Usage

Initialize

Bootstrapping the datasets:

Reading In BS Parameters:

In[931]:=
```
sampleSize = Length@onlyYellowSpots
(* sampleSize usually uses the same # as sample size,
in my case, number of cells*)
repetitions = 1000 (* this is repetition of
  finding the mean of BS data needs to be at least 20 or 30*)
```

Out[931]= 22

Out[932]= 1000

BS for Only Yellow Spots:

data input

Resampling

Basic bootstrapping :

In[877]:=
```
i = 10;
a =
  Table[Table[RandomChoice[onlyYellowSpots[[All, i]]], sampleSize], repetitions ];
```

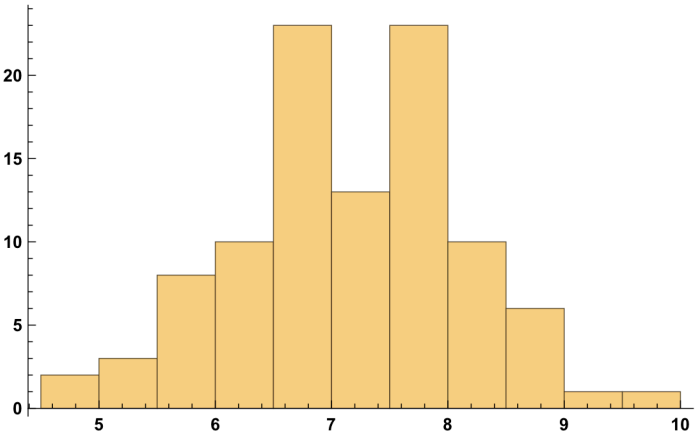
In[879]:=
```
meansBS = N /@ Mean /@ a
stdevsBS = N@StandardDeviation@meansBS
```

Out[879]=
```
{8.36364, 6.86364, 6.18182, 6.18182, 7.77273, 6.5, 7.77273, 5.86364, 6.45455, 5.95455,
 8.31818, 7.86364, 8.04545, 5.13636, 5.95455, 7.90909, 7.90909, 7.45455, 6.86364,
 6.90909, 6.95455, 6.63636, 6.13636, 8.31818, 6.54545, 7.72727, 7.59091, 6.77273,
 4.86364, 7.45455, 6.95455, 7.86364, 7.86364, 8., 8.09091, 6.59091, 7.13636,
 5.5, 7.68182, 7.13636, 6.90909, 7.59091, 7.72727, 9.09091, 7.09091, 8.27273,
 8.54545, 7.04545, 6.59091, 7.72727, 7.22727, 7., 7.63636, 7.45455, 6.59091,
 6.40909, 8.77273, 8.09091, 5.13636, 4.72727, 9.68182, 6.81818, 6.31818, 6.45455,
 7.95455, 5.45455, 8.5, 7.27273, 6.63636, 8.5, 6.63636, 7.95455, 6.81818,
 7.5, 5.68182, 6.86364, 6.77273, 6.63636, 7.86364, 5.77273, 8.09091, 7.86364,
 7.18182, 7.77273, 6.27273, 8.68182, 7.95455, 8.09091, 7.27273, 7.54545, 6.72727,
 5.5, 6.22727, 6.77273, 7.04545, 5.77273, 7.81818, 8.5, 6.77273, 6.40909}
```

Out[880]=
```
0.965826
```

In[881]:=
```
Histogram[meansBS, 10]
```

Out[881]=



Look at different levels of repetition :

In[882]:=
```
repetitionsList = {3, 30, 100, 1000, 10 000};
```

In[883]:=
```
i = 10;
a = Table[ Table[Table[RandomChoice[onlyYellowSpots[[All, i]]], sampleSize],
    repetitionsList[[num]] ], {num, 1, Length@repetitionsList}];
```

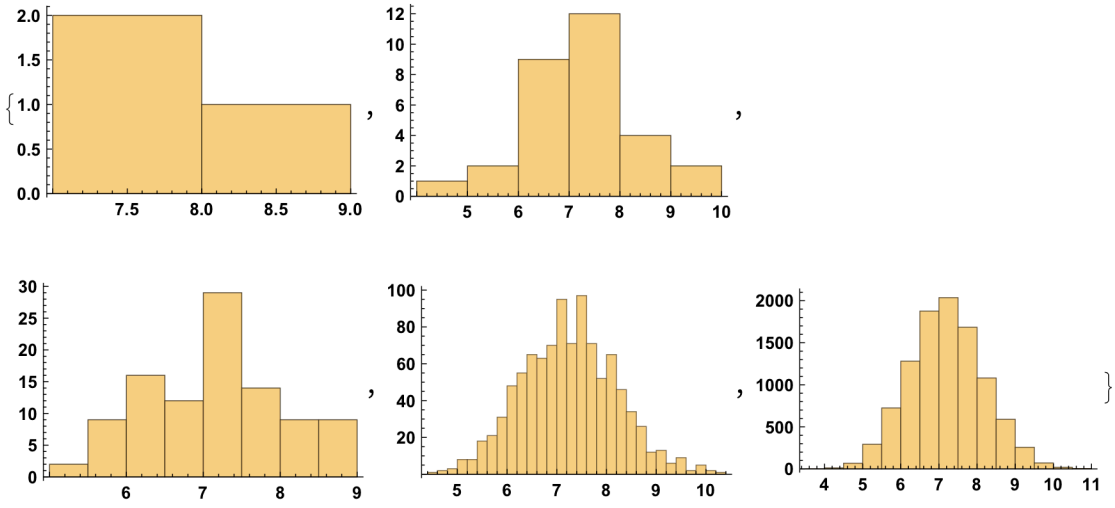
In[885]:=
```
meansBS =
  N /@ Table[Table[Mean[a[[i, j]]], {j, 1, Length@a[[i]], 1}], {i, 1, Length@a, 1}];
stdevsBS = N /@ StandardDeviation /@ meansBS ;
errorBS = ErrorBar /@ stdevsBS;
Length@meansBS
Length@stdevsBS
```

Out[888]=
```
5
```

Out[889]=
```
5
```

In[859]:=
```
Histogram /@ meansBS
```

Out[859]=



Resampling and graphing a time series

Do bootstrapping on each point in a time series to determine error intervals

In[933]:=
```
a = Table[Table[Table[RandomChoice[onlyYellowSpots[[All, i]]], sampleSize],
    repetitions ], {i, 1, Length@onlyYellowSpots[[1]], 1}];
```

In[934]:=
```
meansBS =
  N /@ Table[Table[Mean[a[[i, j]]], {j, 1, Length@a[[i]], 1}], {i, 1, Length@a, 1}];
mediansBS = N /@ Table[Table[Median[a[[i, j]]], {j, 1, Length@a[[i]], 1}],
    {i, 1, Length@a, 1}];
stdevsBS = N /@ StandardDeviation /@ meansBS ;
stdevsBSMedians = N /@ StandardDeviation /@ mediansBS ;
errorBS = ErrorBar /@ stdevsBS;
errorBSmedians = ErrorBar /@ stdevsBSMedians;
Length@meansBS
Length@stdevsBS
```

