

CADMED PACHATZ
Medical Simulation und
Visualisation
Pachatz Peter
Badstrasse 1
AUSTRIA
phone: +43 / 664 / 433 7 600
E- mail: office@cadmed.at
Homepage: <http://www.cadmed.at>

I have been working with computer based visualisation technologies for quite some time, especially in the field of general medical teaching and learning. For this reason I take the liberty of presenting to you details of my latest product in the appendix. It is a

THREE-DIMENSIONAL DIGITAL ATLAS SYSTEM

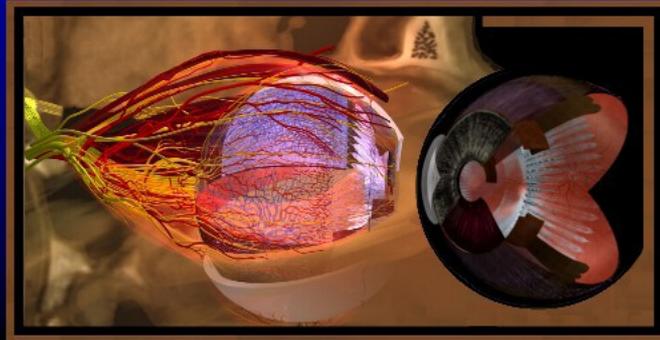
**DISPLAYS UP TO FULL HD TOP QUALITY about the
SENSORY ORGAN, THE EYE.**

- Novel dimension-crossing, proportional,
- spatial visualising system,
- with all the details of the presented structures -
- from macro to histo architecture
- in a highly precise three-dimensional environment,
- a knowledge-based reconstruction and presentation

CADMED

PACHATZ PETER

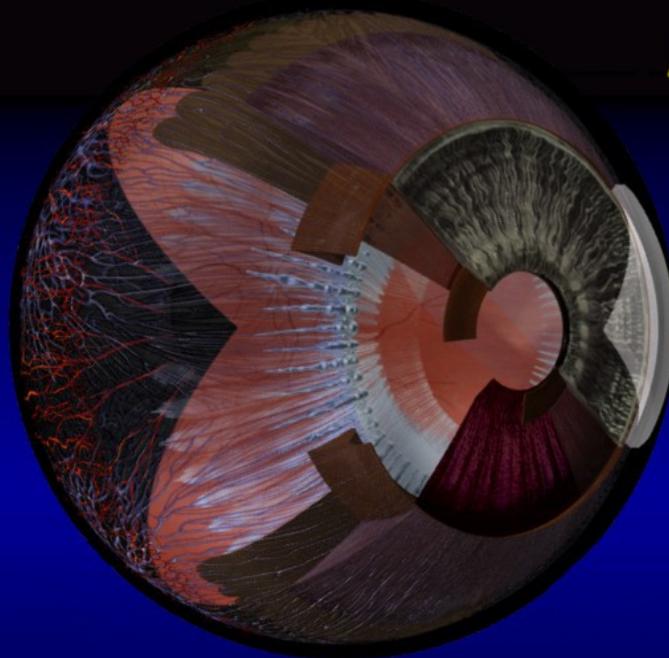
MEDICAL SIMULATION AND VISUALISATION



DIGITALER 3 DIMENSIONALER ATLAS

DAS

AUGE



The essential advantages of the optional use of CADMED PACHATZ products for various institutions and above all universities are as follows:

- a. **CADMED PACHATZ offers complete solutions which can be used at once and are user friendly.**
- b. **No additional hardware will be necessary.** . An average PC system with a DVD player available on the market nowadays is sufficient.
- c. **The product is immediately available, applicable and usable.**
- d. **CADMED PACHATZ offers customers who are interested in high-grade medical visualisation products an economical alternative.**
- e. **The user gets the same visual impression with CADMED PACHATZ products as with very expensive interactive visual real time simulation systems.**

On the one hand **through the quality of the 3D animations offered:**

Full High Definiton 3D Animations - films with a pixel resolution of 1920 x 1080 pixels, needle-sharp through geometric rendering.

