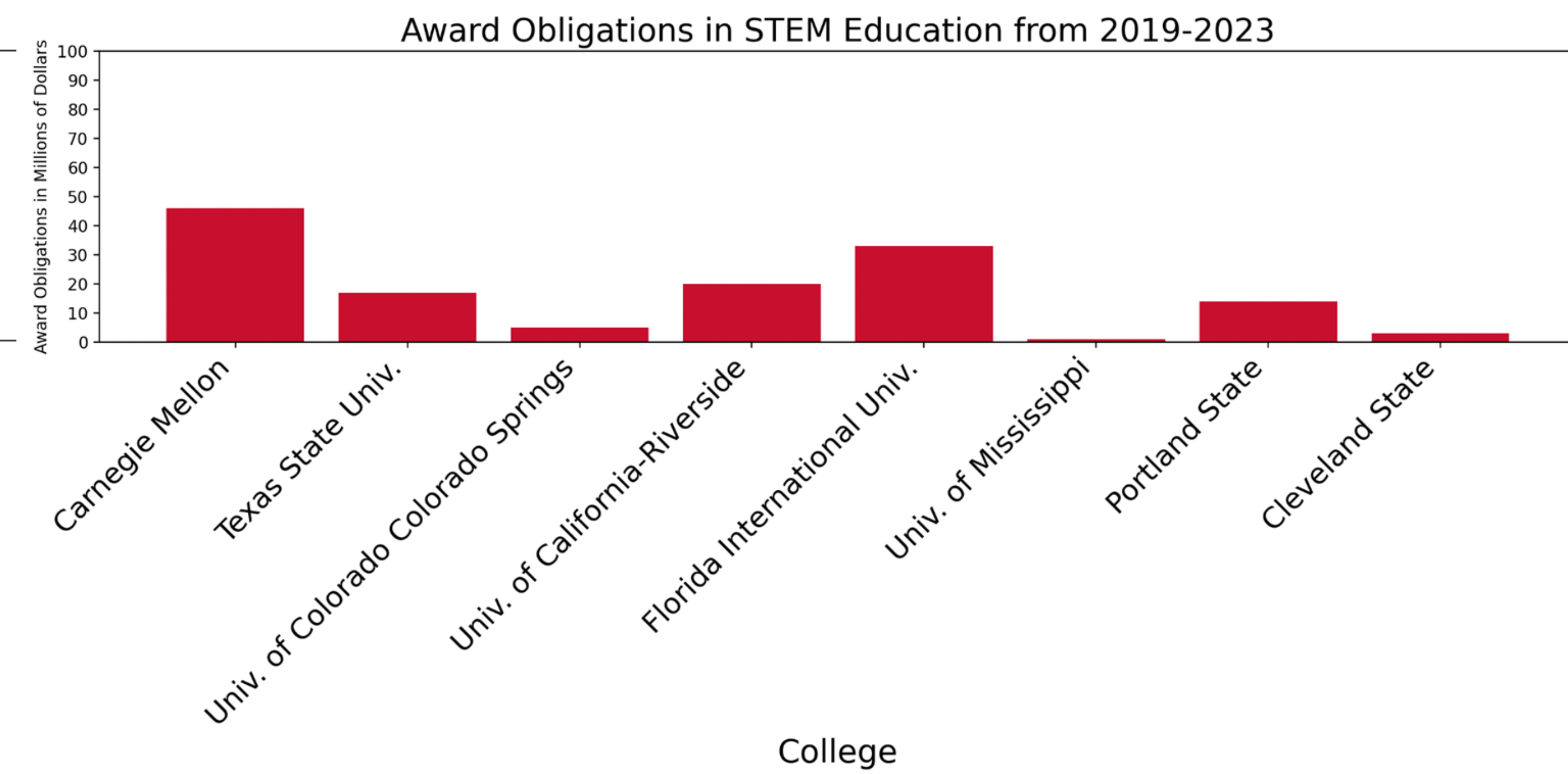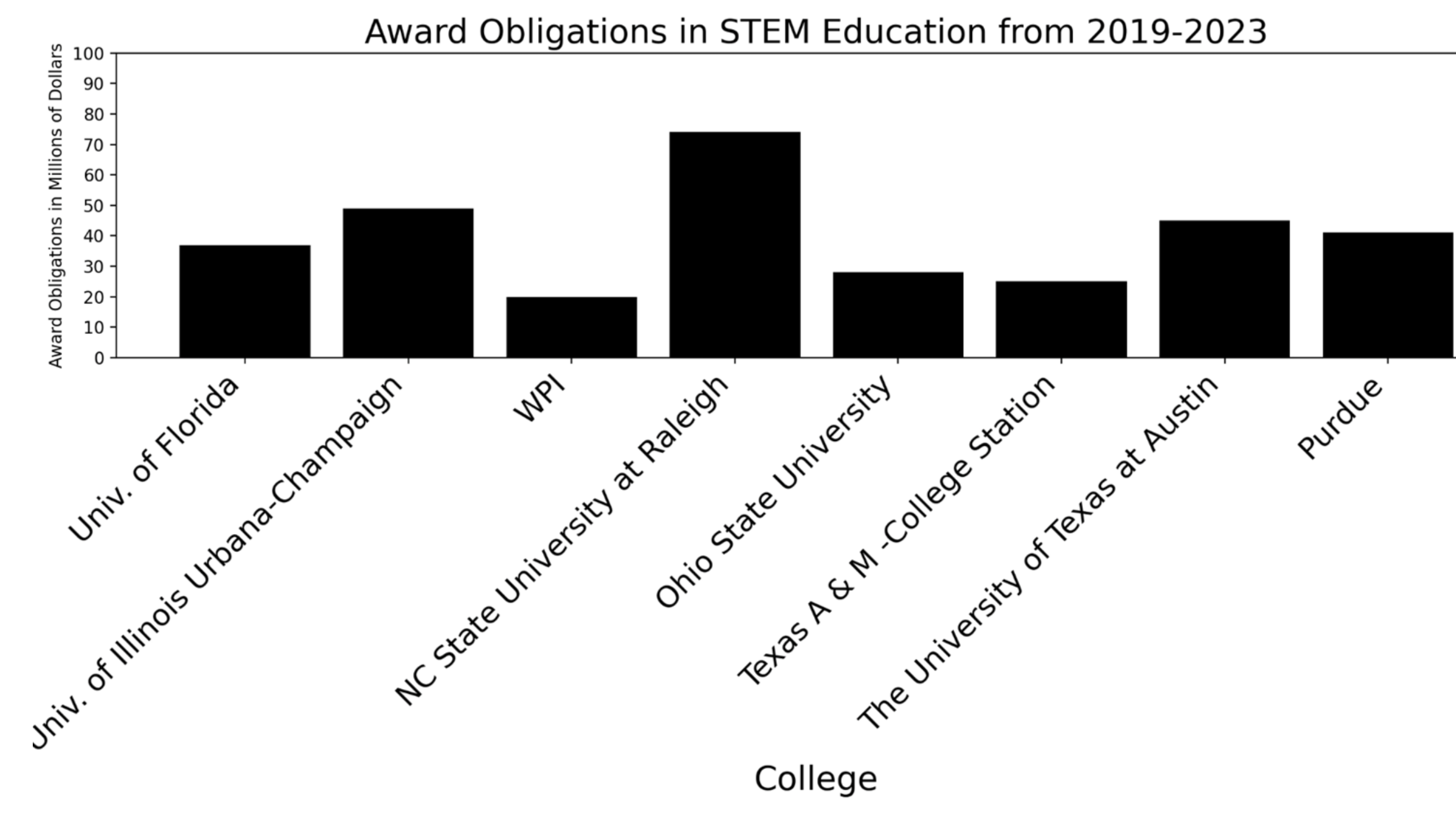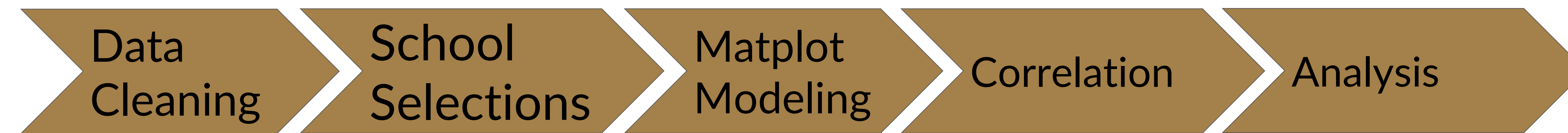
- 8 potential metrics that could influence positive changes
- Narrowing down metrics to more concise measures
- Expanding to new metrics
- Expanding into the workforce and companies to increase workplace diversity

Background

- Gender and race imbalances in engineering
- Some schools have made improvements, while others have not
- Graphs show the changes in gender diversity in engineering from 2012-2022

Number of Women vs Men who Enrolled in Engineering

Number of Women vs Men who Completed a Degree in Engineering

Results

CORRELATION COEFFICIENTS

School "type"	Completion % change versus award obligations	Completion % change versus new awards funded	Difference in completion from 2018 to 2022 versus award obligations	Difference in completion from 2018 to 2022 versus new awards funded
"Successful"	-0.508	0.516	-0.326	0.607
"Unsuccessful"	0.459	0.651	0.809	0.795

- Award Obligations → Funding on new awards or added money to prior awards
- New Awards Funded → Count of new competitive awards made
- % Change → Percent change in completion numbers for women in engineering from 2018 to 2022

References

1. IPEDS Data Center. Ipeds access databases. (n.d.). https://nces.ed.gov/ipeds/use-the-data/download-access-database

1. SageFox Consulting. (n.d.). Engineering Education Metrics Landscape. Public.tableau.com. https://public.tableau.com/app/profile/sagefox.consulting2072/viz/EngineeringPLUSMetricsLandscape/Story1

1. Workbook: Institution factsheet. (n.d.). https://tableau.external.nsf.gov/views/InstitutionFactsheet/InstitutionSnapshot?%3Aembed=y&%3AisGuestRedirectFromVizportal=y&%3Atoolbar=top&utm_medium=email&utm_source=govdelivery

Acknowledgements