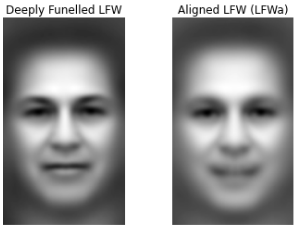
Mean Images

In [54]:
```
#Mean Images of two different aligned versions of LFW:
dfmim=imread('/scratch/testing/experiments-deeply-funelled/meanim.png')
amim=imread('/scratch/testing/experiments/meanim.png')
sb=subplot(1,2,1)
imshow(dfmim),axis('off')
sb.set_title('Deeply Funelled LFW')
sb=subplot(1,2,2)
imshow(amim),gray(),
sb.set_title('Aligned LFW (LFWa)')
axis('off');
```



Experiments on LFW-Aligned

Cropping Offsets (displacement of cropping window from its center position): (X x Y)= (+1 x -4)

Feature Normalization= $\sqrt{L1}$

LBP Features

In [35]:
```
# Without PCA and Chi-Square Simpilarlity on View2
sdir='/scratch/fr/lfw/new-data-xoffset=1-yoffset=-4/lbp-norm-1-/'
v2s=np.load(sdir+'data/view2-LBP-chi-square-simple-threshold-model-results.npy')
print v2s
print 'Average Accuracy of Simple Model (Without PCA, Chi-Square Distance) on View2 = %0.2f'%(np.mean(v2s)*100)
```

```
[ 0.73333333  0.71        0.71166667  0.695       0.685       0.73833333
  0.72        0.68833333  0.65666667  0.70833333]
Average Accuracy of Simple Model (Without PCA, Chi-Square Distance) on View2 = 70.47
```

In [36]:
```
# With PCA (components = 500) and cosine Simpilarlity on View1
sdir='/scratch/fr/lfw/new-data-xoffset=1-yoffset=-4/lbp-norm-1-/'
v2pca=np.load(sdir+'data/view1-LBP-PCA-500-cosine-results.npy')
print 'Accuracy of Model (With PCA, Cosine Similarity) on View1 = %0.2f'%((v2pca[-1,1])*100)
```

```
Accuracy of Model (With PCA, Cosine Similarity) on View1 = 83.30
```

In [37]:
```
# With PCA (components = 500) and cosine Simpilarlity on View2
sdir='/scratch/fr/lfw/new-data-xoffset=1-yoffset=-4/lbp-norm-1-/'
v2pca=np.load(sdir+'data/view2-LBP-PCA-500-cosine-results.npy')
print v2pca
print 'Average Accuracy of Model (With PCA, Cosine Similarity) on View2 = %0.2f'%(np.mean(v2pca[:,1])*100)
```

```
[[ 500.            0.83666667]
 [ 500.            0.82333333]
 [ 500.            0.805     ]
 [ 500.            0.81666667]
 [ 500.            0.82166667]
 [ 500.            0.84833333]
 [ 500.            0.84833333]
 [ 500.            0.82      ]
 [ 500.            0.82166667]
 [ 500.            0.82833333]]
Average Accuracy of Model (With PCA, Cosine Similarity) on View2 = 82.70
```

LTP Features

$\tau = 5$

In [38]:
```
# Without PCA and Chi-Square Simpilarlity on View2
sdir='/scratch/fr/lfw/new-data-xoffset=1-yoffset=-4/LTP-tolerance=5/'
v2s=np.load(sdir+'data/view2-LTP-chi-square-simple-threshold-model-results.npy')
print v2s
print 'Average Accuracy of Simple Model (Without PCA, Chi-Square Distance) on View2 = %0.2f'%(np.mean(v2s)*100)
```

```
[ 0.75333333  0.75        0.69        0.70333333  0.72333333  0.74833333
  0.77833333  0.69166667  0.71333333  0.73333333]
Average Accuracy of Simple Model (Without PCA, Chi-Square Distance) on View2 = 72.85
```

In [39]:
```
# With PCA (components = 500) and cosine Simpilarlity on View1
sdir='/scratch/fr/lfw/new-data-xoffset=1-yoffset=-4/LTP-tolerance=5/'
v2pca=np.load(sdir+'/data/view1-LTP-PCA-500-cosine-results.npy')
print 'Accuracy of Model With PCA (components = 500) and cosine Simpilarlity on View1 = %0.2f'%(v2pca[-1,1]*100)
```

```
Accuracy of Model With PCA (components = 500) and cosine Simpilarlity on View1 = 82.60
```

In [40]:
```
# With PCA (components = 500) and cosine Simpilarlity on View2
v2pca=np.load('/scratch/testing/experiments/features/LTP-tolerance=5/data/view2-LTP-PCA-500-cosine-results.npy')
print v2pca
print 'Average Accuracy of Model (With PCA, Cosine Similarity) on View2 = %0.2f'%(np.mean(v2pca[:,1])*100)
```

```
[[ 500.            0.865     ]
 [ 500.            0.84333333]
 [ 500.            0.80666667]
 [ 500.            0.80666667]
 [ 500.            0.82666667]
 [ 500.            0.84833333]
 [ 500.            0.85666667]
 [ 500.            0.81166667]
 [ 500.            0.81333333]
 [ 500.            0.865     ]]
Average Accuracy of Model (With PCA, Cosine Similarity) on View2 = 83.43
```

$\tau = 7$

```
In [41]: # Without PCA and Chi-Square Simpilarlity on View2
         sdir='/tmp_data/lfw/features/LTP-tolerance=7/'
         v2s=np.load(sdir+'data/view2-LTP-chi-square-simple-threshold-model-results.npy')
         print v2s
         print 'Average Accuracy of Simple Model (Without PCA, Chi-Square Distance) on View2 = %0.2f'%(np.mean(v2s)*100)
```

```
[ 0.71        0.73833333  0.66        0.685       0.70333333  0.72166667
  0.71333333  0.64666667  0.67666667  0.72333333]
Average Accuracy of Simple Model (Without PCA, Chi-Square Distance) on View2 = 69.78
```

LQP Features

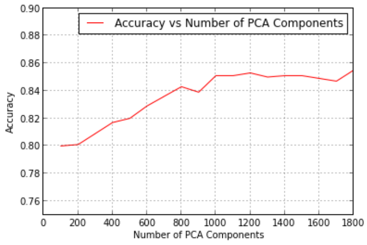
Geometry = $Disc_7^{3*}$

Number of Visual Words=150 per codebook

$\tau = 5$

Cross-Validating on View1:

```
In [42]: # With PCA (components = 2000) and cosine Simpilarlity on View1 (Cross-Validation for number of PCA components)
         sdir='/scratch/fr/lfw/new-data-xoffset=1-yoffset=-4/trained_on_view1/lqp-size=7-codebooksize=150-tolerance=5/'
         v2pca=np.load(sdir+'/data/view1-LQP-PCA-2000-cosine-results.npy')
         np.set_printoptions(suppress=True)
         #print 'Accuracy =', v2pca
         #print 'Average Accuracy o# With PCA (components = 500) and cosine Simpilarlity on View1 = %0.2f'%(v2pca[-1,1]*100)
         plot(v2pca[:-2,0],v2pca[:-2,1],'-r',label='Accuracy vs Number of PCA Components')
         ylim(0.75,0.9)
         xlabel('Number of PCA Components')
         ylabel('Accuracy')
         legend(loc=0)
         grid()
```



Testing on View2

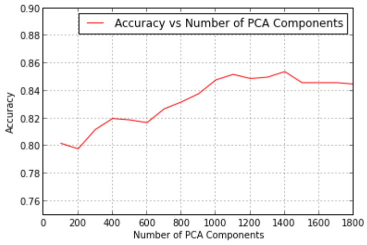
```
In [43]: # Experimeint 1: With PCA (components = 1800) and cosine Simpilarlity on View2
         sdir='/scratch/fr/lfw/new-data-xoffset=1-yoffset=-4/trained_on_view1/lqp-size=7-codebooksize=150-tolerance=5/'
         v2pca=np.load(sdir+'/data/view2-LQP-PCA-1800-cosine-results.npy')
         print v2pca
         print 'Average Accuracy of Model (With PCA Components=1800, Cosine Similarity) on View2 = %0.2f(%f)'%(np.mean(v2pca[:,1])*100,np.std(v2pca[:,1]))
```

```
[[ 1800.             0.87333333]
 [ 1800.             0.84      ]
 [ 1800.             0.83833333]
 [ 1800.             0.845     ]
 [ 1800.             0.84833333]
 [ 1800.             0.88333333]
 [ 1800.             0.86666667]
 [ 1800.             0.85666667]
 [ 1800.             0.84666667]
 [ 1800.             0.87666667]]
Average Accuracy of Model (With PCA Components=1800, Cosine Similarity) on View2 = 85.75(0.015496)
```