On the other hand through **the quantity of the presented contents** which are put into effect in an **animation data base**. So there are **numerous different camera positions and zoom-factors**; this in addition to different fade-outs and fade-ins as well as **colours and surface materials**. This results in a multiple variability of the 3D animations.

- f. **This product is fully compatible with further modules which are being prepared.**

As for example the module "**Visual Cognition**":

All parts of the **visual fields** on the retina are displayed and also the sub-areas with their different receptor species. The **continuation** of the same in the Nervus opticus to the Chiasma Opticum , up to the **cortical projections** with **subareal displays** according to **neurophysiological and neuropsychological criteria**.

I am working on the module "**Motion**": First of all, **simple processes**, but **also** the movements of the eye muscles **controlled by reflexes** - together with the Occulomotorius group, and the Fascilculus longitudinalis medialis as well as the movements of the muscular system of the Corpus ciliare - in a similar way.

Description of the product:

THREE-DIMENSIONAL DIGITAL PICTORIAL ATLAS - 3D (ANIMATIONS) DISPLAYS UP TO FULL HD TOP QUALITY WITH THE TOPIC "THE SENSORY ORGAN, THE EYE"

Summary:

Novel dimension-crossing, proportional, spatial visualising system, with all the details of the presented structures - from macro to histo architecture in a highly precise three-dimensional environment, a knowledge-based reconstruction and presentation

All the facts mentioned below are protected by copyright.

Definition of the product:

The basis of the presented structures are **knowledge-based contents**. These structures are presented with the help of most modern computer based simulation and visualisation technologies. Then contents correspond to the average frequency.

For the user the core of this product is an interactive, **three-dimensional environment** which shows the reconstructed 3 D morphology of the sensory organ, the eye.

The products differ with regard to the amount and the length of the films which show the spatial appearance of the structures, and also with regard to the degree of the shown precision of the morphology, as it was presented in the Zoom series and also as it was presented through the nature and content of the structures themselves. So the Corpus ciliare is only contained in the more costly products, as the production costs were higher accordingly.

Remarks, general references, technical background

For this digital three-dimensional pictorial atlas, which was made with the most modern computer based visualisation technologies, knowledge-based fundamental findings were determined and worked out. These findings are based on metric bases which again are connected with certain regular distributions of frequency. These fundamental findings are the basis for generating spatial data models which were all reconstructed and which deal with the systematic and topographic morphology of the sensory organ, the eye.

The main principle of a computer based visualising and simulation technology is to strive for a truthful reconstruction of the morphology such as it exists in nature.

The aim can only be to create a computer generated reconstruction – a digital 3D morphology, which combines the different anatomical and histological techniques of fixing tissue - virtually combined in the computer.

It is possible only with the help of then most modern visualising technologies to show all the structures in this way - in all the dimensions of macroscopy and microscopy.

Criteria for precision:

Any kind of error can be quantified, i.e. measured and verified.

