



# **Smiechová kultúra IT a Úvod do počítačovej grafiky**

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**Comenius University Bratislava**

**14. februára 2006, FMFI UK**

# Font Design in 9th Century

## HLAHOLICA FONT DESIGN –

the oldest Slavonic alphabet was created by **St. Cyrilius/Constantinus** before **863**. He is thus the first known font designer in world history. Hlaholica celebrates its **1141<sup>th</sup> anniversary** in 2004. Unfortunately, we do not know neither the exact date nor the hour of the release.



NA POČIATKU BOLO SLOVO ŽRŤ ŽPŽ ĽA ŽŽŽVŽ HSKONI BĚ SLOVO

# Motivating Question

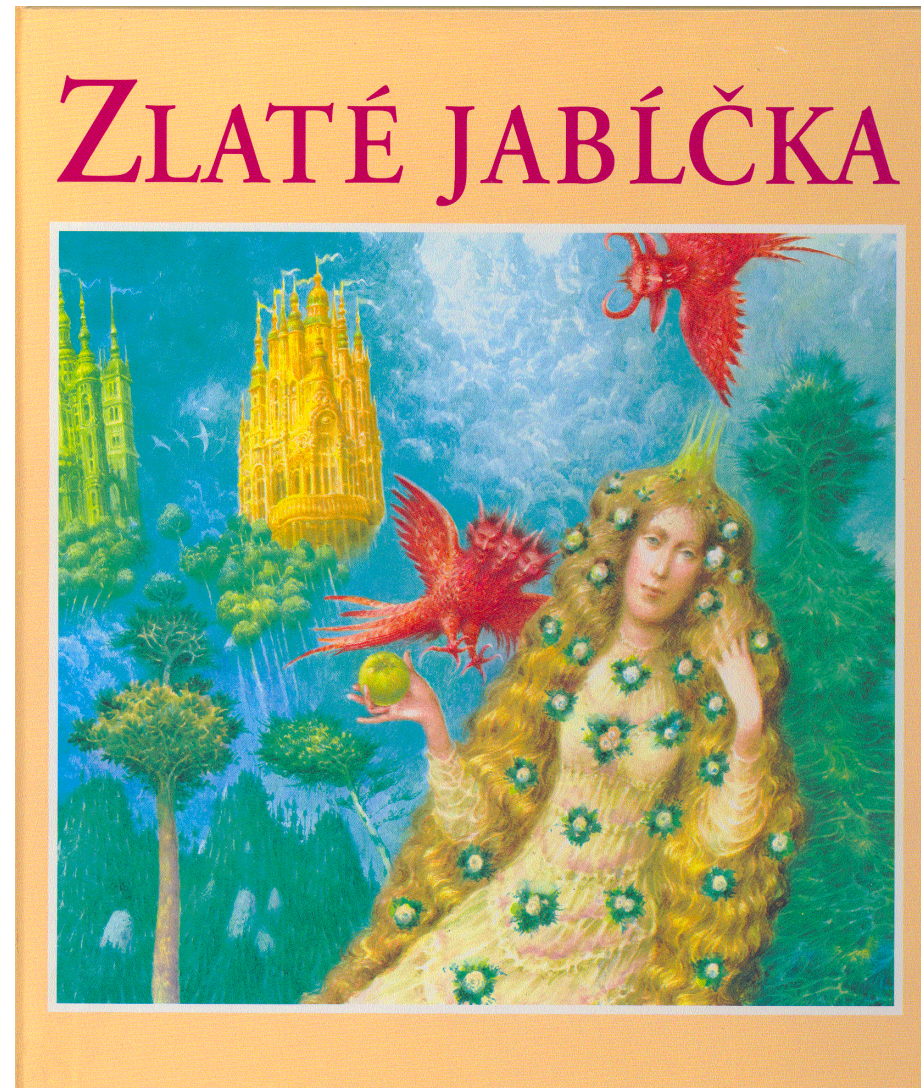
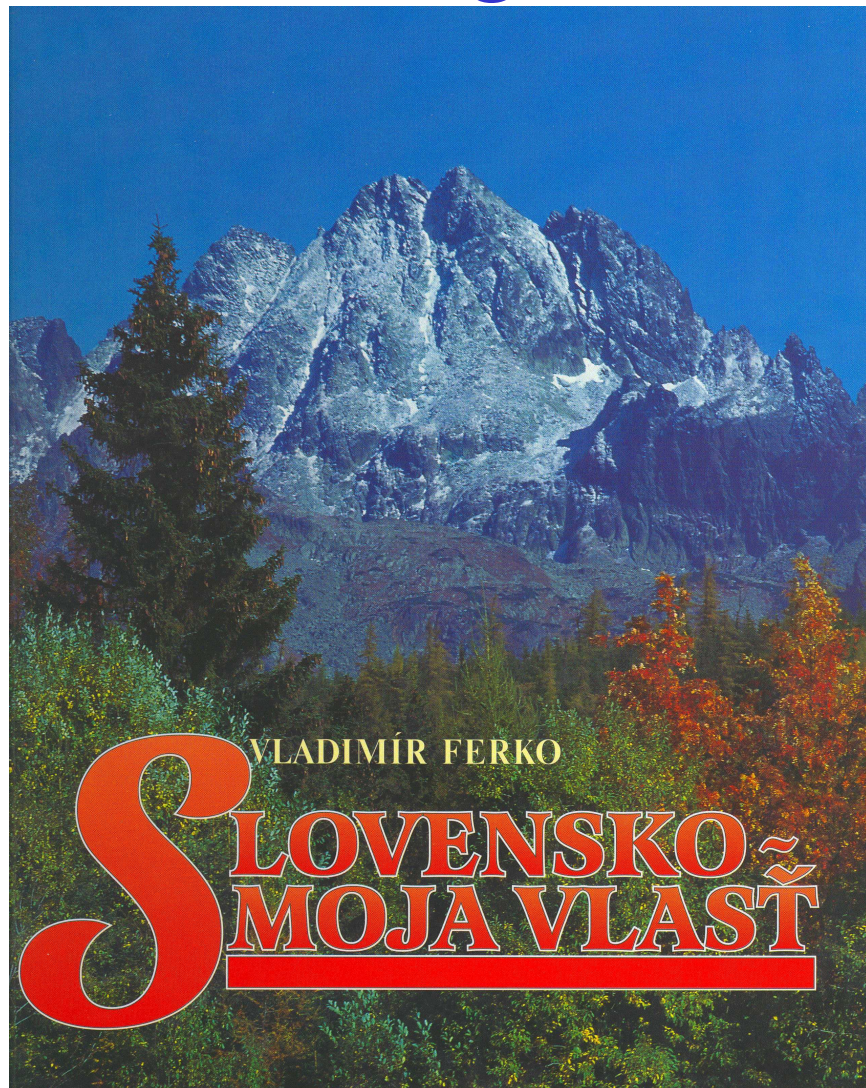
- **This is a riddle:  
there is no official institution having neither  
budget nor responsibility for this. On the other  
hand, it works perfectly and it represents  
significant part of web communication.**
  - **Hint: Everybody knows it personally and  
shares it nearly every day. And it is not  
spamming.**
- What is it?**

# Credits in this presentation

- **Sorry to say, we cannot credit all the images used here because they are part of internet folklore and thus their authors remain mostly anonymous. Whereever we know the author, we give full credits. All illustrations here were distributed as folklore, ie. for making people **enjoying**.**

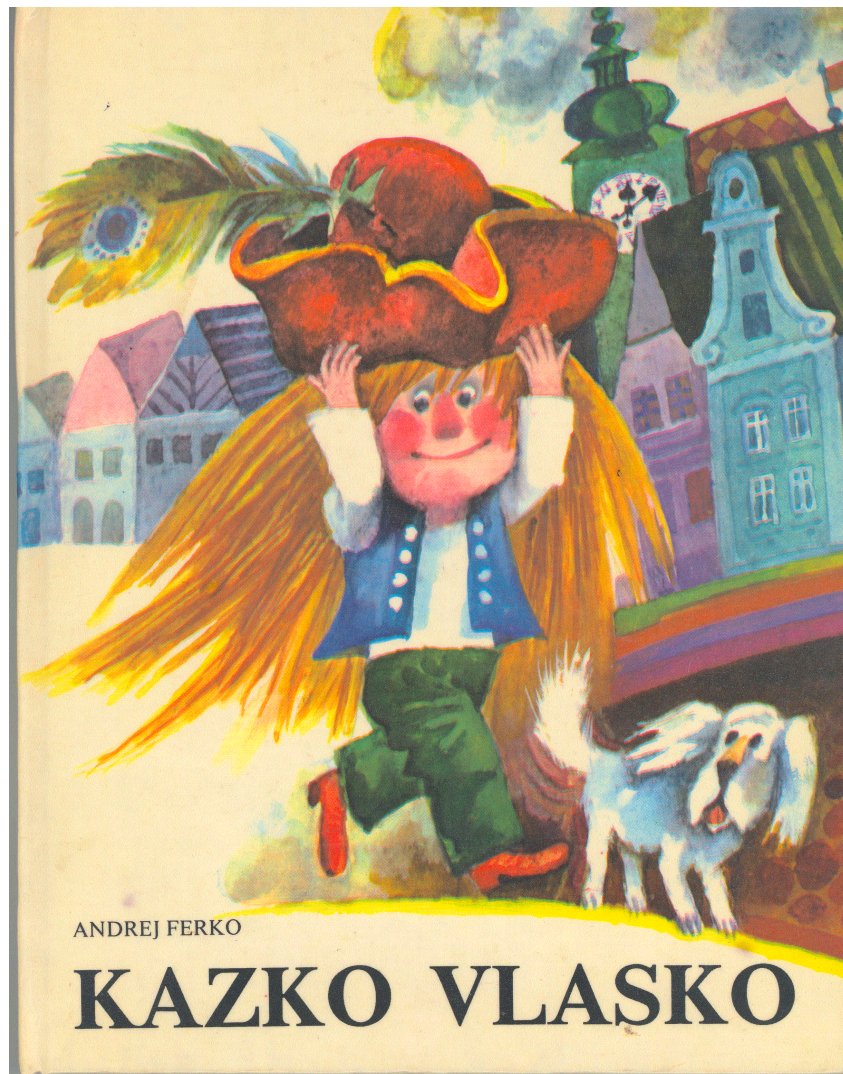


# Background: Communication



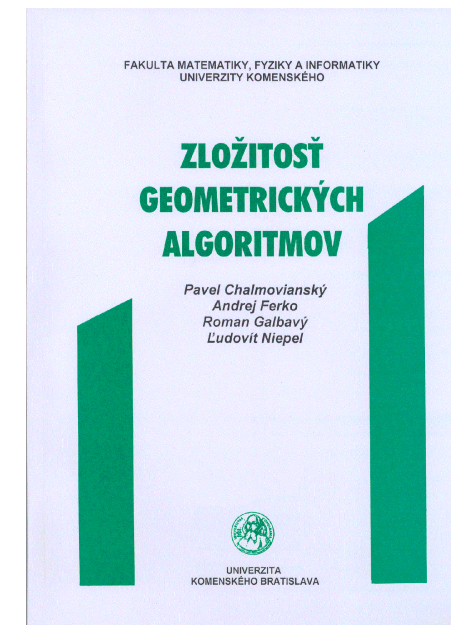
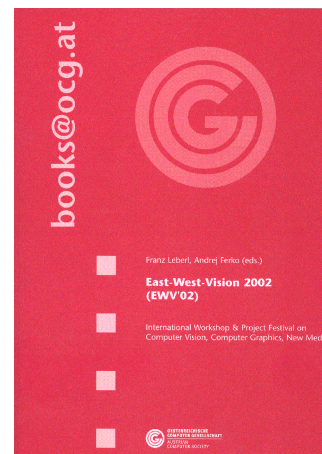
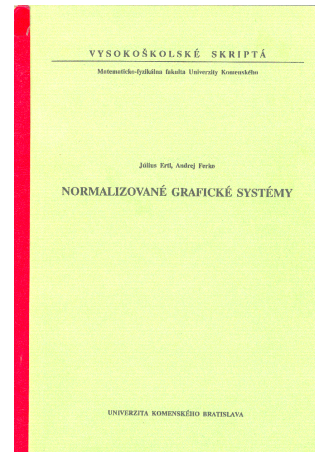
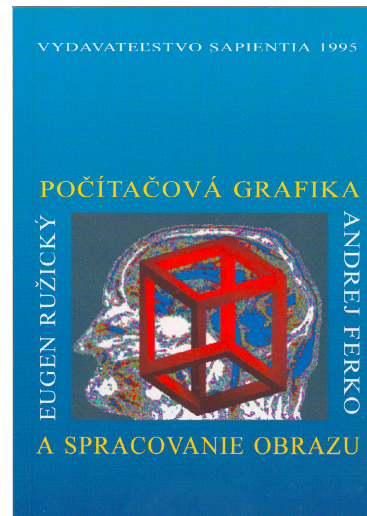
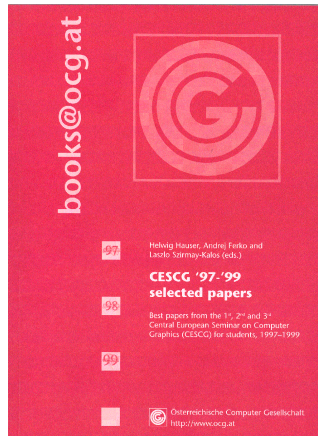


