**First, what was the purpose of creating this visualization? What is it's goal?**

We wanted to provide a novel way of allowing prospective students and career changers to explore career options. We acknowledge that these metrics are not the sole things to consider when choosing your career, but they are useful to throw into the mix, and not easy to compare in anything else we found online.

We think that data on the employment, salary, and the projected growth of different occupations can give people an idea of what to expect from the occupation they might wish to pursue. The ultimate goal of this visualisation is to help people make a more informed decision on the career path they wish to choose for themselves.

**What kind of constraints did this project have? Time? Technical? Other?**

There were time and budget constraints but they weren’t a major restriction.  We had some difficulties trying to get some of the functions to work in d3, like preventing the axes from scrolling to values less than zero, and creating the zoom functionality.  We got help via the very generous participants on stackoverflow.

Similar to our experience on stackoverflow, we were trying to figure out how to handle the fact there were a few outliers spaced out along the x-axis. I made a call out on Twitter and David Nopli @Biff\_Bruise not only suggested a zooming axis, but actually built one in Excel.

**Can you talk about the data source a bit? How did you simplify it, what did you decide to leave out or to highlight?**

We used Occupational Statistics (the latest available at the time was for 2011) and Employment Projections released by the US Bureau of Labor Statistics (BLS). Both these datasets contain data on numerous occupations: from the very popular ones e.g. teachers to the very niche ones, e.g. logging specialists. We narrowed down the list of occupations following an adapted version of the CNN Money: Best Jobs in America methodology and focused only on occupations that employed at least 10,000 people in 2011 and had a median salary of at least $40,000. These criteria gave us means to focus on occupations that require a degree. We also had to leave out certain occupations, for which the median salary estimate was not available e.g. actors, musicians, professional sportsmen, etc. We felt fairly comfortable doing this as these professions are not among the common destinations of university graduates.

To go beyond the numbers of employment, salary, and projected growth, we incorporated measures of required education and work experience to give users an idea of what the credentials needed to enter a given occupation are.

**Were there any alternative designs you considered? If so would you mind showing them and describing their strengths and weaknesses?**

We considered using area of the dots rather than colour to indicate a value, but thought that area tends to grab too much attention. We really wanted the main two eye-catching variables to be represented by position, and that way we could reveal the patterns through clustering (we initially tried clustering but ended up opting for quadrants using the median of medians - clustering wasn't helping to make the point in a clear fashion).

We considered using a continuous colour scale for growth, but actually thought being able to simply see which were declining and inclining was more important than distinguishing between subtle differences in hue.  Predicted growth is never likely to be super-accurate anyway, so there was probably little value in getting so specific with the representation.

One of the ideas at the early stages of the project was to plot employment and salary figures on a map of the United States, with a possible addition of time as a variable to show how employment and salary for different professions have changed over the past 10-20 years. However, we really wanted to compare the salaries and the number employed rather than where the jobs were. There was also a suggestion of showing a line graph of salary over time when you click through, but thought the resulting lines suffered from 2 weaknesses:

Difficult for the user to know what to take from them

Many of them just showed the general change in the economy

We also experimented with switching up the three axes (i.e. x/y/z or popularity/income/growth) to see which way worked best. And there were many features and layout elements that were visually tweaked as we built it, as we could see what needed changing once we could actually play with it.

**What technology was used to implement this graphic? Were there any challenges or limitations there?**

All the graphic design work was completed in illustrator (including creating a sample scatter plot with a real sample of the data), which didn't really offer any challenges.

We built it in JavaScript using Scalable Vector Graphics and d3.js. It was our devs first time using this library, so he had several hold-ups during the build while struggling to make a feature work - most notably with the mouse zooming, and then with the zoom/drag boundaries, zoom buttons, reset zoom button, and calculating/placing the median lines. Stackoverflow was invaluable to me. Special shout out to user Superboggly who saved me repeatedly!

**Any other insights into your conceptual and design process would be greatly appreciated.**

The design was refined and simplified with each iteration to optimise the use of the pixel width we were working with and to juggle the numerous functions to ensure they worked well together while being simple to use and understand.

The initial design had a select and compare functionality with two drop down bars at the top, one to select the industry/s of interest and another to select industry/s to compare to. We changed this so that there was only one drop down to select category/s of interest and we displayed all categories not selected on default in light grey. This simplified usability while still allowing the user to compare selected industries of interest to all other categories.

In the early designs the category drop down overlapped the graph when expanded. In the final version it pushes the graph down to allow the user to continue to engage with the graph while being able to select and deselect different fields of interest.

Initially we were going to put the on-hover information for the points in the plot in an info bar beneath the graph and have it colour coded with the hexagons in the scatter. With this arrangement the key was beside the graph to the right. Each of the aforementioned features didn’t provide the perfect solution. With the on hover info appearing below the graph we ran the risk of it dropping below the fold and being missed by those viewing it on smaller screens. For this reason we integrated the on hover info panel inside the graph are ensuring that it would always be visible to the user. We also moved the key below the graph to allow us to make the graph full-page width, and to allow the drop-down and quadrant annotations to sit beside the graph. I (Mark) would have still liked the key above the graph so you know what you’re looking at before you look at it, but felt this was a small compromise to make in the grander scheme of things.

We tried a number of different methods of implementing the annotations for the quadrants before arriving on the final solution. The challenge was really working out how to incorporate them in a way that added as little clutter as possible, given there was already quite a lot going on in and around the graph. We felt the quadrant annotations were important to really help people understand what to take from the graph.