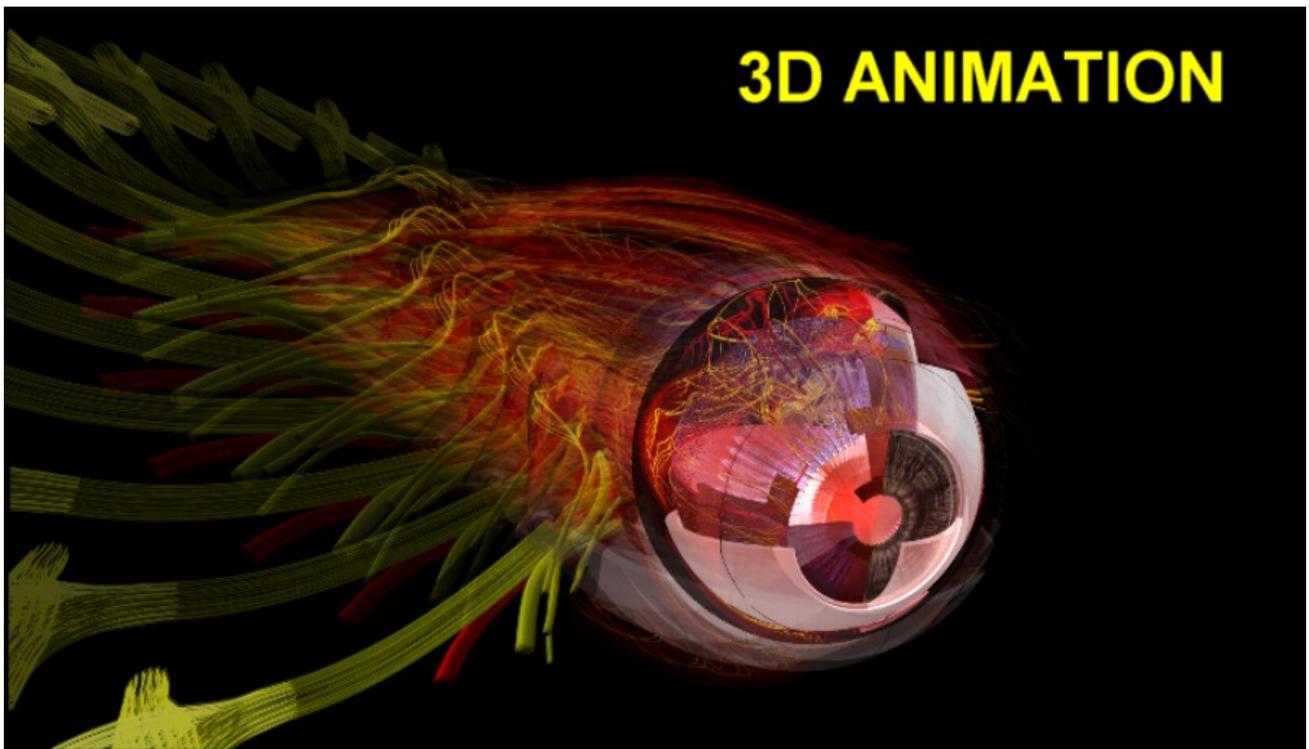
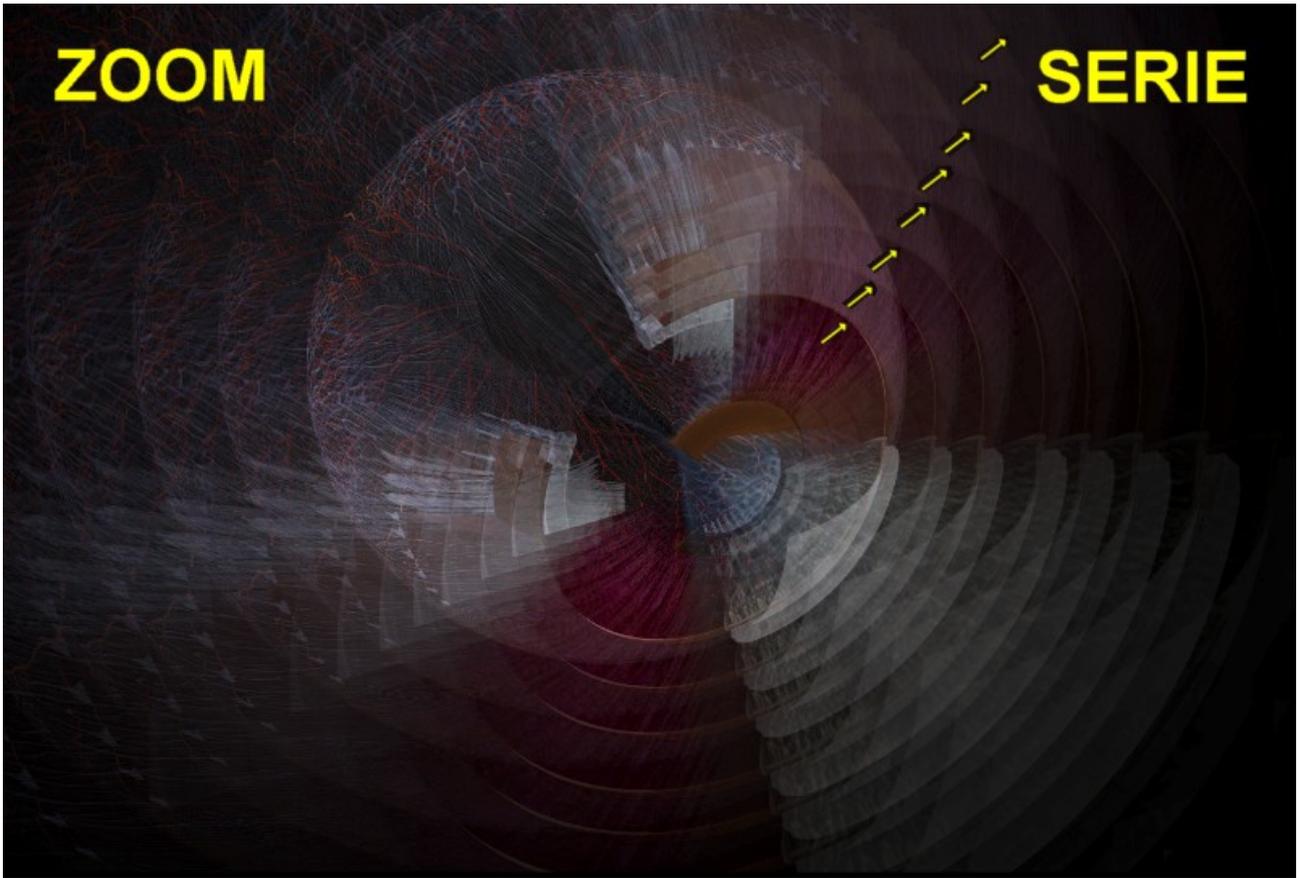
This is also true for computer based 3D reconstructions.