# Background: Communication





# Background: Bratislava & Graz



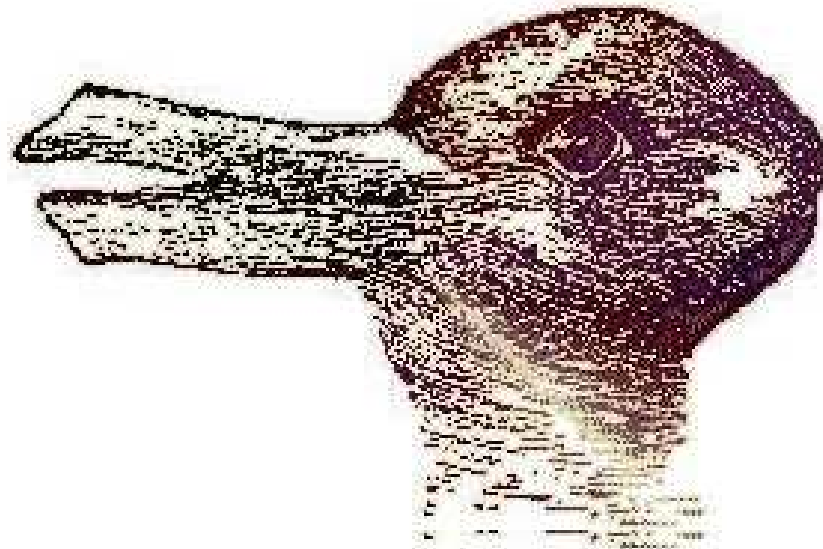
# Patavedecky seminar

- **Kocka v tvare L**
- **Dokazy existencie Lochness Monster**
- **Hanula – datovy obsah optickeho kable**
- **Rozdelovacie funkcie casu**
- **Rychlost tmy**
- **...**

# Comment on the Next Slide

- There are two different types of ambiguous images – ambiguous message and ambiguous observer...
- ... **enjoying** our brain by parallelism (perception, game) or ambiguity (content)
- The first image has been analyzed in Vienna by Ludwig Wittgenstein and other famous philosophers

# A Rabbit... or a Duck?



***A Rabbit.... Or A Duck?***

***hint: the duck is looking left, the rabbit is looking right***

# What is the weird shape?



- Ambassadors by H. Hobein, jr. 16<sup>th</sup> century.

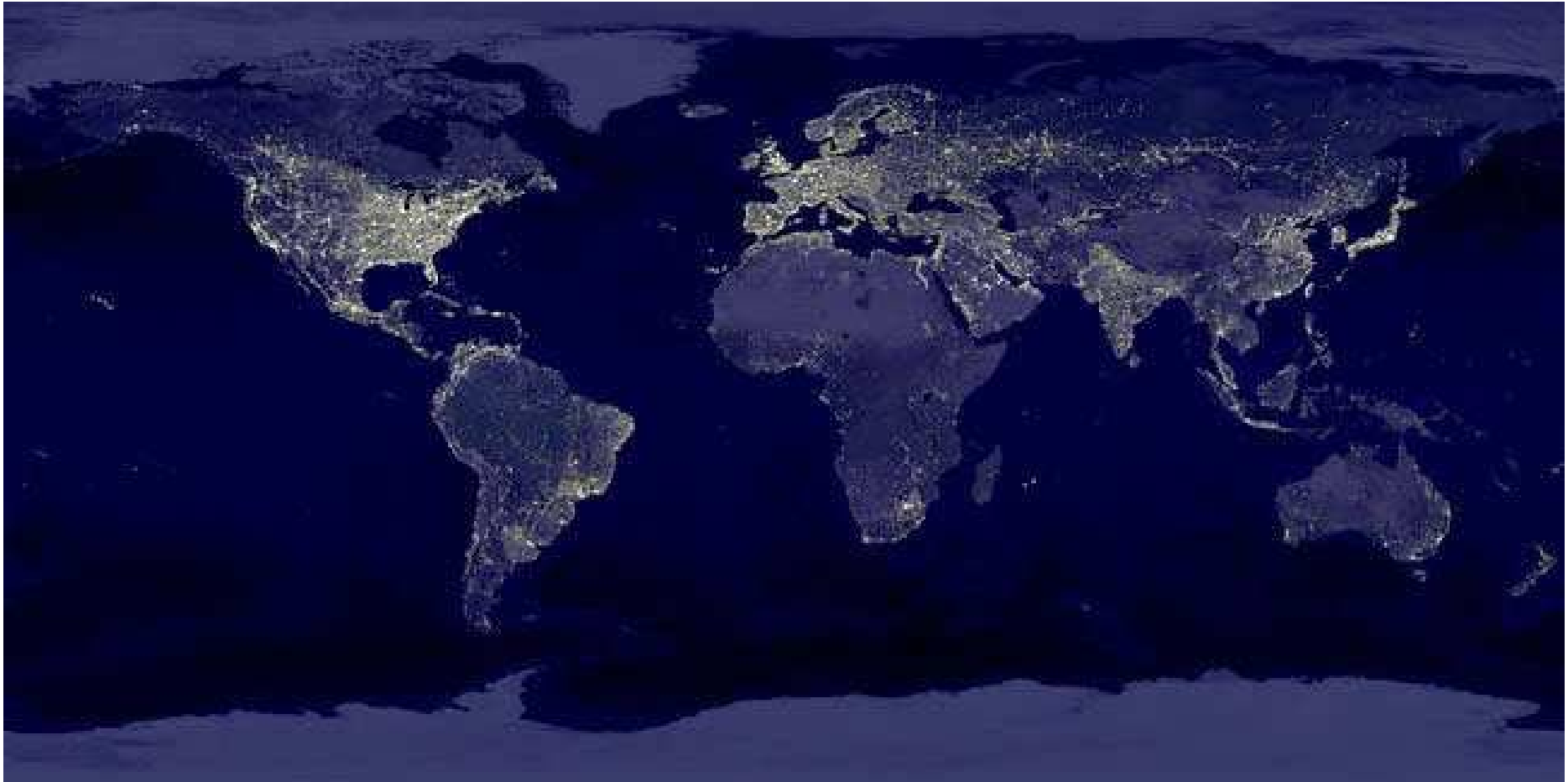
# Comment on the Next Slide

- ... enjoying of our brain by ambiguity...
- This is – according to Koestler – available in comic inspiration, Humor (eg. Rabbit/Duck) and in Science and Art (see the next couple of images)
- Koestler 1964 names this bisociation, bridging of two contexts (opposed to association)
  - BTW The same or more is provided by multiple windows on the screen
  - The following 2 images are popular examples from Science and Art





# Earth in the Night



<http://antwarp.gsfc.nasa.gov/apod/ap001127.html>







# Motivating Answer I

- **This is a riddle:  
there is no official institution having neither budget nor responsibility for this. On the other hand, it works perfectly and it represents significant part of web communication.**
  - **Hint: Everybody knows it personally and shares it nearly every day. And it is not spamming.**
- What is it?**

## Motivating Answer II

- **What is it?**
- **The whole system of “institutions” for verbal and graphics folklore is named the alternative culture or laughter culture (Bakhtin). Roughly speaking, it is the creative communication of interesting paradoxes.**

## Motivating Answer III

- **Having the answer we can finish the presentation now.**

- But if You wish...

# Mikhail Bakhtin

- ***“It could be said (with certain reservations, of course) that a person of the Middle Ages lived, as it were, two lives: one that was the official life, monolithically serious and gloomy, subjugated to a strict hierarchical order, full of terror, dogmatism, reverence and piety; the other was the life of the carnival square, free and unrestricted, full of ambivalent laughter, blasphemy, the profanation of everything sacred, full of debasing and obscenities, familiar contact with everyone and everything. Both these lives were legitimate, but separated by strict temporal boundaries.”***

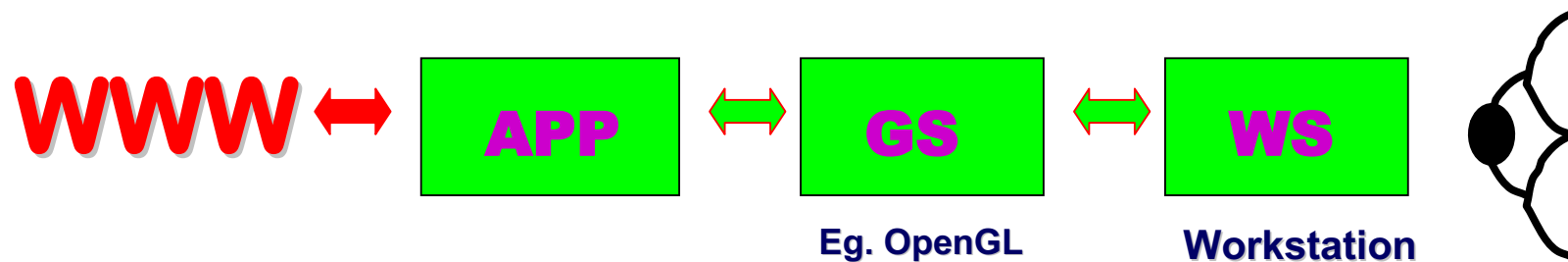
# Agenda

- 1. Internet Foklore, Popular Culture (done)
- **2. On Better Model of a Human Being**
- 3. Towards the *Troublems* of Humor Theory
- 4. Rennaissance Analogy for WWW
- 5. Information Visualization Metaphors
- 6. Conclusions
- 7. Discussion (Top Unpleasant Question)



# Communication Interfaces

- Author - Application Programmer - GS Author - User

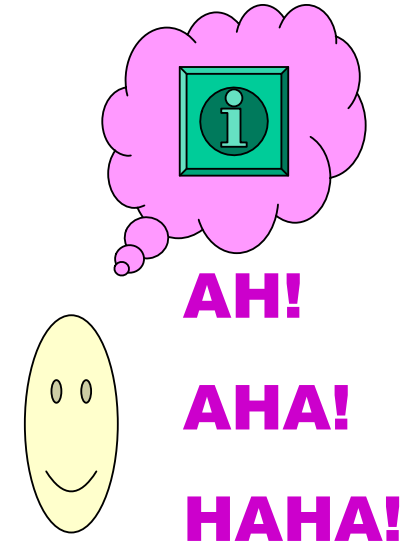


- What is interesting for users?

# Ambiguity Interesting Unlimited

- Communication

A  
S  
H



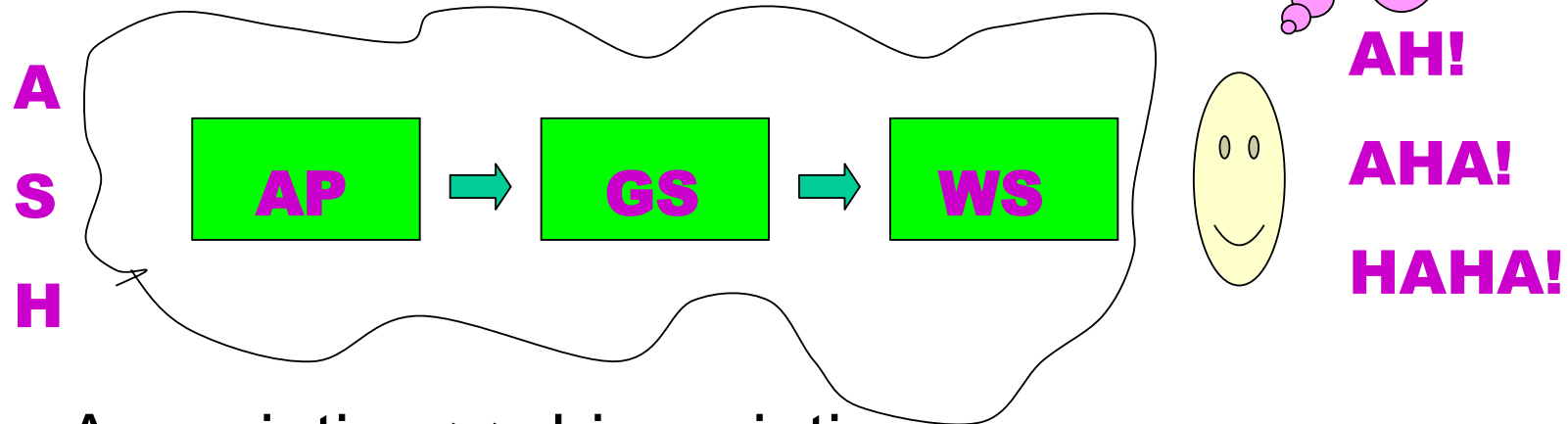
- Arthur KOESTLER, 1964

## Comment on the Next Slide

- **Note that Art, Science and Humor gives ASH for short and that the bissociation makes alive the sparks ((H)AH(A)) out from this dead ash**

# On Model of a Human Being

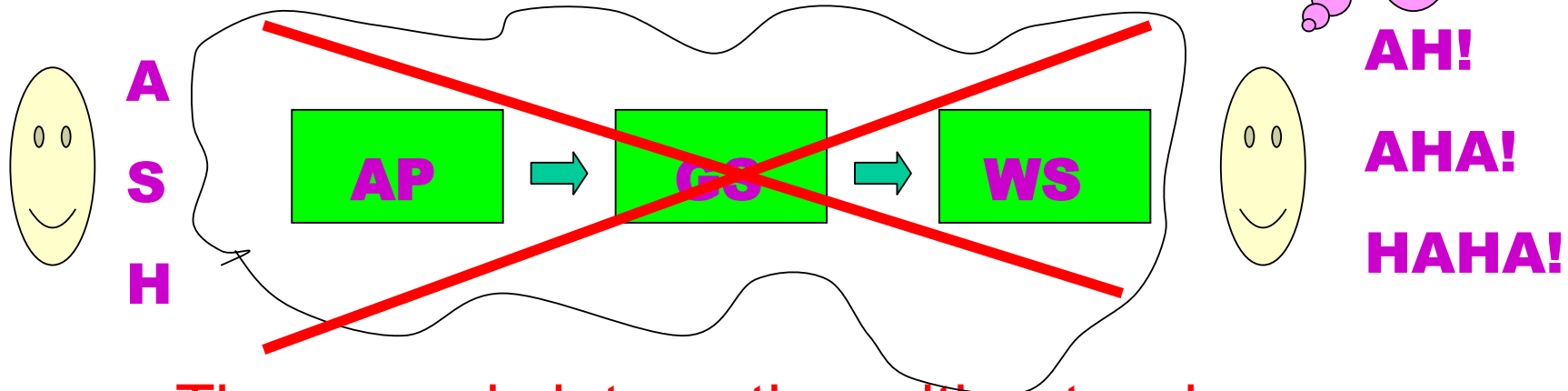
- The Act of Creation (creatology):



- Association >> bissociation
- Arthur KOESTLER: no labyrinth, no mouse, just bissociating two contexts

# Human – Human Interface

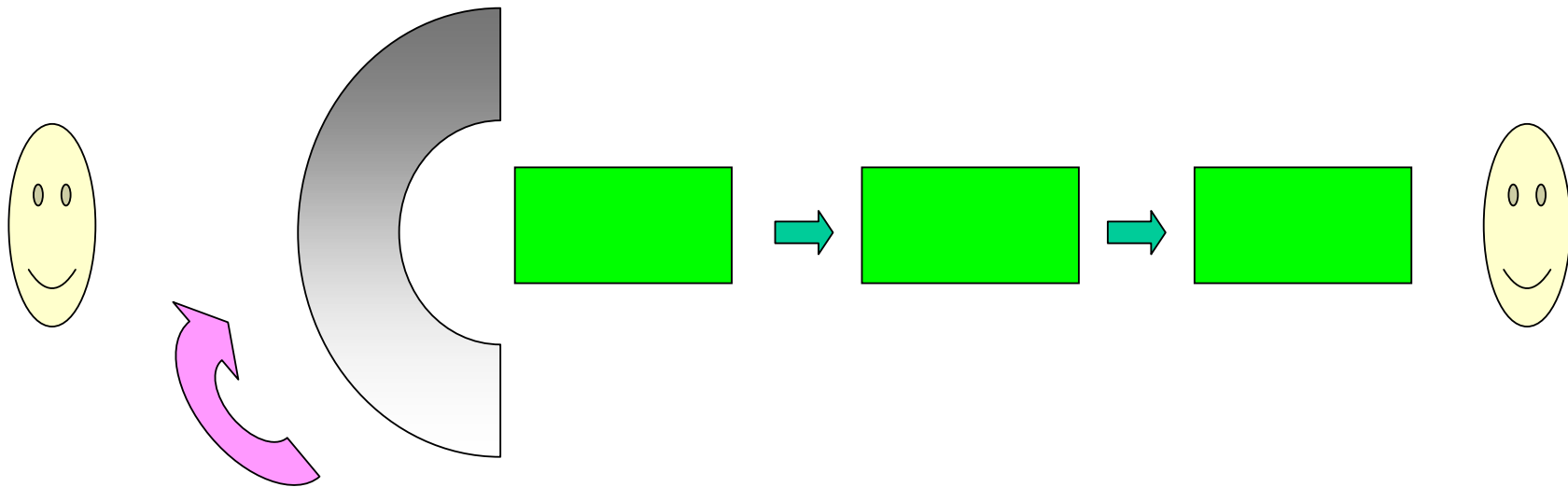
- The Act of Creation (creatology):



- The same is interesting without web
- Art, scientific discovery, comic inspiration (Humor)
- Note that Humor is undefined like Set or Shape

# Serious Unambiguous Messages

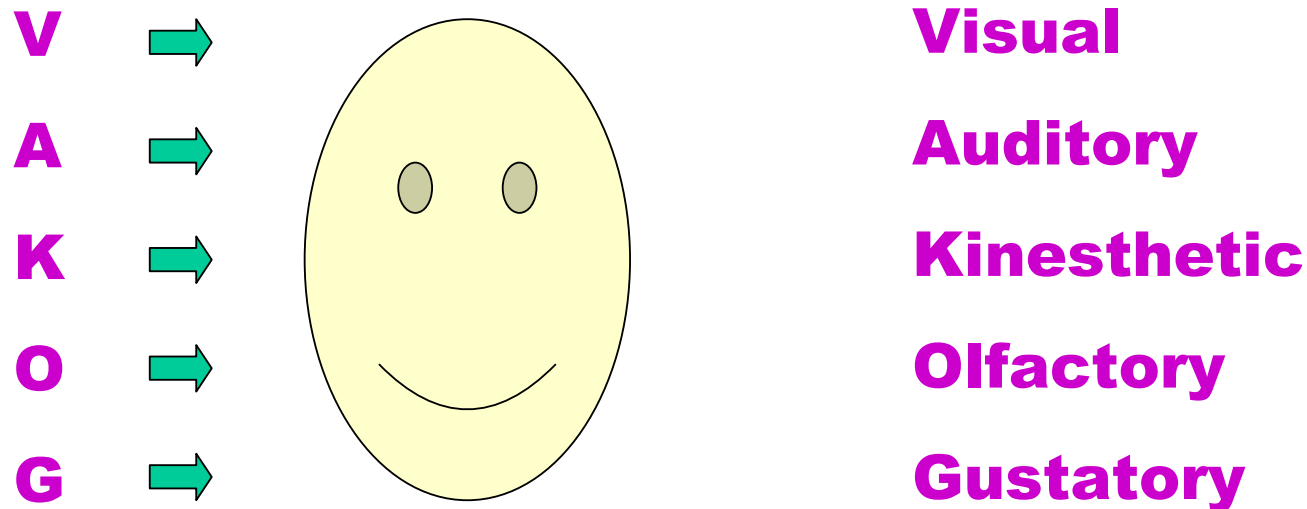
- White box... Black Box: known to unknown



- **Knowledge Increase** (electric circuits... CFD... Big Bang or humor theory)
- **Labyrinth and Mouse** (standard brainstorming creatology)

# On Model of a Human Being

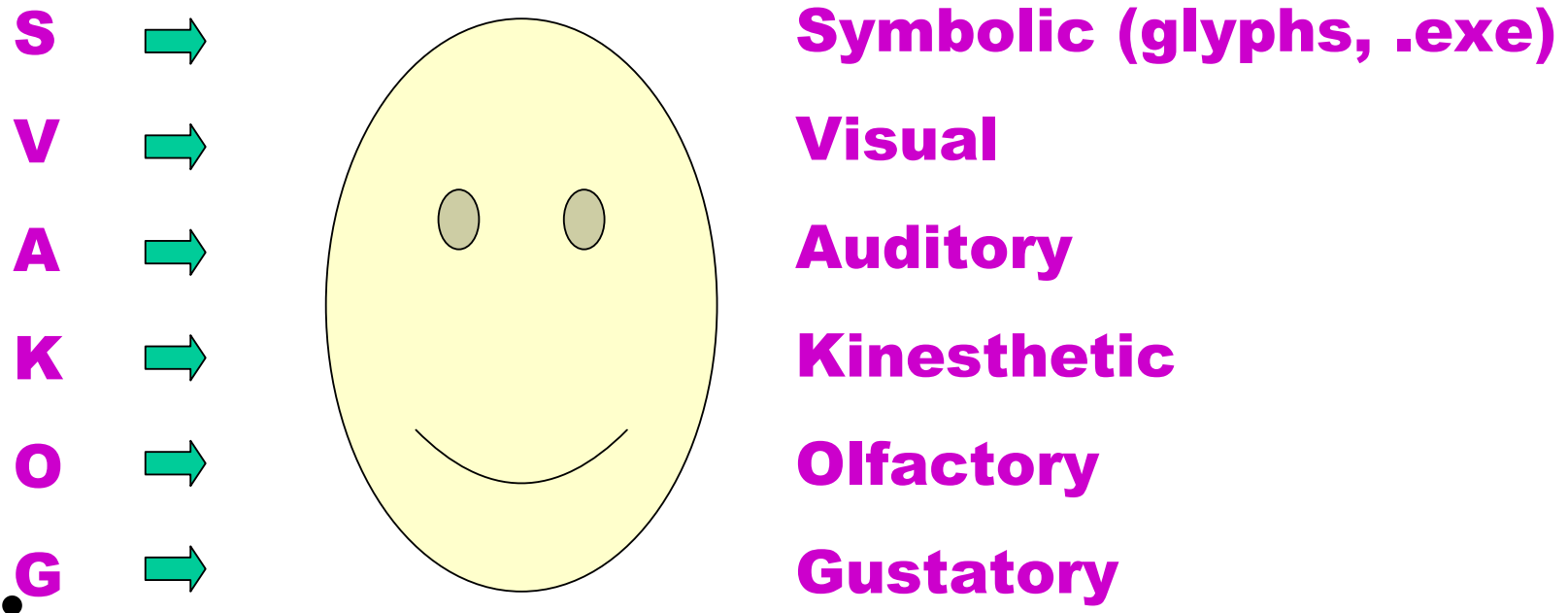
- Communication World Champions: NLP



- John GRINDER & Richard BANDLER, 1972+
- NLP = Neurolinguistic Programming

# On Model of a Human Being

- Input Completion: Add Symbolic Channel





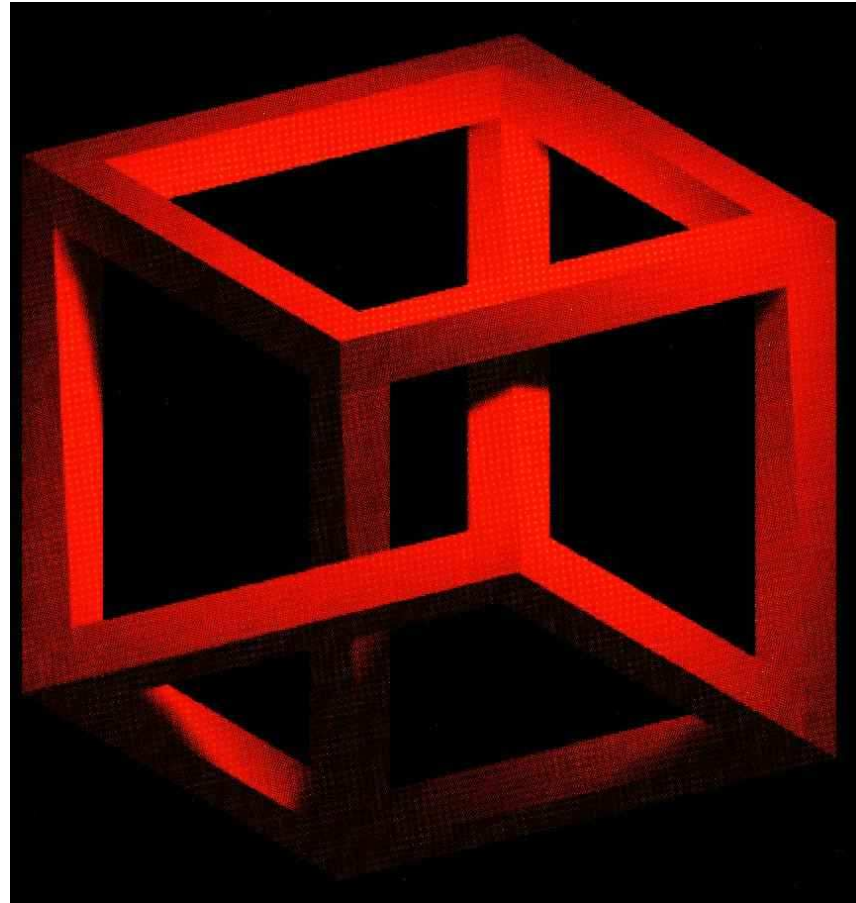
# On Model of a Human Being

- More from NLP (applied in education, psychotherapy, etc.)
- Elicitation (*open the communication*)
- Calibration, filters
- Anchors, chaining anchors (*attractors*)
- Neurological levels: environment, behavior, capability, belief, identity, spiritual
- O'Connor, J. - Seymour, J. 1989. Etc.

# Comment on the Next Slide

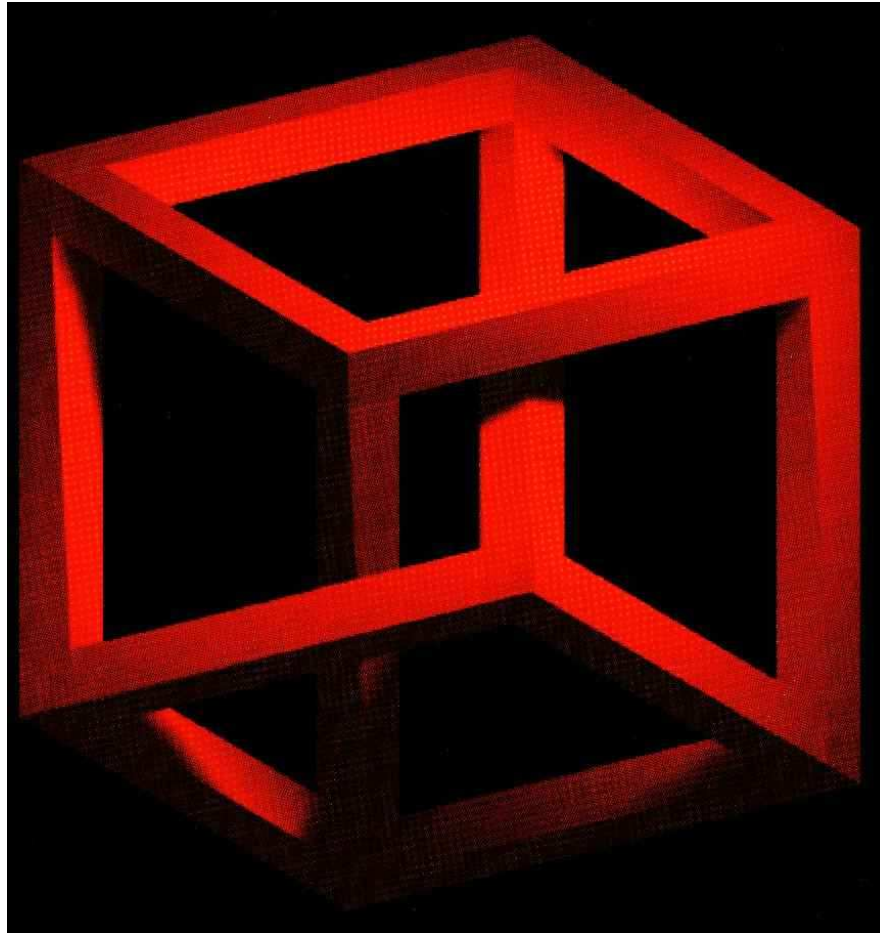
- **Another riddle today...**
- **Do You believe that the following 3D object exist?**
- **After asking this question in Audio,**
- **Show the next slide. Let the people vote for NO answer first by rising the hands. Then show the slide with stills**
- **And after run the animation to increase the surprise for NO voters.**

Does this exist ?

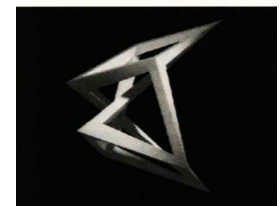
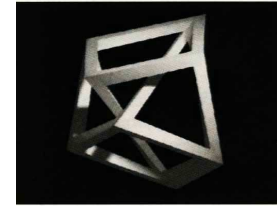
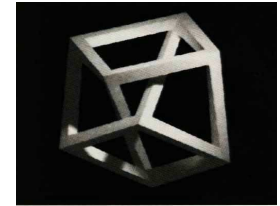


•  $\exists?$

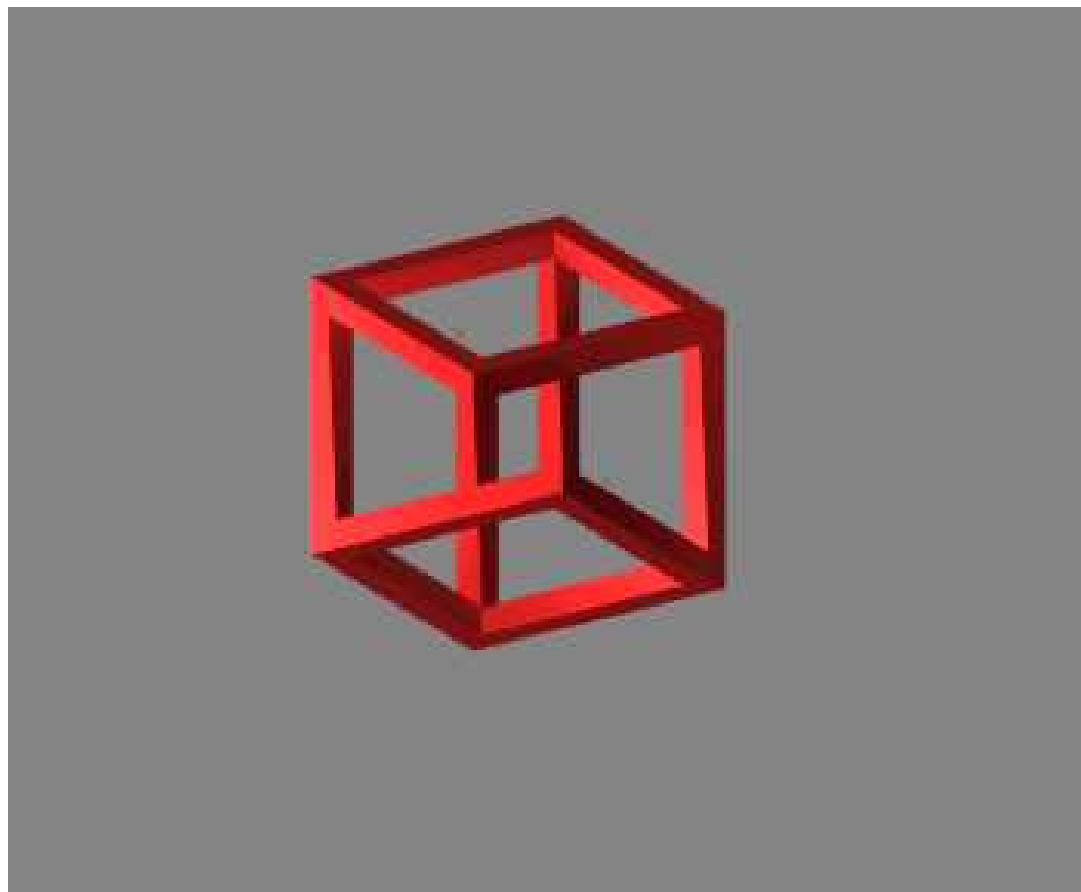
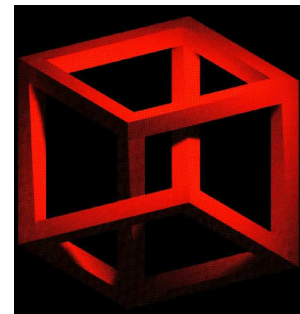
# KUBOID by P. Eliáš



- E!



# KUBOID by P. Eliáš

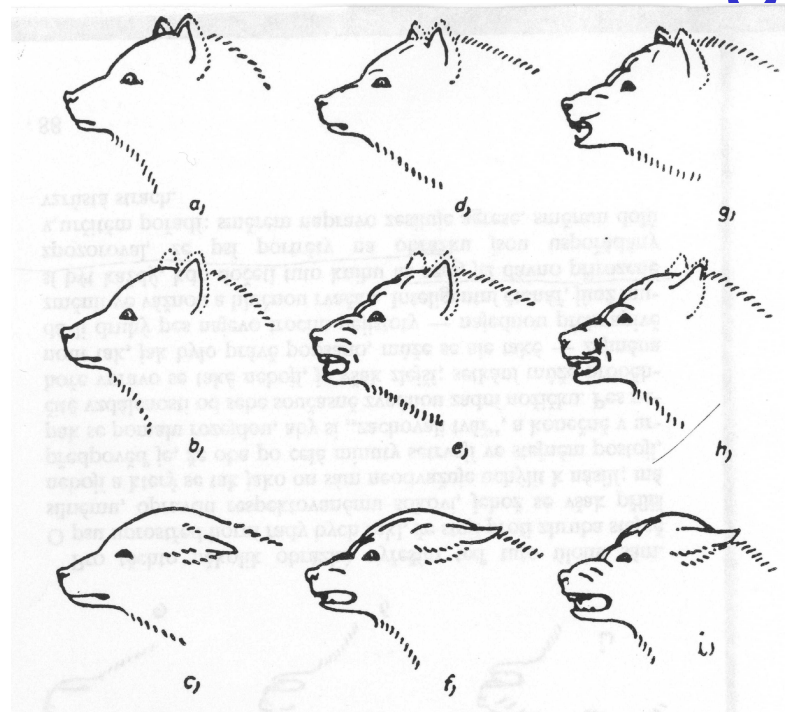


- <http://www.dunako.com/pavol/cuboid/>

# On Model of a Human Being

- Each living animal or human:
- Aggression,      anger,      very fast!
- Escape,      fear,      very fast!
- Food,      hunger,      slower
- Sex,      sex,      the slowest one...
- ... and a Great Parliament of Emotions
- Konrad LORENZ, Das sogenannte Böse. 1963.

# Emotional Ambiguity



**Ambiguous**

- ... and a Great Parliament of Emotions
- Konrad LORENZ, Das sogenannte Böse. 1963.

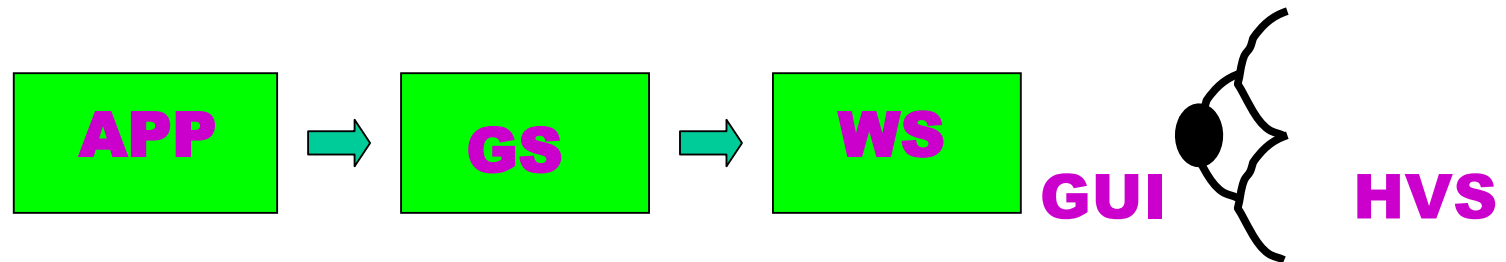
# On Model of a Human Being

- Each human being includes 3 personalities:
- Child, visual, emotional, creative ... **Visual**
- Adult, symbolic, rational ... **Symbolic**
- Parent, auditory, moral ... **Audio**
- and something “crowded” (mass hysteria)
- D. GOLEMAN, Emotional Intelligence. 1998.