Out[940]= 65

Out[941]= 65

In[942]:=
```
c = Table[times, repetitions] // Transpose;
```

In[943]:=
```
Length@c
Length /@ c
```

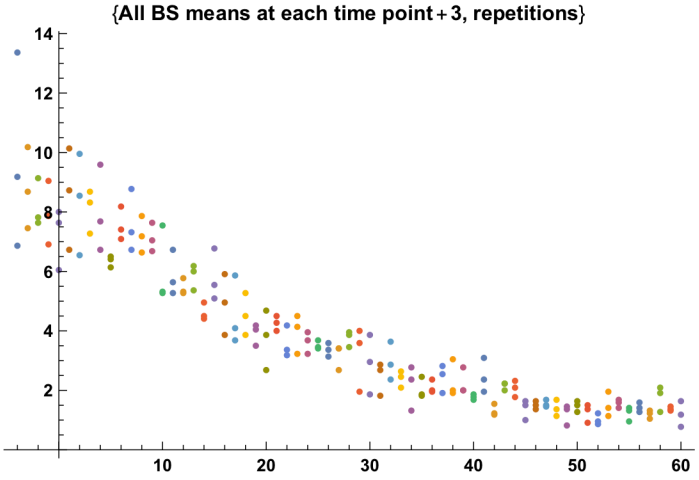
Out[943]= 65

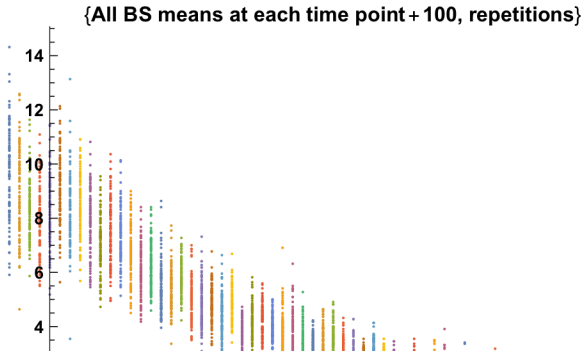
Out[944]=
```
{1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000,
 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000,
 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000,
 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000,
 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000, 1000}
```

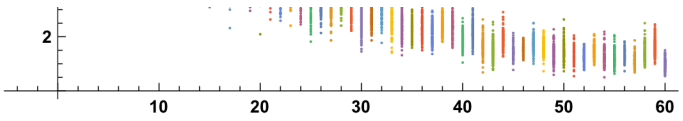
In[945]:=
```
repTimes = Table[times, repetitions] // Transpose;
medianTimeBS =
  Table[Transpose[{repTimes[[i]], mediansBS[[i]]}], {i, 1, Length@mediansBS, 1}];
meanTimeBS = Table[Transpose[{repTimes[[i]], meansBS[[i]]}],
   {i, 1, Length@meansBS, 1}];
```

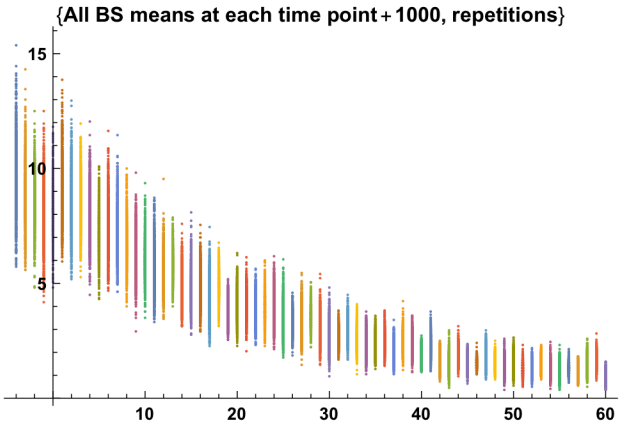
In[948]:=
```
b = Transpose[{myYelOnlySpotTime , errorBS}];
```

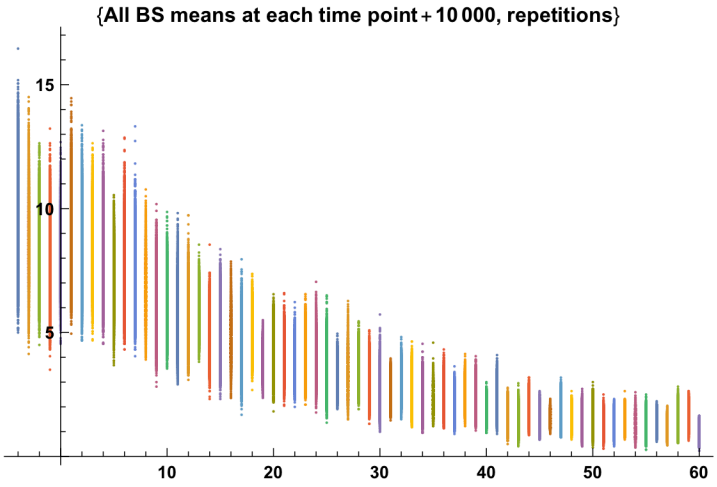
In[949]:=
```
repBS = ListPlot[
  meanTimeBS,
  PlotLabel → {"All BS means at each time point" + repetitions , "repetitions"}]
```





