Project (version 1) Description: *Minority Women in Mathematics*

It is well-known that gender and racial minorities are tragically underrepresented in Science Technology Engineering and Mathematics (STEM). In the US, women only make up approximately one-third of all recipients of STEM bachelor's degrees, and closer to one-fourth of mathematics/statistics PhD earners are women. More tragically, despite being 13% of the US population, less than 1% of professors within academia are minority women. Not surprisingly, minority women also earn significantly less.

February is Black History Month, and March is Women's History Month. Try a google search with "minority women in mathematics" or "history of black women in mathematics," pick a mathematician, and write about them! You are also ***completely welcome*** to choose someone in economics, or a topic of your choice. Math history interests me, so most of my suggestions below are about famous mathematicians! You're absolutely free to choose someone else, but some famous ones are

- Euphemia Lofton Haynes
  - first African American woman to earn a PhD in mathematics
- Evelyn Boyd Granville
  - second African-American woman to earn a PhD in mathematics (she went to Yale!)
- Maryam Mirzakhani
  - first woman to earn the Fields Medal (most prestigious prize in mathematics)
- Marjorie Lee Brown
  - third African-American woman to earn a PhD in mathematics
  - first African-American woman on advisory council of NSA
- Gloria Ford Gilmer
  - first African-American woman to publish a non-Ph.D.-thesis mathematics research paper
- Katherine Johnson
  - calculations critical to success of first US crewed space flight
- Dorothy Vaughan
  - human computer for NASA
  - taught herself and her staff at NASA Fortran

Here are some questions to keep in mind while you read:
- where/when they were born
- what their childhood was like
- what their education was like
- challenges they faced
- significant contributions to (or milestones achieved in) their field
- other facts you find interesting

NOTE: *I suppose writing a paper seems to make the most sense for this project. That's by no means a requirement. If you can find some other interesting way to present what you've learned, please feel free! There's no strict requirement on how long this should be. I just want to see that you've done some research and learned something. No specific format for citations either, but I'd be interested to see your sources! Students have enjoyed this project in the past, and I hope you do, too!*

<u>Project (version 2) Description:</u> *Multivariable Mathematics in the Real World*

Try a google search with "How are linear algebra (or multivariable calculus) used in…" or "constrained optimization in economics" to find articles on how our topics apply in your major, area of study, or something you're interested in. Some ideas with interesting results are:

- Computer science
- Business/Economics
- Engineering
- Video games
- Cell phones
- Sports analytics
- Google's search algorithm

Report why you chose the topic and how linear algebra applies using specific to examples. Some ideas of what you might talk about are below. These are *suggestions*, they may or may not apply to the topic you've chosen. Feel free to talk about anything that interests you.

Reason for Choosing the Topic
- Why did you choose your particular topic?
- How does the topic relate to you?
- Was it easy to find connections to our course?

Connections to Linear Algebra
- What applications do you find?
- How important are the subjects in our course to the topic you've chosen?
- Are there any other applications of mathematics to this topic?

Connections to Class
- What things have we learned in class that are similar to what you find online?
- What parts of the applications do you feel like you understand very well?
- It might be nice to provide a few numerical examples (ask me if you need help!).

Other
- Are there any specific people who use our subjects in the topic you've chosen?
- How does this use of mathematics affect us today?
- Talk about anything else you find relevant, interesting, or important.

NOTE: *I suppose writing a paper seems to make the most sense for this project. That's by no means a requirement. If you can find some other interesting way to present what you've learned, please feel free! There's no strict requirement on how long this should be. I just want to see that you've done some research and learned something. No specific format for citations either, but I'd be interested to see your sources! Students have enjoyed this project in the past, and I hope you do, too!*