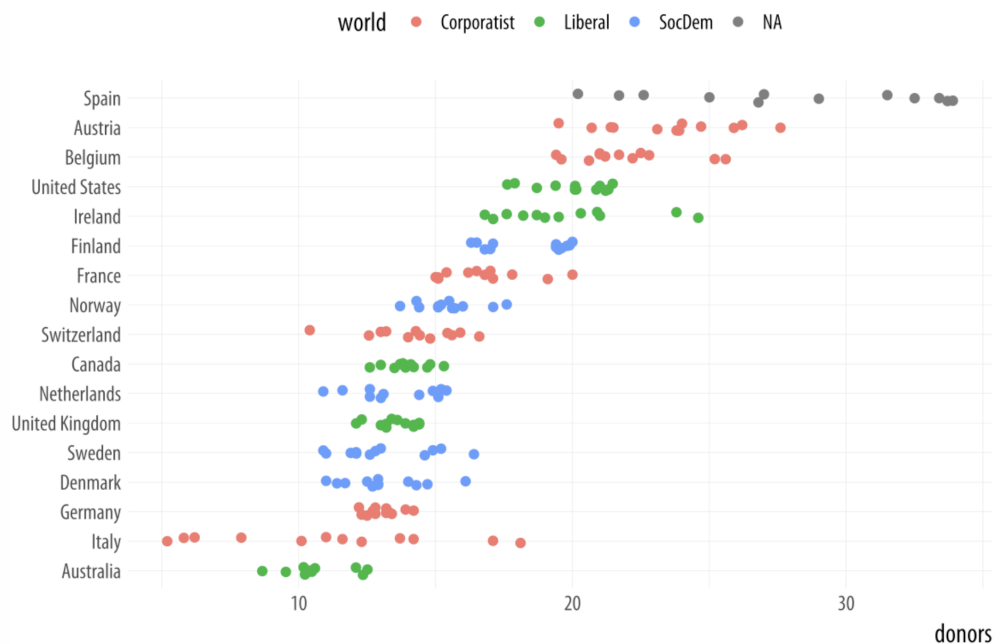


# CS251 HW 1 | Monday Feb 11, 2019 | Week 2

Name:

## Question 1



For the above plot<sup>[1]</sup>:

a) What scales are used?

b) Name the types of each variable/feature.

c) Would it be justified to permute the rows? How about permuting the color scale mappings?

d) Data points that share a common y value and have similar x-values are slightly offset (jittered) to increase the overall plot's clarity. What important constraint should we impose when implementing this common strategy?

## Question 2

Consider the following data on Reed Frog tadpole mortality.

Density	Preditors	Num Survived	Proportion Survived
25	"no"	10	0.9
35	"pred"	20	1.0
75	"pred"	40	0.5
35	"pred"	110	0.1
25	"no"	60	0.5

a) Create a matrix  $D$  with *Density* in the x-coordinate and *Num Survived* in the y-coordinate that will allow us to transform these two variables into screen coordinates using the format from class (i.e. column vector).

b) Write the translation and scale matrices required to convert  $D$  to normalized view coordinates.

c) Convert the data into normalized view coordinates. NOTE: I recommend doing this by hand.

d) Write the matrices required to convert your answer for c to screen coordinates that has extent ( $400 \times 200$  pixels).

e) Convert your answer from c to screen coordinates. NOTE: I recommend doing this by hand.

### Question 3

a) What effect would the following matrix have on a data column vector?

$$\begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$$

b) Is the homogenous coordinate always needed in scale and translation matrices?

1. *Data: Number of organ donors and political party collected for over a decade in 17 countries. Source: Healy (2018)* ↩