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```
%%Visualization of reconstruction data
```

```
% change here your data structure
```

```
data=recon_output_cum_all_13_happy_within_4els_all_id;
```

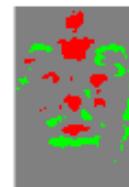
```
acc=[recon_output_cum_all_13_happy_within_4els_all_id.hap_to_hap;recon_output_cum_
```

visualization of significant pixels for single permutation test

```
[pIdsN,~]=disp_CIs(data.CI_neut,data.p_neutAll,data.q,data.minNumPix,data.bck,data
```

```
[pIdsH,~]=disp_CIs(data.CI_happy,data.p_happAll,data.q,data.minNumPix,data.bck,data
```

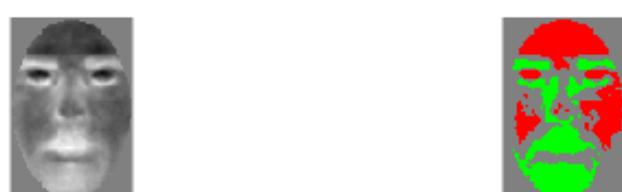
Neutral: Dimension 1



Neutral: Dimension 2



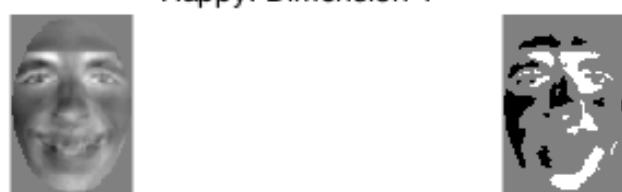
Neutral: Dimension 3



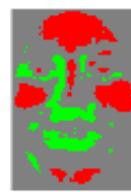
Neutral: Dimension 5



Happy: Dimension 1



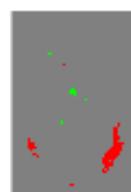
Happy: Dimension 2



Happy: Dimension 3



Happy: Dimension 5

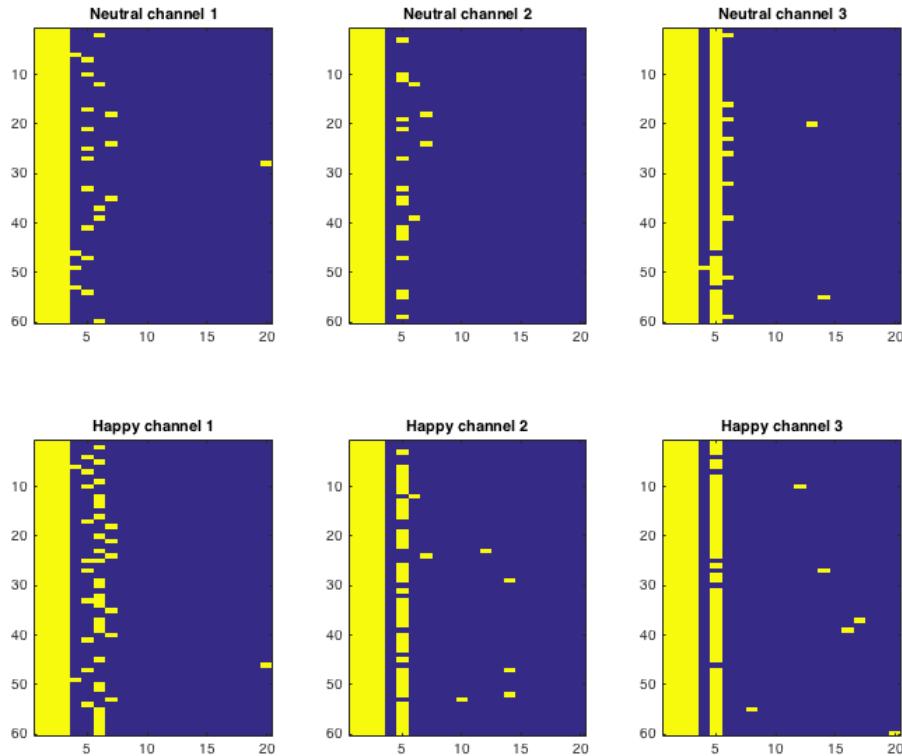


Happy: Dimension 6



visualizatio of significant dimensions based on permutations

```
fig=figure;
set(fig, 'Position', [100, 100, 800, 695]);
for i=1:3
    subplot(2,3,i)
    imagesc(squeeze(data.outMatGen_neut(:,:,i)));
    title(['Neutral channel ' num2str(i)]);
    subplot(2,3,i+3)
    imagesc(squeeze(data.outMatGen_happ(:,:,i)));
    title(['Happy channel ' num2str(i)]);
end
```



showing faces

```
imageN=[1:120];
numIm=length(imageN)
fig=figure;
for i=1:numIm
    recon_mat_sq_rgb = lab2rgb(data.recon_mat_sq(:,:,:,imageN(i)));
    % fig=figure;
    set(fig, 'Position', [100, 100, 800, 500]);
```

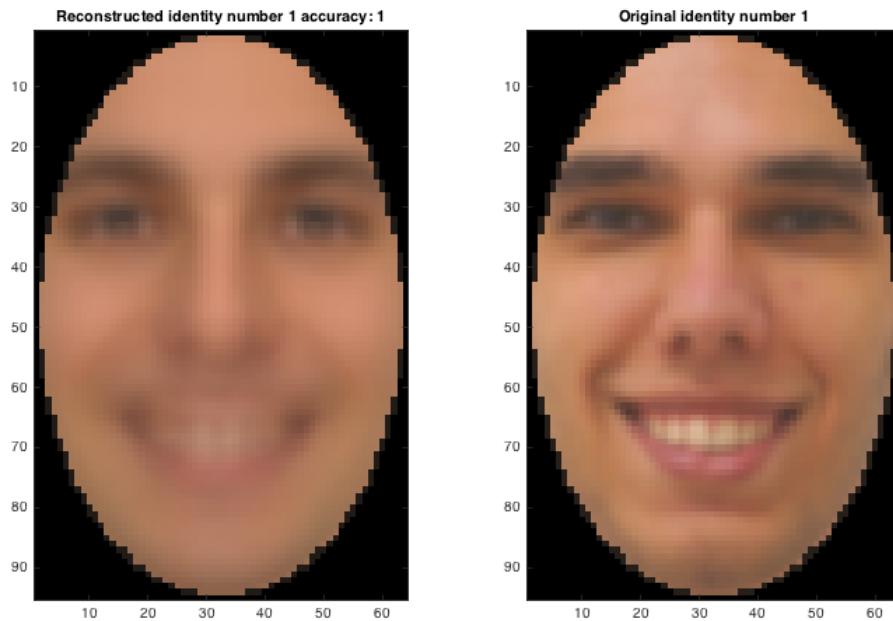
```

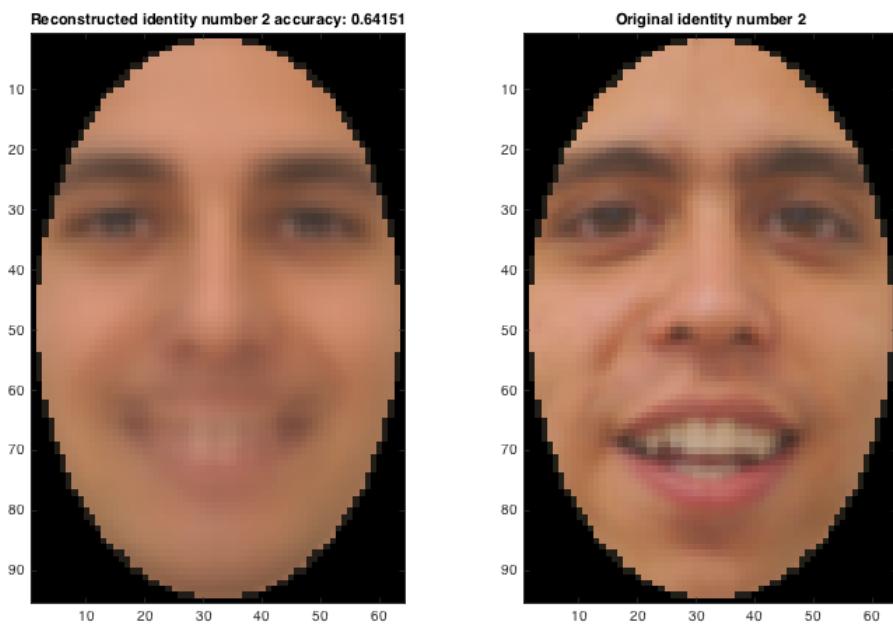
if numIm<3
    subplot(numIm,2,1+(i-1)*2)
else

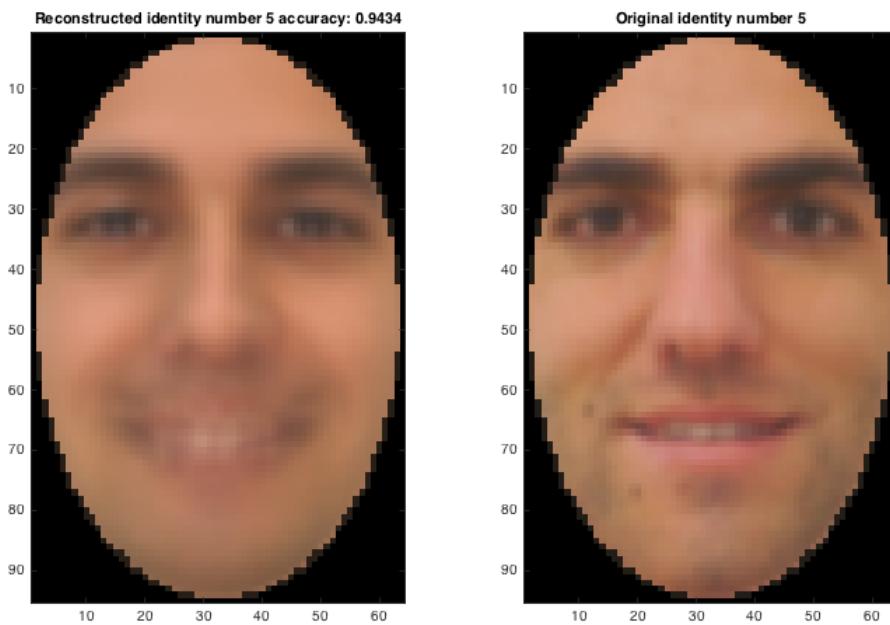
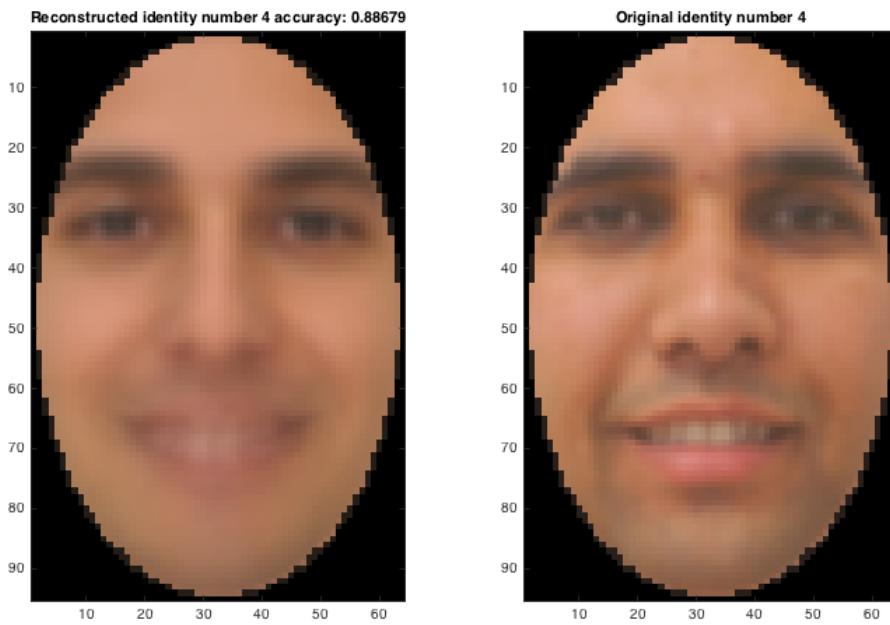
    subplot(1,2,1)
end
imagesc(uint8(squeeze(recon_mat_sq_rgb)));
title(['Reconstructed identity number ' num2str(imageN(i)) ' '
accuracy: ' num2str(acc(i))])
if numIm<3
    subplot(numIm,2,2+(i-1)*2)
    imagesc(data.ims{imageN(i)});
    title(['Original identity number ' num2str(imageN(i))])
else
    subplot(1,2,2)