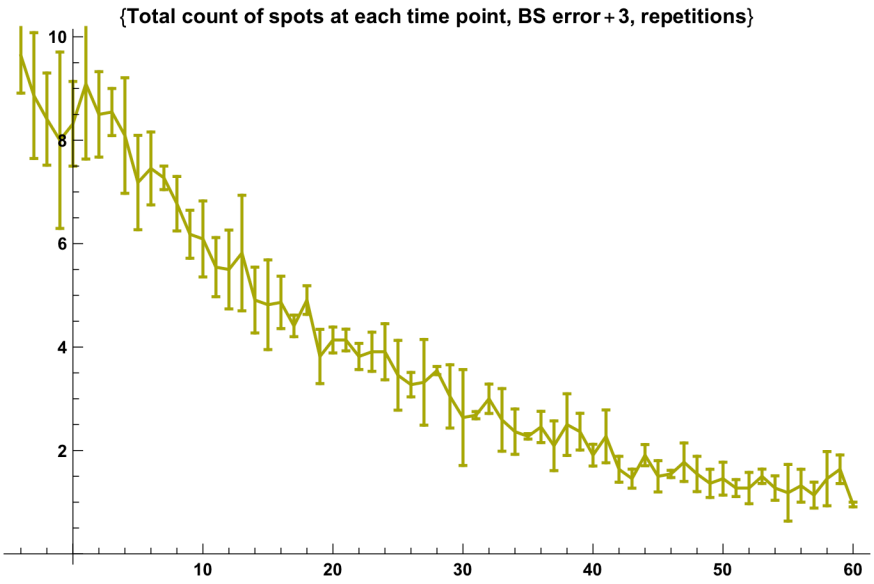


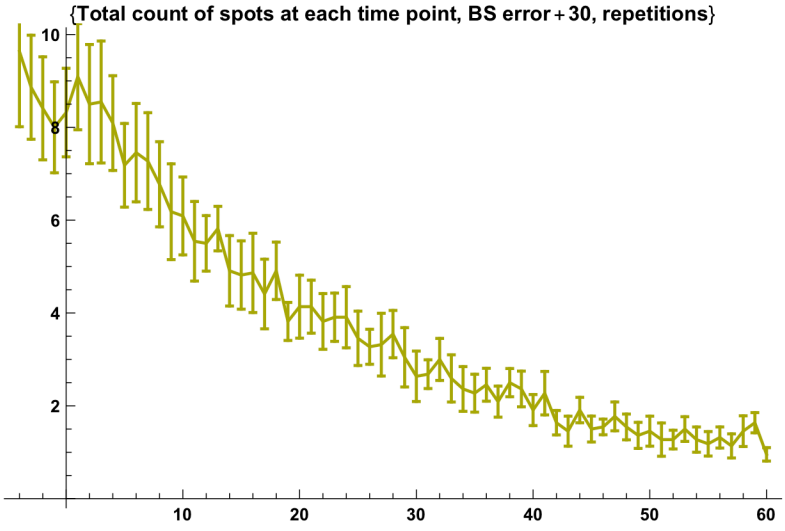


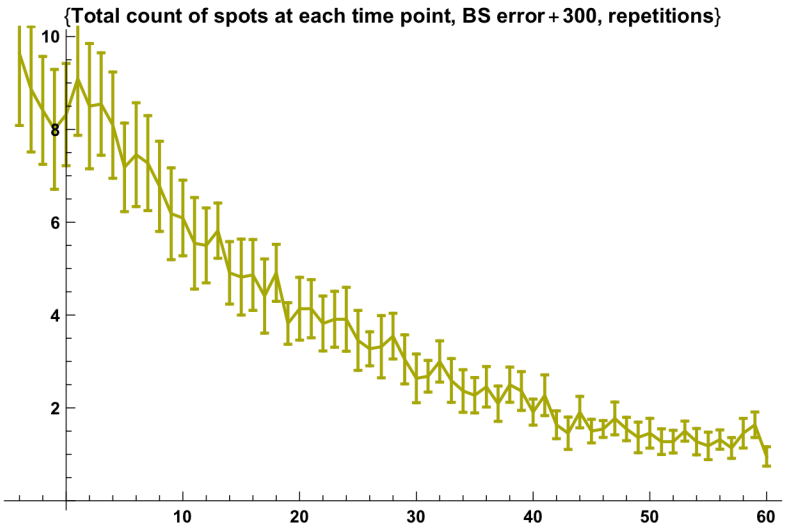


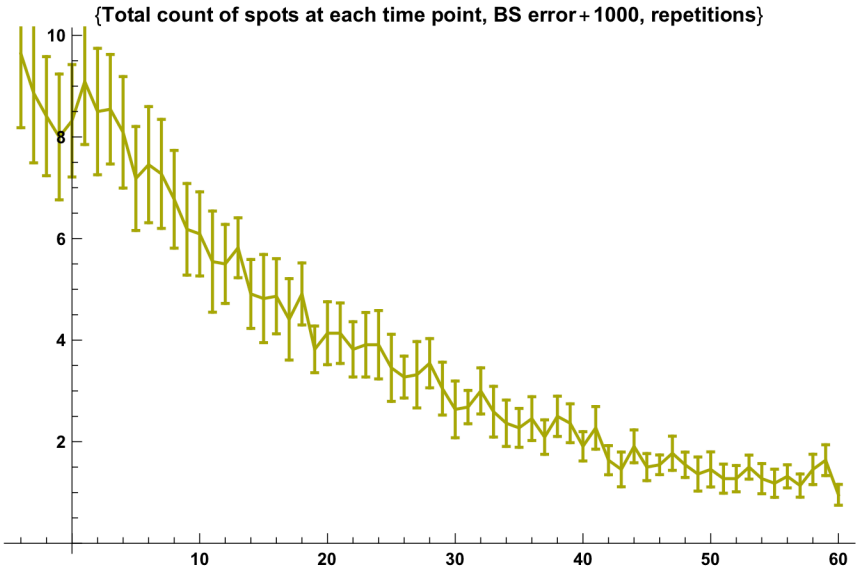
In[954]:=
```
ErrorListPlot[b, PlotStyle → {Darker[Yellow]},
 PlotLabel → {"Total count of spots at each time point, BS error" + repetitions ,
   "repetitions"}, Joined → True]
```

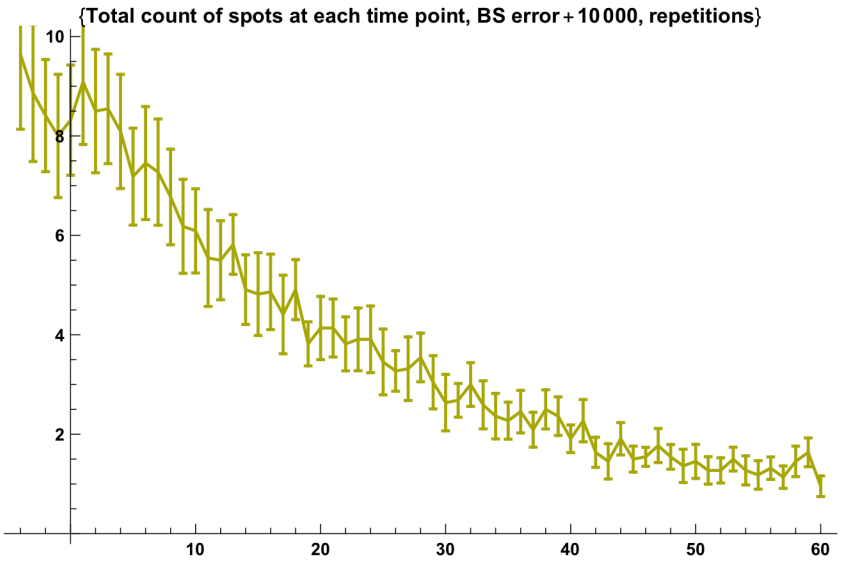
In[955]:=


{Total count of spots at each time point, BS error + 3, repetitions}
10
8
6
4
2
10
20
30
40
50
60


{Total count of spots at each time point, BS error + 30, repetitions}
10
8
6
4
2
10
20
30
40
50
60


{Total count of spots at each time point, BS error + 300, repetitions}
10
8
6
4
2
10
20
30
40
50
60


{Total count of spots at each time point, BS error + 1000, repetitions}
10
8
6
4
2
10
20
30
40
50
60



BS for Purple Spots:
(Don’t shift+entr)