In [1]:
```
import matplotlib.pyplot as plt
import numpy as np
import librosa
import IPython.display as ipd
```

Loading audio files

In [2]:
```
debussy_file = "audio/debussy.wav"
redhot_file = "audio/redhot.wav"
duke_file = "audio/duke.wav"
```

In [3]:
```
ipd.Audio(debussy_file)
```

Out[3]:

In [4]:
```
ipd.Audio(redhot_file)
```

Out[4]:

In [5]:
```
ipd.Audio(duke_file)
```

Out[5]:

In [6]:
```
# load audio files with librosa
debussy, sr = librosa.load(debussy_file)
redhot, _ = librosa.load(redhot_file)
duke, _ = librosa.load(duke_file)
```

Spectral centroid with Librosa

In [7]:
```
FRAME_SIZE = 1024
HOP_LENGTH = 512
```

In [8]:
```
sc_debussy = librosa.feature.spectral_centroid(y=debussy, sr=sr, n_fft=FRAME_SIZE, hop_length=HOP_LENGTH)[0]
sc_redhot = librosa.feature.spectral_centroid(y=redhot, sr=sr, n_fft=FRAME_SIZE, hop_length=HOP_LENGTH)[0]
sc_duke = librosa.feature.spectral_centroid(y=duke, sr=sr, n_fft=FRAME_SIZE, hop_length=HOP_LENGTH)[0]
```

In [9]:
```
sc_debussy.shape
```

Out[9]:
```
(1292,)
```

Visualising spectral centroid

In [10]:
```
frames = range(len(sc_debussy))
t = librosa.frames_to_time(frames, hop_length=HOP_LENGTH)
```

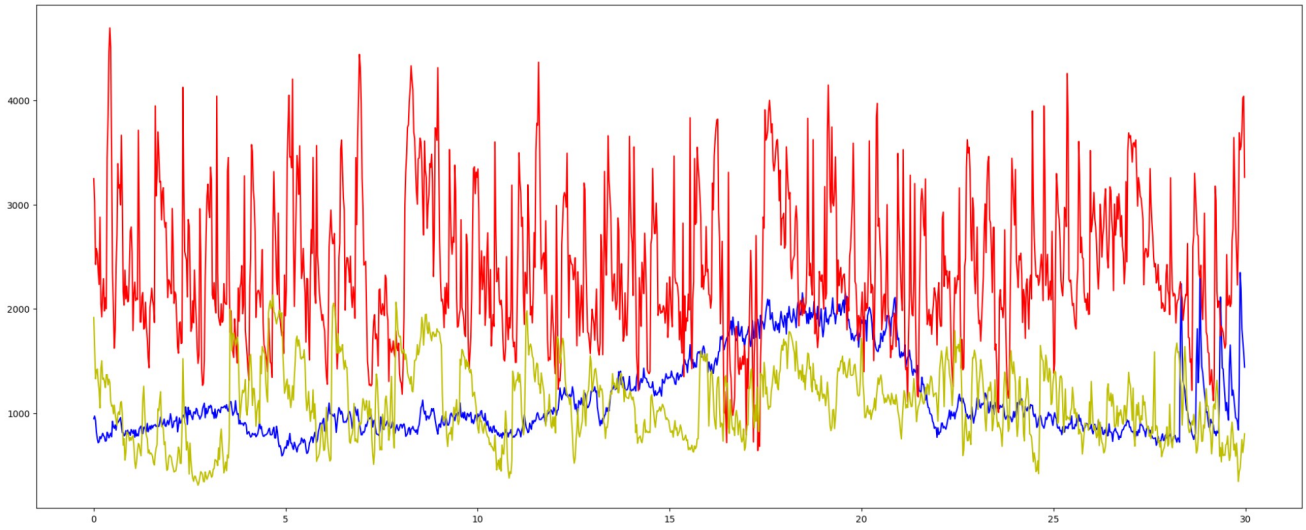
In [11]:
```
len(t)
```

Out[11]:
```
1292
```

In [12]:
```
plt.figure(figsize=(25,10))

plt.plot(t, sc_debussy, color='b')
plt.plot(t, sc_redhot, color='r')
plt.plot(t, sc_duke, color='y')

plt.show()
```



Spectral bandwidth with Librosa

In [13]:
```
ban_debussy = librosa.feature.spectral_bandwidth(y=debussy, sr=sr, n_fft=FRAME_SIZE, hop_length=HOP_LENGTH)[0]
ban_redhot = librosa.feature.spectral_bandwidth(y=redhot, sr=sr, n_fft=FRAME_SIZE, hop_length=HOP_LENGTH)[0]
ban_duke = librosa.feature.spectral_bandwidth(y=duke, sr=sr, n_fft=FRAME_SIZE, hop_length=HOP_LENGTH)[0]
```

In [14]:
```
ban_debussy.shape
```

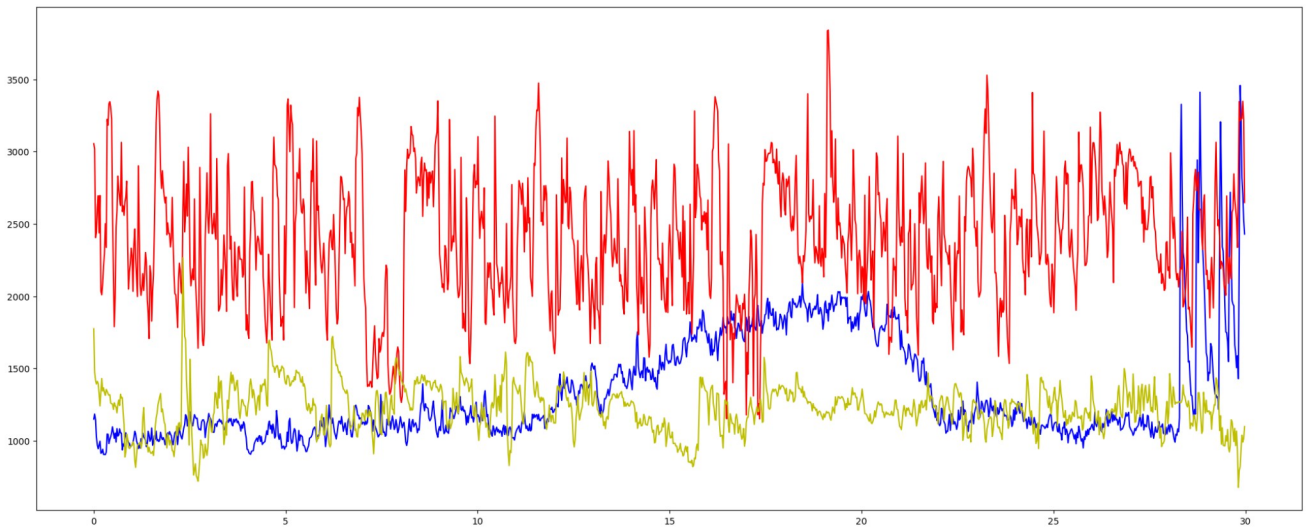
Out[14]:
```
(1292,)
```

Visualising spectral bandwidth

In [15]:
```
plt.figure(figsize=(25,10))

plt.plot(t, ban_debussy, color='b')
plt.plot(t, ban_redhot, color='r')
plt.plot(t, ban_duke, color='y')

plt.show()
```



In [ ]: