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*Institute for
Information
Technology*

***Navigation, Visualization and Searching in
Databases of Full Body 3D Scans***

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Scientific Data and Knowledge within the Information Society

24 October 2006, Beijing

- **Introduction:**
 - Description of the visual interface
 - CAESAR information content
- **Navigation**
- **Visualization**
- **Search**
- **Human Shape Variability Study (PCA)**
- **Summary**


The Visual Interface of Cleopatra

Cleopatra - Microsoft Internet Explorer


File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites History Mail Print Edit

Address http://132.246.40.24/Cleopatra71/Cleopatra71

CLEOPATRA VII  CAESAR[™]
3-D Anthropometric Database

by Eric Paquet and Marc Rioux



1 to 12 out of 87

Search

More

File:













Filter:


Keywords:

Shape: Structure:

Colour: Scale:

Shape, 1
Structure, 0
Scale, 0
Colour, 0
Filter, Gender=1 and weight>160 and
age<30
csr0058a1, 100.0%
csr0211a1, 88.7%
csr0218a1, 88.7%
csr0144a1, 88.1%

 100.0% csr0058a1	 88.7% csr0211a1	 88.7% csr0218a1	 88.1% csr0144a1
 87.9% csr0223a1	 86.8% csr0140a1	 86.8% csr0299a1	 86.1% csr0152a1
 86.1% csr0285a1	 85.9% csr0138a1	 85.7% csr0126a1	 85.2% csr0251a1

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de recherches Canada


Done Internet

Cleopatra - Microsoft Internet Explorer


File Edit View Favorites Tools Help

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Address http://132.246.40.24/Cleopatra71/Cleopatra71

CLEOPATRA VII  CAESAR™
3D Anthropometric Database

by Eric Paquet and Marc Rioux



File:













Filter:


Keywords

Shape: Structure:

Colour: Scale:

```
Shape,1
Structure,0
Scale,1
Colour,0
Filter,void
```

 csr0150b1	 csr0224c1	 csr0316c1	 csr0142b1
 csr0133a1	 csr0305a1	 csr0206a1	 csr0113b1
 csr0133c1	 csr0084a1	 csr0116a1	 csr0129b1

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Traditional Anthropometry Data

Cleopatra - Microsoft Internet Explorer

Address: http://132.246.40.24/Cleopatra71/Cleopatra71

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by Eric Paquet and Marc Rioux



1 to 12 out of 87

File: Measures

Filter: About Database View

Keywords:

Shape: Structure Profile

Colour: Scale:


```

csr0218a1, 88.7%
csr0144a1, 88.1%
csr0223a1, 87.9%
csr0140a1, 86.8%
csr0299a1, 86.8%
csr0152a1, 86.1%
csr0285a1, 86.1%
csr0138a1, 85.9%
csr0126a1, 85.7%
csr0251a1, 85.2%
    
```

Measures - Microsoft Internet Explorer

Acromial Height, Sitting	Ankle Circumference	Spine-to-Shoulder	Spine-to-Elbow	Arm Length (Spine to Wrist)	Armscye Circumference (Scye Circ Over Acromion)	Bizygomatic Breadth
61.9	26.3999	21.1	54.0	85.6999	44.4	13.699901
Bust/Chest Circumference	Bust/Chest Circumference (Under Bust)	Buttock-Knee Length	Chest Girth (Chest Circumference at Scye)	Crotch Height Recorded	Elbow Height	Eye Height, Sitting
99.9	-1.0	60.5999	103.1999	80.9	24.8999	80.0
Face Length	Foot Length	Hand Circumference	Hand Length	Head Breadth	Head Circumference	Head Length
12.3	28.3999	21.1	21.0	14.6	54.4	19.0
Hip Breadth, Sitting	Hip Circumference (Maximum)	Hip Circ Max Height	Knee Height Sitting	Neck Base (Neck Circumference)	Shoulder Breadth	Sitting Height
37.2	98.9	87.4	56.0999	44.5	50.7	91.8
Stature	Subscapular Skinfold	Thigh Circumference	Thigh Circumference (Max Sitting)	Thumb Tip Reach	TTR 1	TTR 2
176.5	0.85	57.0999	57.5	82.1999	81.8	82.0999
TTR 3	Triceps Skinfold	Total Crotch Length (Crotch Length)	Vertical Trunk Circumference	Waist Circumference, Pref	Waist Front Length	Weight
44.5	0.6	62.2999	165.1	83.0999	43.7	163.5

csr0285a1 csr0138a1 csr0126a1 csr0251a1

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Done Internet

Cleopatra - Microsoft Internet Explorer

Address: http://132.246.40.24/Cleopatra71/Cleopatra71

CLEOPATRA VII

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CAESAR™
3-D Anthropometric Database

1 to 12 out of 87

File: Measures

Filter: About Database View Measures

Shape: Structure

Colour: Scale

Keywords

Profile - Microsoft Internet Explorer


Country	Site	Civilian	Age	Birth State	Occupation	Education
1	3	1	27	33	8	5
Number of Children	Fitness	Car Make	Car Year	Car Model	Race	Reported Height
1	4	18	86	6	1	70.0
Reported Weight	Subgroup Number	Marital Status	Family Income	Shoe Size	Jacket Size	Pants Size Waist
175.0	0	1	6	13	8	7
Pants Size Inseam	Blouse Size	Pants Size Woman	Bra Size			
7	-1	-1	-1			

86.1%
csr0285a1

85.9%
csr0138a1

85.7%
csr0126a1

85.2%
csr0251a1

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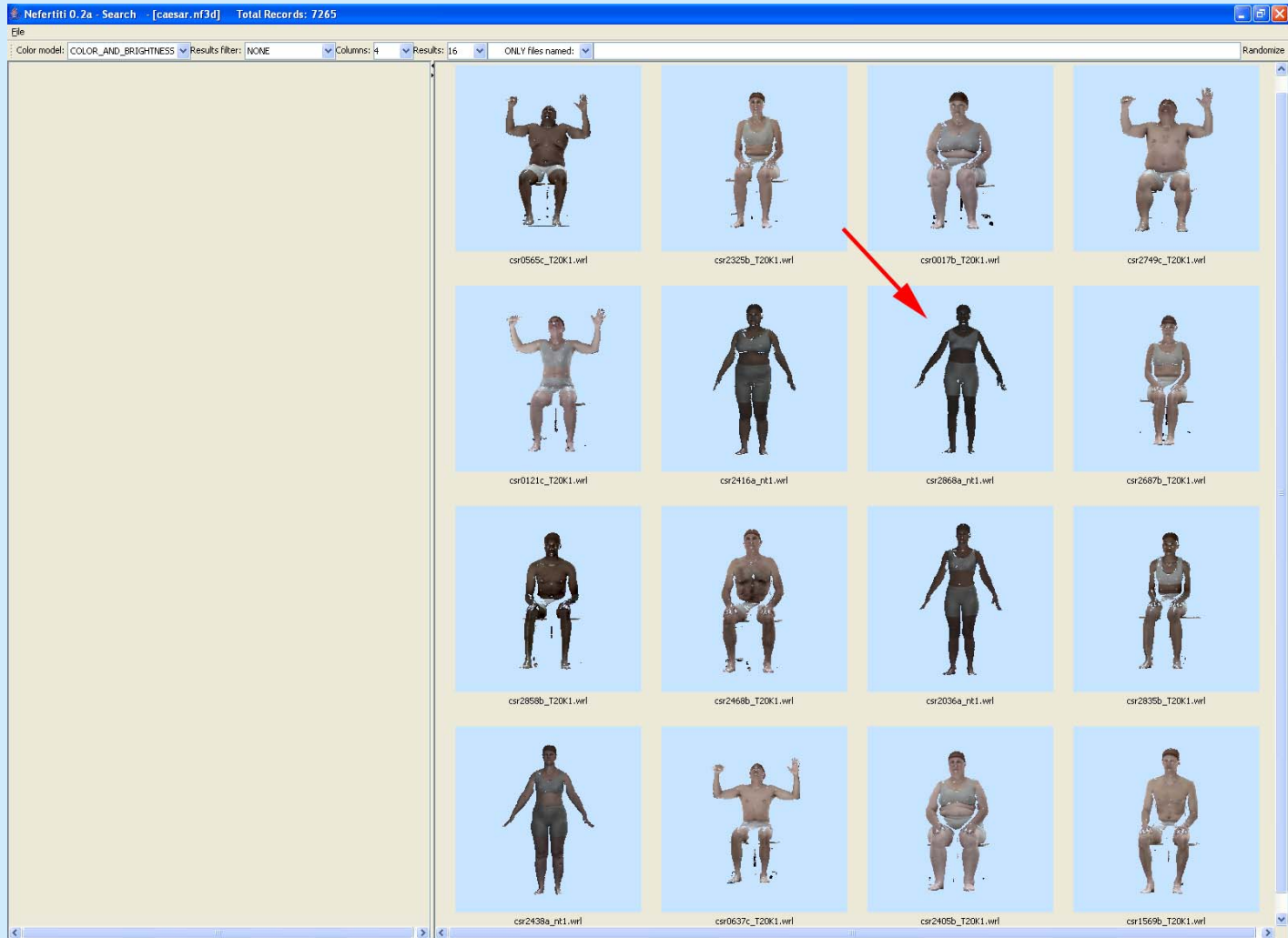
Done Internet

Step 1: Random Search

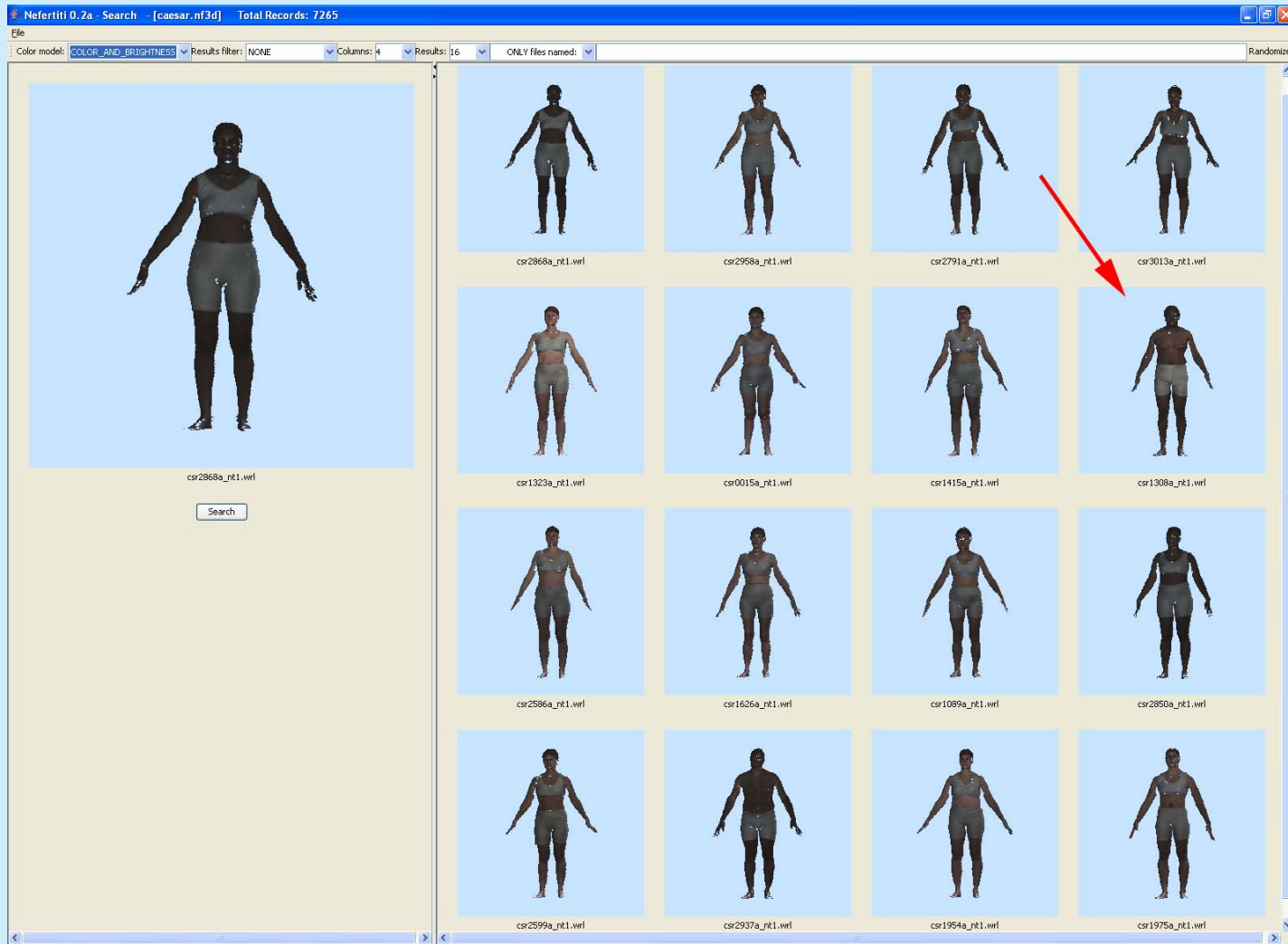
Step 2: Initial Visual Selection

Step 3: Iterative Visual Navigation

Step1: Random Search

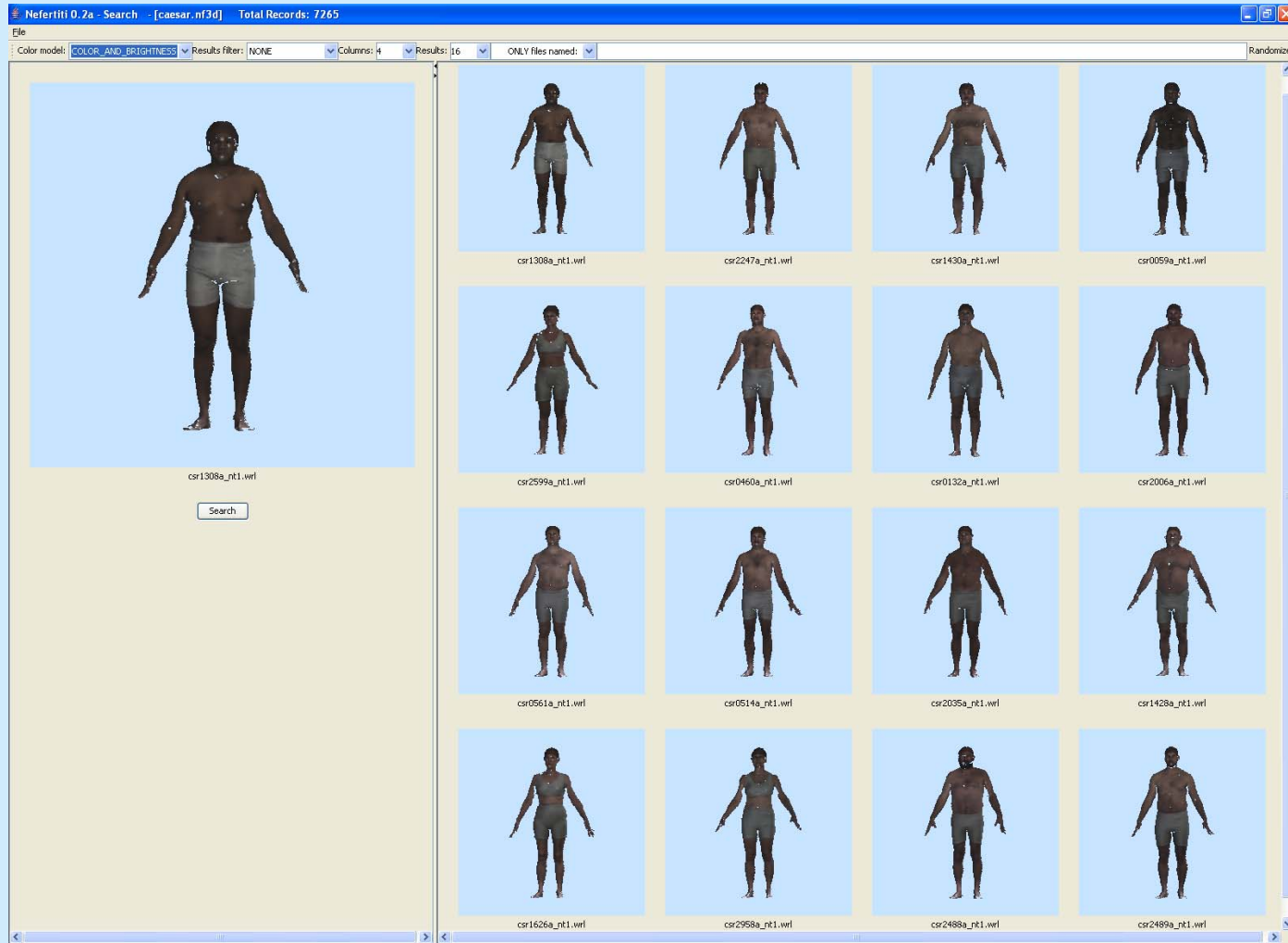


Step 2: Visual Selection + Search

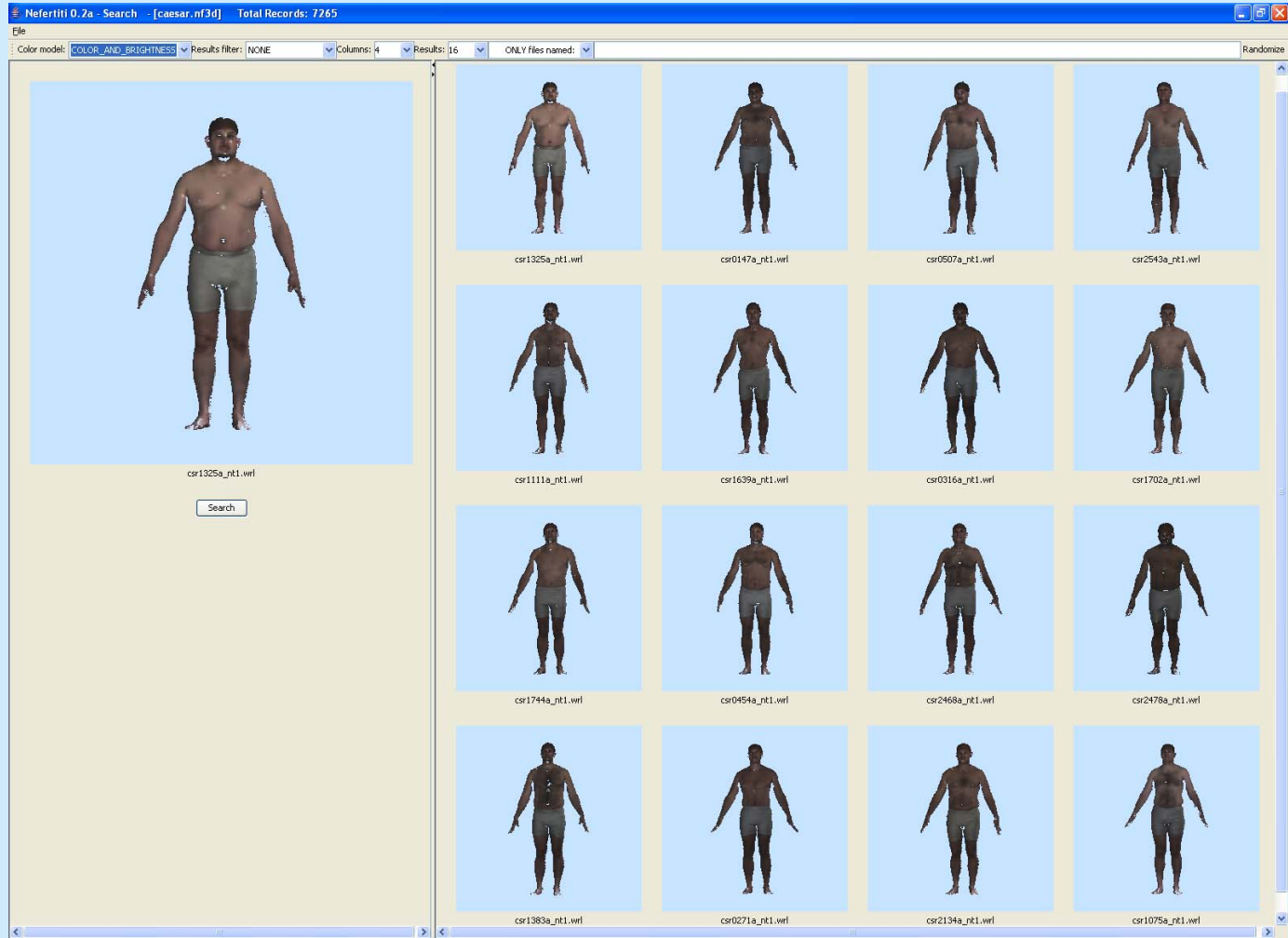


Visual Navigation

Step 3: Iterative Navigation: i2, i3, i4.....



Final Step (5 iterations)



Example #1: Slim (Final Step)

The screenshot displays a software window titled "Nefertiti 1.0a - Search - [caesar.nf3d] Total Records: 7265". The interface is divided into two main sections. On the left is a large preview window showing a 3D model of a human figure. Below this model is a "Search" button. On the right is a grid of 20 smaller thumbnail images, each representing a different 3D model. Each thumbnail is labeled with a file name, such as "csr1892a_nt1.wrl", "csr1988a_nt1.wrl", "csr2112a_nt1.wrl", "csr2485a_nt1.wrl", "csr1495a_nt1.wrl", "csr0425a_nt1.wrl", "csr1370a_nt1.wrl", "csr2880a_nt1.wrl", "csr1275a_nt1.wrl", "csr2695a_nt1.wrl", "csr0228a_nt1.wrl", "csr0511a_nt1.wrl", "csr2676a_nt1.wrl", "csr0526a_nt1.wrl", "csr2010a_nt1.wrl", "csr2504a_nt1.wrl", "csr2310a_nt1.wrl", "csr0572a_nt1.wrl", "csr2973a_nt1.wrl", and "csr2664a_nt1.wrl". The interface also includes a "Columns: 5" dropdown, "Results: 20" dropdown, and "ONLY files named:" dropdown at the top left, and a "Randomize" button at the top right.

Example #2: Heavy (Final Step)

The screenshot displays a software window titled "Nofertiti 1.0a - Search - [caesar.nf3d] Total Records: 7265". The interface is divided into two main sections:

- Left Panel:** A large preview window showing a 3D model of a woman in a grey two-piece outfit. Below the model is a "Search" button.
- Right Panel:** A grid of 20 smaller thumbnails, each showing a similar 3D model from a slightly different perspective or with a different pose. Each thumbnail is labeled with a file name, such as "csr2441a_nt1.wrl", "csr1640a_nt1.wrl", "csr0113a_nt1.wrl", "csr2316a_nt1.wrl", "csr1733a_nt1.wrl", "csr1123a_nt1.wrl", "csr1945a_nt1.wrl", "csr1942a_nt1.wrl", "csr2284a_nt1.wrl", "csr2713a_nt1.wrl", "csr1879a_nt1.wrl", "csr2405a_nt1.wrl", "csr2619a_nt1.wrl", "csr2302a_nt1.wrl", "csr2423a_nt1.wrl", "csr2923a_nt1.wrl", "csr1316a_nt1.wrl", "csr2744a_nt1.wrl", "csr2545a_nt1.wrl", and "csr2592a_nt1.wrl".

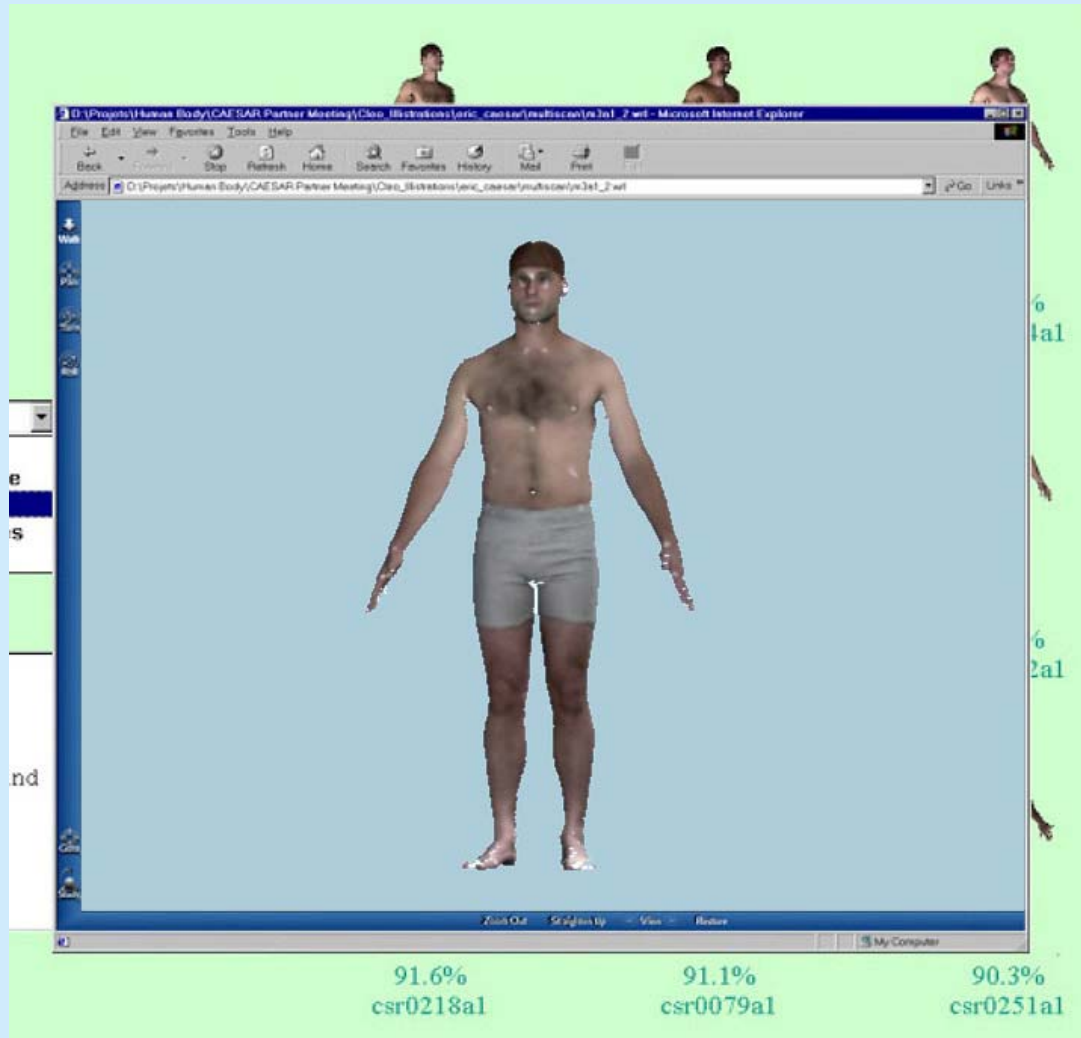
At the top of the right panel, there are controls for "Columns: 5", "Results: 20", and "ONLY files named:", along with a "Randomize" button.

- Integrated 3D Viewer
- Real-time 3D-Texture examination
- Real-time Rendering

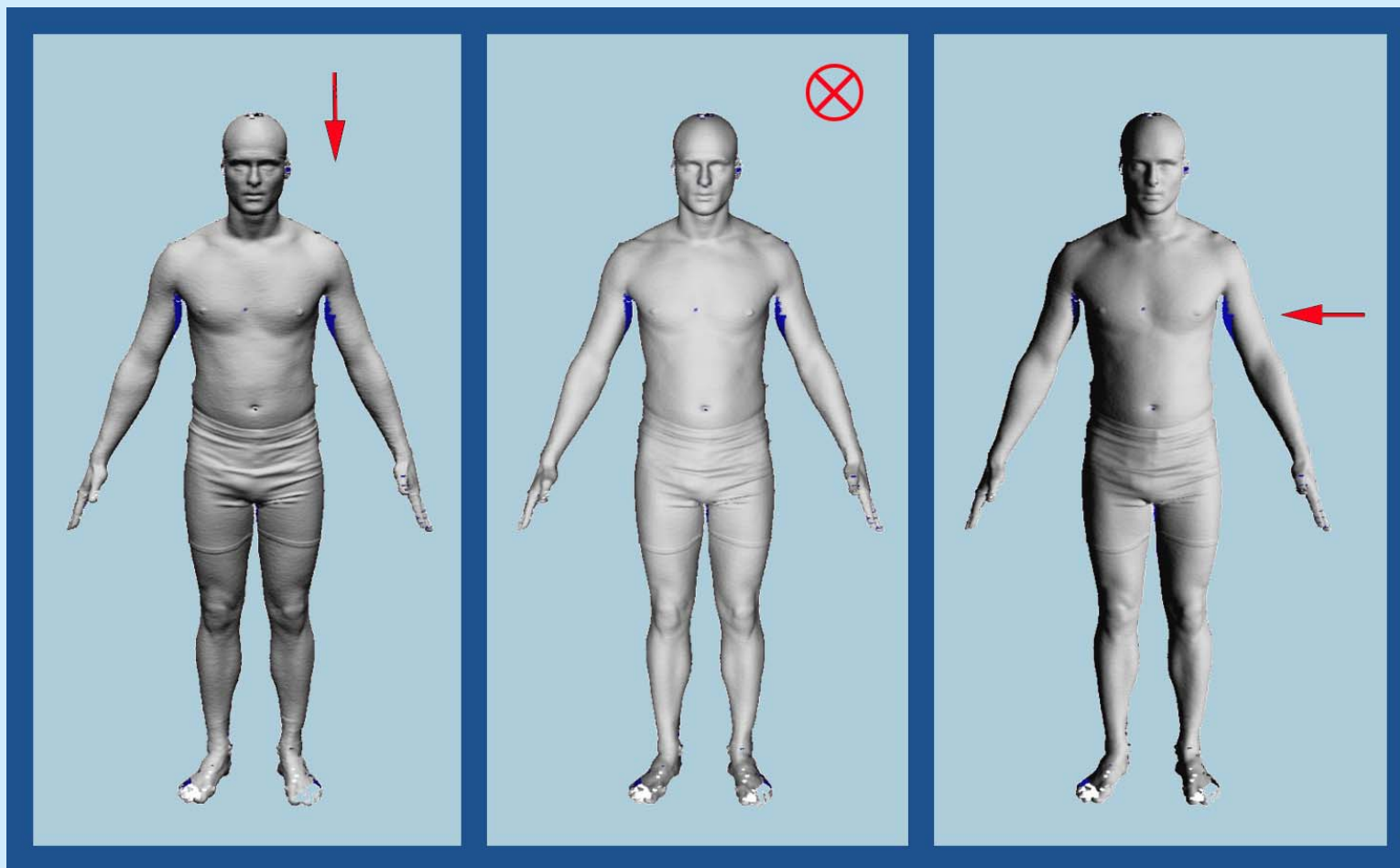
Visualization

Click on any icon to open a 3D viewer

Rotation, Translation, Zoom




Rendering



Similarity Search

- Shape
- Shape, Size and Texture
- Shape-Based, Filtered (Text and/or Data)

Shape-Based



1 to 12 out of 845

File:

Filter:













Keywords

Shape: Structure:

Colour: Scale:

```

Shape, 1
Structure, 0
Scale, 0
Colour, 0
Filter, void
csr0310a1, 100.0%
csr0288a1, 88.1%
csr0241a1, 87.1%
csr0158a1, 86.9%
csr0067a1, 86.5%
                    
```

			
100.0% csr0310a1	88.1% csr0288a1	87.1% csr0241a1	86.9% csr0158a1
			
86.5% csr0067a1	86.3% csr0216a1	86.3% csr0143a1	85.9% csr0075a1
			
85.7% csr0189a1	85.5% csr0104a1	85.3% csr0182a1	85.1% csr0134a1

Shape-Based, Filtered



1 to 12 out of 87

Search

More

File:

Filter:

Shape: Structure:

Colour: Scale:

```
Shape,1
Structure,0
Scale,0
Colour,0
Filter,Gender=1 and weight>160 and
age<30
csr0058a1,100.0%
csr0211a1,88.7%
csr0218a1,88.7%
csr0144a1,88.1%
```



100.0%
csr0058a1



88.7%
csr0211a1



88.7%
csr0218a1



88.1%
csr0144a1



87.9%
csr0223a1



86.8%
csr0140a1



86.8%
csr0299a1



86.1%
csr0152a1



86.1%
csr0285a1



85.9%
csr0138a1



85.7%
csr0126a1

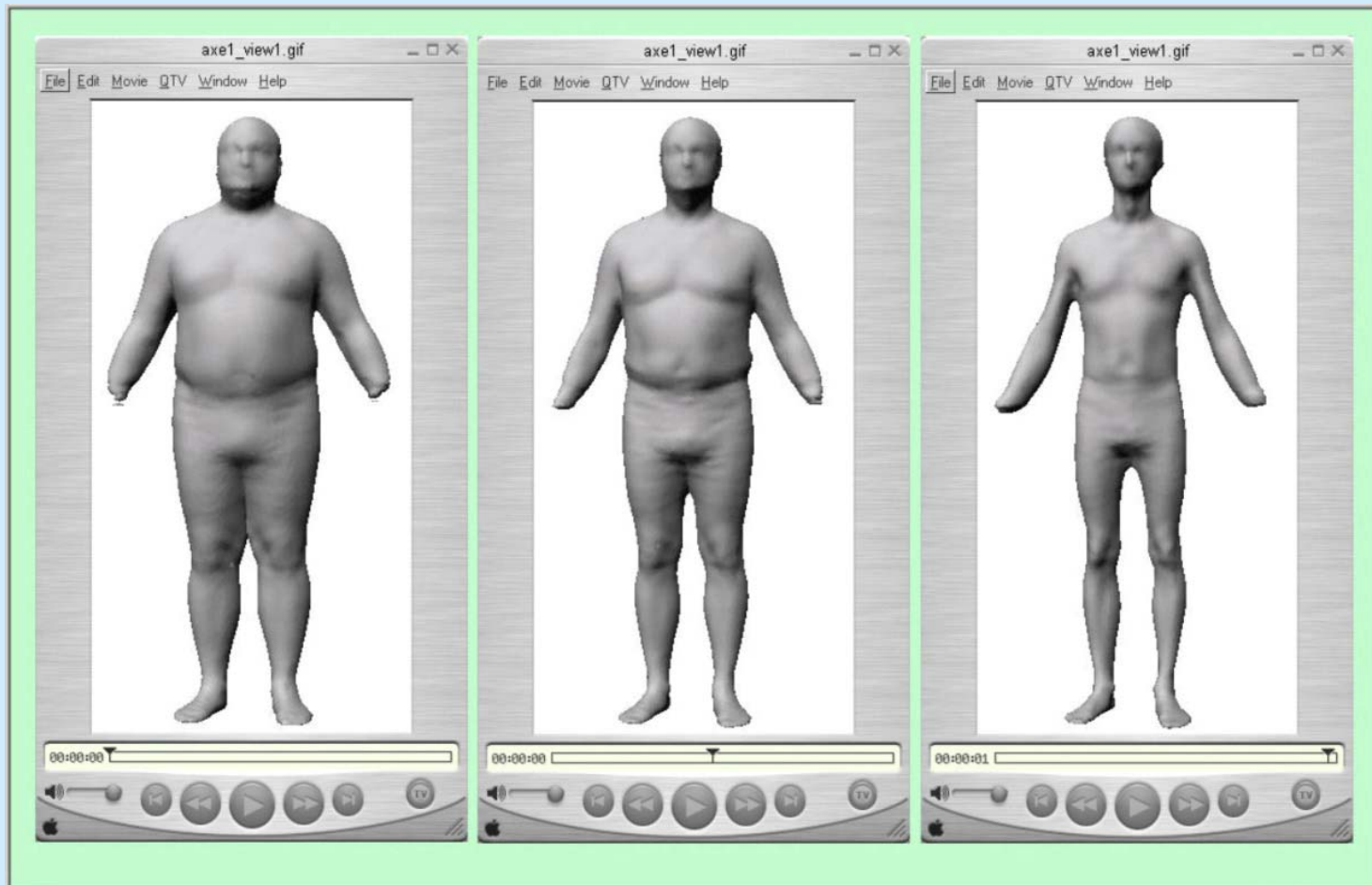


85.2%
csr0251a1

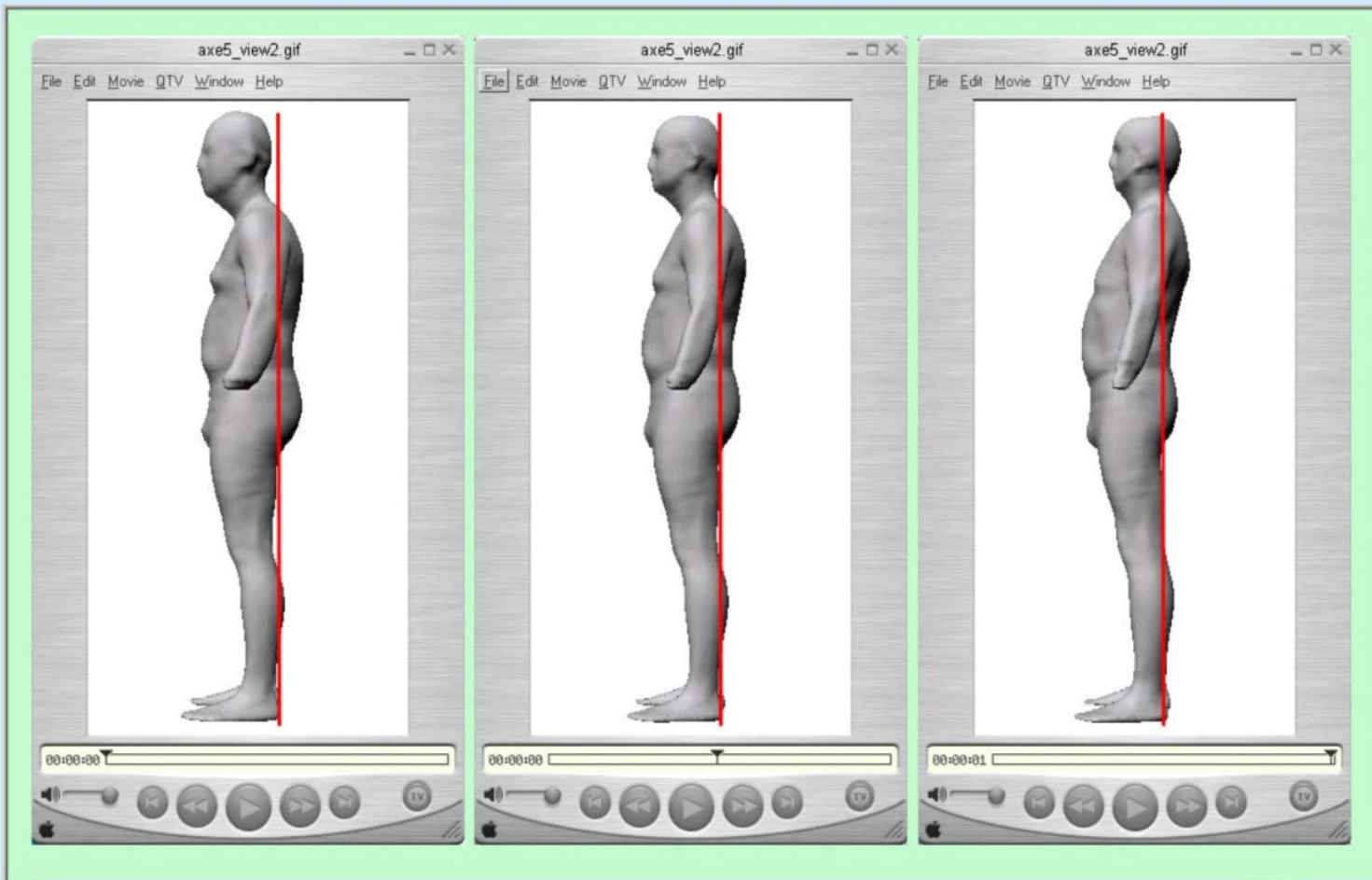
PCA on body shape

- Components of variability of the human shapes
- Much work remains for component interpretation
- Two components shown here

First Component



Fifth Component



- Integrated text and shape search engine
- Search of similar body shapes, which can be filtered by demographic and/or traditional anthropometric data
- The search engine can also manage 3D CAD files and human models
- Graphical icons and visual interface similar to a web search engine
- 3D visualization using a web navigator and a VRML viewer plug-in
- Export capability of search results to analysis software