I plan to simulate figure 3D from Loewenstein et al paper (Multiplicative Dynamics Underlie the Emergence of the Log-Normal Distribution of Spine Sizes in the Neocortex In Vivo)

Figure 3D show the distribution of spine sizes

```
import matplotlib.pyplot as plt
import numpy as np
import scipy.stats as st
```

The below code represents a rough simulation of the data from Loewenstein et al paper. The data from the paper follows the normal distribution and this simulation roughly follows the normal distribution.

```
# Figure 3D follows Gaussian Distribution. Here the parameter of the Gaussian Distribution
mu = 1.74
sigma = 0.1002
N = 3474

# Get samples
samples = np.random.normal(mu, sigma, N)

# plot histogram for a given number of bins (using trapz to approximate pdf)
nbins = 13
counts, edges = np.histogram(samples, bins=nbins)
xaxis = (edges[1:] + edges[:-1])/2
n_pdf = np.divide(counts, np.trapz(counts, xaxis))
plt.bar(xaxis, n_pdf)
```

```
<BarContainer object of 13 artists>
```