$\tau = 7$

Cross-Validating on View1:

```
In [44]: #Experiment1: With PCA (components = 2000) and cosine Simpilarlity on View1 (Cross-Validation for number of PCA components)
         sdir='/tmp_data/lfw/features/lqp-size=7-codebooksize=150-tolerance=7/'
         v2pca=np.load(sdir+'/data/view1-LQP-PCA-2000-cosine-results.npy')
         np.set_printoptions(suppress=True)
         plot(v2pca[:-2,0],v2pca[:-2,1],'-r',label='Accuracy vs Number of PCA Components')
         ylim(0.75,0.9)
         legend(loc=0)
         xlabel('Number of PCA Components')
         ylabel('Accuracy')
         grid()
```



Testing on View2

```
In [45]: # Experiment1: With PCA (components = 1400) and cosine Simpilarlity on View2
         sdir='/tmp_data/lfw/features/lqp-size=7-codebooksize=150-tolerance=7/'
         v2pca=np.load(sdir+'/data/view2-LQP-PCA-1400-cosine-results.npy')
         print v2pca
         print 'Average Accuracy of Model (With PCA Components=1400, Cosine Similarity) on View2 = %0.2f(%f)'%(np.mean(v2pca[:,1])*100,np.std(v2pca[:,1]))
```

```
[[ 1400.             0.86166667]
 [ 1400.             0.85      ]
 [ 1400.             0.85666667]
 [ 1400.             0.84666667]
 [ 1400.             0.83166667]
 [ 1400.             0.86166667]
 [ 1400.             0.85833333]
 [ 1400.             0.84333333]
 [ 1400.             0.83666667]
 [ 1400.             0.865     ]]
Average Accuracy of Model (With PCA Components=1400, Cosine Similarity) on View2 = 85.12(0.010803)
```

Experiments on Deeply Funneled

Cropping Offsets (displacement of cropping window from its center position): (X x Y)= (+1 x -4)

LBP Features

```
In [46]: # Without PCA and Chi-Square Simpilarlity on View2
         v2s=np.load('/scratch/testing/experiments-deeply-funelled/features/LBP/data/view2-LBP-chi-square-simple-threshold-model-results.npy')
         print v2s
         print 'Average Accuracy of Simple Model (Without PCA, Chi-Square Distance) on View2 = %0.2f'%(np.mean(v2s)*100)
```

```
[ 0.705       0.69        0.665       0.68166667  0.70166667  0.70166667
  0.72166667  0.68333333  0.65166667  0.685     ]
Average Accuracy of Simple Model (Without PCA, Chi-Square Distance) on View2 = 68.87
```

```
In [47]: # With PCA (components = 500) and cosine Simpilarlity on View1
         v2pca=np.load('/scratch/testing/experiments-deeply-funelled/features/LBP/data/view1-LBP-PCA-500-cosine-results.npy')
         print 'Accuracy of Model (With PCA, Cosine Similarity) on View1 = %0.2f'%(v2pca[:,1]*100)
```

```
Accuracy of Model (With PCA, Cosine Similarity) on View1 = 79.80
```

```
In [48]: # With PCA (components = 500) and cosine Simpilarlity on View2
         v2pca=np.load('/scratch/testing/experiments-deeply-funelled/features/LBP/data/view2-LBP-PCA-500-cosine-results.npy')
         print v2pca
         print 'Average Accuracy of Model (With PCA, Cosine Similarity) on View2 = %0.2f'%(np.mean(v2pca[:,1])*100)
```

```
[[ 500.            0.82166667]
 [ 500.            0.79333333]
 [ 500.            0.79833333]
 [ 500.            0.81333333]
 [ 500.            0.82166667]
 [ 500.            0.83166667]
 [ 500.            0.84      ]
 [ 500.            0.80833333]
 [ 500.            0.81166667]
 [ 500.            0.80833333]]
Average Accuracy of Model (With PCA, Cosine Similarity) on View2 = 81.48
```

LTP Features

$\tau = 5$

```
In [49]: # Without PCA and Chi-Square Simpilarlity on View2
         v2s=np.load('/scratch/testing/experiments-deeply-funelled/features/LTP-tolerance=5/data/view2-LTP-chi-square-simple-threshold-model-results.npy')
         print v2s
         print 'Average Accuracy of Simple Model (Without PCA, Chi-Square Distance) on View2 = %0.2f'%(np.mean(v2s)*100)
```

```
[ 0.70833333  0.725       0.68833333  0.68666667  0.72833333  0.71333333
  0.73833333  0.69        0.67833333  0.70666667]
Average Accuracy of Simple Model (Without PCA, Chi-Square Distance) on View2 = 70.63
```

```
In [50]: # With PCA (components = 500) and cosine Simpilarlity on View1
         v2pca=np.load('/scratch/testing/experiments-deeply-funelled/features/LTP-tolerance=5/data/view1-LTP-PCA-500-cosine-results.npy')
         print 'Accuracy of Model With PCA (components = 500) and cosine Simpilarlity on View1 = %0.2f'%(v2pca[:,1]*100)
```

```
Accuracy of Model With PCA (components = 500) and cosine Simpilarlity on View1 = 81.30
```

```
In [51]: # With PCA (components = 500) and cosine Simpilarlity on View2
         v2pca=np.load('/scratch/testing/experiments-deeply-funelled/features/LTP-tolerance=5/data/view2-LTP-PCA-500-cosine-results.npy')
         print v2pca
         print 'Average Accuracy of Model (With PCA, Cosine Similarity) on View2 = %0.2f'%(np.mean(v2pca[:,1])*100)
```

```
[[ 500.            0.80833333]
 [ 500.            0.80666667]
 [ 500.            0.815     ]
 [ 500.            0.79833333]
 [ 500.            0.82833333]
 [ 500.            0.80166667]
 [ 500.            0.82833333]
 [ 500.            0.78333333]
 [ 500.            0.8       ]
 [ 500.            0.825     ]]
Average Accuracy of Model (With PCA, Cosine Similarity) on View2 = 80.95
```

RGB Images:

```
In [52]: # Without PCA and Chi-Square Simpilarlity on View2
         v2s=np.load('/scratch/testing/experiments-deeply-funelled/features-rgb/LTP-tolerance=5/data/view2-LTP-chi-square-simple-threshold-model-results.npy')
         print v2s
         print 'Average Accuracy of Simple Model (Without PCA, Chi-Square Distance) on View2 = %0.2f'%(np.mean(v2s)*100)
```

```
[ 0.69833333  0.71833333  0.68833333  0.675       0.725       0.71166667
  0.75833333  0.695       0.68333333  0.70166667]
Average Accuracy of Simple Model (Without PCA, Chi-Square Distance) on View2 = 70.55
```

Cropping Offsets (displacement of cropping window from its center position): (X x Y)= (0 x 0)

$\tau = 5$

Gray-scale Images

In [53]:

```
# Without PCA and Chi-Square Simpilarlity on View2
v2s=np.load('/scratch/testing/experiments-deeply-funelled-xoffset=0-yoffset=0/features/LTP-tolerance=5/data/view2-LTP-chi-square-simple-threshold-model-results.npy')
print v2s
print 'Average Accuracy of Simple Model (Without PCA, Chi-Square Distance) on View2 = %0.2f'%(np.mean(v2s)*100)
```

```
[ 0.71166667  0.725       0.68666667  0.68333333  0.73666667  0.71833333
  0.73666667  0.69333333  0.66333333  0.71333333]
Average Accuracy of Simple Model (Without PCA, Chi-Square Distance) on View2 = 70.68
```