    imagesc(data.ims{imageN(i)});
    title(['Original identity number ' num2str(imageN(i))])
    if i<numIm
        fig=figure;
    end
end
%     imagesc(data.ims{imageN(i)});
%     title(['Original identity number ' num2str(imageN(i))])
end

numIm =
120

```



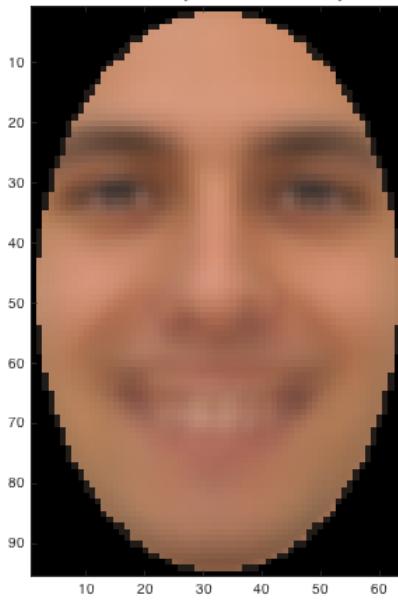




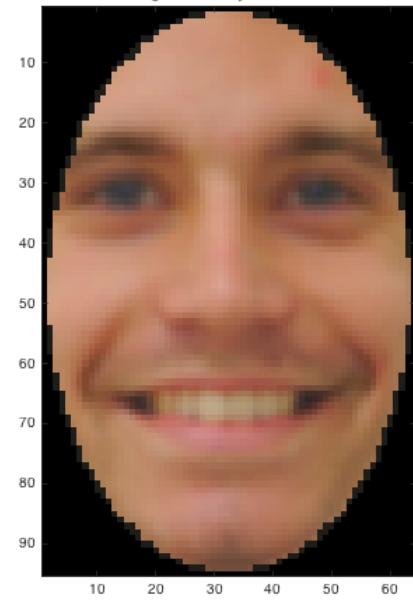




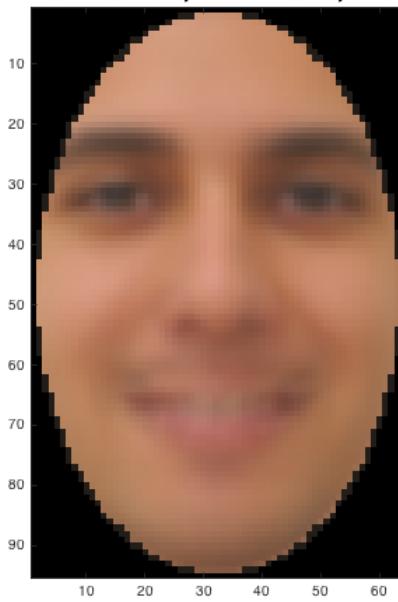
Reconstructed identity number 10 accuracy: 0.75472



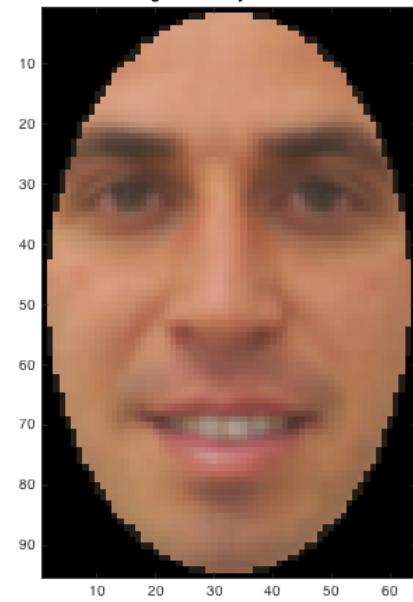
Original identity number 10



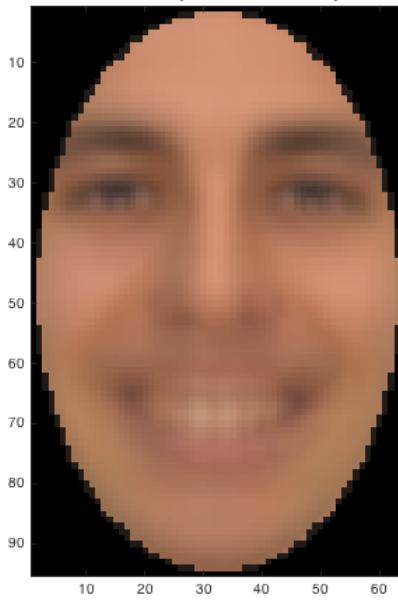
Reconstructed identity number 11 accuracy: 0.83019



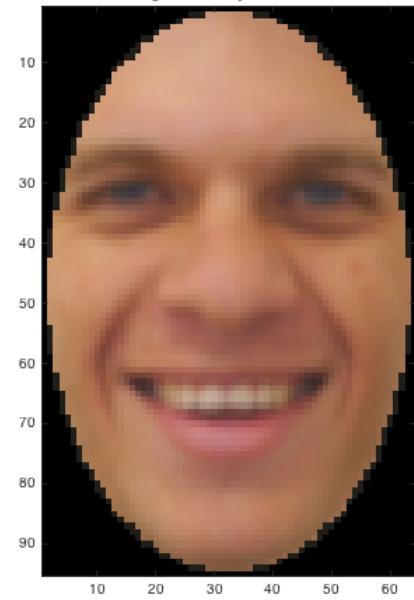
Original identity number 11



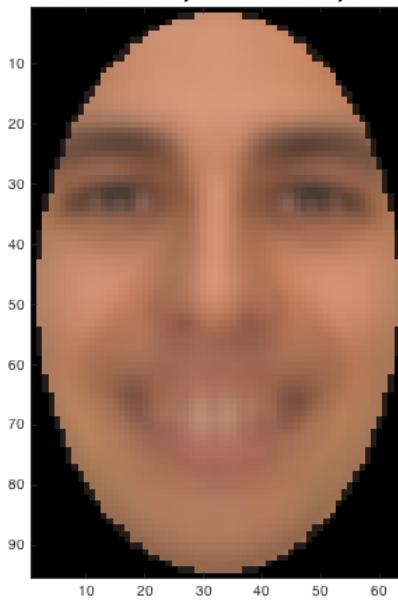
Reconstructed identity number 12 accuracy: 0.037736



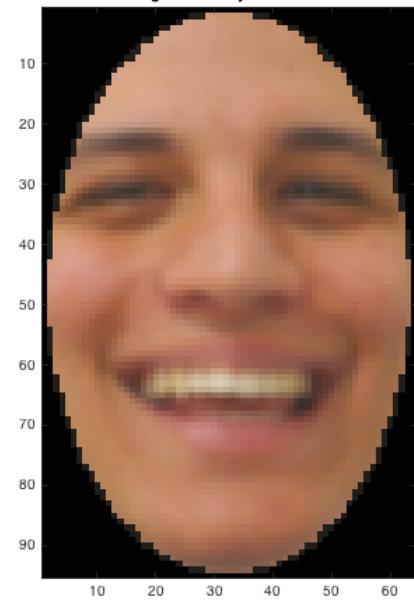
Original identity number 12



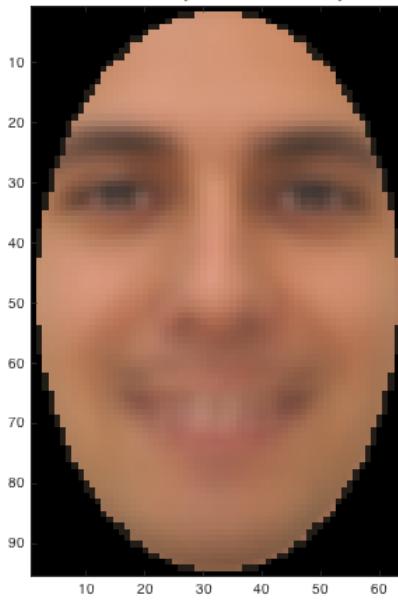
Reconstructed identity number 13 accuracy: 0.11321



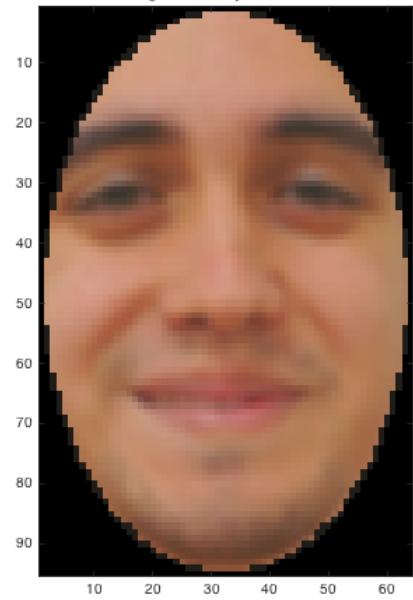
Original identity number 13



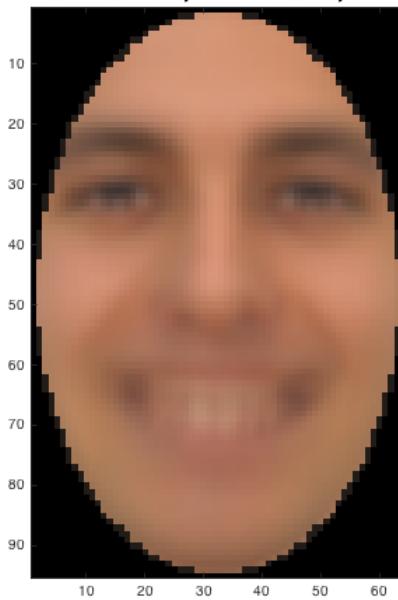
Reconstructed identity number 14 accuracy: 0.66038



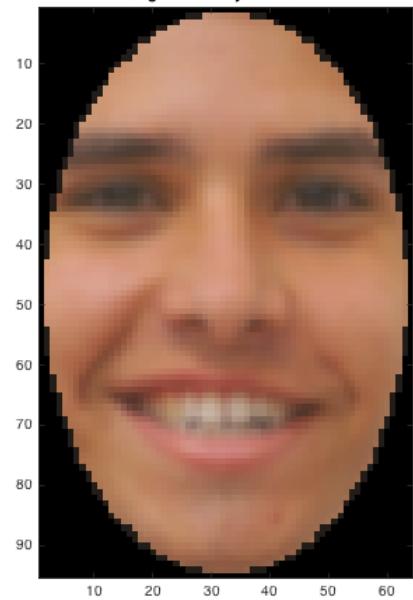
Original identity number 14



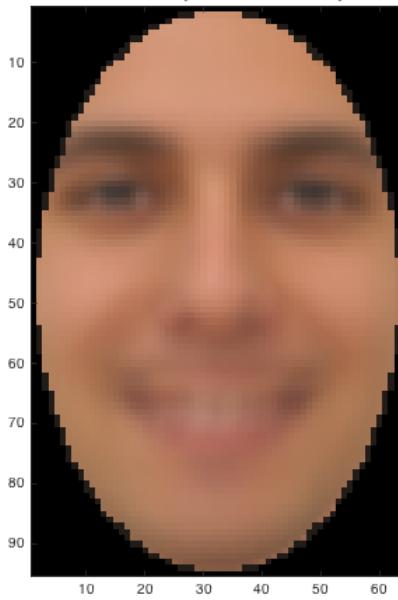
Reconstructed identity number 15 accuracy: 0.79245



Original identity number 15



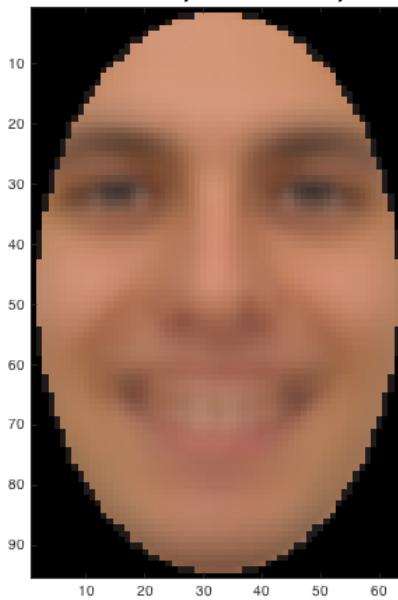
Reconstructed identity number 16 accuracy: 0.71698



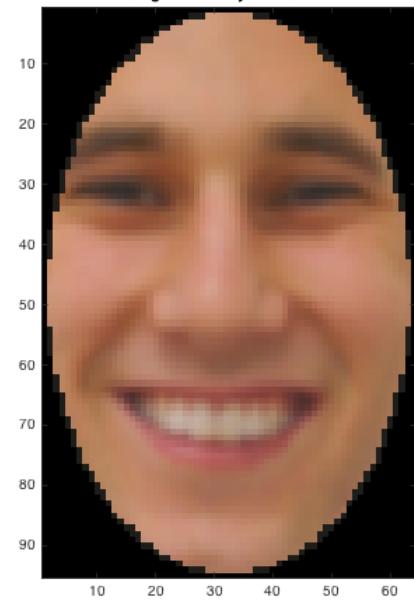
Original identity number 16

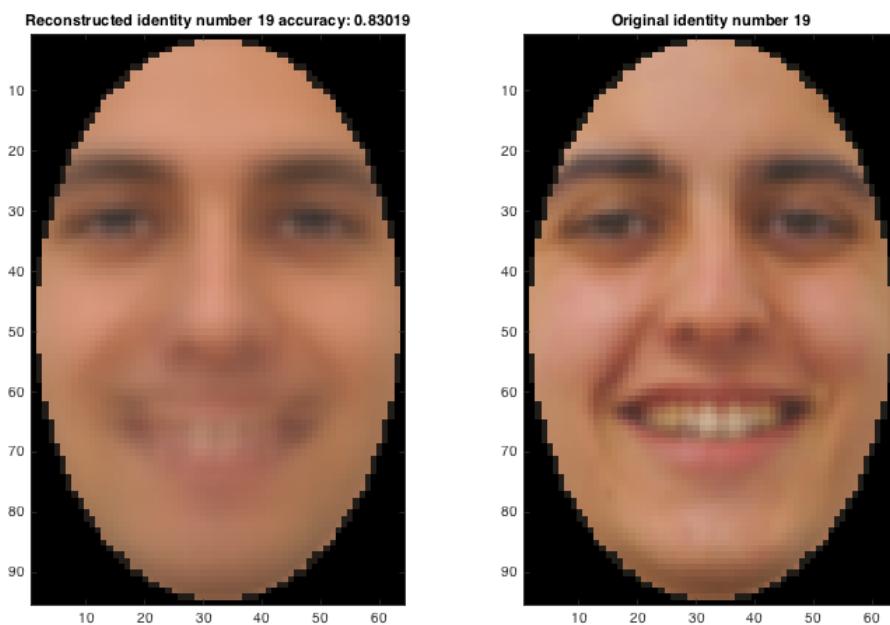
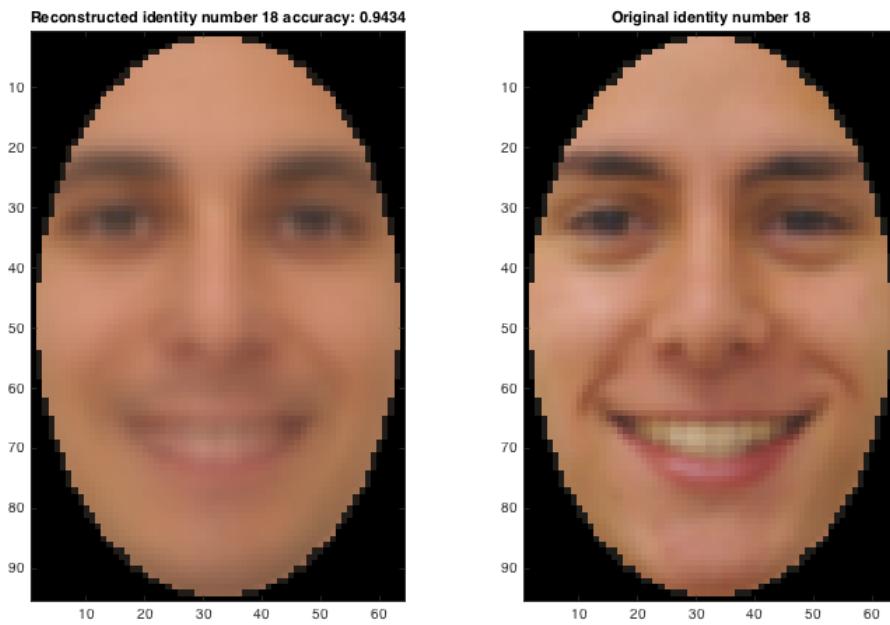


Reconstructed identity number 17 accuracy: 0.64151

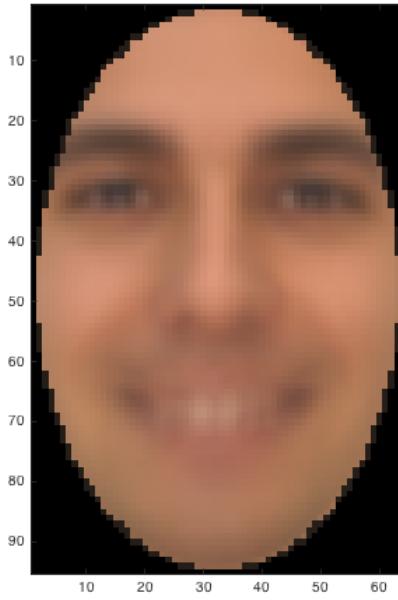


Original identity number 17

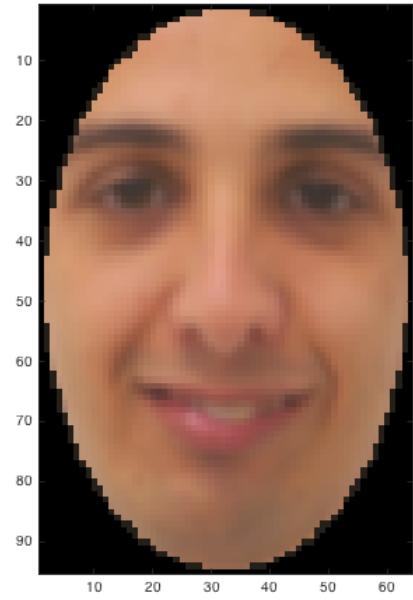




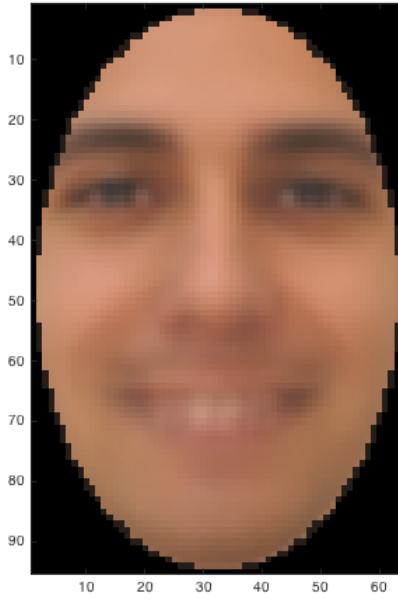
Reconstructed identity number 20 accuracy: 0.90566



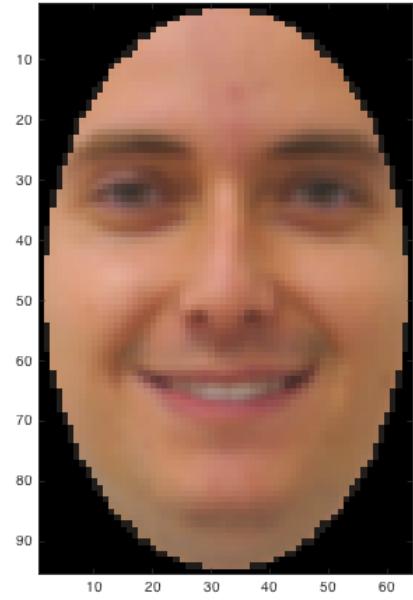
Original identity number 20



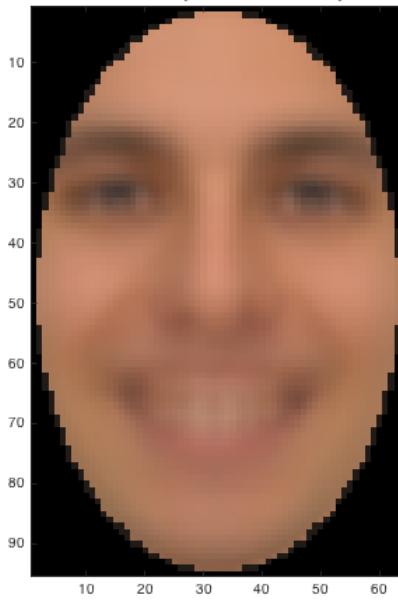
Reconstructed identity number 21 accuracy: 0.71698



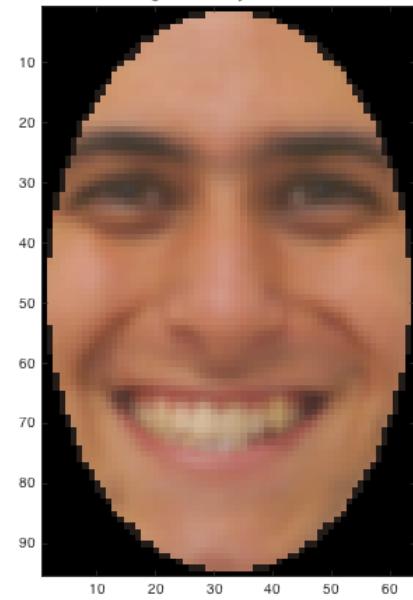
Original identity number 21



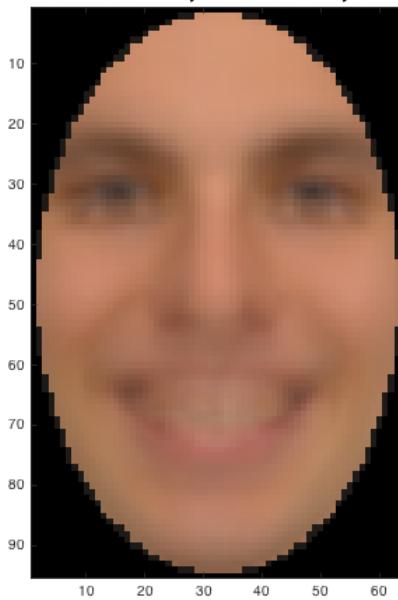
Reconstructed identity number 22 accuracy: 0.67925



Original identity number 22

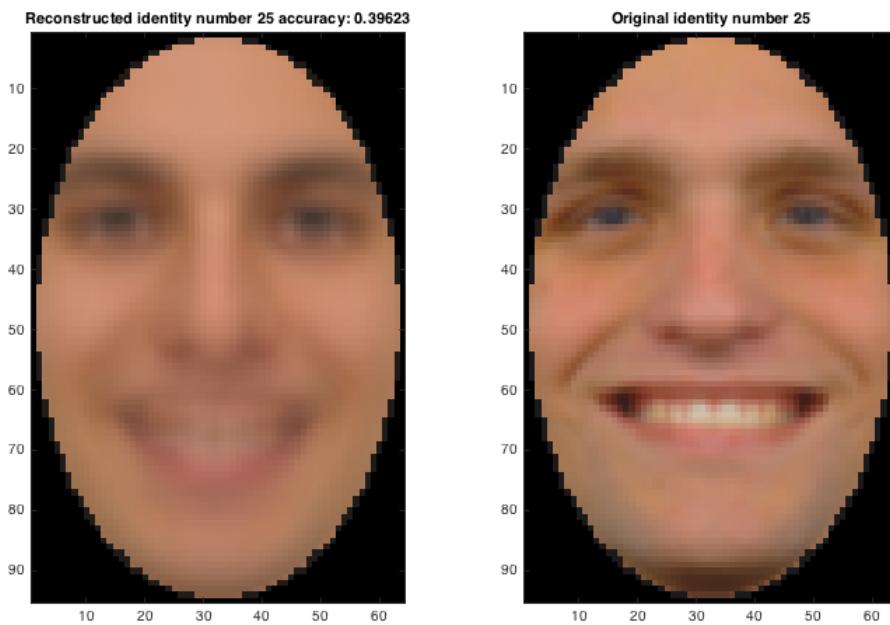
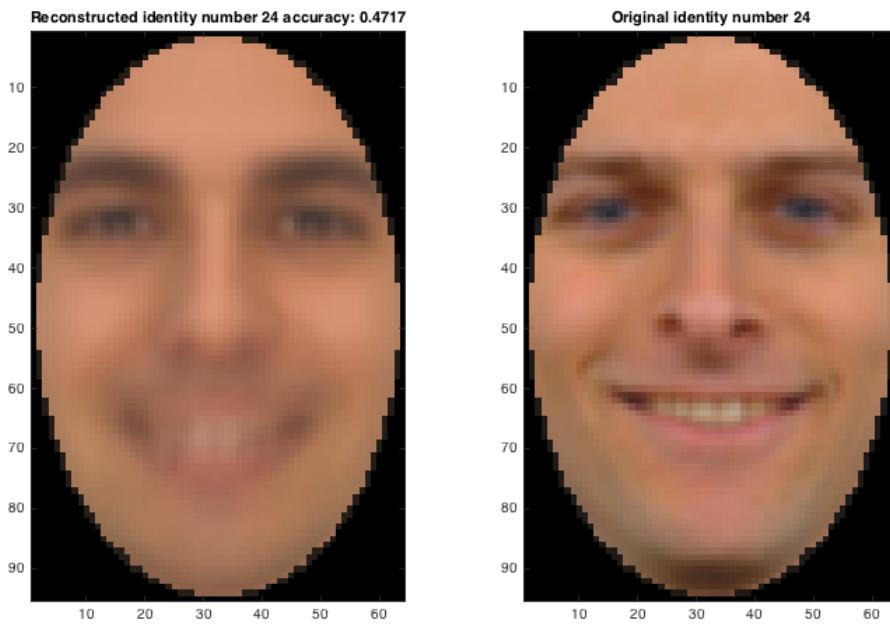


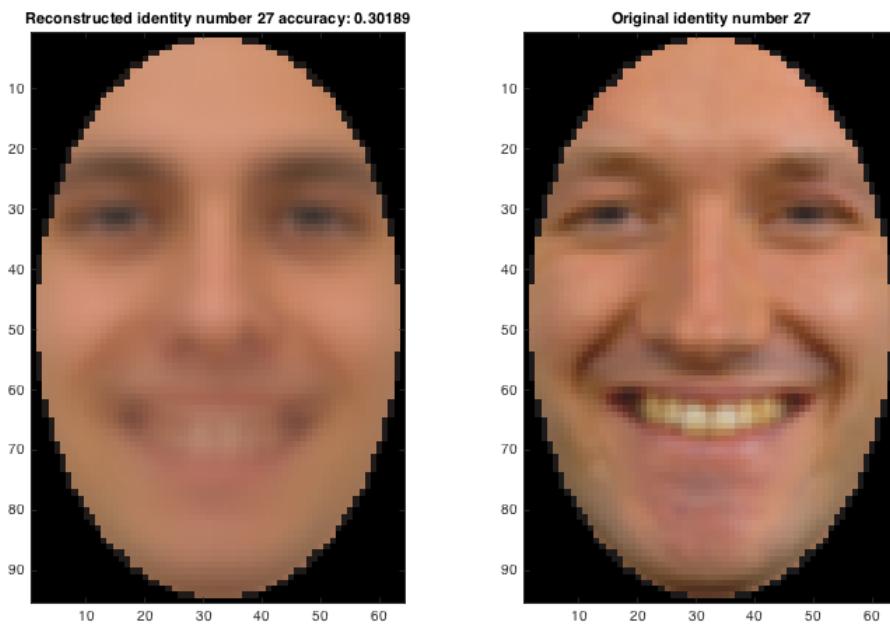
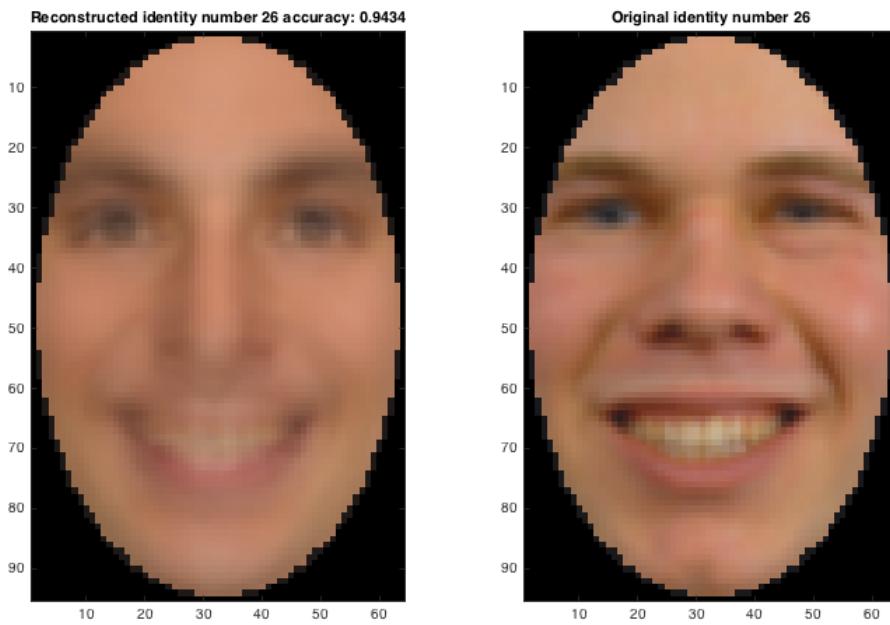
Reconstructed identity number 23 accuracy: 0.9434



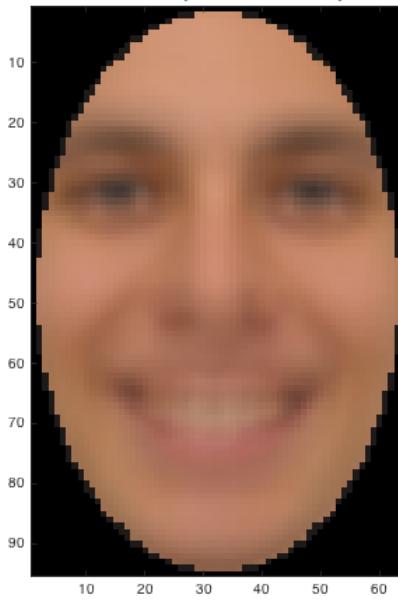
Original identity number 23







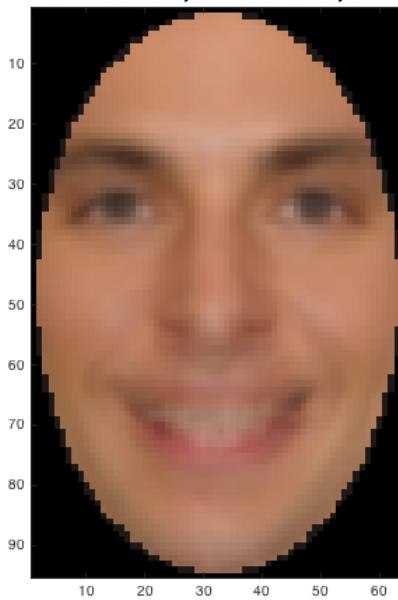
Reconstructed identity number 28 accuracy: 0.45283



Original identity number 28



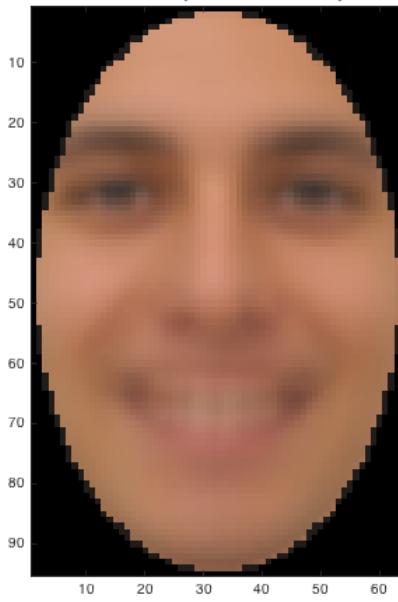
Reconstructed identity number 29 accuracy: 0.81132



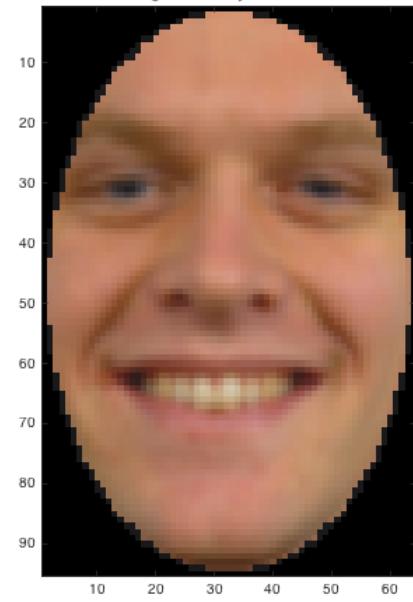
Original identity number 29



Reconstructed identity number 30 accuracy: 0.37736



Original identity number 30



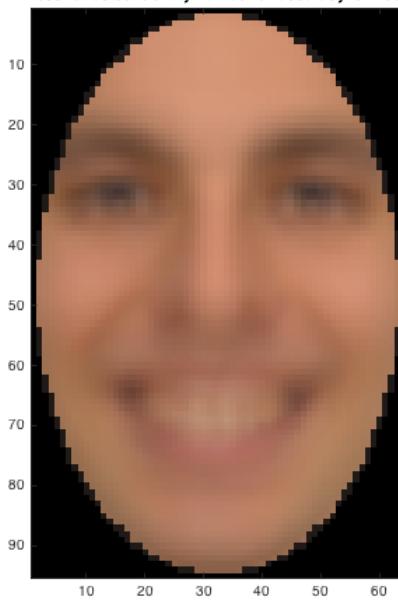
Reconstructed identity number 31 accuracy: 0.39623



Original identity number 31



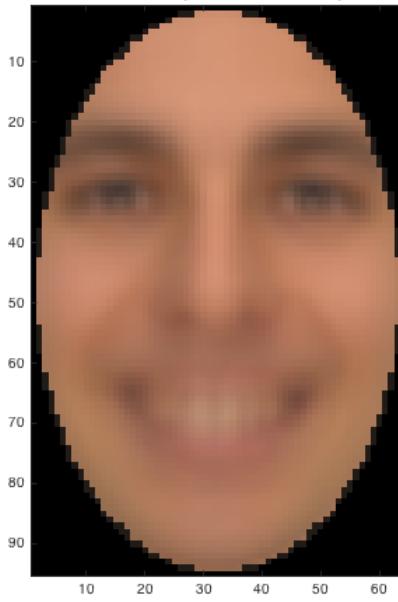
Reconstructed identity number 32 accuracy: 0.77358



Original identity number 32



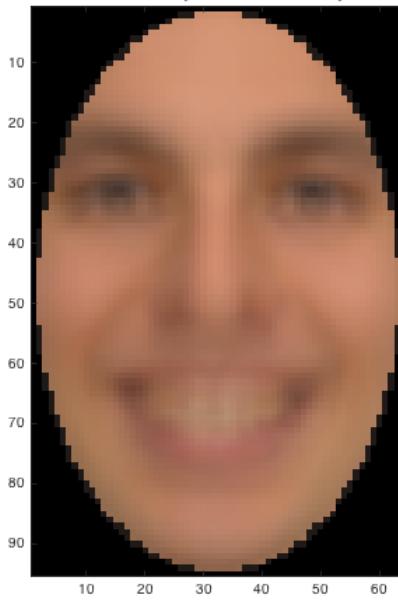
Reconstructed identity number 33 accuracy: 0.22642



Original identity number 33



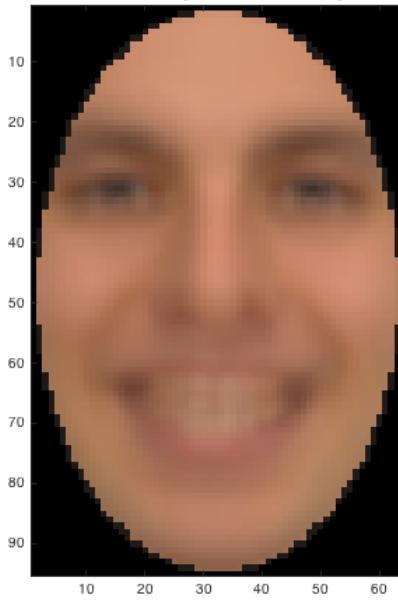
Reconstructed identity number 34 accuracy: 0.79245



Original identity number 34



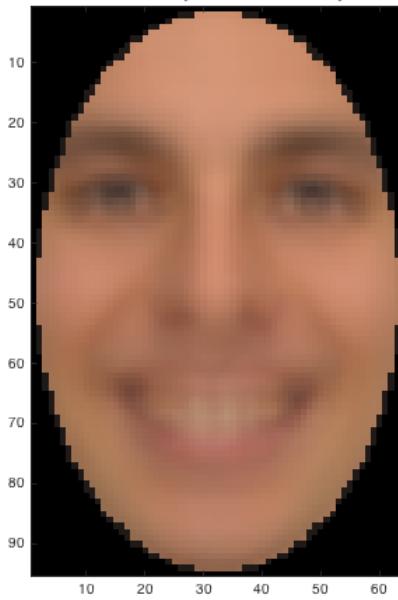
Reconstructed identity number 35 accuracy: 0.90566



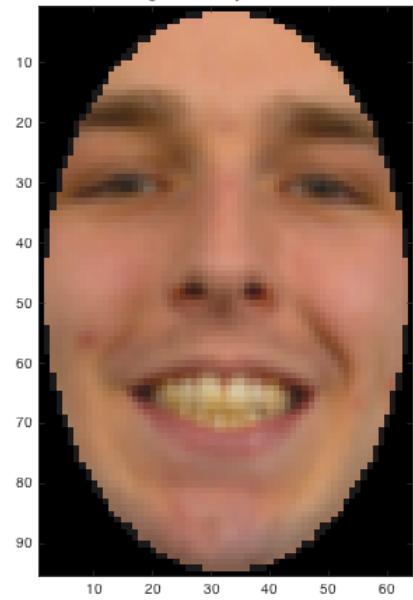
Original identity number 35



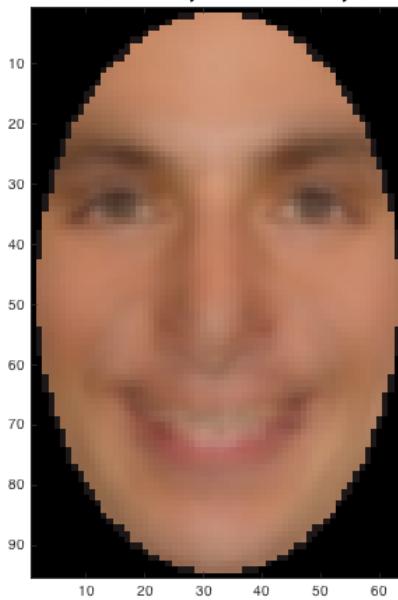
Reconstructed identity number 36 accuracy: 0.26415



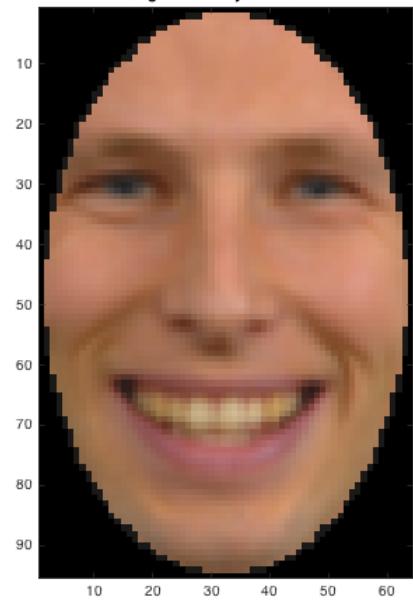
Original identity number 36

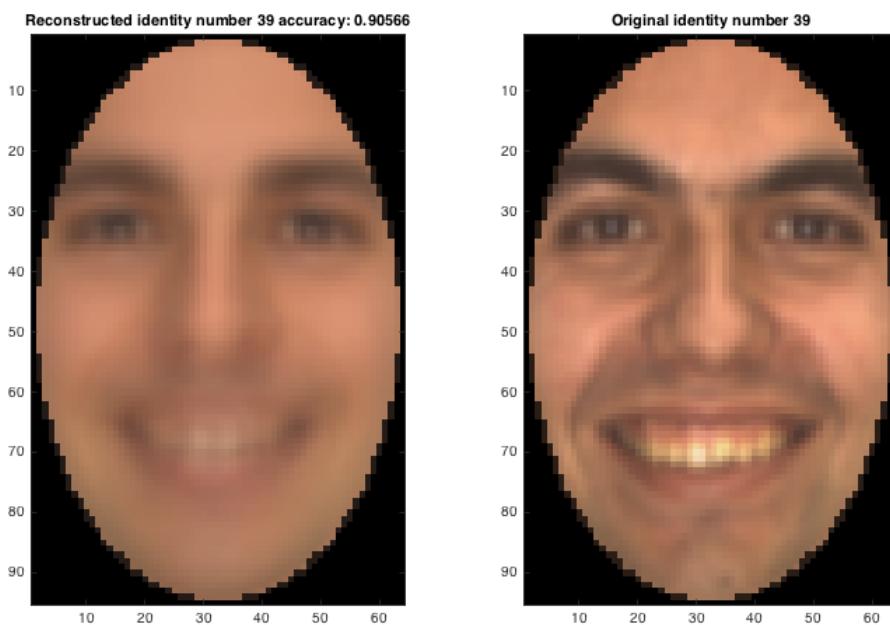
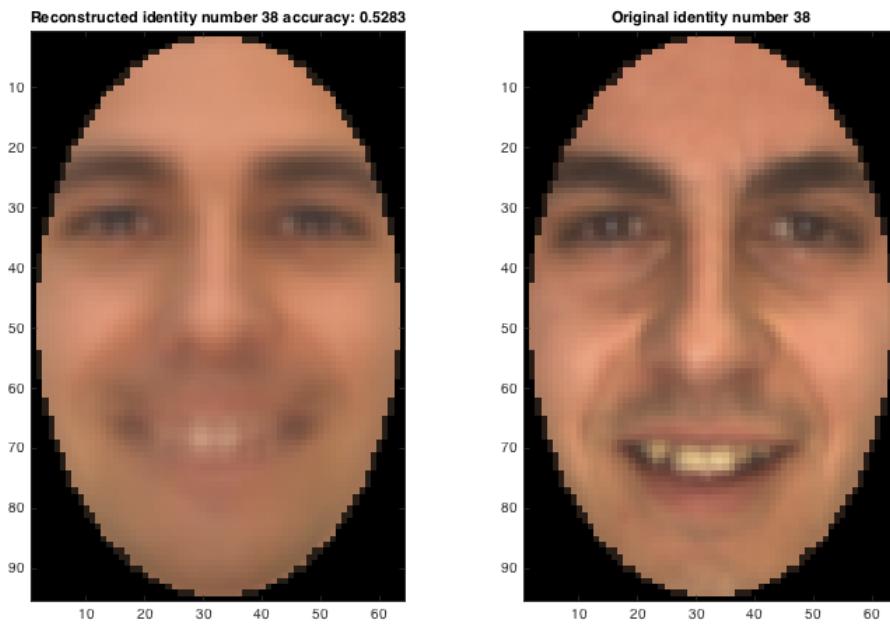


Reconstructed identity number 37 accuracy: 0.9434

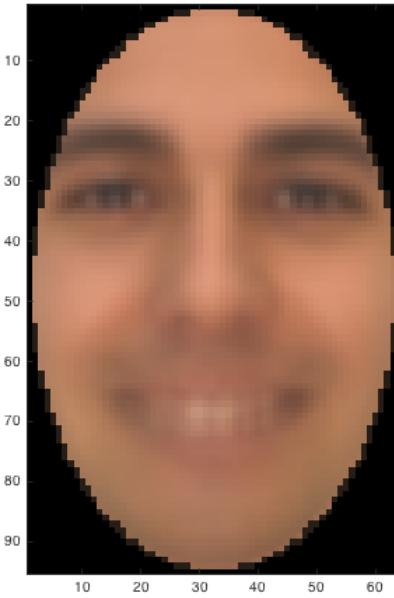


Original identity number 37





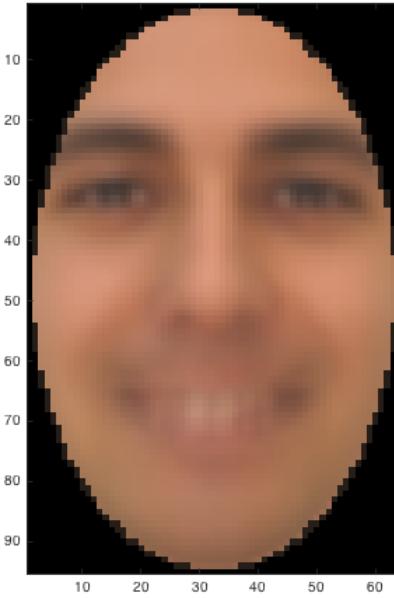
Reconstructed identity number 40 accuracy: 0.54717



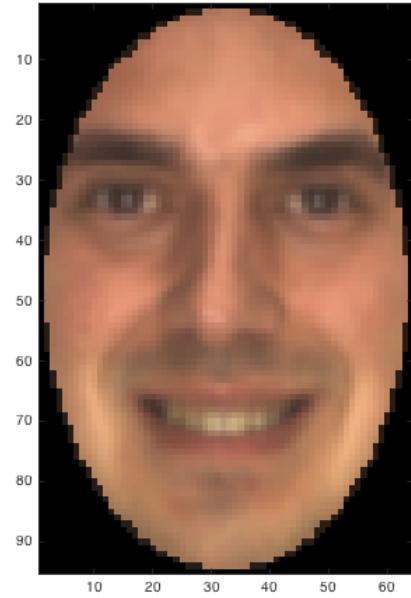
Original identity number 40



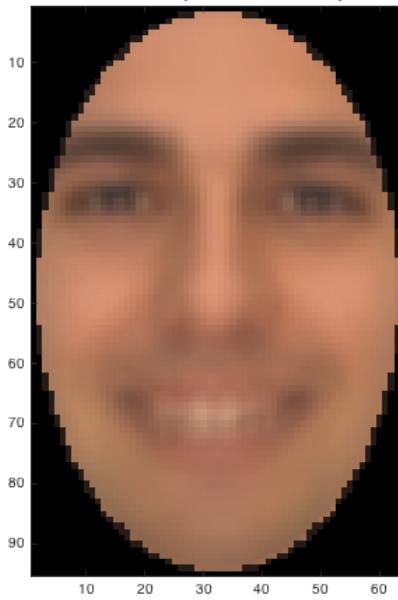
Reconstructed identity number 41 accuracy: 0.20755



Original identity number 41



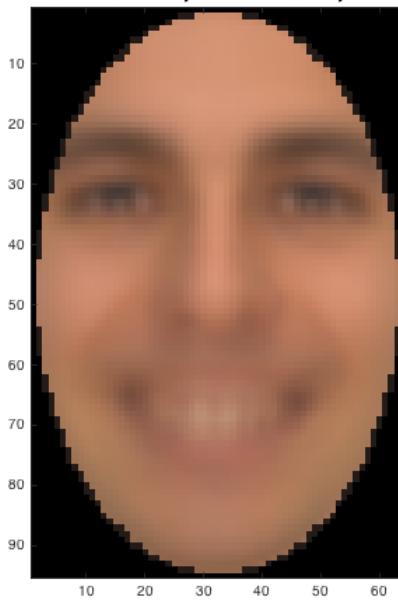
Reconstructed identity number 42 accuracy: 0.86792



