In [1]:

```
import matplotlib.pyplot as plt
import pandas as pd
import numpy as np

np.random.seed(42)
N = 100
x = np.random.normal(170, 20, N)
y = x + np.random.normal(5, 25, N)
colors = np.random.rand(N)
area = (25 * np.random.rand(N))**2
```

In [2]:

```
df = pd.DataFrame({
    'X': x,
    'Y': y,
    'Colors': colors,
    "bubble_size":area})

df.head(n=3)
```

Out[2]:

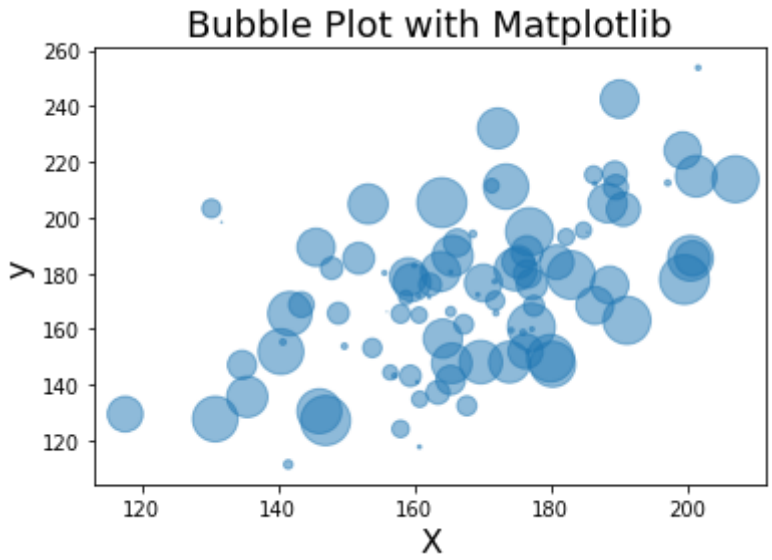
	X	Y	Colors	bubble_size
0	179.934283	149.550015	0.877373	553.972491
1	167.234714	161.718581	0.740769	93.172029
2	182.953771	179.385908	0.697016	577.429562

In [3]:

```
# scatter plot with scatter() function
# transparency with "alpha"
# bubble size with "s"
plt.scatter('X', 'Y',
            s='bubble_size',
            alpha=0.5,
            data=df)
plt.xlabel("X", size=16)
plt.ylabel("y", size=16)
plt.title("Bubble Plot with Matplotlib", size=18)
```

Out[3]:

```
Text(0.5, 1.0, 'Bubble Plot with Matplotlib')
```

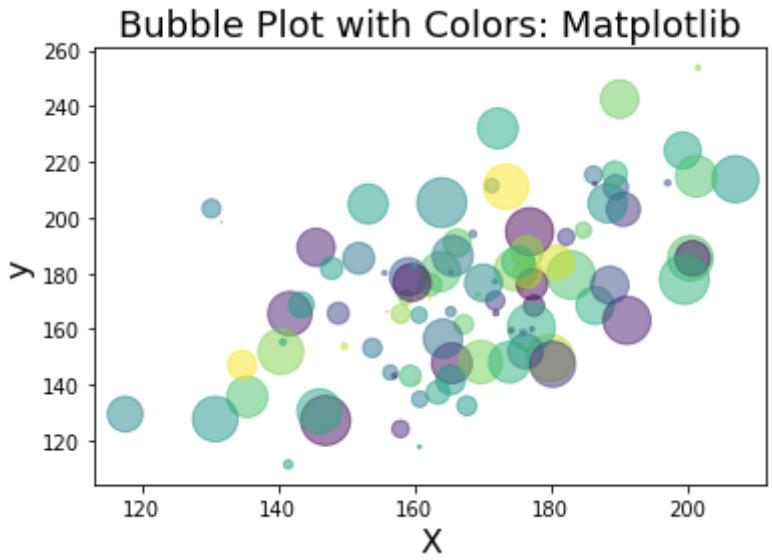


In [4]:

```
# scatter plot with scatter() function
```

```
# transparency with "alpha"
# bubble size with "s"
# color the bubbles with "c"
plt.scatter('X', 'Y',
            s='bubble_size',
            c='Colors',
            alpha=0.5, data=df)
plt.xlabel("X", size=16)
plt.ylabel("y", size=16)
plt.title("Bubble Plot with Colors: Matplotlib", size=18)
```

Out[4]:
```
Text(0.5, 1.0, 'Bubble Plot with Colors: Matplotlib')
```



In [ ]: