In [10]:
```
import numpy as np  # Importing NumPy library
import pandas as pd  # Importing Pandas library
import matplotlib.pyplot as plt  # Importing Matplotlib library's "pyplot" modu
import seaborn as sns  # Importing Seaborn library


import os
```

In [11]:
```
data = pd.read_csv("Regression_Dataset.csv")
data
```

Out[11]:

	S.No	Left-Lateral-Ventricle	Left-Inf-Lat-Vent	Left-Cerebellum-White-Matter	Left-Cerebellum-Cortex	Left-Thalamus	Left-Caudate	Left-Putamen	Lef Pallidu
0	1	22916.9	982.7	15196.7	55796.4	6855.5	2956.4	4240.7	2223
1	2	22953.2	984.5	15289.7	55778.6	6835.1	3064.2	4498.6	2354
2	3	23320.4	1062.1	15382.1	55551.2	7566.0	3231.7	4456.2	1995
3	4	24360.0	1000.5	14805.4	54041.8	8004.6	3137.3	4262.2	1983
4	5	25769.4	1124.4	16331.1	54108.6	6677.4	2964.4	4204.6	2409
...	...	...	...	...	...	...	...	...	
4221	4222	27065.6	532.4	12425.1	51042.9	6354.8	3822.6	4490.5	2019
4222	4223	28408.8	912.7	14024.8	43103.5	6060.7	3114.2	3731.0	1937
4223	4224	34467.9	1659.6	12744.5	54924.8	6256.7	3573.4	3526.6	2189
4224	4225	31627.5	1334.4	15883.2	57148.2	6982.4	4475.8	4464.4	2317
4225	4226	14879.4	704.2	11346.6	50468.5	6935.4	3258.5	3751.5	2226

4226 rows × 141 columns

In [12]:
```
X = data.drop(["Age"], axis=1)
y = data['Age']
```

In [13]:
```
from sklearn.model_selection import train_test_split

x_train,x_test,y_train,y_test = train_test_split(X,y,test_size=0.2, random_stat
```

In [14]:
```
from sklearn.ensemble import GradientBoostingRegressor
boost = GradientBoostingRegressor(n_estimators=100, learning_rate=0.1, max_dept
boost.fit(x_train, y_train)
```

Out[14]:
```
GradientBoostingRegressor(max_depth=1, random_state=0)
```

In [15]:
```
from sklearn.model_selection import cross_val_predict  # For K-Fold Cross Valid
from sklearn.metrics import r2_score  # For find accuracy with R2 Score
from sklearn.metrics import mean_squared_error  # For MSE
from math import sqrt  # For squareroot operation

y_pred_boosted_train = boost.predict(x_train)
```

```
y_pred_boosted_test = boost.predict(x_test)

r2_boosted_train = r2_score(y_train, y_pred_boosted_train)
print("Training R^2 for Boosted Trees Model: ", r2_boosted_train)

r2_boosted_test = r2_score(y_test, y_pred_boosted_test)
print("Testing R^2 for Boosted Trees Model: ", r2_boosted_test)

RMSE_boosted_train = sqrt(mean_squared_error(y_train, y_pred_boosted_train))
print("RMSE for Training Data: ", RMSE_boosted_train)

RMSE_boosted_test = sqrt(mean_squared_error(y_test, y_pred_boosted_test))
print("RMSE for Testing Data: ", RMSE_boosted_test)
```

```
Training R^2 for Boosted Trees Model:  0.8440751927299814
Testing R^2 for Boosted Trees Model:  0.8282934968877312
RMSE for Training Data:  7.877436339654356
RMSE for Testing Data:  8.49144878829781
```

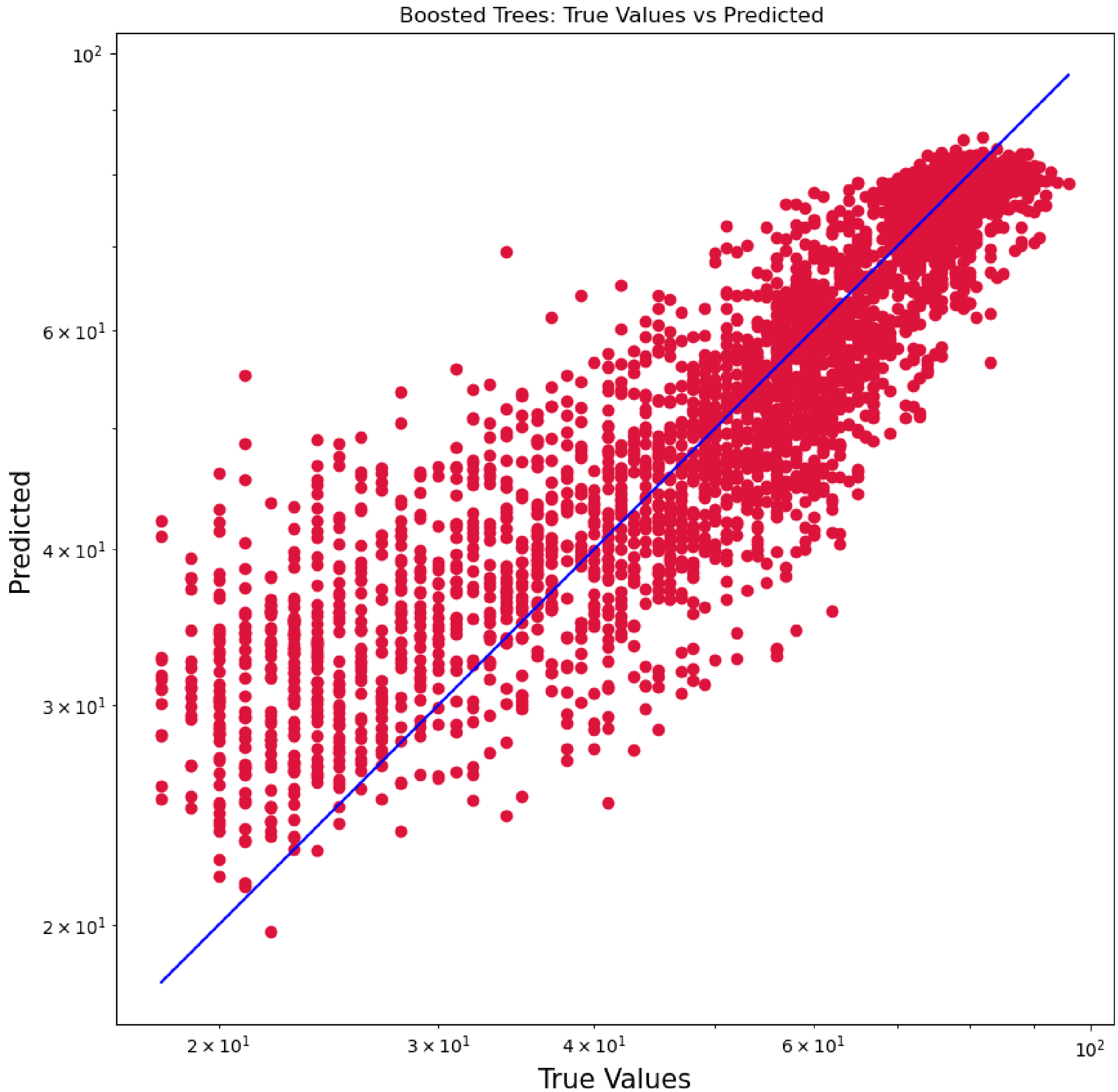
In [16]:

```
true_value = y_train
predicted_value = y_pred_boosted_train
```

In [17]:

```
plt.figure(figsize=(10,10))
plt.scatter(true_value, predicted_value, c='crimson')
plt.yscale('log')
plt.xscale('log')

p1 = max(max(predicted_value), max(true_value))
p2 = min(min(predicted_value), min(true_value))
plt.plot([p1, p2], [p1, p2], 'b-')
plt.xlabel('True Values', fontsize=15)
plt.ylabel('Predicted', fontsize=15)
plt.title("Boosted Trees: True Values vs Predicted ")
plt.axis('equal')
plt.show()
```


Boosted Trees: True Values vs Predicted
Predicted
True Values
10^2
6×10^1
4×10^1
3×10^1
2×10^1
2×10^1
3×10^1
4×10^1
6×10^1
10^2

```
In [ ]:
```