Original identity number 42



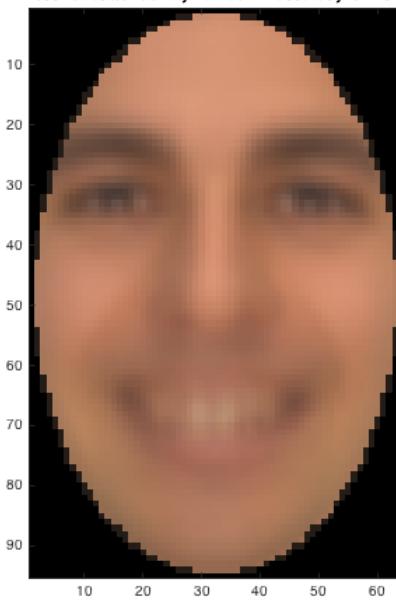
Reconstructed identity number 43 accuracy: 0.58491



Original identity number 43



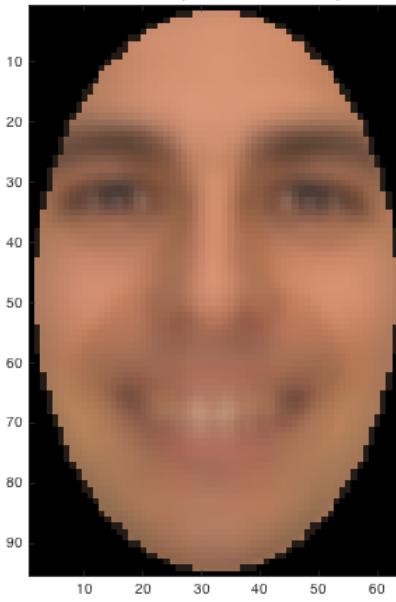
Reconstructed identity number 44 accuracy: 0.22642



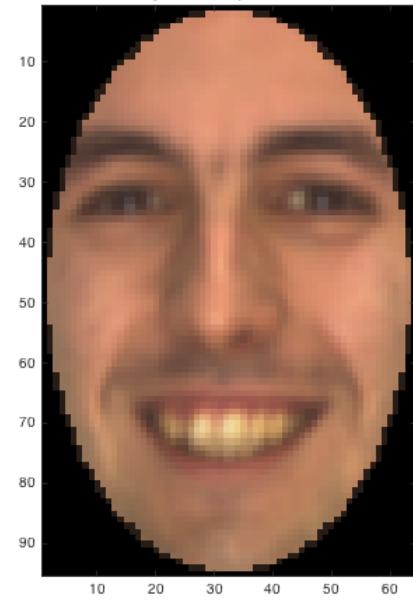
Original identity number 44

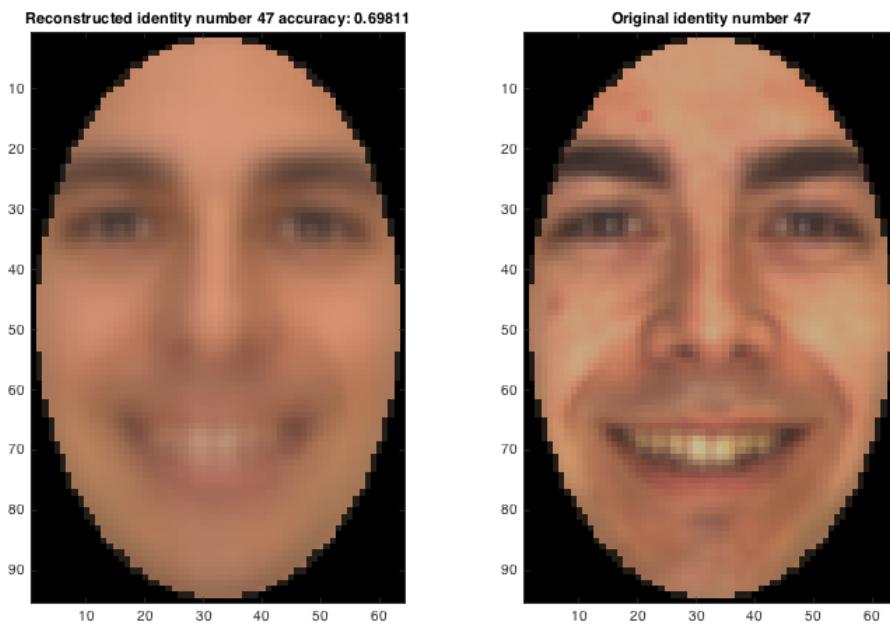
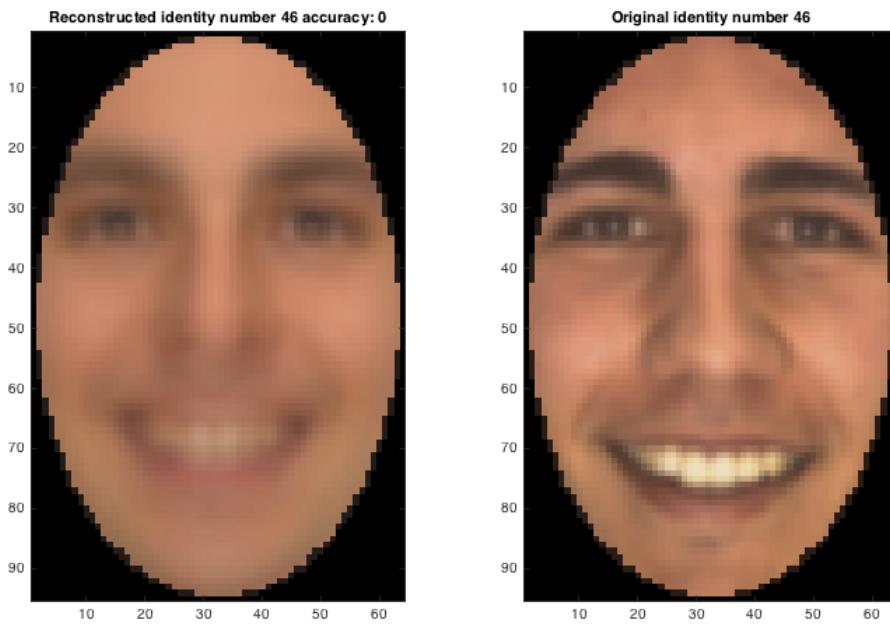


Reconstructed identity number 45 accuracy: 0.86792

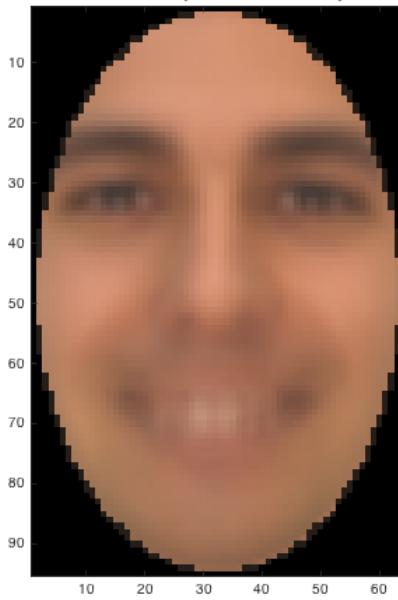


Original identity number 45

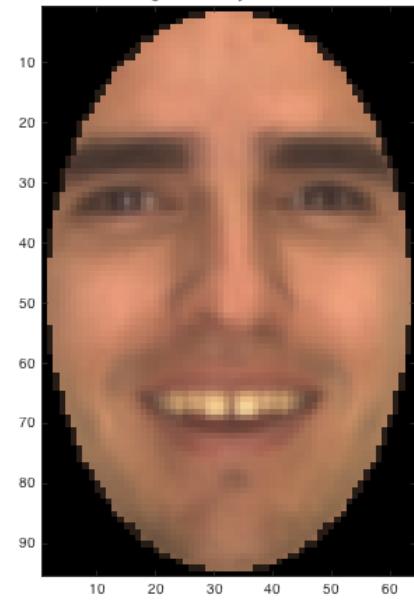




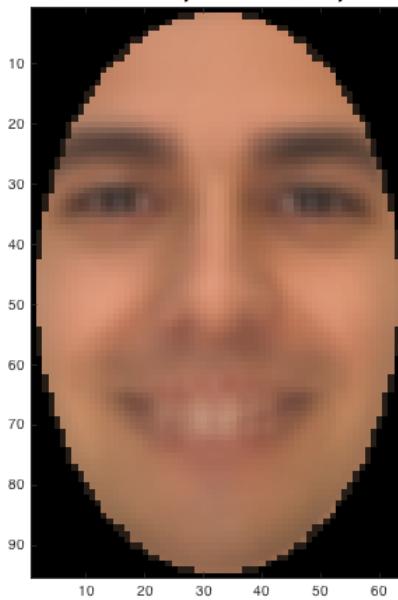
Reconstructed identity number 48 accuracy: 0.86792



Original identity number 48



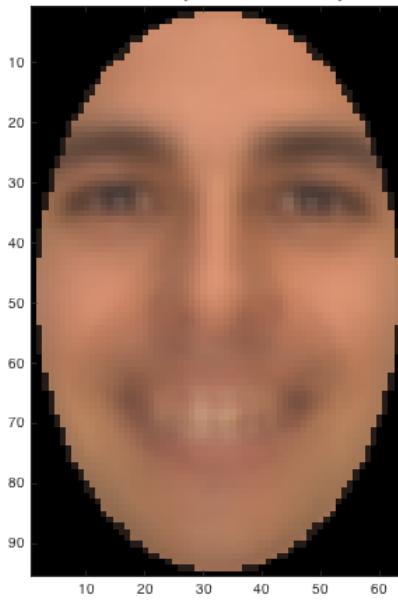
Reconstructed identity number 49 accuracy: 0.71698



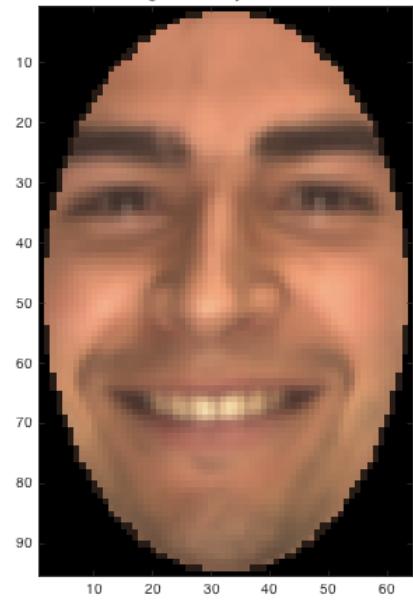
Original identity number 49



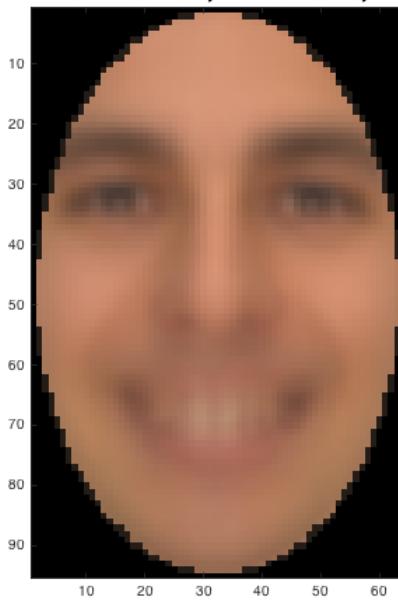
Reconstructed identity number 50 accuracy: 0.84906



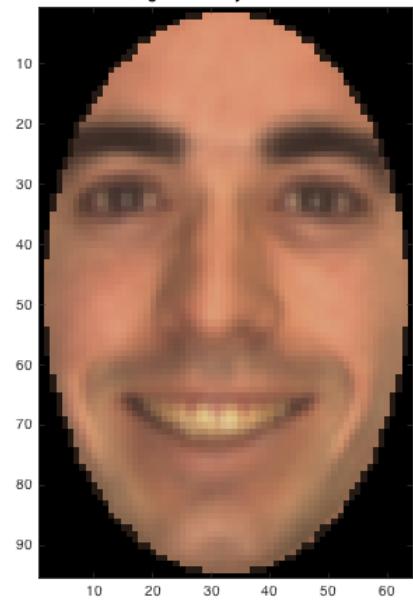
Original identity number 50



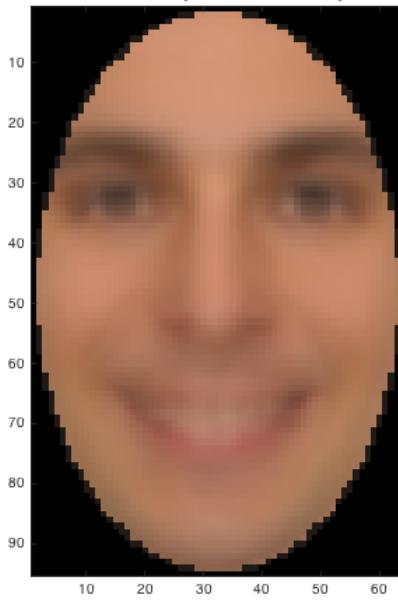
Reconstructed identity number 51 accuracy: 1



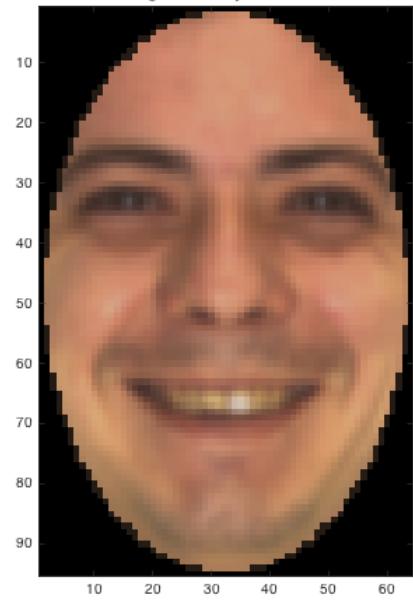
Original identity number 51



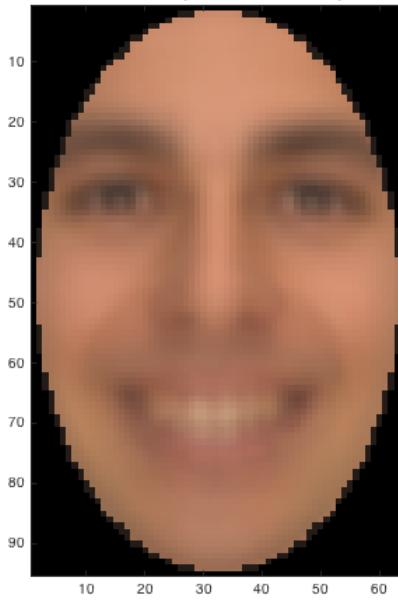
Reconstructed identity number 52 accuracy: 0.18868



Original identity number 52



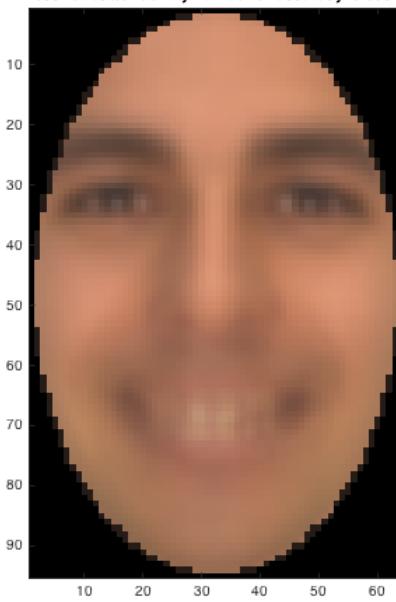
Reconstructed identity number 53 accuracy: 0.71698



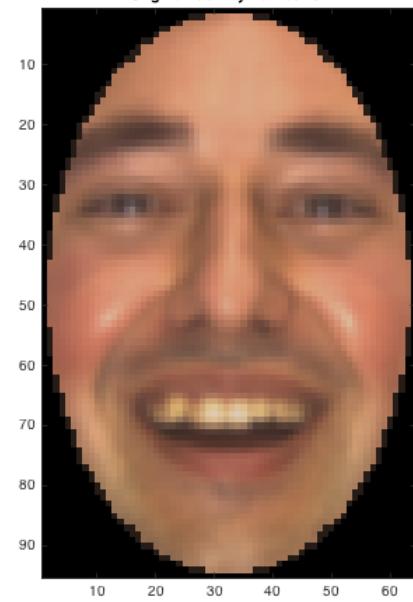
Original identity number 53



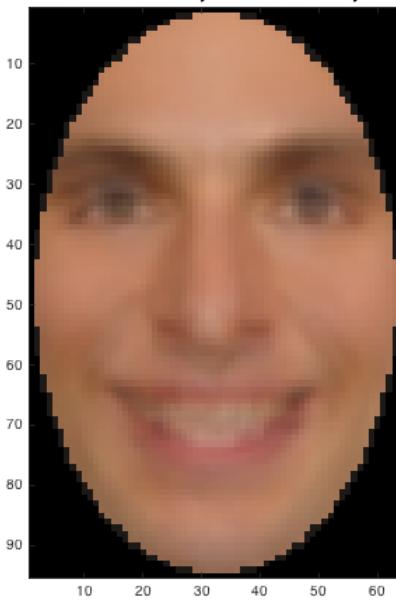
Reconstructed identity number 54 accuracy: 0.39623



Original identity number 54

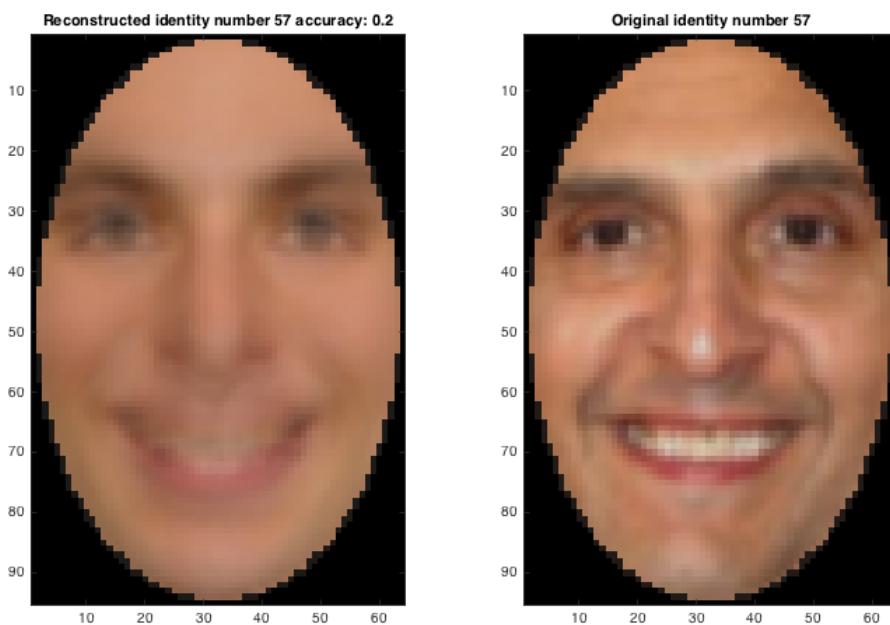
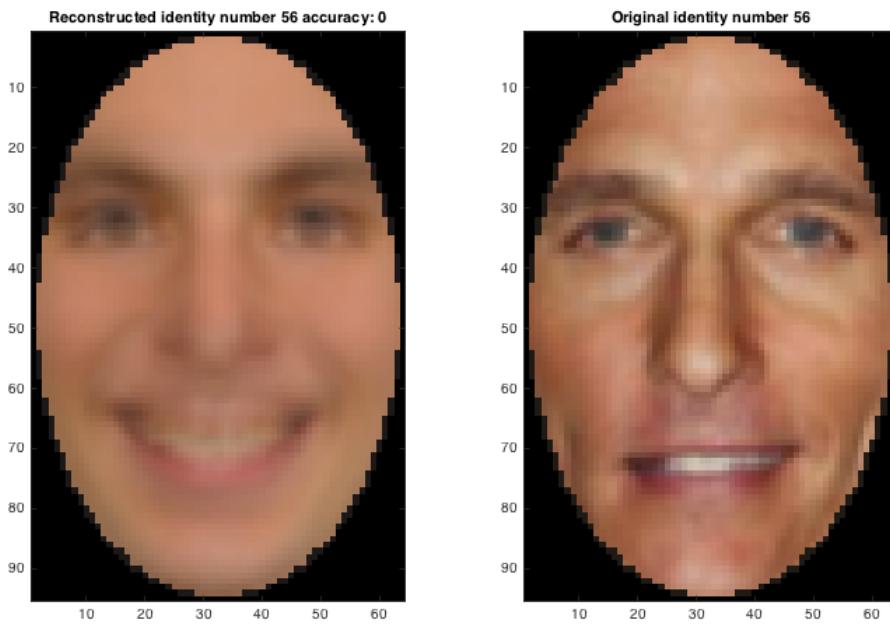


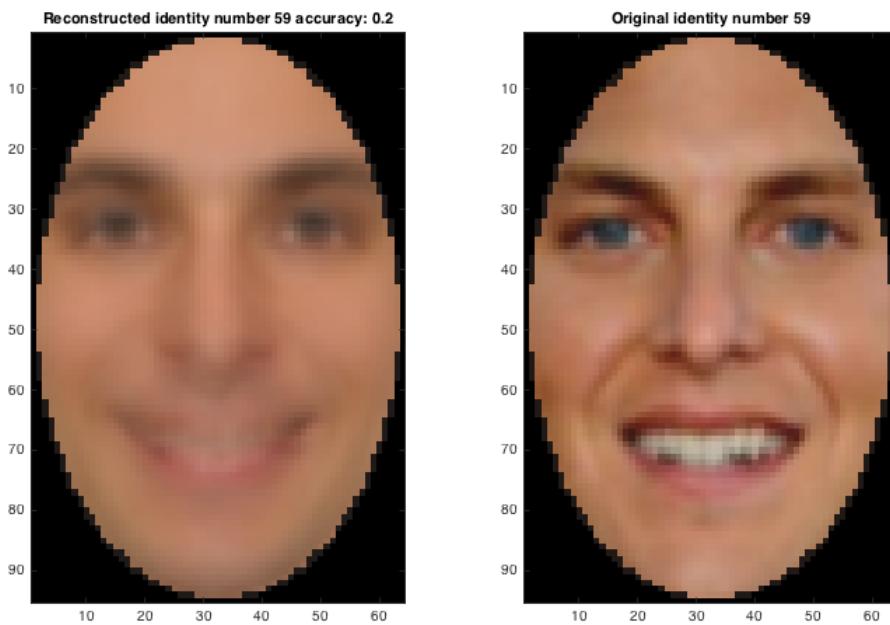
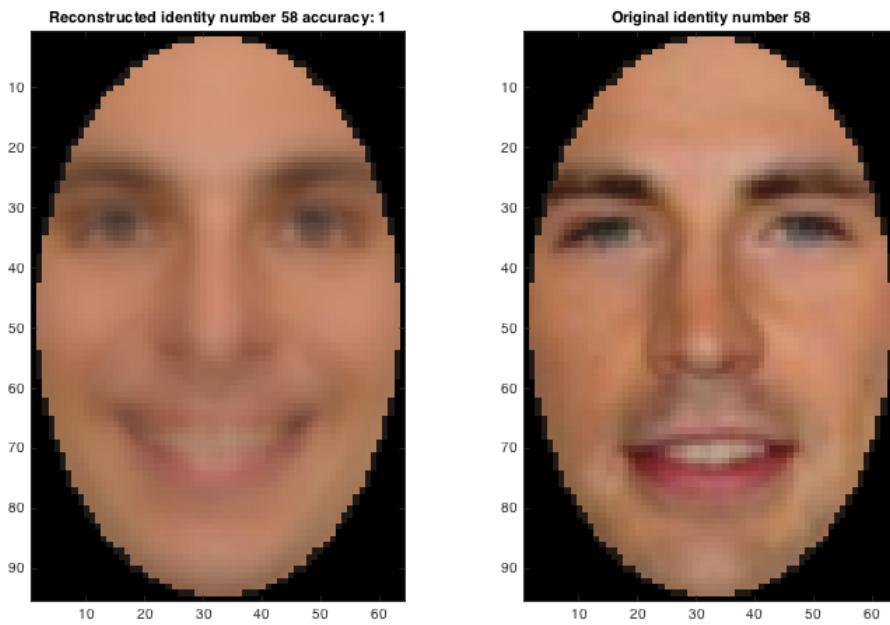
Reconstructed identity number 55 accuracy: 0.2

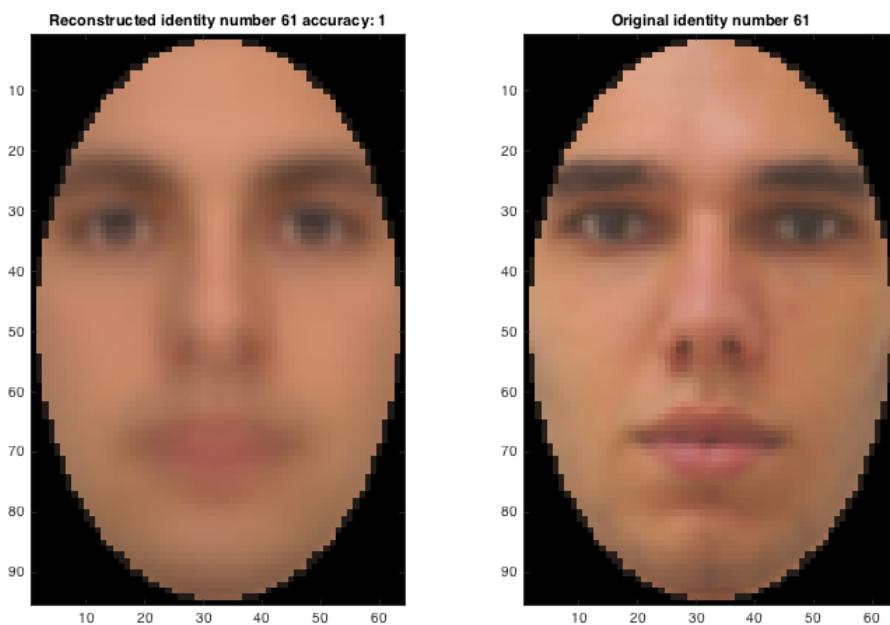
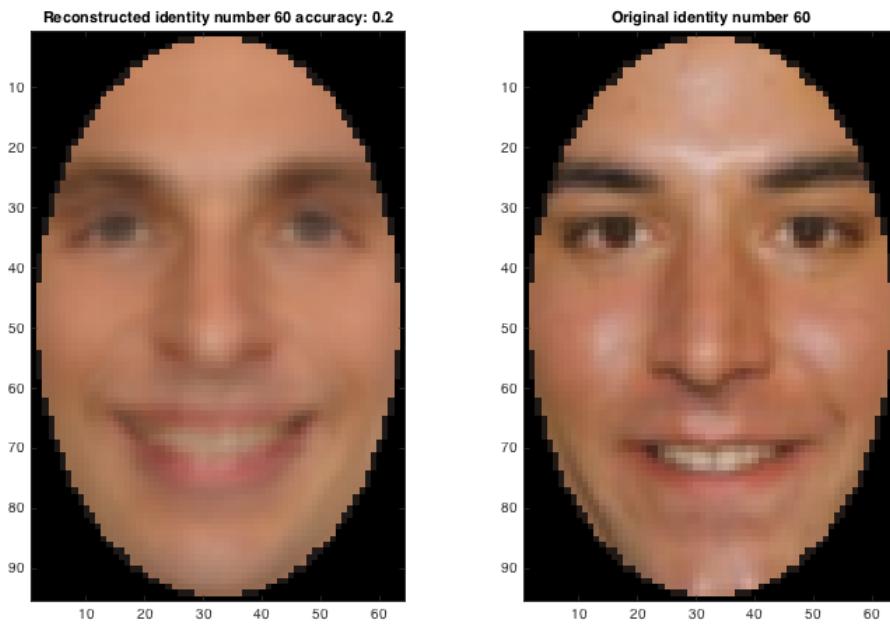


Original identity number 55

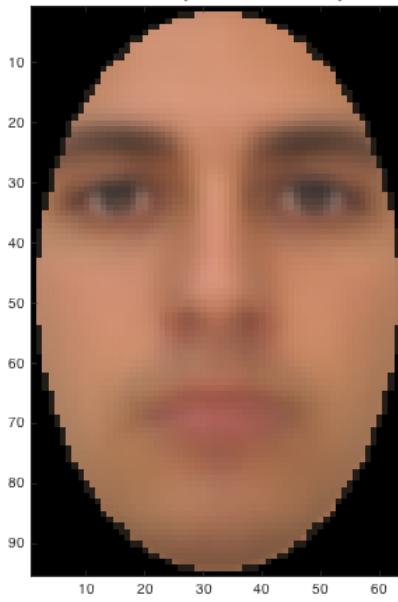




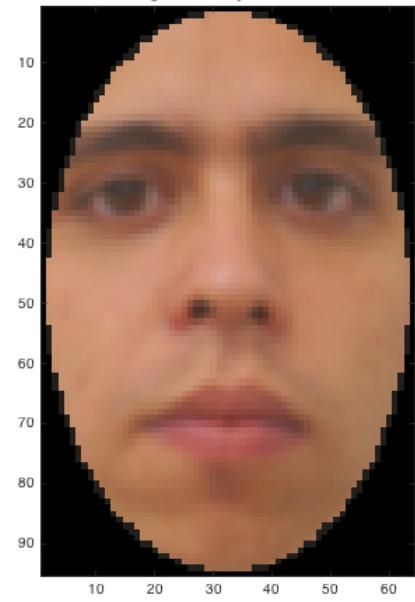




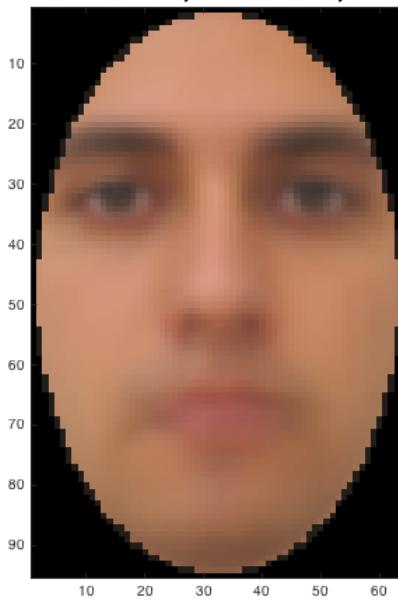
Reconstructed identity number 62 accuracy: 0.67925



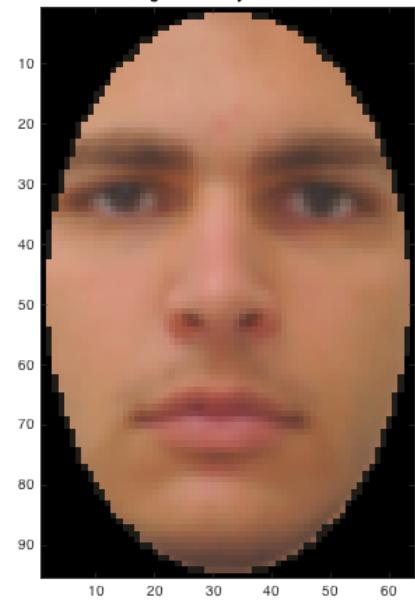
Original identity number 62



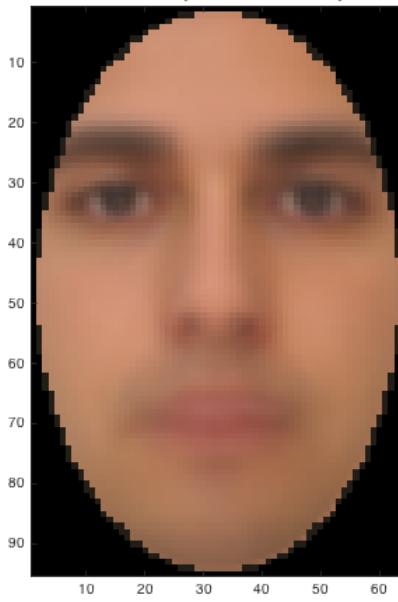
Reconstructed identity number 63 accuracy: 0.73585



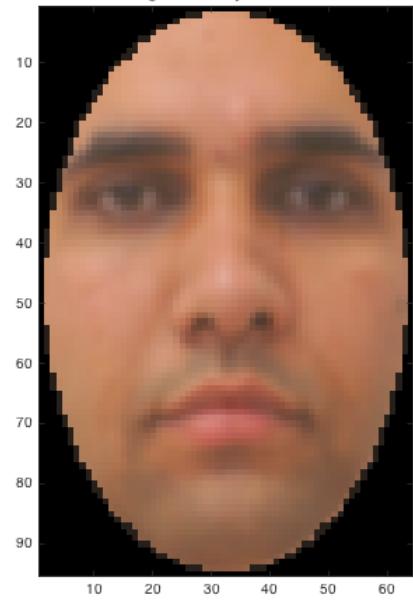
Original identity number 63



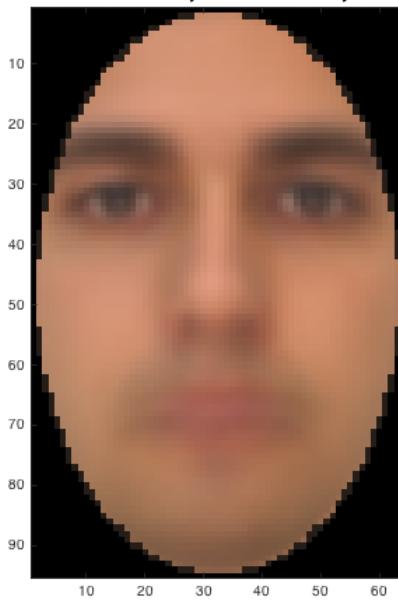
Reconstructed identity number 64 accuracy: 0.83019



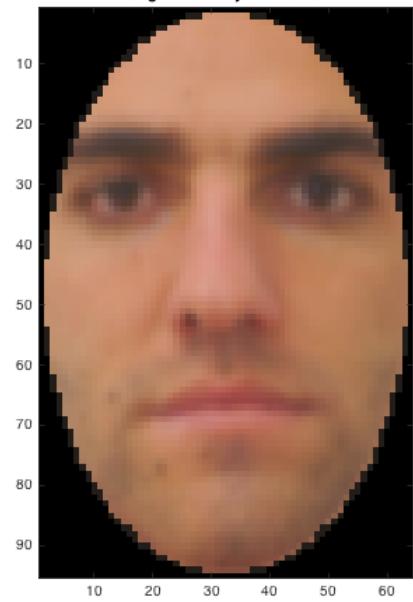
Original identity number 64



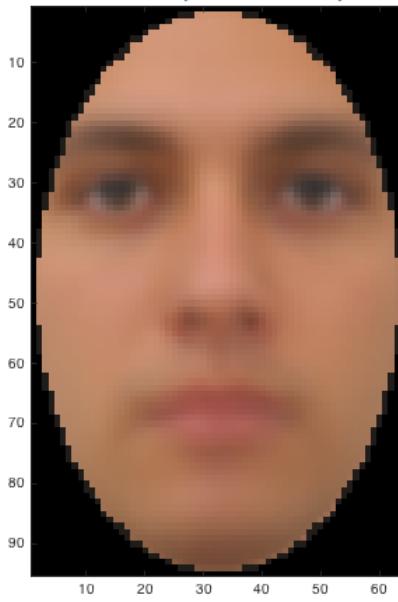
Reconstructed identity number 65 accuracy: 0.9434



Original identity number 65



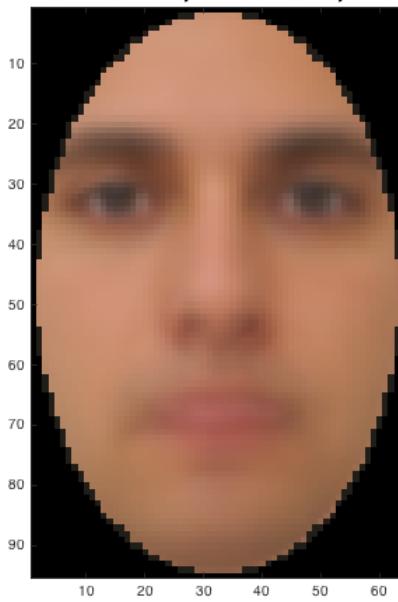
Reconstructed identity number 66 accuracy: 0.84906



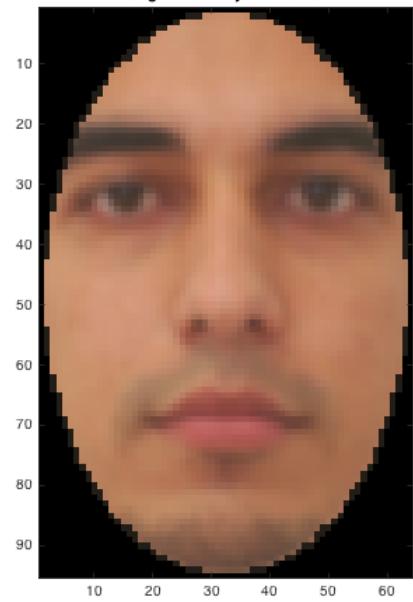
Original identity number 66



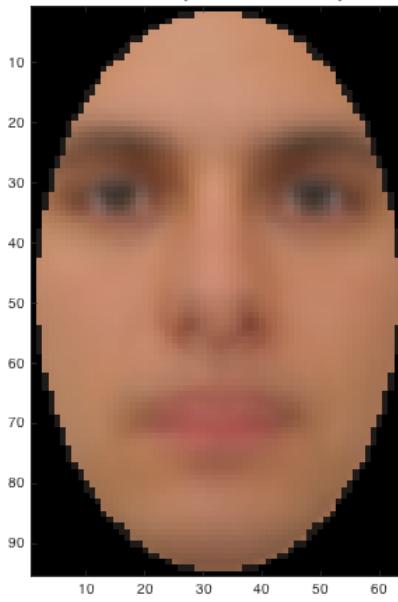
Reconstructed identity number 67 accuracy: 0.83019



Original identity number 67



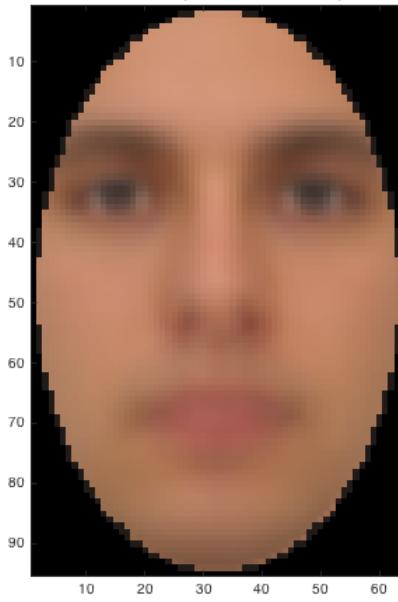
Reconstructed identity number 68 accuracy: 0.83019



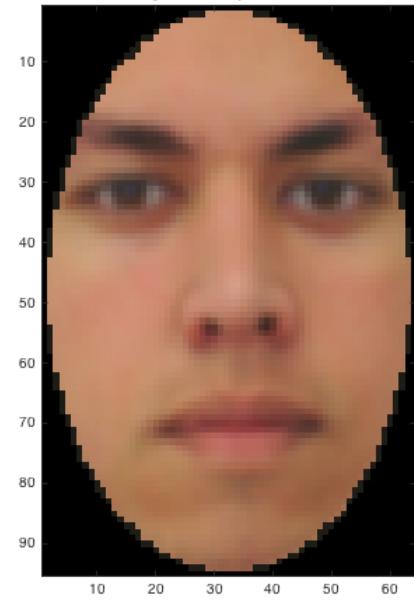
Original identity number 68



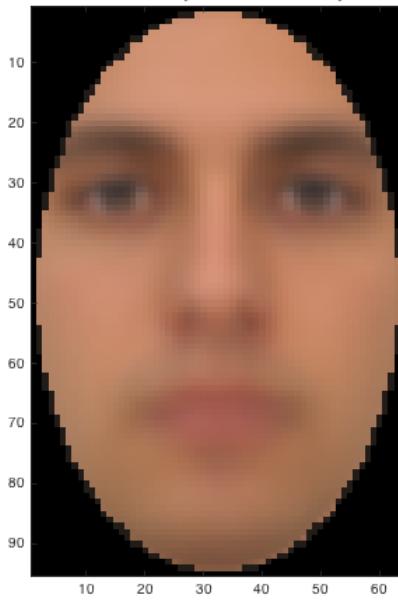
Reconstructed identity number 69 accuracy: 0.66038



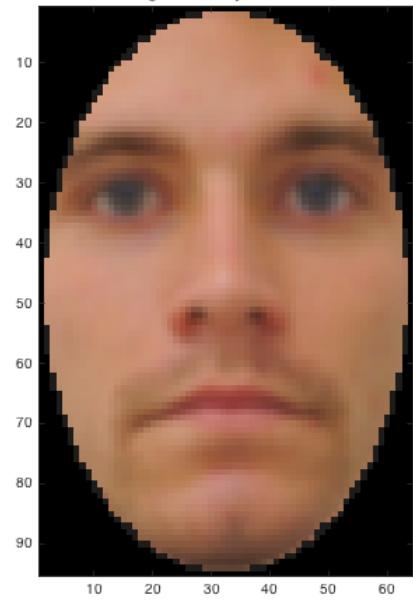
Original identity number 69



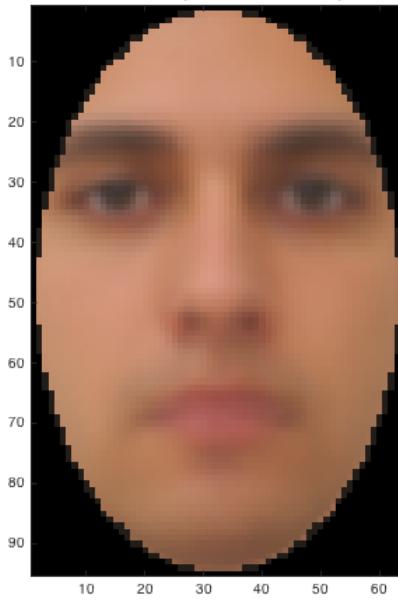
Reconstructed identity number 70 accuracy: 0.86792



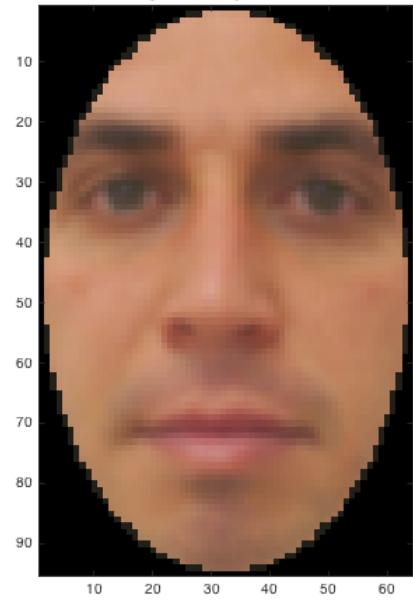
Original identity number 70

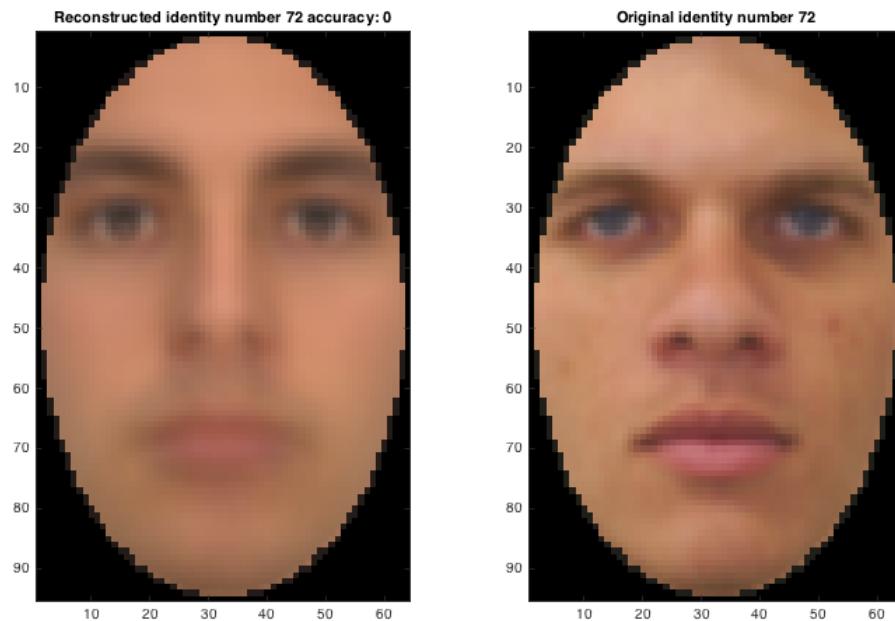


Reconstructed identity number 71 accuracy: 0.71698

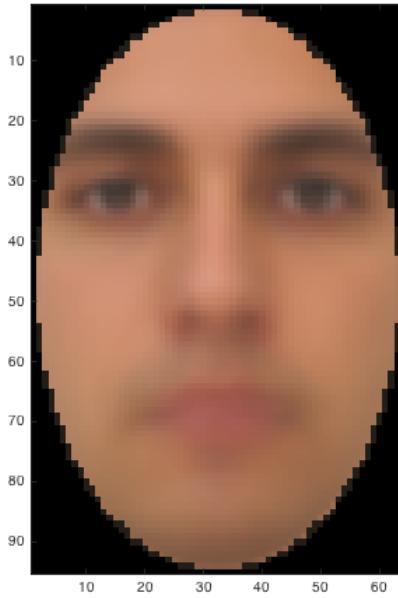


Original identity number 71

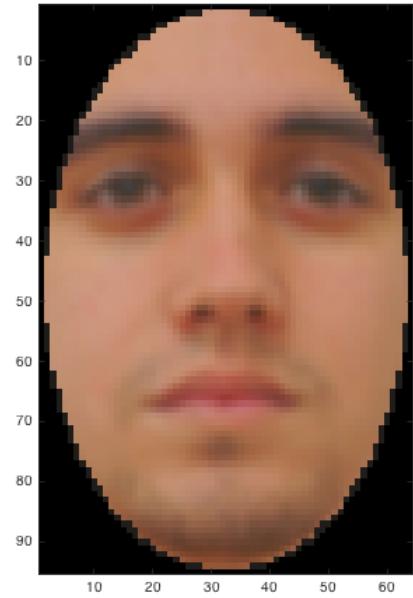




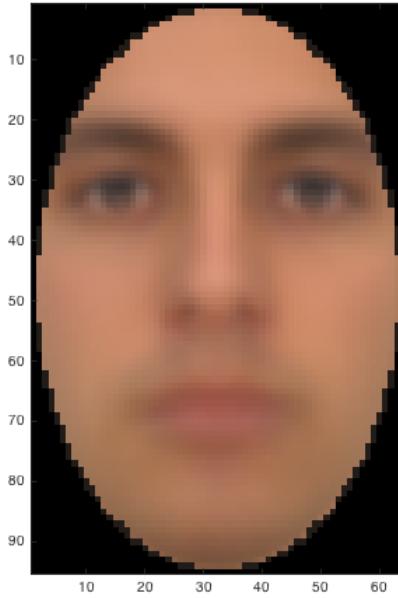
Reconstructed identity number 74 accuracy: 0.64151



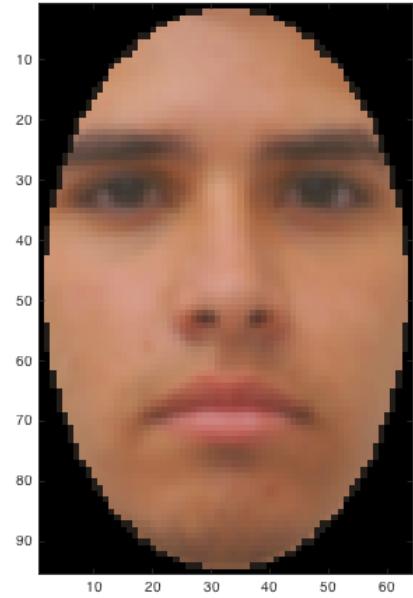
Original identity number 74



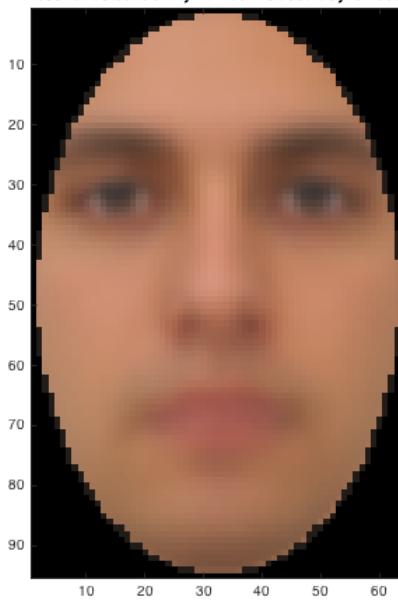
Reconstructed identity number 75 accuracy: 0.88679



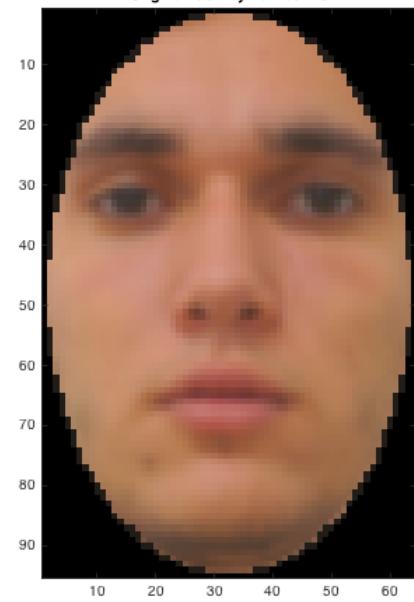
Original identity number 75



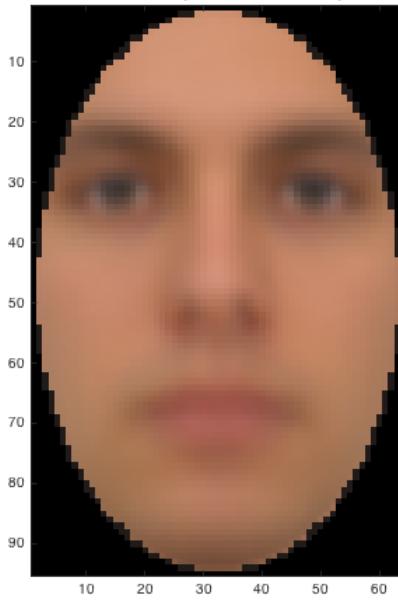
Reconstructed identity number 76 accuracy: 0.73585



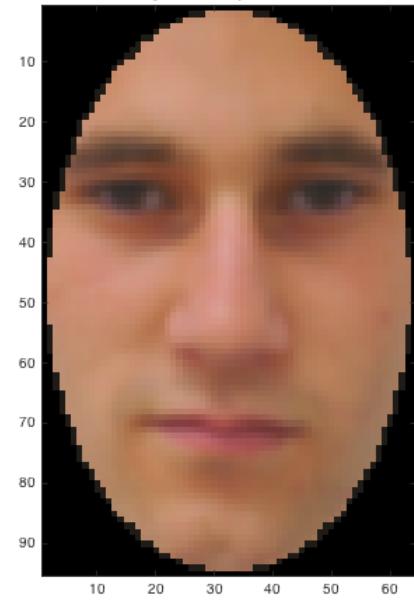
Original identity number 76

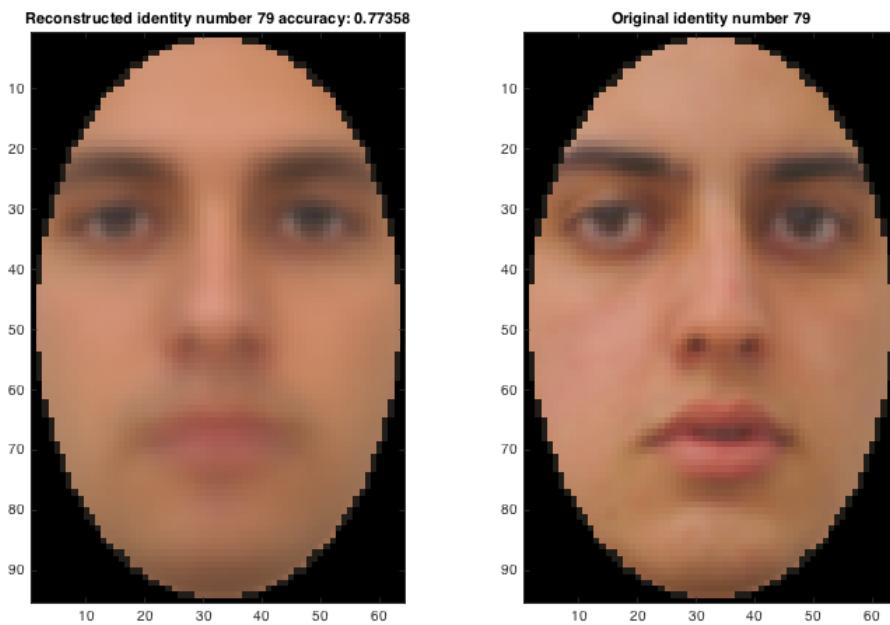
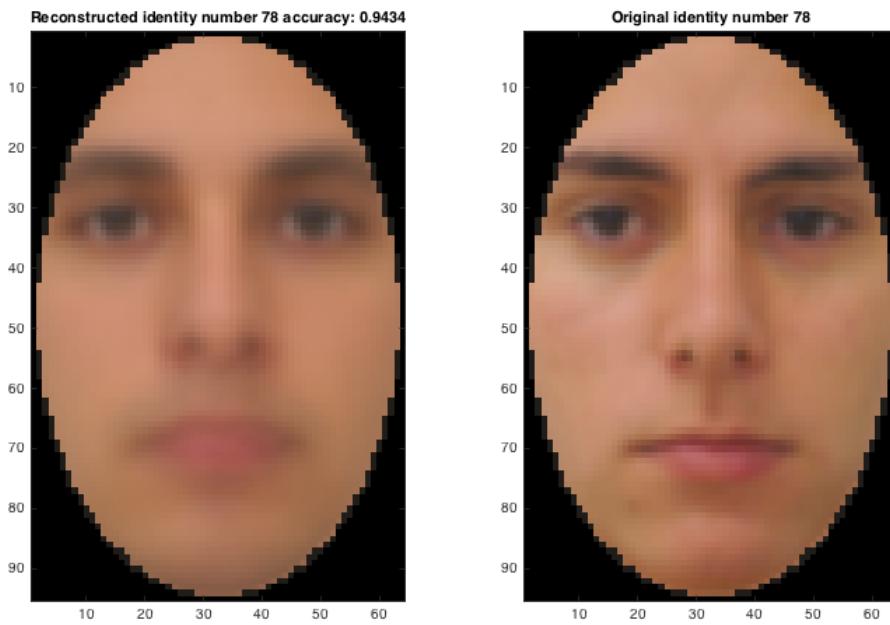


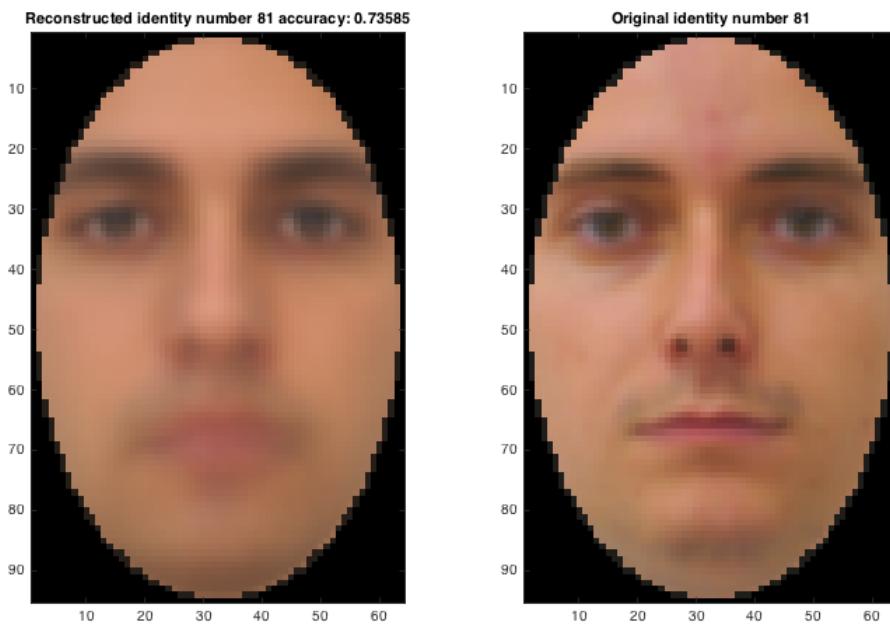
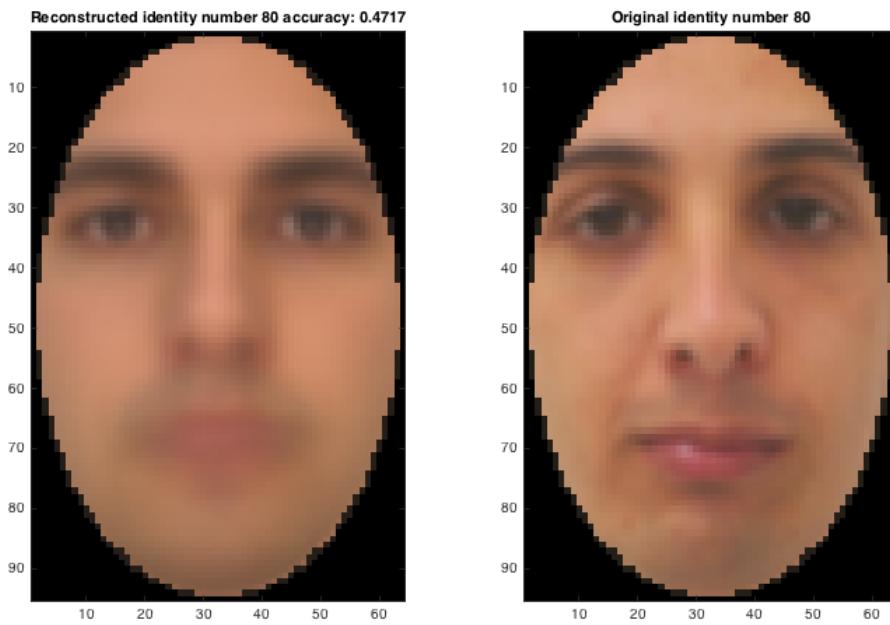
Reconstructed identity number 77 accuracy: 0.26415



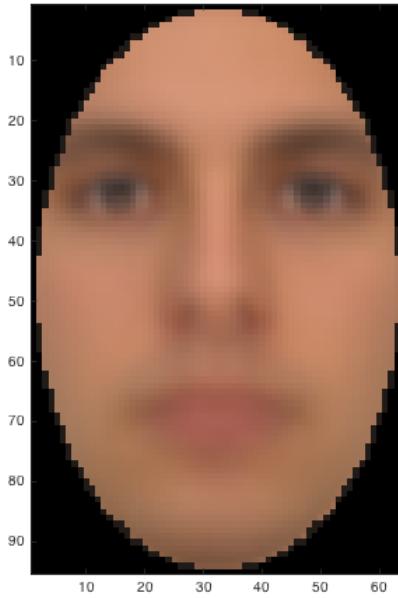
Original identity number 77



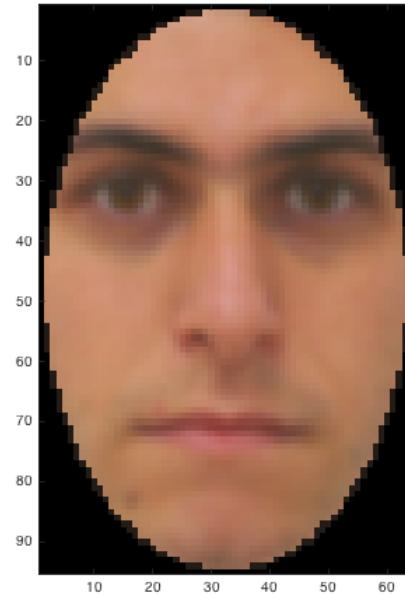




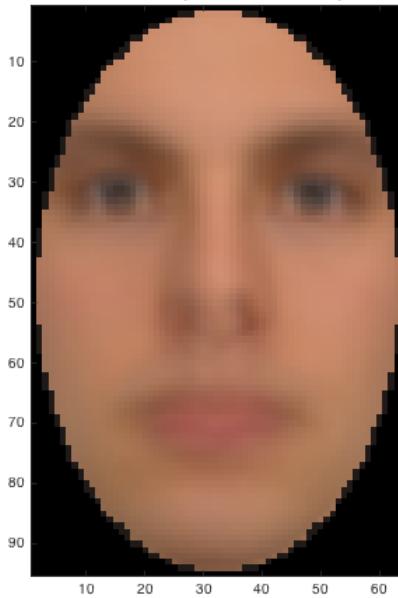
Reconstructed identity number 82 accuracy: 0.69811



Original identity number 82



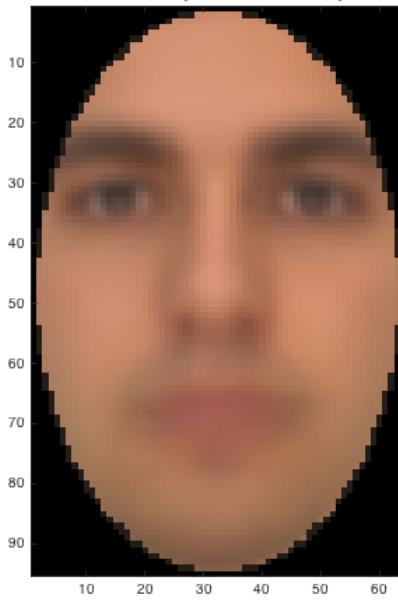
Reconstructed identity number 83 accuracy: 0.79245



Original identity number 83



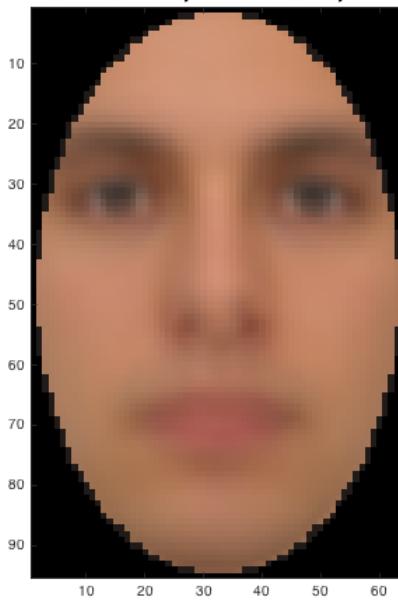
Reconstructed identity number 84 accuracy: 0.54717



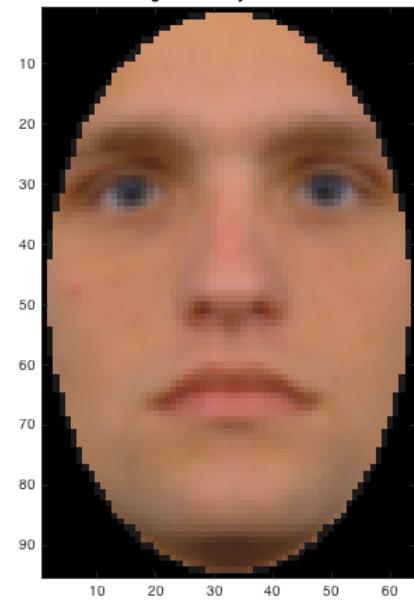
Original identity number 84



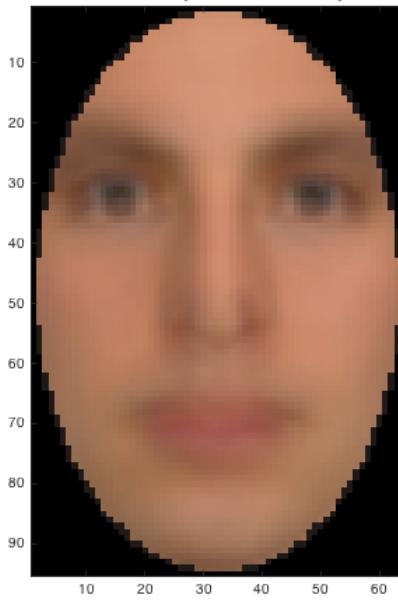
Reconstructed identity number 85 accuracy: 0.43396



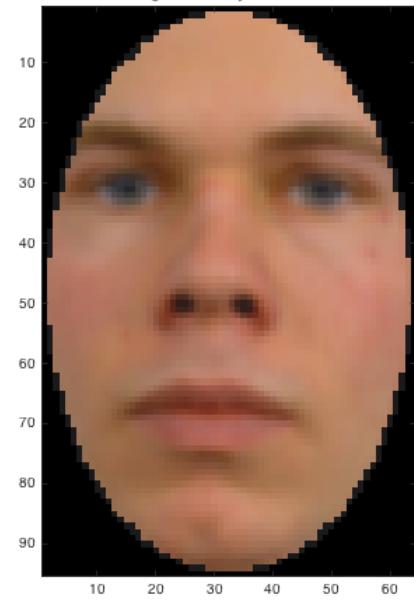
Original identity number 85



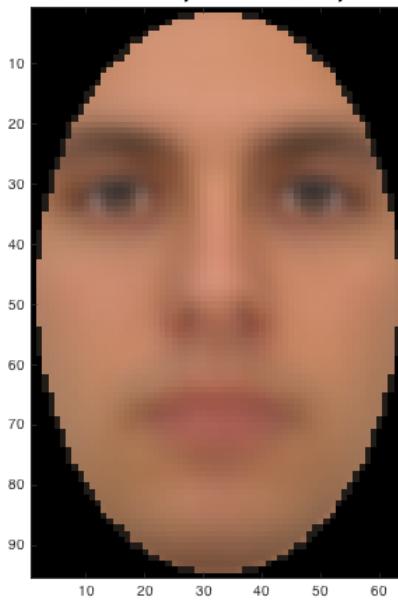
Reconstructed identity number 86 accuracy: 0.92453



Original identity number 86



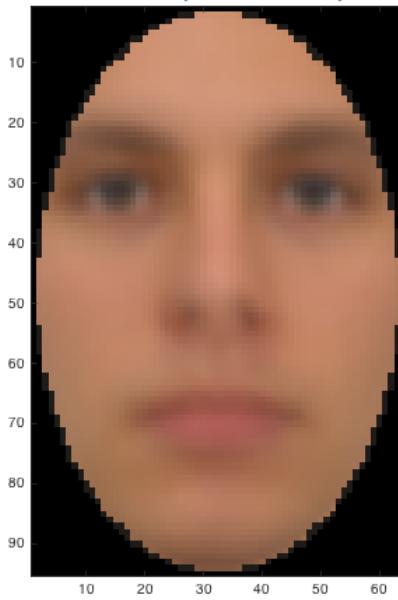
Reconstructed identity number 87 accuracy: 0.11321



Original identity number 87



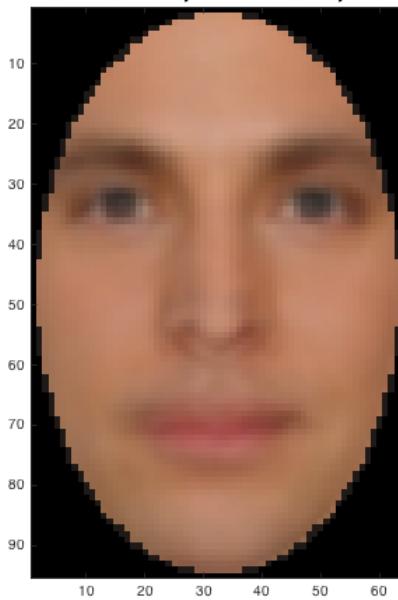
Reconstructed identity number 88 accuracy: 0.86792



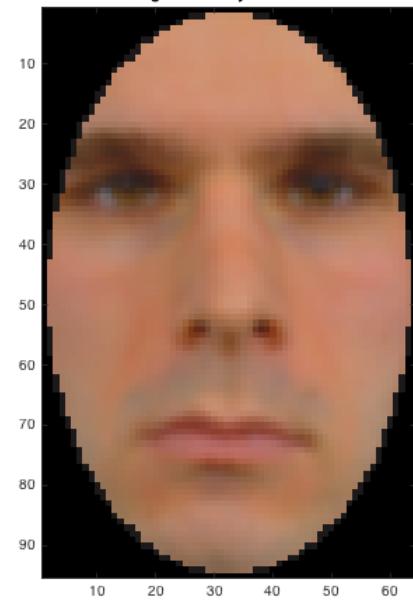
Original identity number 88



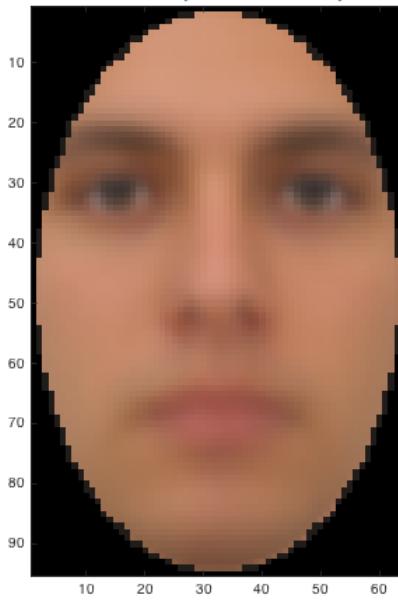
Reconstructed identity number 89 accuracy: 0.96226



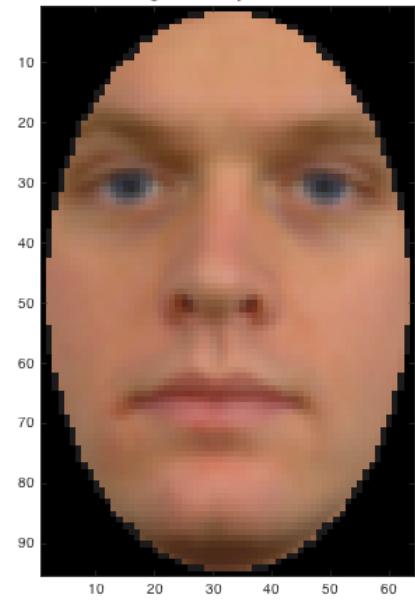
Original identity number 89



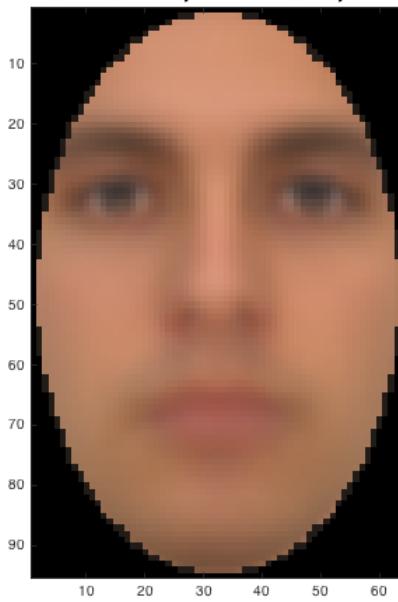
Reconstructed identity number 90 accuracy: 0.43396



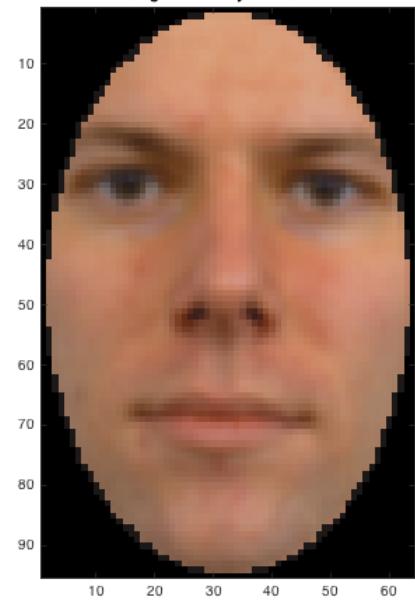
Original identity number 90



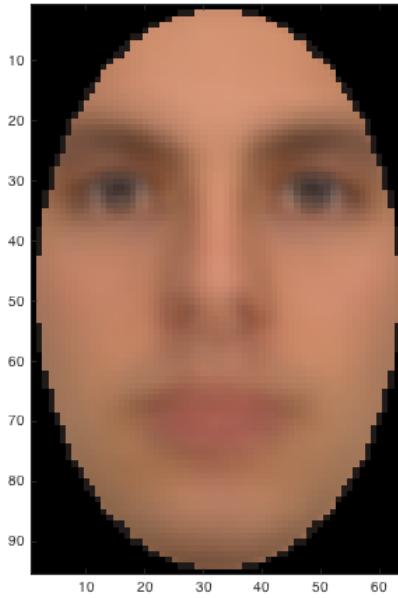
Reconstructed identity number 91 accuracy: 0.41509



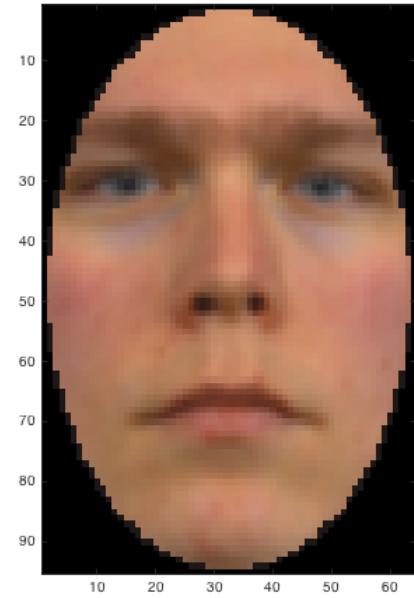
Original identity number 91



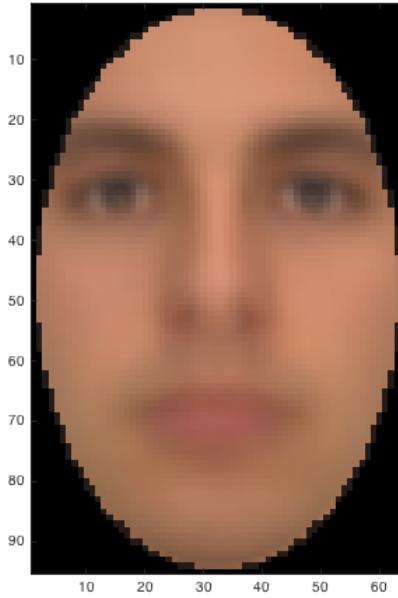
Reconstructed identity number 92 accuracy: 0.69811



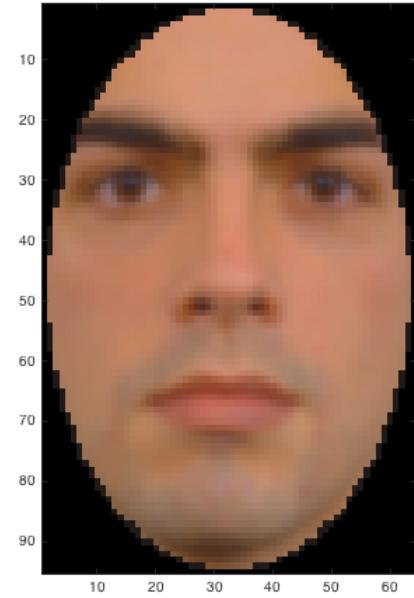
Original identity number 92



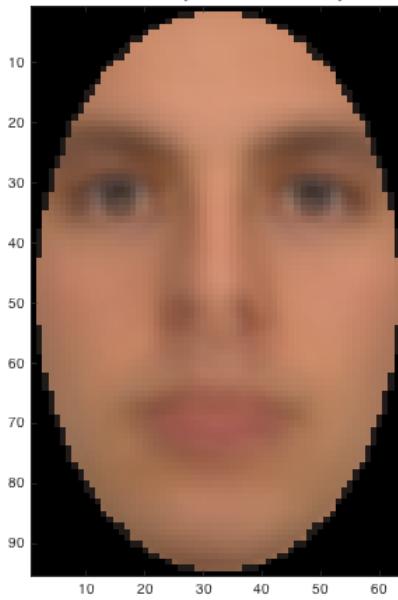
Reconstructed identity number 93 accuracy: 0.58491



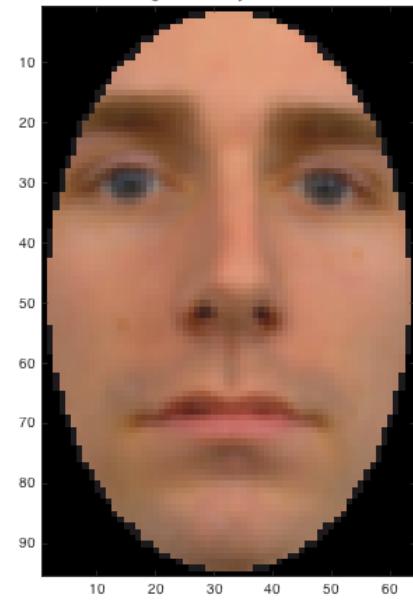
Original identity number 93



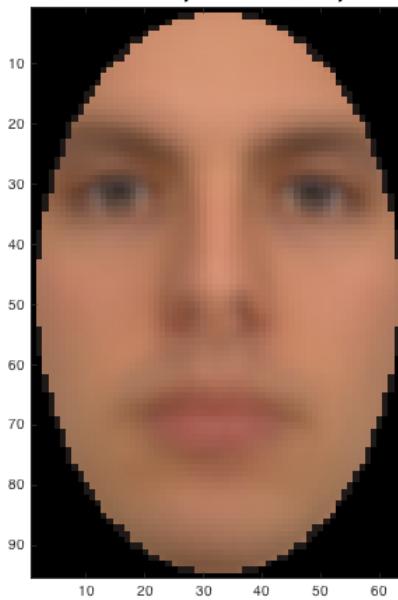
Reconstructed identity number 94 accuracy: 0.66038



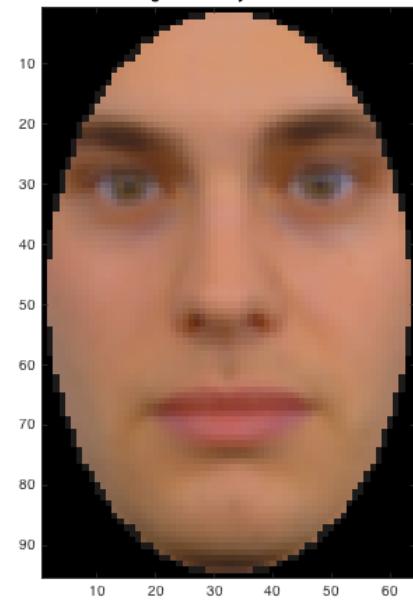
Original identity number 94



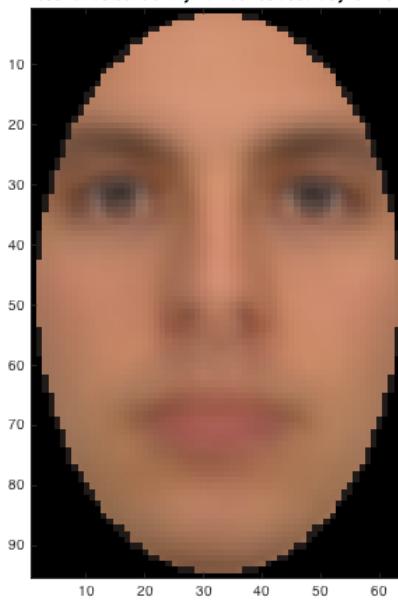
Reconstructed identity number 95 accuracy: 0.92453



Original identity number 95



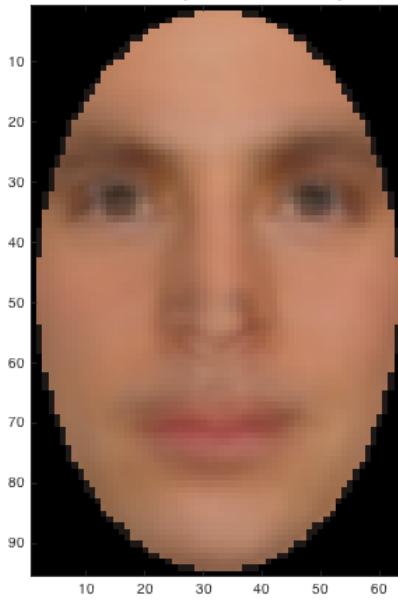
Reconstructed identity number 96 accuracy: 0.24528



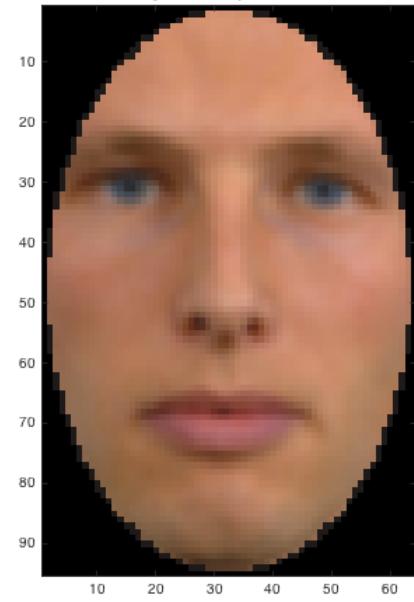
Original identity number 96



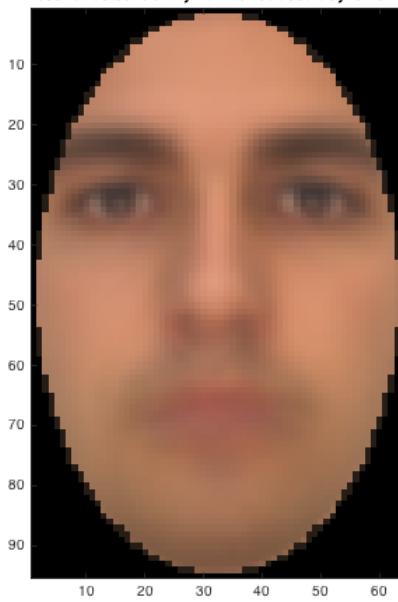
Reconstructed identity number 97 accuracy: 0.96226



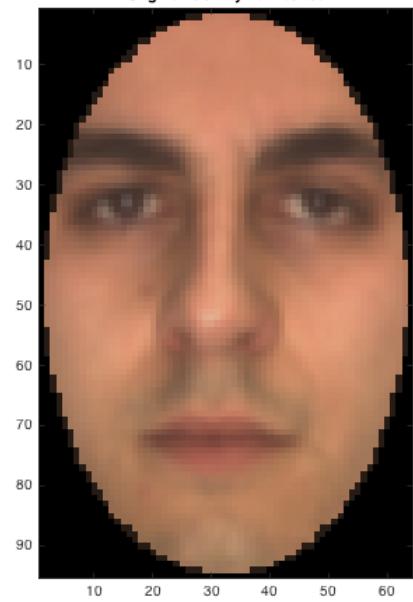
Original identity number 97



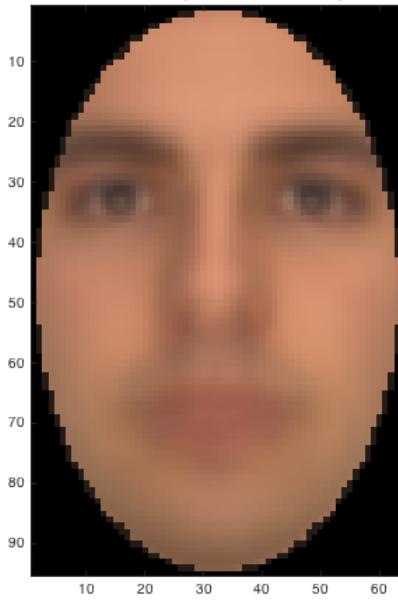
Reconstructed identity number 98 accuracy: 0.75472



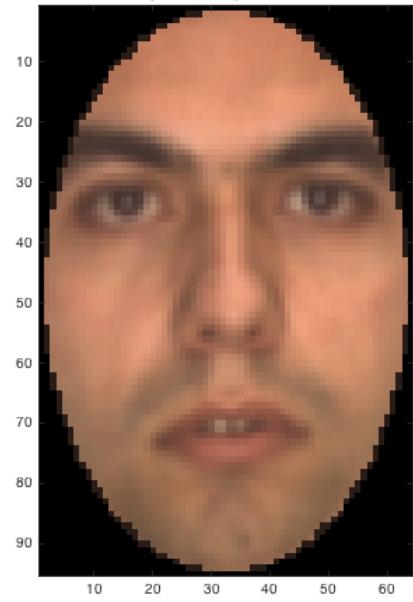
Original identity number 98



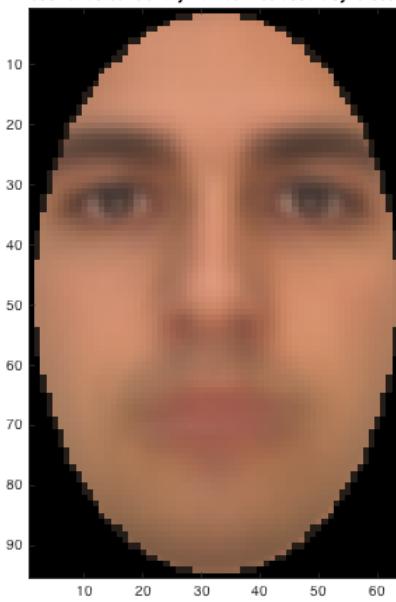
Reconstructed identity number 99 accuracy: 0.88679



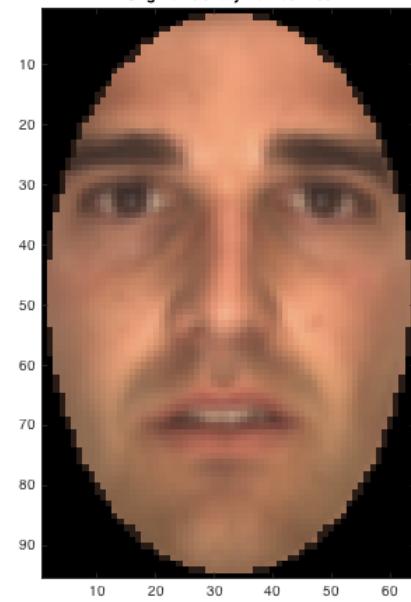
Original identity number 99



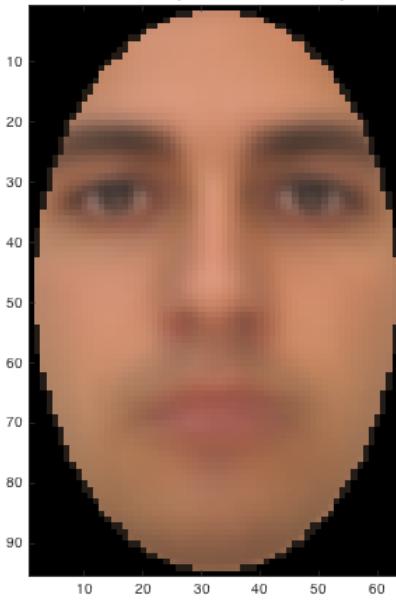
Reconstructed identity number 100 accuracy: 0.60377



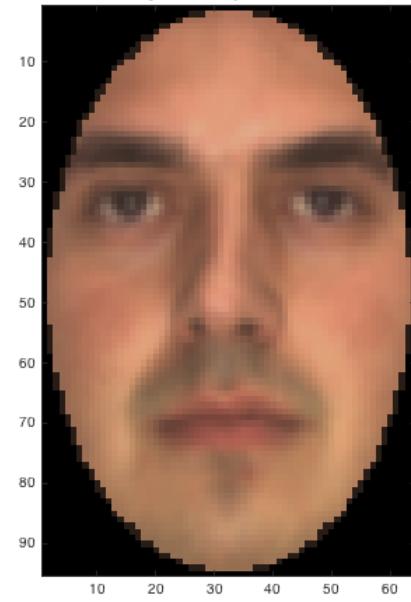
Original identity number 100



Reconstructed identity number 101 accuracy: 0.13208



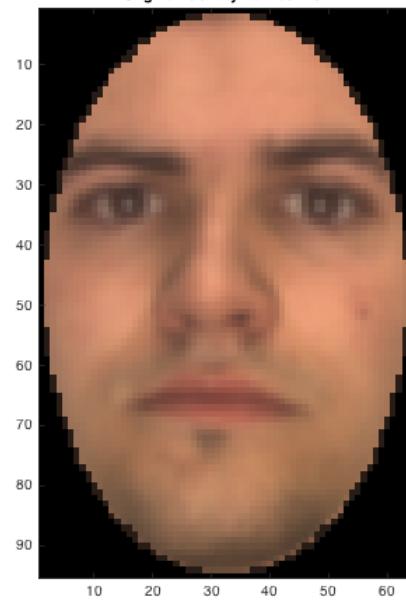
Original identity number 101



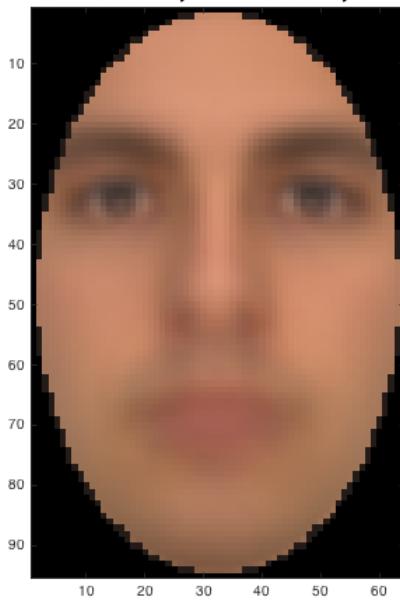
Reconstructed identity number 102 accuracy: 0.83019



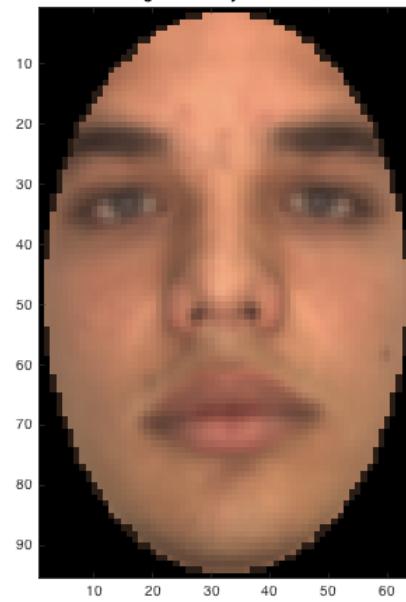
Original identity number 102



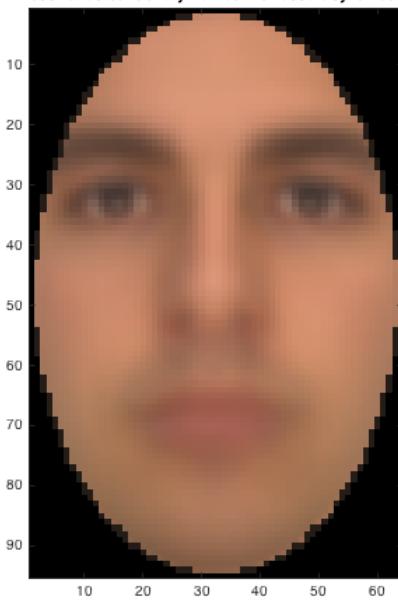
Reconstructed identity number 103 accuracy: 0.92453



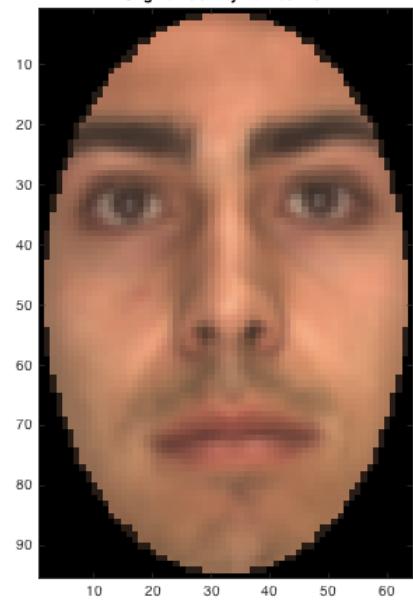
Original identity number 103



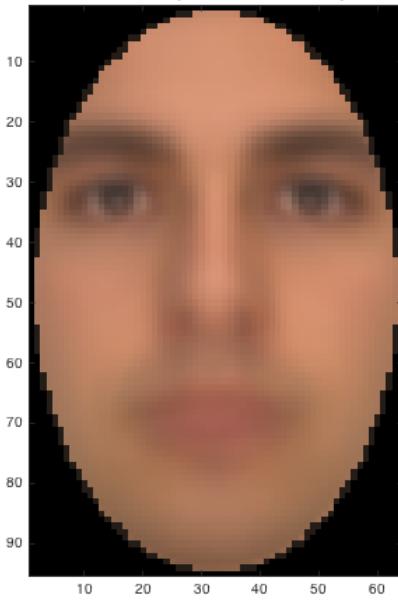
Reconstructed identity number 104 accuracy: 0.43396



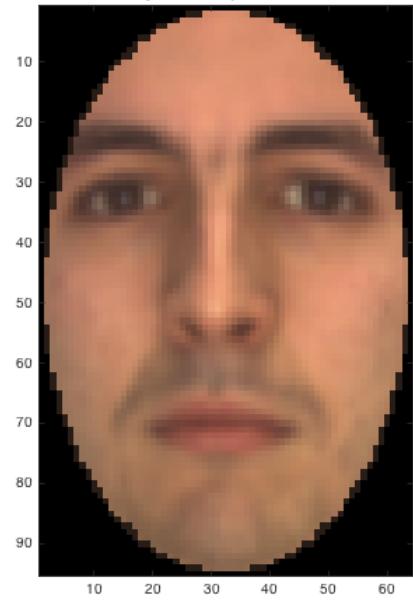
Original identity number 104

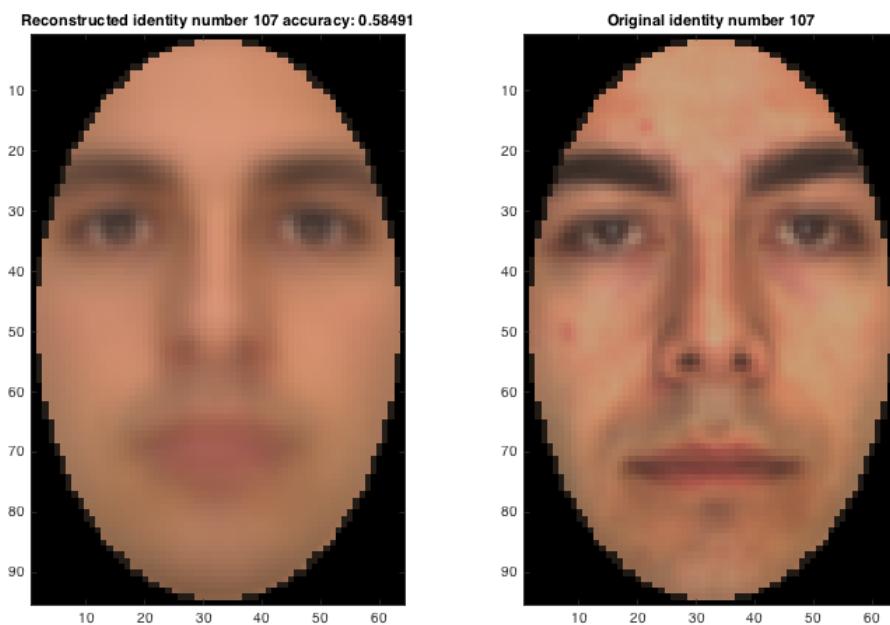
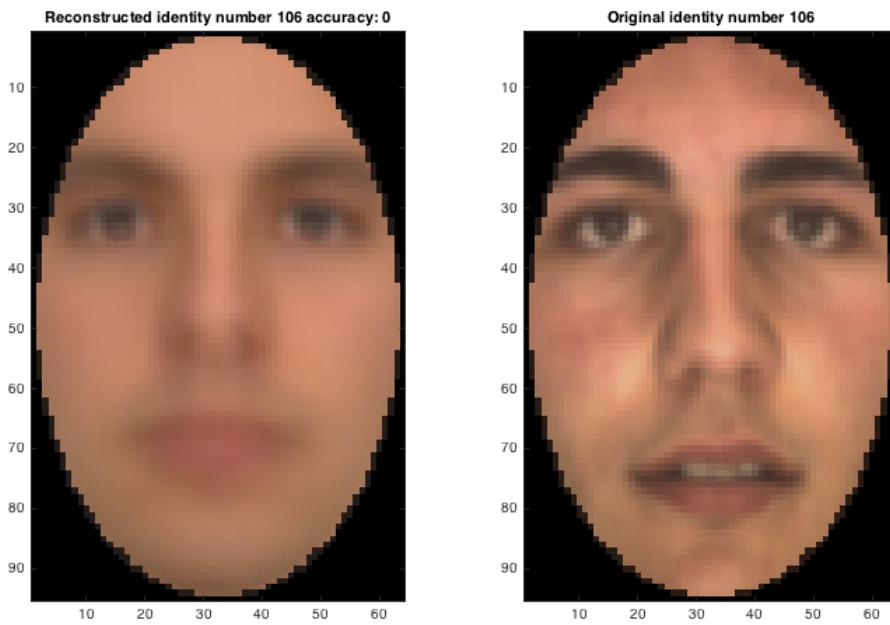


Reconstructed identity number 105 accuracy: 0.98113

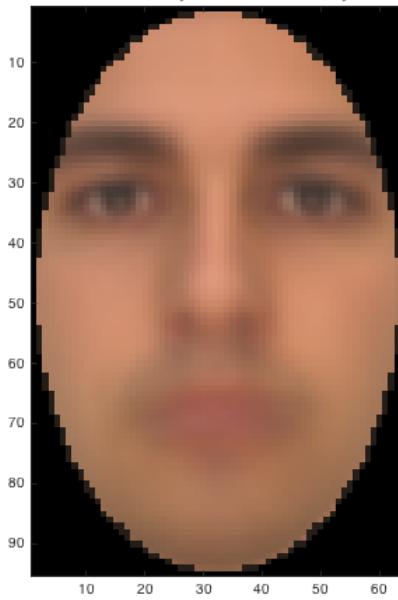


Original identity number 105

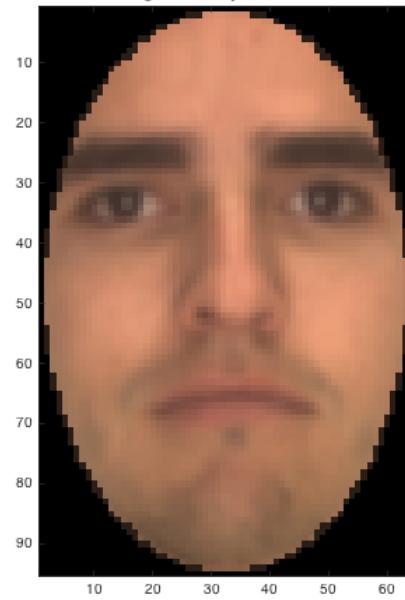




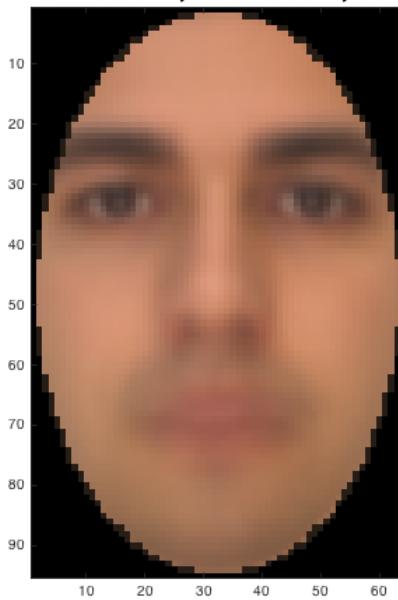
Reconstructed identity number 108 accuracy: 0.98113



Original identity number 108



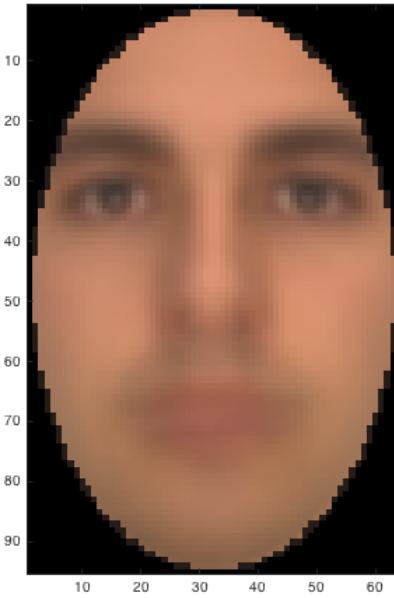
Reconstructed identity number 109 accuracy: 0.67925



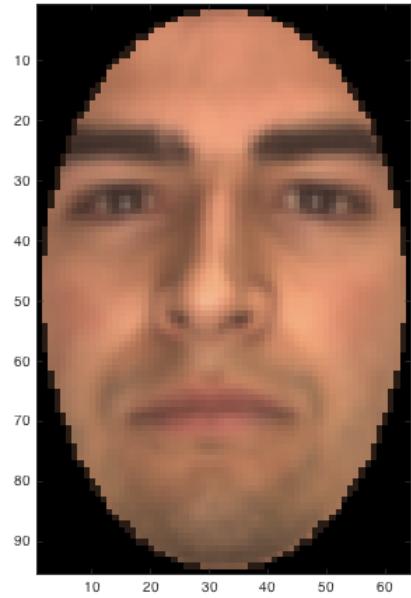
Original identity number 109



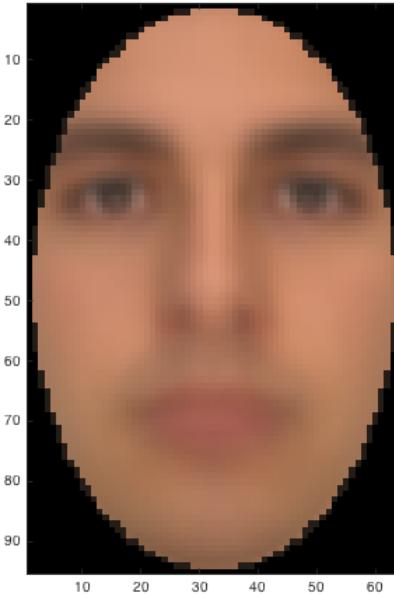
Reconstructed identity number 110 accuracy: 0.81132



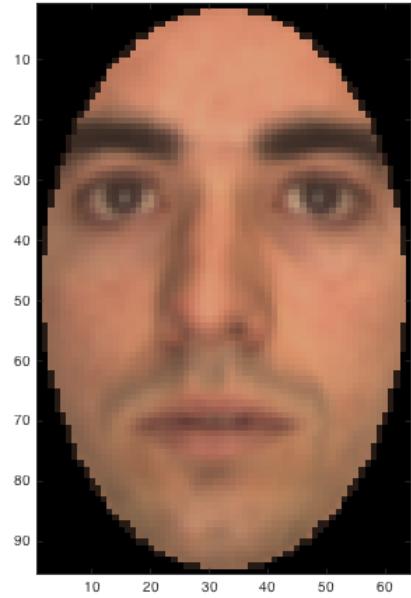
Original identity number 110



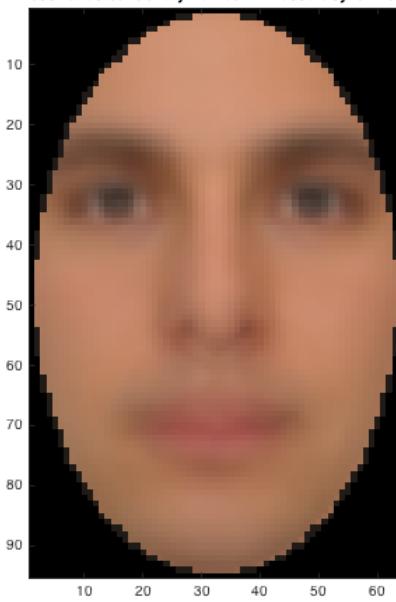
Reconstructed identity number 111 accuracy: 0.9434



Original identity number 111



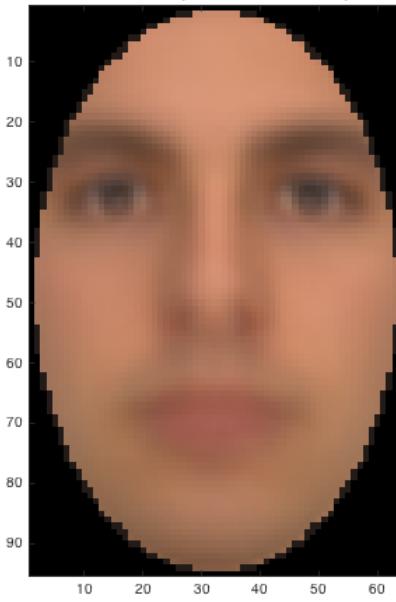
Reconstructed identity number 112 accuracy: 0.11321



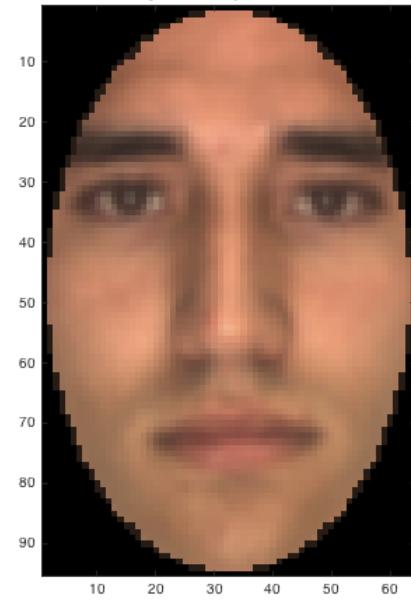
Original identity number 112



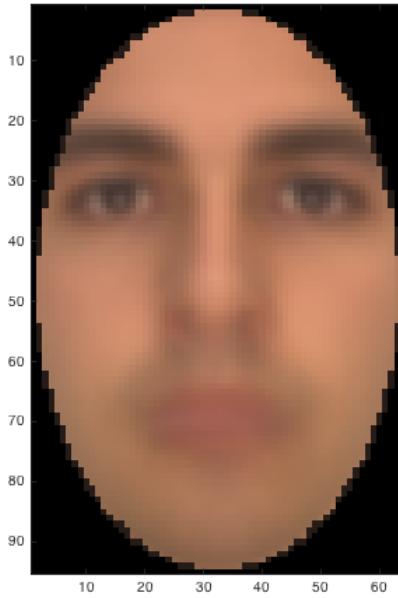
Reconstructed identity number 113 accuracy: 0.4717



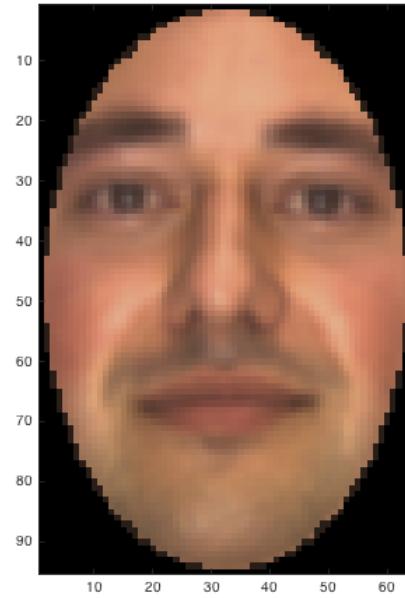
Original identity number 113



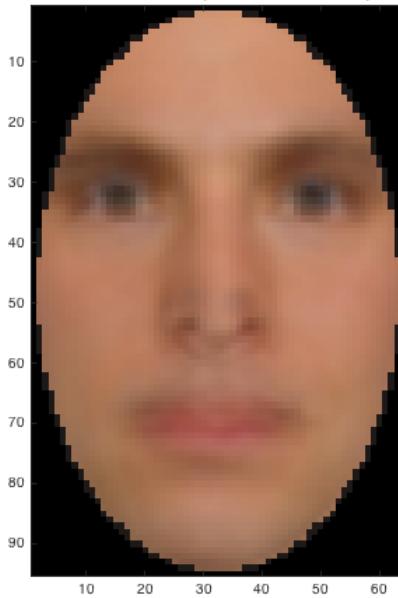
Reconstructed identity number 114 accuracy: 0.54717



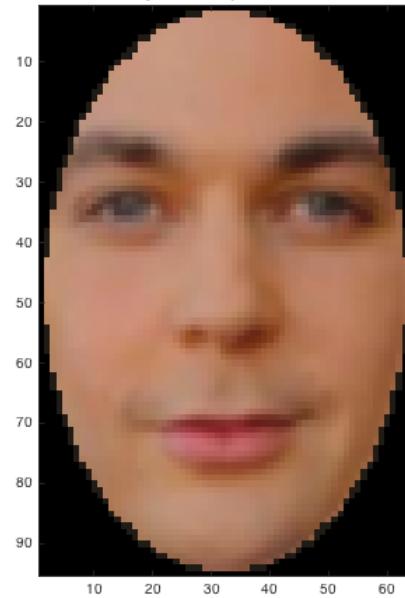
Original identity number 114

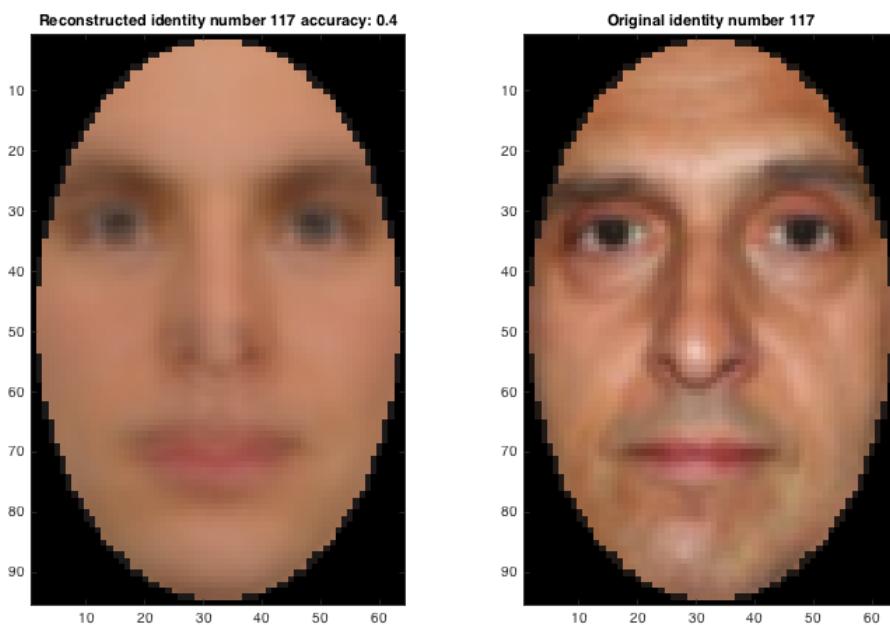
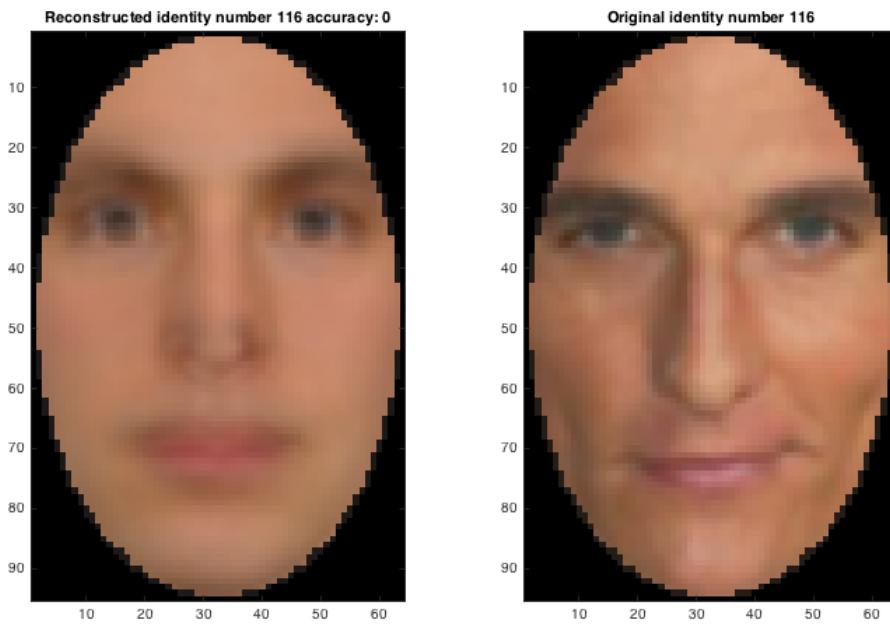


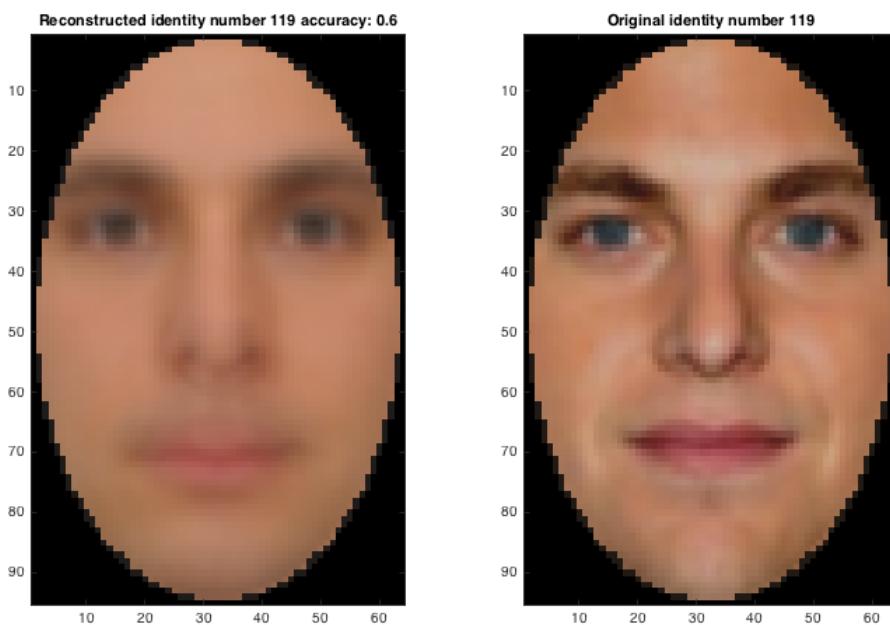
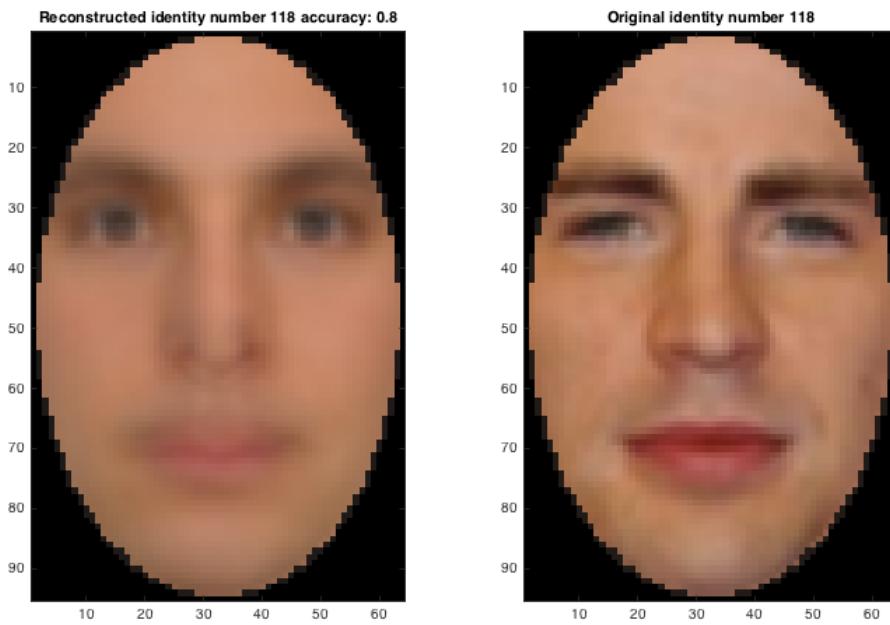
Reconstructed identity number 115 accuracy: 0

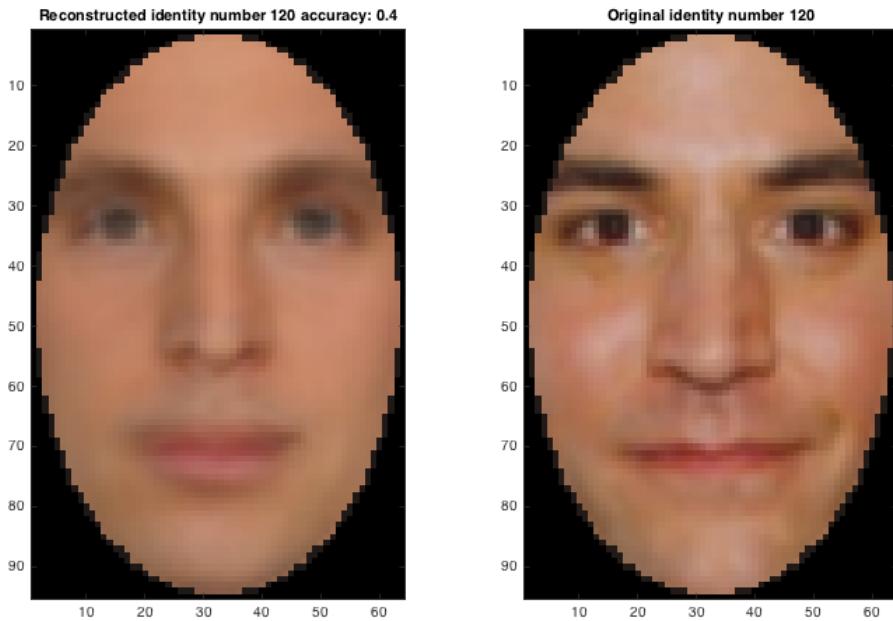


Original identity number 115









plotting heatmaps of the test

shows percentage of accurate discrimination (same pairs vs different pairs) in at each pixel.

```

lims=[0.1 0.8];
jet1=jet; jet1(1,:)=[0 0 0];
imNum=data.imNum;
[out_neut_L]=heat_map_recon(data.recon_mat_sq(:,:,1:imNum
+1:imNum*2),data.labout(imNum+1:imNum*2),1);
[out_neut_A]=heat_map_recon(data.recon_mat_sq(:,:,1:imNum
+1:imNum*2),data.labout(imNum+1:imNum*2),2);
[out_neut_B]=heat_map_recon(data.recon_mat_sq(:,:,1:imNum
+1:imNum*2),data.labout(imNum+1:imNum*2),3);
[out_happ_L]=heat_map_recon(data.recon_mat_sq(:,:,1:imNum),data.labout(1:imNum),
[out_happ_A]=heat_map_recon(data.recon_mat_sq(:,:,1:imNum),data.labout(1:imNum),
[out_happ_B]=heat_map_recon(data.recon_mat_sq(:,:,1:imNum),data.labout(1:imNum),
plot_heatmap(out_neut_L,lims,jet1)
plot_heatmap(out_neut_A,lims,jet1)
plot_heatmap(out_neut_B,lims,jet1)
plot_heatmap(out_happ_L,lims,jet1)
plot_heatmap(out_happ_A,lims,jet1)
plot_heatmap(out_happ_B,lims,jet1)

```