# On Model of a Human Being

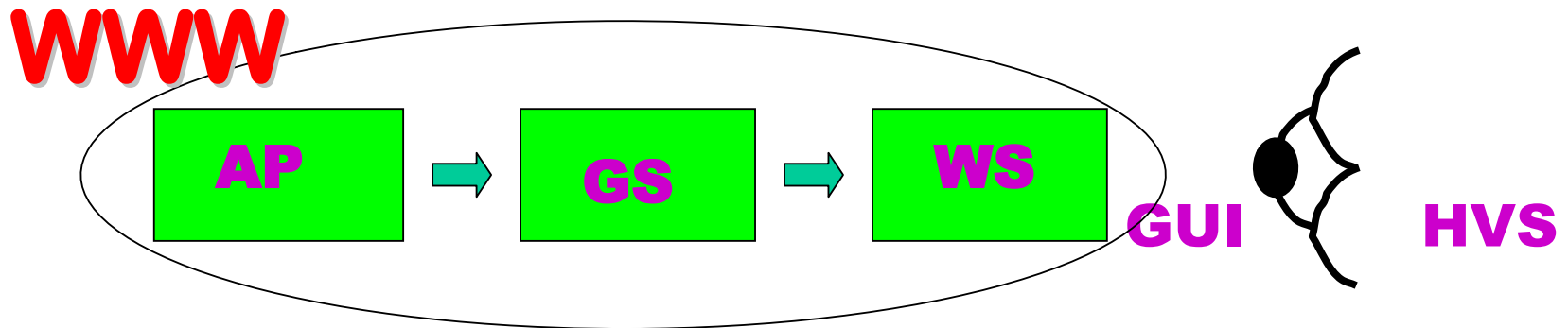
- Ambiguities can be communicated via Symbolic, Visual, and Auditory channels with full joy
- Web, application, graphics system and workstation support all 3 channels



# Web Graphics

- Human visual system fed through GUI perceives the content dominantly through web pages

- 



# Rennnaissance Analogy 4 WWW

- **Guttenberg, Rabelais, Bakhtin**
- **Tim Berners-Lee, ?, ??**
- 
- **Partial semiotic explanations – J. Bond, Matrix, ...**
- **V. Propp, W. Disney etc., U. Eco, and many others**

# Listening to Geri's Game

*you cannot control  
what you cannot measure*

DeMarco, 1982



<http://www.pixar.com/shorts/gg/>  
Copyright © Pixar Animation Studios

- Standard measure for messages given by semiotics

# Sign Systems... Semiotics (Peirce)

- **Semiotics:**
- **Icon**
- **Index**
- **Symbol**
- **Signal**



<http://www.pixar.com/shorts/gg/>  
Copyright © Pixar Animation Studios

- **All 4 kinds of sign representation available in Geri's Game**  
sound: iconic noise, indexed voice, symbolic raven's cry and  
signalized game opening (the sound with the first move)

# Semiotics (Peirce )

- Unfortunately, semiotics seems to be poor for ambiguities

*you cannot control  
what you cannot measure*

DeMarco, 1982

## Comment on the Next Slide

- **The following group of images are the real world photos, the ambiguities are dicovered by the photographer here**
- **They include parallel spaces which is the noble nick for the stupidity**



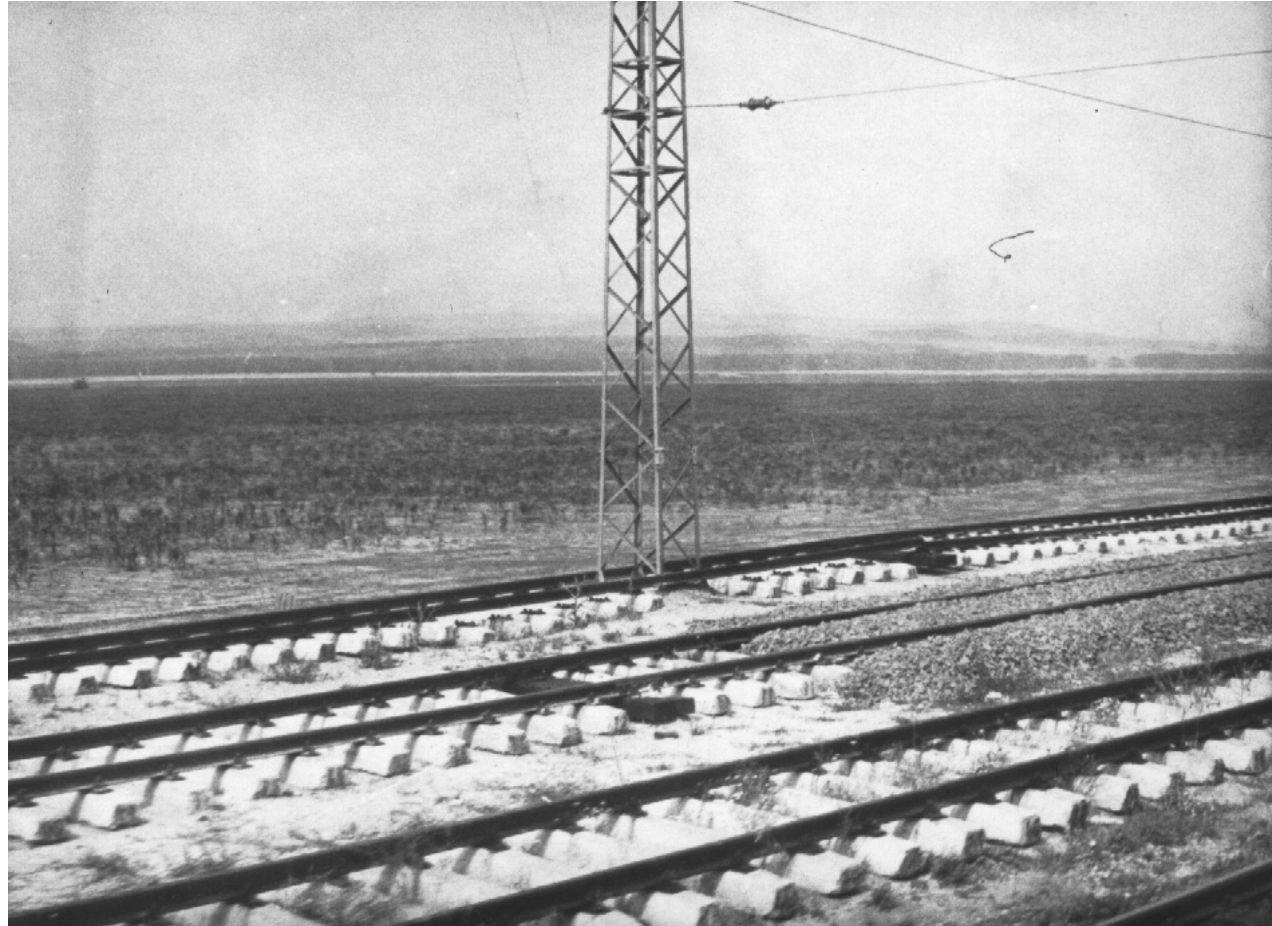
# Parallel Use of Space in Graz...



- Real world photo by A. F., Graz 2001



# Parallel Use of Space, Transsylvania...



- Real world photo by L. Lazar

Author Unknown



# Bratislava – Grass/Hay & Basketball



# Bratislava – Open Windows



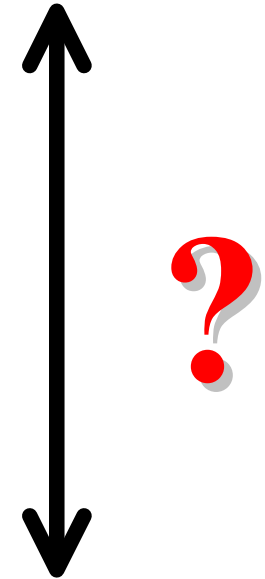


# Bratislava Prepared for Deep Snow

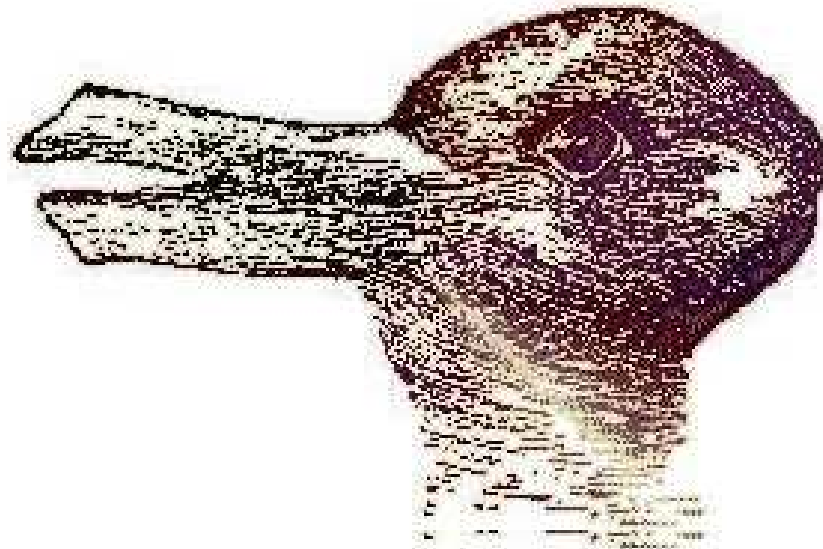




# Where is the Ambiguity? (Very Individual)



# Where is the Ambiguity?



***A Rabbit.... Or A Duck?***

***hint: the duck is looking left, the rabbit is looking right***

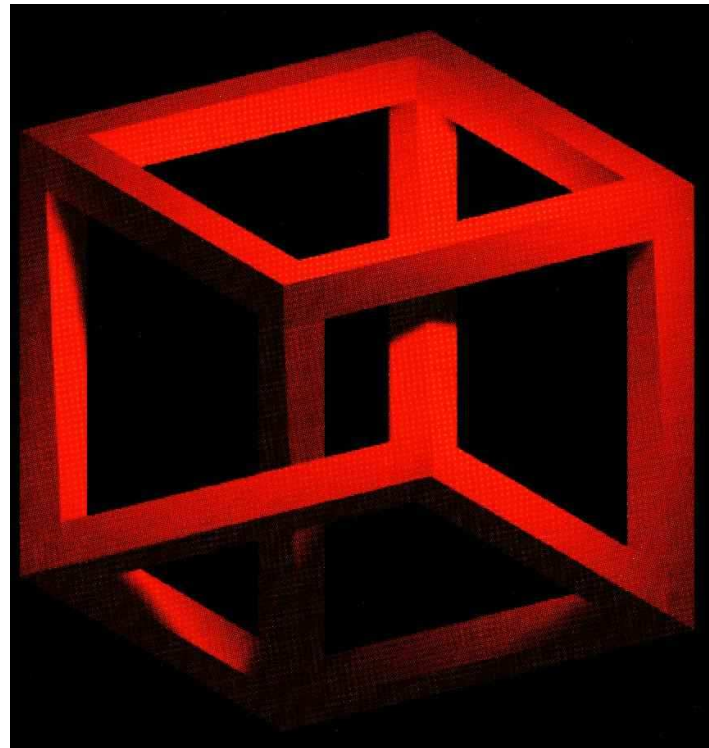


## Where is the Ambiguity?



- Ambassadors by H. Hobein, jr.
-

Pavol Elias gives the construction of existing paradoxical 3D objects by cutting them into unambiguous parts



- Here are two unambiguous parts

# Humor Theory ???

- **Humor theories... Aristotle (Poetica, lost part)**
- **U. Eco: The Name of the Rose**
- **Bergson and Freud, M. Minsky - 2 brains**
- **Nietzsche, Huizinga, Fink... (ontology of game)**
- **... Chaplin, Disney, Sellers (practice)**
- **Weapon of the week ones: Central Europe, home of Jewish jokes, Werner P. Videa story**
- **Graz Shade of ClockTower...**

# Mikhail Bakhtin

- ***“It could be said (with certain reservations, of course) that a person of the Middle Ages lived, as it were, two lives: one that was the official life, monolithically serious and gloomy, subjugated to a strict hierarchical order, full of terror, dogmatism, reverence and piety; the other was the life of the carnival square, free and unrestricted, full of ambivalent laughter, blasphemy, the profanation of everything sacred, full of debasing and obscenities, familiar contact with everyone and everything. Both these lives were legitimate, but separated by strict temporal boundaries.”***

# Comment on the Next Slide

- The following 'displays' the symbolic analogy to Rabbit/Duck & Ambassadors.
- It is a calambur Troublem and similar staff. Calambur is a French word used after the German ambassador Kahlenberg spoke using his approximate French in Paris, 17th or 18th century
- (=: is a parody of ☺

# Towards the Troublems of Encoding

- **Encoding ambiguities simple in S channel**
- **Troublem** **1. Trouble, 2. Problem**
- **:=) (I have two noses, the shortest joke at all)**
- **~:-P** **1. smiley, thinking and steaming or:**
- **2. having only one single hair**
  - Helwig HAUSER, <http://www.cg.tuwien.ac.at/~helwig/smileys.html>
- **Encoding ambiguities pretty hard in general**

# Comment on the Next Slide

- The following ‘displays’ the audio analogy to Rabbit/Duck & Ambassadors.
- It is a bitonal music, where there are two tonal keys simultaneously, ie. You can listen to one chord as Tonic and Dominanta. This is out of classic harmonic analysis and MozArt would never use this. Can You play it?

# Towards the Troublems of Encoding (Mussorgsky)

- Encoding ambiguities in Audio channel ?

•

The image displays two pages of a musical score for the piece '6. Samuel Goldenberg und Schmuyle' by Modest Mussorgsky. The score is written for piano and includes various musical notations, dynamics, and tempo markings.

**Page 1 (Left):**

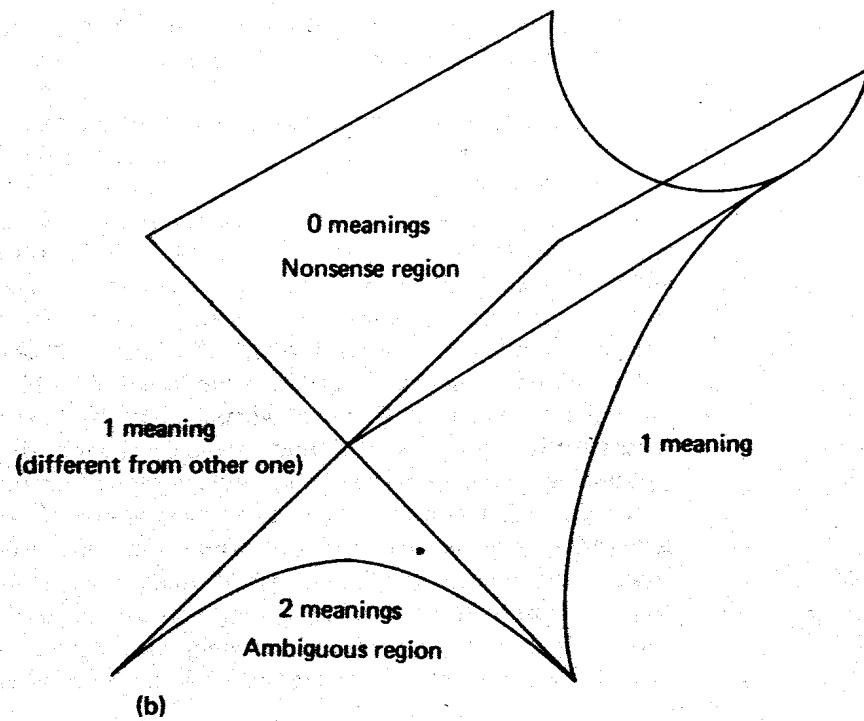
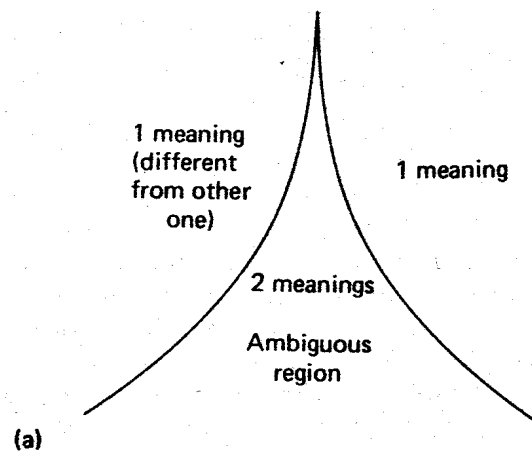
- Tempo: *Andante.*
- Key signature: B-flat major / D-flat minor (three flats).
- Measure numbers: 8, 13.
- Section: *Coda.*
- Dynamic markings: *mf*, *p*, *dim.*, *pp*.
- Text: *Da Capo il Schernino, senza Trio, e poi Coda.*
- Section title: **6. Samuel Goldenberg und Schmuyle.**

**Page 2 (Right):**

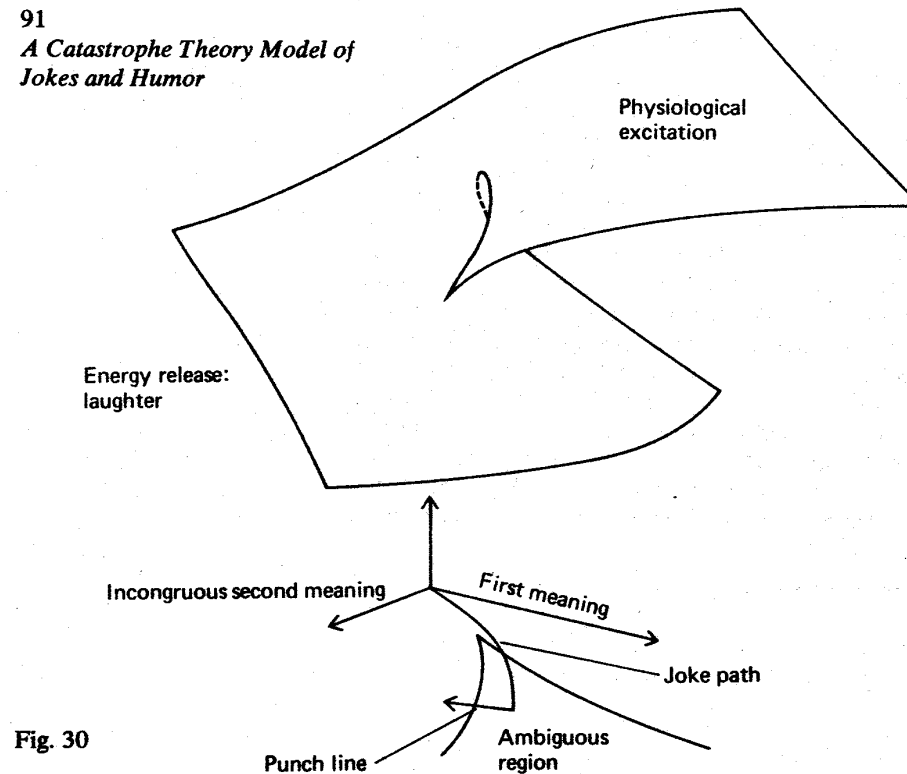
- Tempo: *Andante grave.*
- Measure numbers: 10, 15.
- Dynamic markings: *mf*, *cresc.*, *poco ritard. con dolore*.

Both pages feature complex piano textures with multiple voices and intricate rhythmic patterns. The notation includes various articulations, slurs, and dynamic markings to guide the performer.





# Model of Joke (2 meanings)

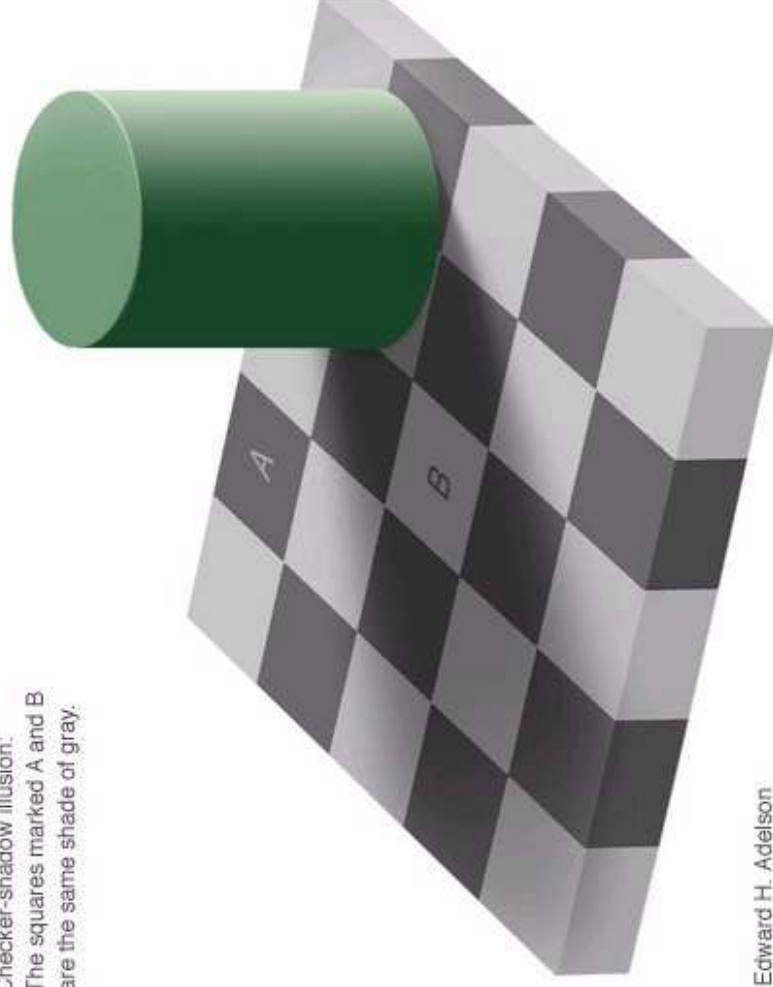


- A catastrophe theory model of joke, J. A. Paulos

# Comment on the Next Slide

- **Sorry for the next slide, containing controversial and offending content**
- **The bisociation, bridging of two contexts (opposed to association) explains the structure of blasphemy as well, again there are two contexts...**
- **Markus, I am not sure, if we should use this... Hm...**
- **I have put there a large non-blasphemy to balance and I mean this should be shown very fast**

Checker-shadow illusion:  
The squares marked A and B  
are the same shade of gray.



Edward H. Adelson

# Back to the Troublems of Encoding

- **Encoding ambiguities requirements:**
- **All channels S, V, A, K, O, G**
- **All contexts (at least two 😊)**
- **Relevant related parts of contexts**
  
- **Our idea: encode data, not the meaning**
- **The advantage: ASCII, MIDI, ... MPEG-4**

# Encoding Troublem

- **Our proposal: context is data format**
- **E4. Example (coding calambur). Let  $K1 = K2 = \text{IS 646 (ASCII)}$ . Let  $S1 = (\text{"trouble problem"})$ . Let  $S2 = (\text{"troublem"})$ .  $P1 = \text{"trouble"}$ ,  $P2 = \text{"problem"}$ ,  $P3 = \text{"troublem"}$ . Lengths of  $P1$ ,  $P2$ ,  $P3$  are 7, 7, and 8.  $P2$  and  $P3$  are defined only in one set. The previous requirements give not the valid sextuple to code this troublem. Evidently the comic information has been transferred, but not coded yet. We have seemingly all the bits, but no coding. The solution is given by more contexts (dimensions):**
  - 
  - **Divide  $S1$  into  $S3 = (\text{"trouble"})$  and  $S4 = (\text{"problem"})$ .**
  - **Now the ordered nonet  $[K1, K1, K1, S3, S4, S2, \text{"trouble"}, \text{"problem"}, \text{"troublem"}]$  describes the calambur completely. The 3 parts in the space of our understanding to the word troublem are activated simultaneously and the appropriate 2 links  $P1-P3$ ,  $P2-P3$  are given by the nonet. Calambur is thus coded - within 3 contexts.**



## Comment on the Next Slide

- **There are two different metaphors often combined in visualization, the following is the reversed river metaphor**

VRML Test-Szene - Microsoft Internet Explorer

Datei Bearbeiten Ansicht Favoriten Extras ?

Zurück

Suchen

Favoriten

Verlauf

Adresse [http://www.icg.tu-graz.ac.at/~Education/Vorlesung/CAD\\_KU/demo/demo.html](http://www.icg.tu-graz.ac.at/~Education/Vorlesung/CAD_KU/demo/demo.html) Wechsell zu Links

Favoriten

Hinzufügen... Verwal

Links

Media

MSN

Radio Station Guide


Webereignisse

Index of -grabner

Computer Graphics and ...

# The novice computer user's paradise

This simple embedded VRML world illustrates one of the most threatening fears of novice computer users and a reasonable solution to overcome the arising problems. To investigate the world's behaviour, just move towards the computer screen and follow the instructions.



The VRML scene depicts a computer setup on a brown platform against a green background. A monitor displays the text 'Press any key to continue!' in red. Below it is a keyboard where every key is labeled 'ANY'. To the right, a red joystick with a green base is visible. At the bottom of the scene is a control bar with a 'standard view' button, navigation icons, and a 'COSMO' logo.

by grabner find \*direct jump\* top of page

ICG - Computer Graphics and Vision - TU-Graz/Austria - You are logged in as special guest ! Internet

Start

lectures

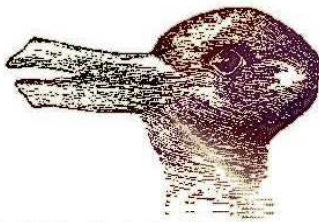
Web3D

VRML Test-Scen...

07:50

# Categories of Ambiguous Web Graphics

- Categories of ambiguous messages created and communicated by web graphics:
- **static** (stills) and **dynamic** (animations, interactive 3D worlds)



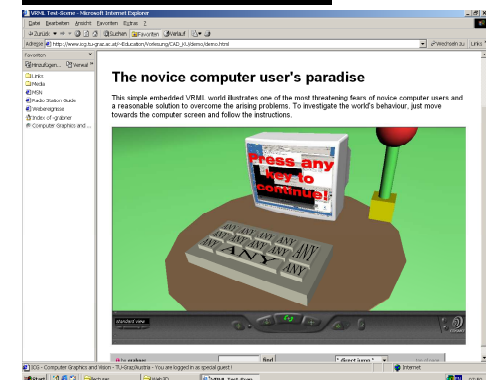
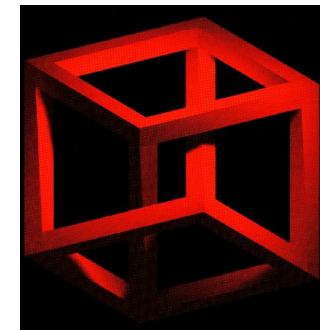
*A Rabbit.... Or A Duck?  
hint: the duck is looking left, the rabbit is looking right*

**One view**

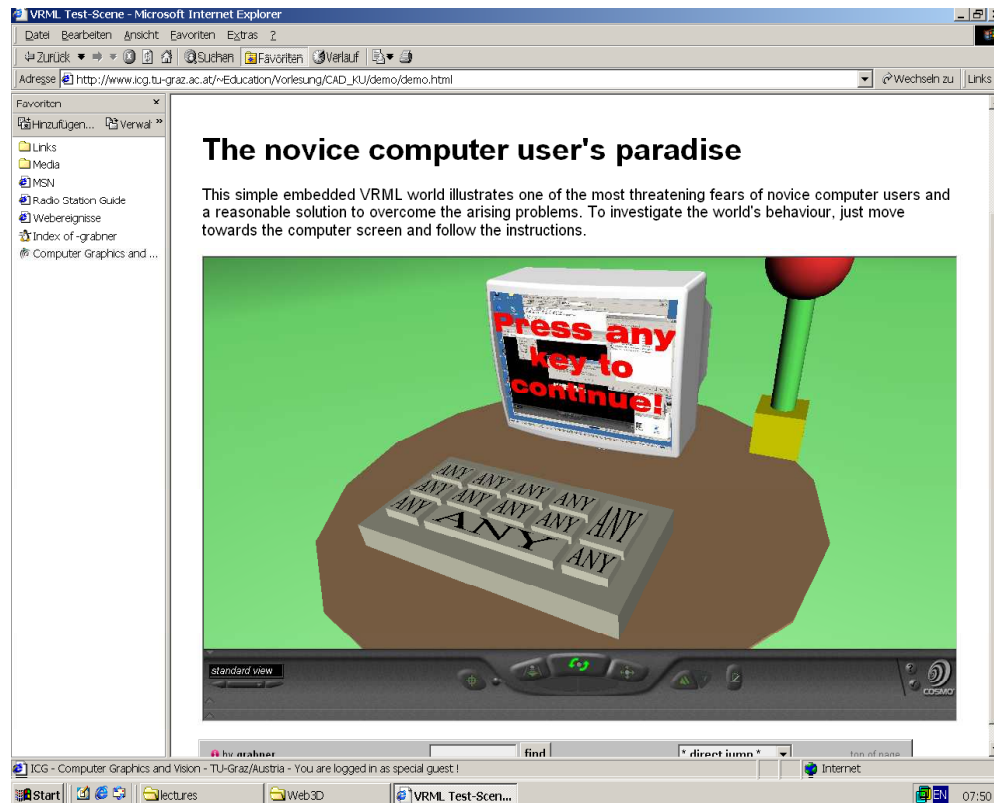


**2+ views**

**N views (using mirrors)**



# Even the Interactive Ambiguities



- VRML worlds by M. Grabner, TU Graz 2002

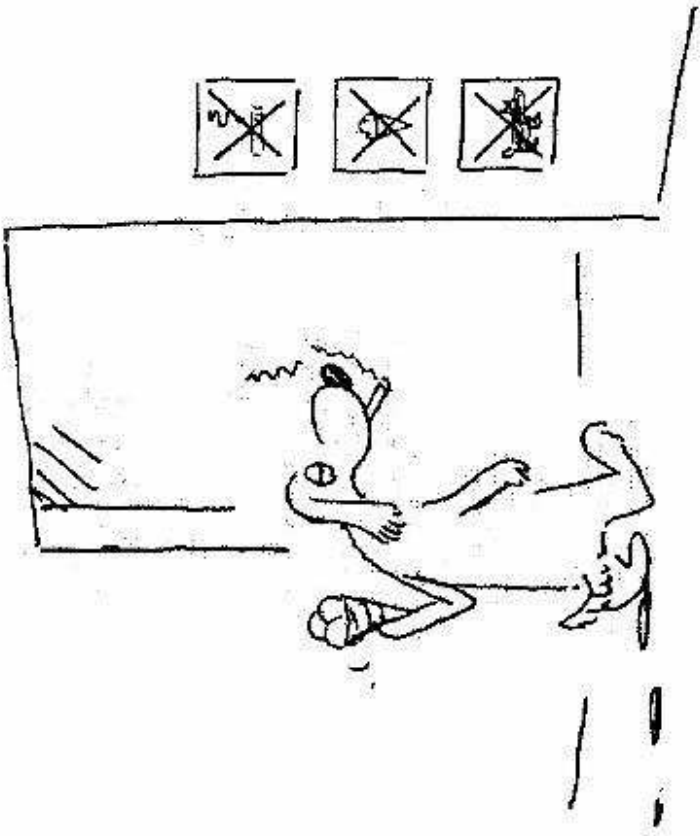
## Comment on the Next Slide

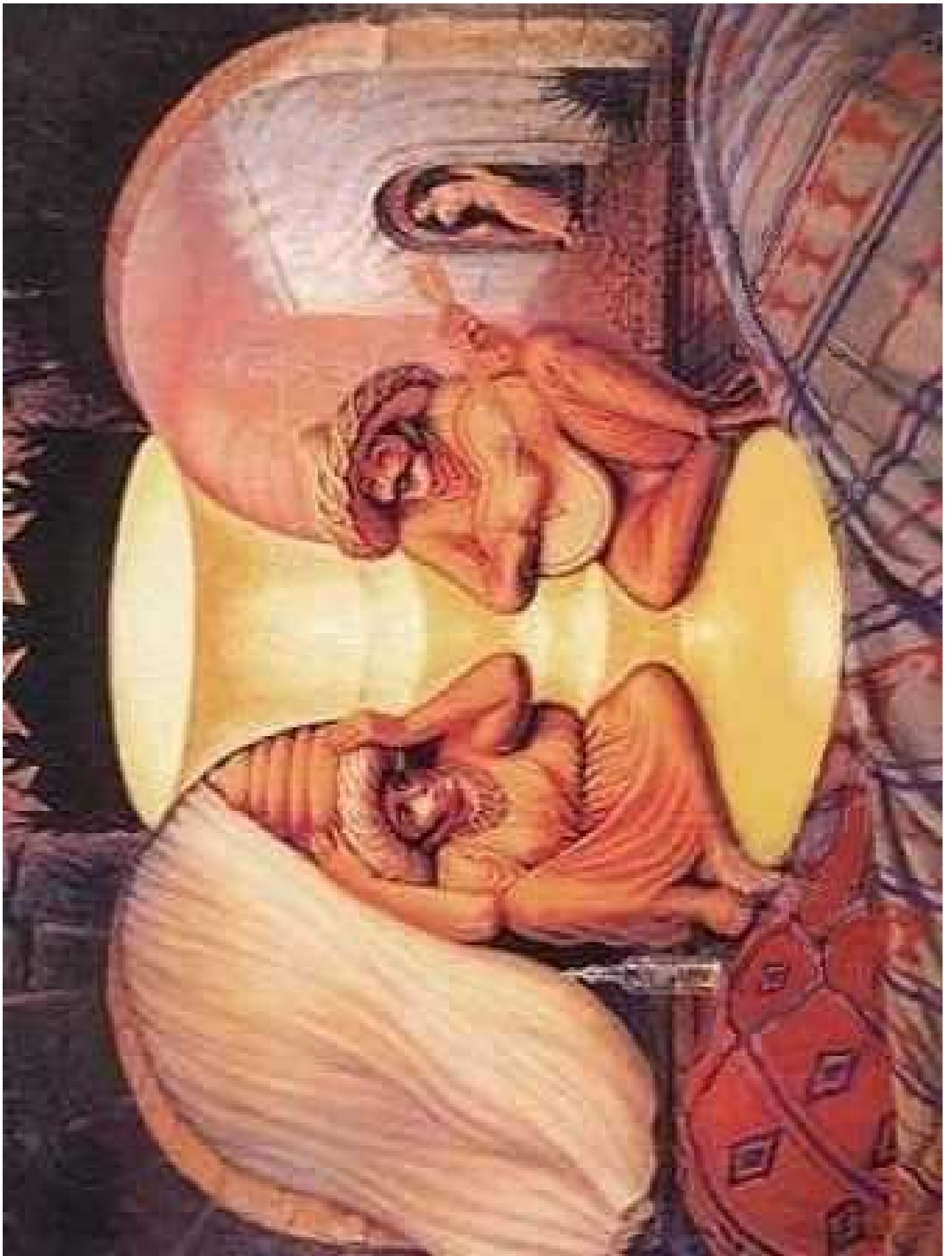
- **Polish text – Attention, the dog is good, but it has very weak nerves..**