Also computer based visualizing and simulation systems have their limits of precision, which means that there are inaccuracies from certain increased dimensions. They are caused by the technology itself. I would like to ask you to make a comparison with the artefacts in anatomical or histological fixing techniques.

The main goal is maximum precision, therefore the computer systems we used in the data processing were calibrated up to the NANO area.

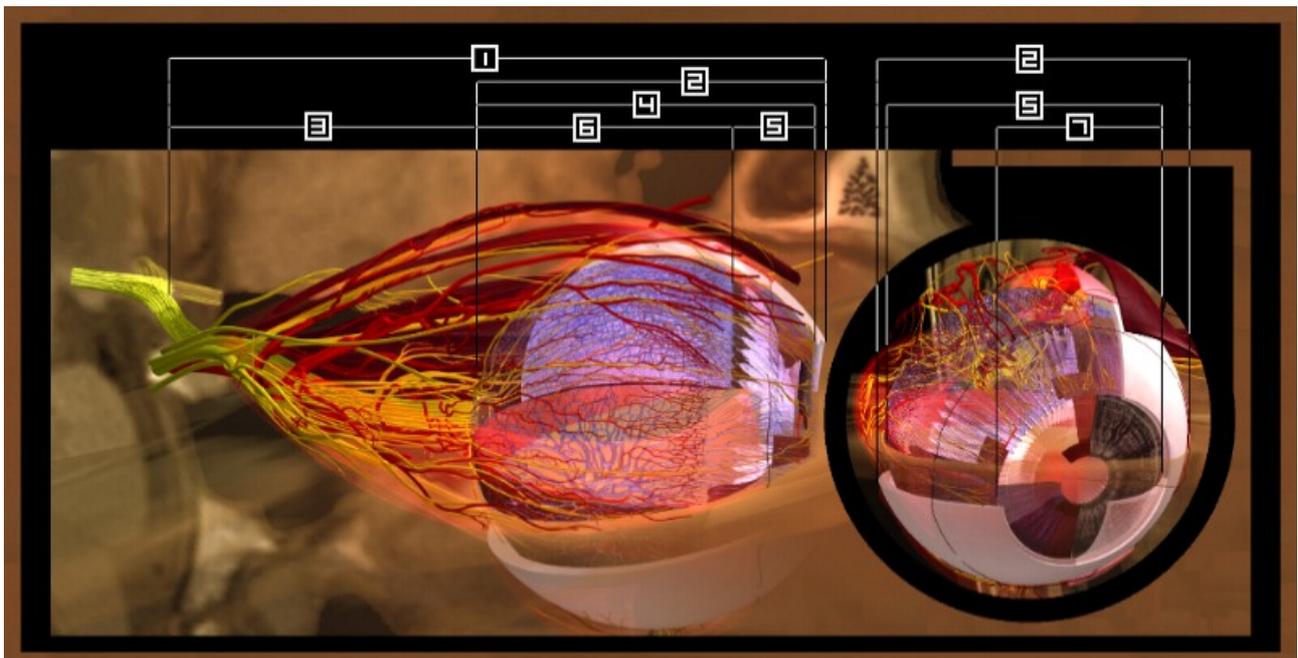
The spatial data models generated in this way are even suited for CAVE - the ultimate visualising and simulation system on the market.

The image of the precision of the 3D structures was made visible and converted for the viewer in the so-called zoom series of certain products. One zoom series shows a three-dimensional situation, beginning with the general survey which via certain zoom factors ends with a big enlargement. This is true for 360-degree rotations and also for camera movements. Each zoom factor corresponds to a completely calculated 3D computer animation. For this reason losses of precision (e.g. washed out pictures) are not produced. Because of the altered and varying perspectives there emerge new interesting visual impressions.



The content of the product is module-based, and will now be explained with the help of the diagram which shows the contents 1 to 7:

- 1- Macroscopic general survey (contained in 8-)
- 2- The whole Bulbus oculi
 - a- Views of the Bulbus only - in a macroscopic survey
 - b- Views of the general survey from the perspective of the Bulbus, with views of the outside and the inside of the Bulbus (from the perspective of the viewer of a 360-degree rotation)
- 3- Nervus opticus
- 4- The whole Retina
- 5- Corpus ciliare
- 6- Retina pars optica
- 7- Iris
- 8- Each product also contains a description which consists of a text and pictures (2D pictures, 3D animation).



The film series, which show parts 1 to 8 of the eye, contain varying displays of the combinations of structures and sub-structures.

The content of 1 - for example, the general survey of arteries and nerves with glassy, transparent arteries and nerves, with varying faded in or faded out structures in most varying combinations - one below the other.

See picture 1.

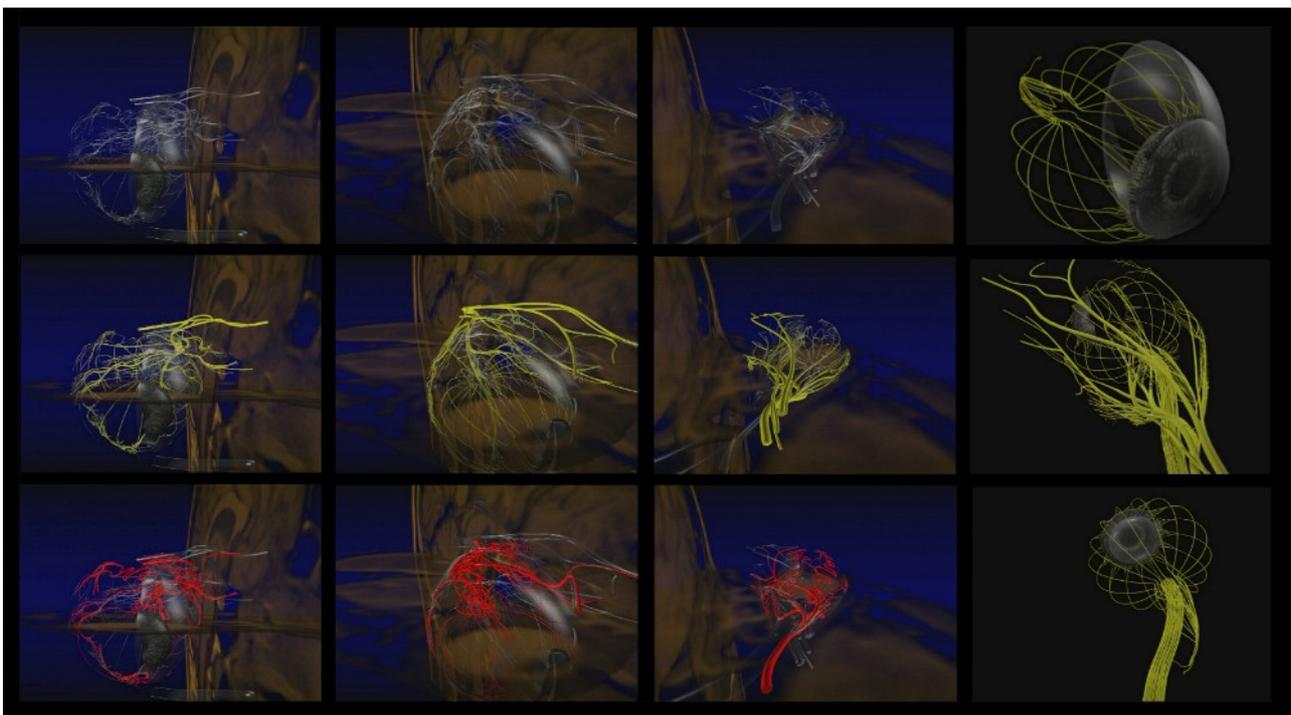
The viewer can see a selection of different surfaces of the structures and different degrees of diversity of the images.

Furthermore, the most varying combinations of cross-sections, e.g. with Musculi, Bulbus, Corpus ciliare (see picture), etc. with various fade-outs of certain parts of the presented structures. All this is three-dimensional in pictures and moving pictures (3D animation) (up to Full HD (1920 x 1080 pixels)).

On request we can send you additional full HD contents which are available on data carriers with a very high BIT-rate - in technical TOP quality for large projections.

The detailed contents which are presented in high-resolution quality can be used for teaching purposes but they are also excellently suitable for a presentation on large flatscreens in doctors' surgeries.

Picture 1 - A few examples of 3D animations



The various levels of products differ in the kind of presented structures and the quantity of content:

1. **Entry level:** Macro - general survey with Bulbus (1,2,3,8) and a zoom series with Full HD contents
2. **Mid level:** Corpus ciliare, Retina (1 to 8), approximately triple content of 2 with Full HD contents
3. **High level:** with more contents, special films for the Bulbus, and expanded zoom series calculated with especially precise intervals - (up to more than 50 calculated 3D Animations - one Animation per zoom factor - supreme precision in the display on Hard Disk storage with Full HD contents)

4. **On request:**

Supreme level: All this in a high BIT-rate on a hard-disk carrier

for large projections and with the contents of 3 - for all those interested in this kind of quality

5. **On request:**

Supreme level - full collection: All this in a high BIT-rate on

a hard-disk carrier for large projections and with the contents of 4 plus even more contents (full collection), e.g. for Universities, institutes and all those interested in this kind of variety and quality

CADMED

PACHATZ PETER

MEDICAL SIMULATION AND VISUALISATION

