**Issues:**

‘frames\_indicies’ column has gaps:

To determine the frames taken for BSA to touch the area of measurement by mass photometer (20um by ~115um area)

An overlap could happen at multiple frames over the entire measurement period (60s) – this will be eliminated via code after we have determined the range of frames BSA takes to make ‘full’ contact.

The frames range required to measure a BSA molecules:

* To determine this likely need to consider the motion of BSA as a piece of string as Iain showed (string will be used as analogy for HA below).
* Frames recorded while string lands on grid and as HA leaves the grid (we can possibly determine the maximum point of contact of the string with via mass [kDa] being similar to premeasured mass).
* When taking frames the mass is likely to start small and at the point of contact = BSA mass then decrease again as the molecules leaves to repeat the process.
* As we look at areas where this pattern occurs we can likely determine a frame range for BSA contact and use this to highlight points from the entire data set via the code I have attached.

**Additions to the visualiser:**

Horizontal slider, where frames with their respective x and y points can be plotted on the scatter graph from min to max of the “frame\_indices”. As you move the slider the number of the frame shows under the slider.

Add a counter in the centre of the slider (will tally the green, yellow, orange, red plots)

**Code:**

In "possibleframerange.txt",

Assign rows 1,2,3,4,5... etc, then carry out the following process from the first row down.

If any numbers in the first row are found in X rows, then delete X

Example:

10 11 11 13 keep

11 11 13 remove

13 16 16 remove

21 21 25 keep

33 35 37 keep

35 37 39 39 remove

37 39 39 40 41 remove

39 39 40 41 43 43 keep

39 40 41 43 43 remove

40 41 43 43 remove

41 43 43 remove

43 43 46 47 remove

43 46 47 remove

46 47 49 keep

Print the new data in a new text file called "framerange"

**Summary so far:**

* We created 3 text files containing the x, y and frame indices.
* Created an algorithm to find possible frame range from all frames text data (range of 4 between number set + 3 number of more).
* Created another algorithm to check through the text output of the previous algorithm and output another text file with a refined frame range.
* Now I use frame range to match up to the (x,y) coordinates and then colour code each plot based on if it was a 3rd, 4th, 5th.... 11th reading in a range
* Replace each integer in “framerange.txt” with the range/row they are found in at “xy.txt” and print new data on “framerange\_row.txt”
* For each integer in the 3rd column, find the row matching the integer in “xy.txt” then copy the integers in the 1st and 2nd column on a new text file called “3rd\_overlap”.
* For the 4th-11th columns, repeat the process and produce new text files called “4th\_overlap”, “5th\_overlap”, “6th\_overlap” etc.
* Plot green points on the scatter graph using the 1st and 2nd columns as x and y points, respectively from “3rd\_overlap.txt”.
* Plot yellow points on the scatter graph using x and y points, respectively from “4rd\_overlap.txt”.
* Repeat this logic and change colour for 5-11 overlap.txt files.

**Stuck on this:**

For each integer in the 4th column of "framerange\_line.txt", find the line matching the integer in “xy.txt” then copy the integers in the 1st and 2nd column on a new text file called “4th\_overlap”.

For each integer in the 5th column of "framerange\_line.txt", find the line matching the integer in “xy.txt” then copy the integers in the 1st and 2nd column on a new text file called “5th\_overlap”.

For each integer in the 6th column of "framerange\_line.txt", find the line matching the integer in “xy.txt” then copy the integers in the 1st and 2nd column on a new text file called “6th\_overlap”.

Repeat for 7th, 8th, 9th, 10th and 11th columns and change the overlap text file to match the name of the column.

Using python.

Read "framerange\_line" and "xy.txt"

For each number in the 3rd column of "framerange\_line.txt", find the line matching the integer in “xy.txt”, then the copy integers in the 1st and 2nd column on a new text file called “3rd\_overlap”.

Loop this for columns 4-11 and output 8 more text files.

Send the complete code without explanation.

**This worked well.**

Using python.

1. Read “xy.txt”.

Note the 3rd column data in “xy.txt” as "frame".

2. Copy data “framerange.txt” and print new data on “framerange\_line.txt”.

3. Match the data in “framerange\_line.txt” to "frame" in “xy.txt”. Replace the first line in “framerange\_line.txt” with the number of the line the "frame" is found in the “xy.txt” file.

4. Replace all lines in “framerange\_line.txt” with the number of the line the "frame" is found in the “xy.txt” file.

5. Print “framerange\_line.txt”.

Send the complete code without explanation.