In [1]:
```
import numpy as np
import matplotlib.pyplot as plt
import pywt
import pywt.data
```

In [2]:
```
pywt.families()
```

Out[2]:
```
['haar',
 'db',
 'sym',
 'coif',
 'bior',
 'rbio',
 'dmey',
 'gaus',
 'mexh',
 'morl',
 'cgau',
 'shan',
 'fbsp',
 'cmor']
```

In [3]:
```
w = pywt.Wavelet("db3")
print(w)
```

```
Wavelet db3
  Family name:    Daubechies
  Short name:     db
  Filters length: 6
  Orthogonal:     True
  Biorthogonal:   True
  Symmetry:       asymmetric
  DWT:            True
  CWT:            False
```

In [5]:
```
pywt.wavelist()
```

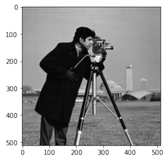
Out[5]:
```
['bior1.1',
 'bior1.3',
 'bior1.5',
 'bior2.2',
 'bior2.4',
 'bior2.6',
 'bior2.8',
 'bior3.1',
 'bior3.3',
 'bior3.5',
 'bior3.7',
 'bior3.9',
 'bior4.4',
 'bior5.5',
 'bior6.8',
 'cgau1',
 'cgau2',
 'cgau3',
 'cgau4',
 'cgau5',
 'cgau6',
 'cgau7',
 'cgau8',
 'cmor',
 'coif1',
 'coif2',
 'coif3',
 'coif4',
 'coif5',
 'coif6',
 'coif7',
 'coif8',
 'coif9',
 'coif10',
 'coif11',
 'coif12',
 'coif13',
 'coif14',
 'coif15',
 'coif16',
 'coif17',
 'db1',
 'db2',
 'db3',
 'db4',
 'db5',
 'db6',
 'db7',
 'db8',
 'db9',
 'db10',
 'db11',
 'db12',
 'db13',
 'db14',
 'db15',
 'db16',
 'db17',
 'db18',
 'db19',
 'db20',
 'db21',
 'db22',
 'db23',
 'db24',
 'db25',
 'db26',
 'db27',
 'db28',
 'db29',
 'db30',
 'db31',
 'db32',
 'db33',
 'db34',
 'db35',
 'db36',
 'db37',
 'db38',
 'dmey',
 'fbsp',
 'gaus1',
 'gaus2',
 'gaus3',
 'gaus4',
 'gaus5',
 'gaus6',
 'gaus7',
 'gaus8',
 'haar',
 'mexh',
 'morl',
 'rbio1.1',
 'rbio1.3',
 'rbio1.5',
 'rbio2.2',
 'rbio2.4',
 'rbio2.6',
 'rbio2.8',
 'rbio3.1',
 'rbio3.3',
 'rbio3.5',
 'rbio3.7',
 'rbio3.9',
 'rbio4.4',
 'rbio5.5',
 'rbio6.8',
 'shan',
 'sym2',
 'sym3',
 'sym4',
 'sym5',
 'sym6',
 'sym7',
 'sym8',
 'sym9',
 'sym10',
 'sym11',
 'sym12',
 'sym13',
 'sym14',
 'sym15',
 'sym16',
 'sym17',
 'sym18',
 'sym19',
 'sym20']
```

In [6]:
```
wavelet = pywt.Wavelet("haar")
print(wavelet)
```

```
Wavelet haar
  Family name:    Haar
  Short name:     haar
  Filters length: 2
  Orthogonal:     True
  Biorthogonal:   True
  Symmetry:       asymmetric
  DWT:            True
  CWT:            False
```

In [7]:
```
original = pywt.data.camera()
plt.imshow(original, cmap="gray")
```

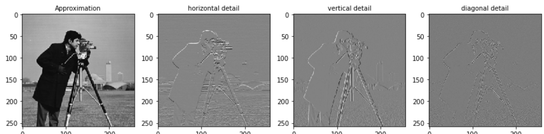
Out[7]:
```
<matplotlib.image.AxesImage at 0x7fbac4cb5370>
```



In [24]:
```
coeffs2 = pywt.dwt2(original, "bior1.3")
titles = ["Approximation", "horizontal detail", "vertical detail", "diagonal detail"]
LL,(LH, HL, HH) = coeffs2
```

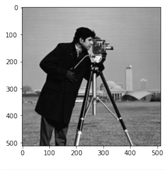
In [25]:
```
fig = plt.figure(figsize=(12,3))
for i,a in enumerate([LL, LH, HL, HH]):
    ax = fig.add_subplot(1,4,i+1)
    ax.imshow(a, interpolation= "nearest", cmap= plt.cm.gray)
    ax.set_title(titles[i], fontsize=10)

fig.tight_layout()
plt.show()
```



In [26]:
```
transformed_image_inverse = pywt.idwt2(coeffs2,"bior1.3")
plt.imshow(transformed_image_inverse, cmap="gray")
```

Out[26]:
```
<matplotlib.image.AxesImage at 0x7fbacb1016d0>
```



In [ ]:
```
```