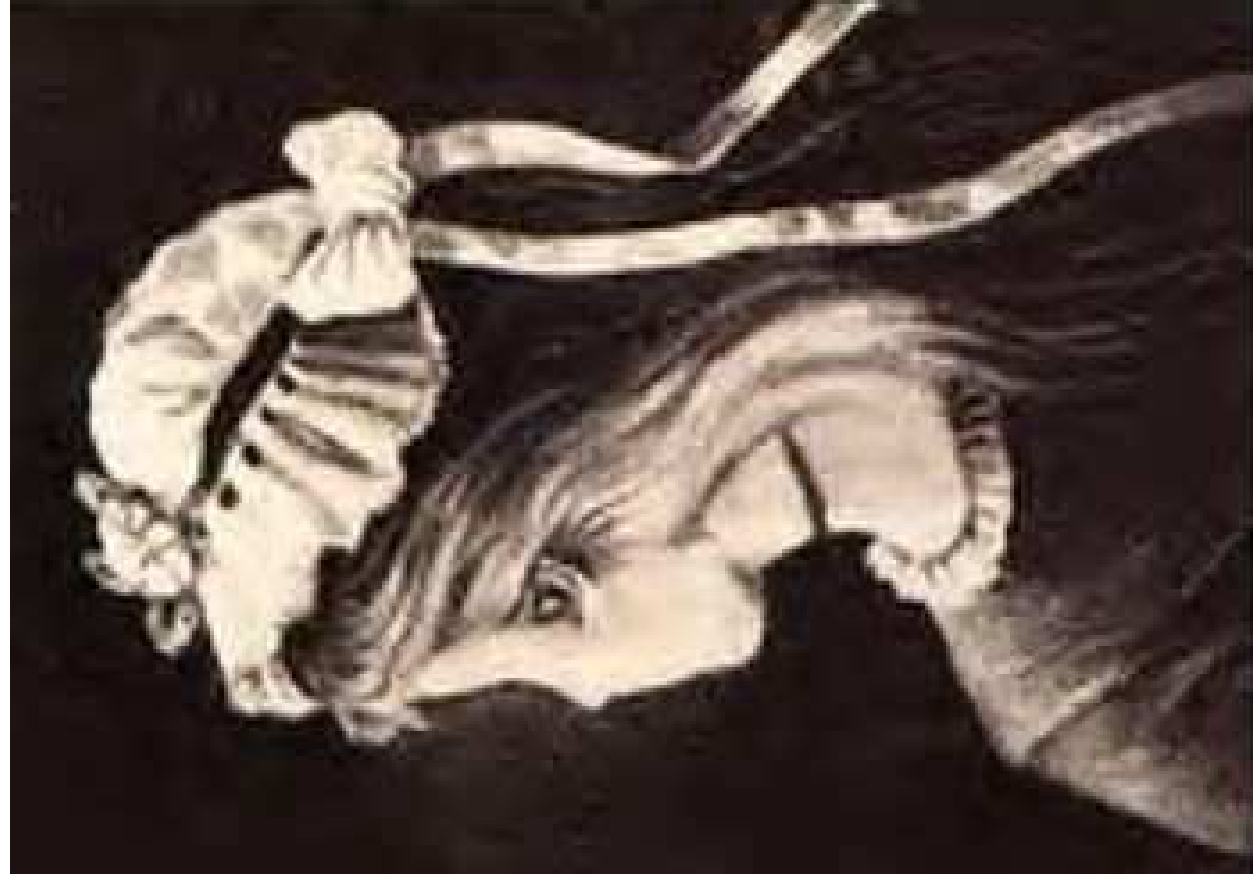






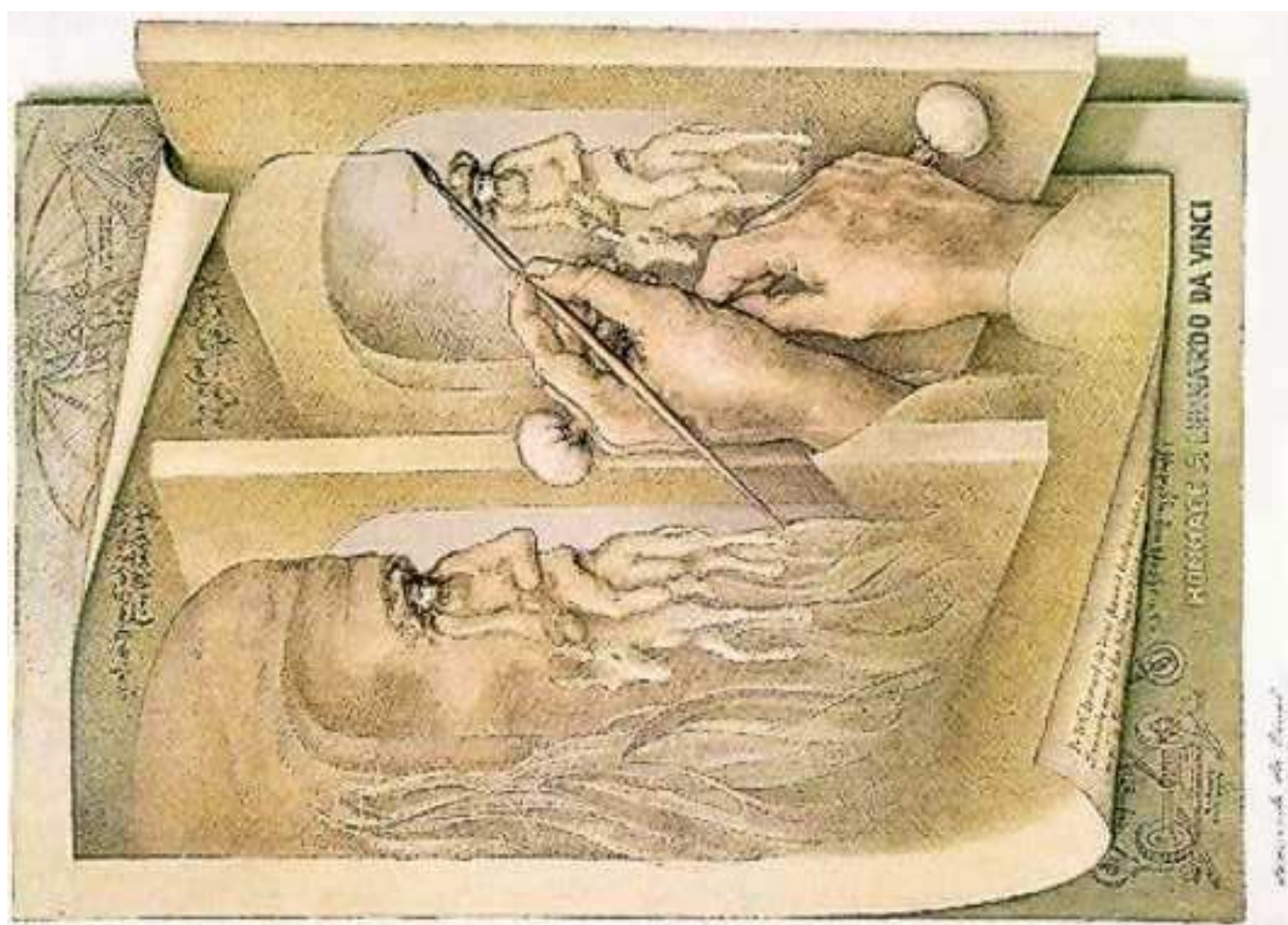






***Old Woman...Or Young Girl***



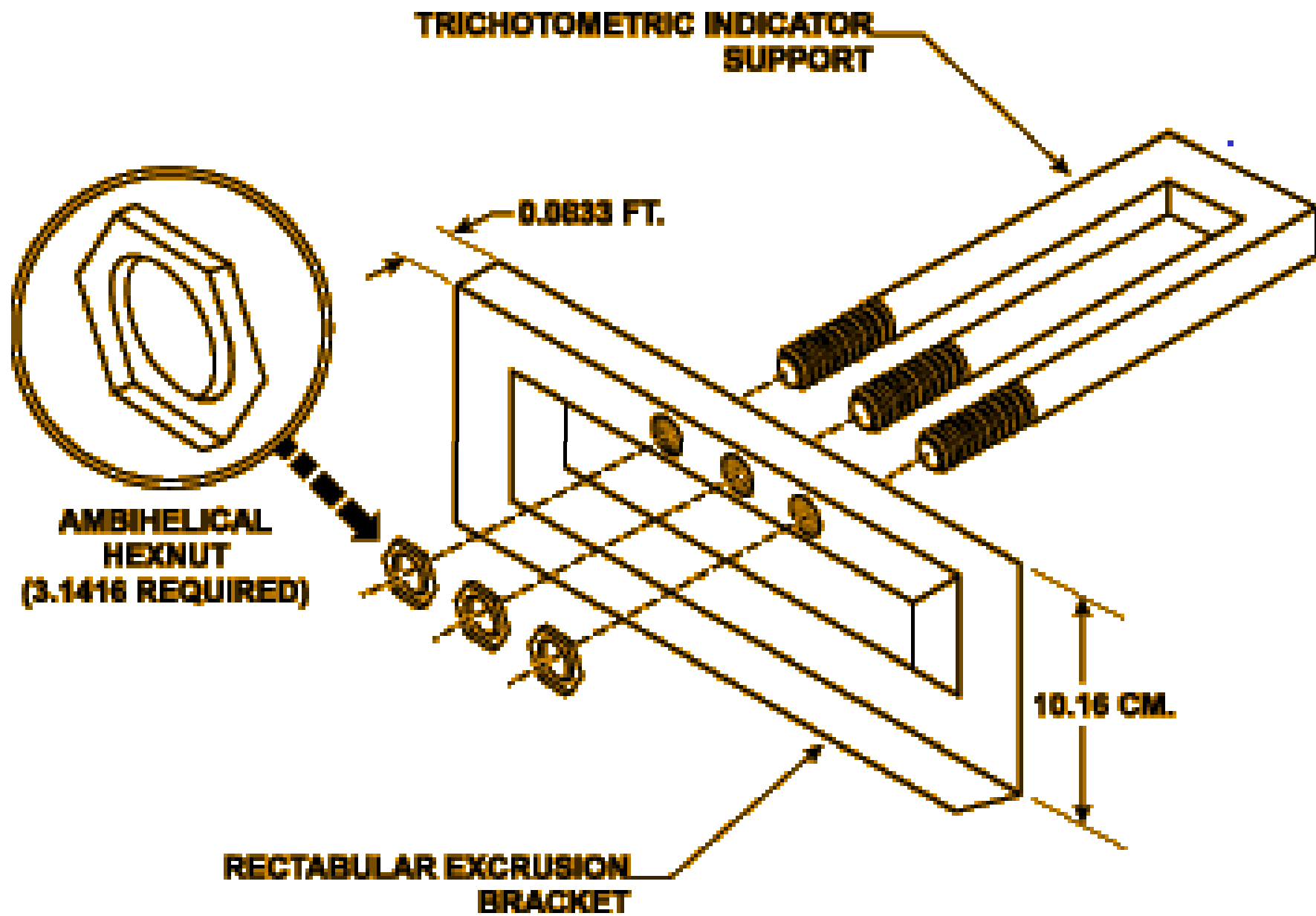


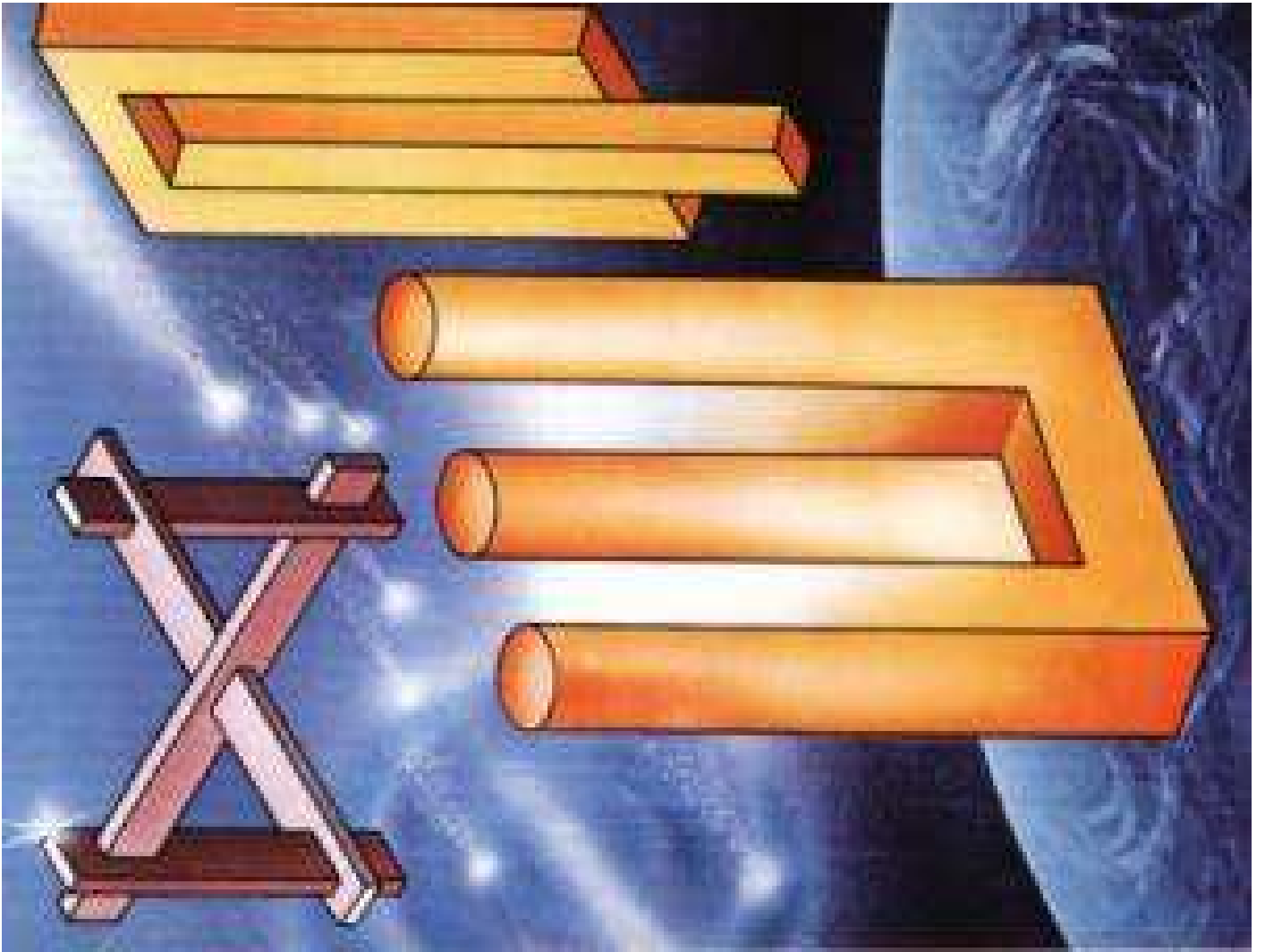


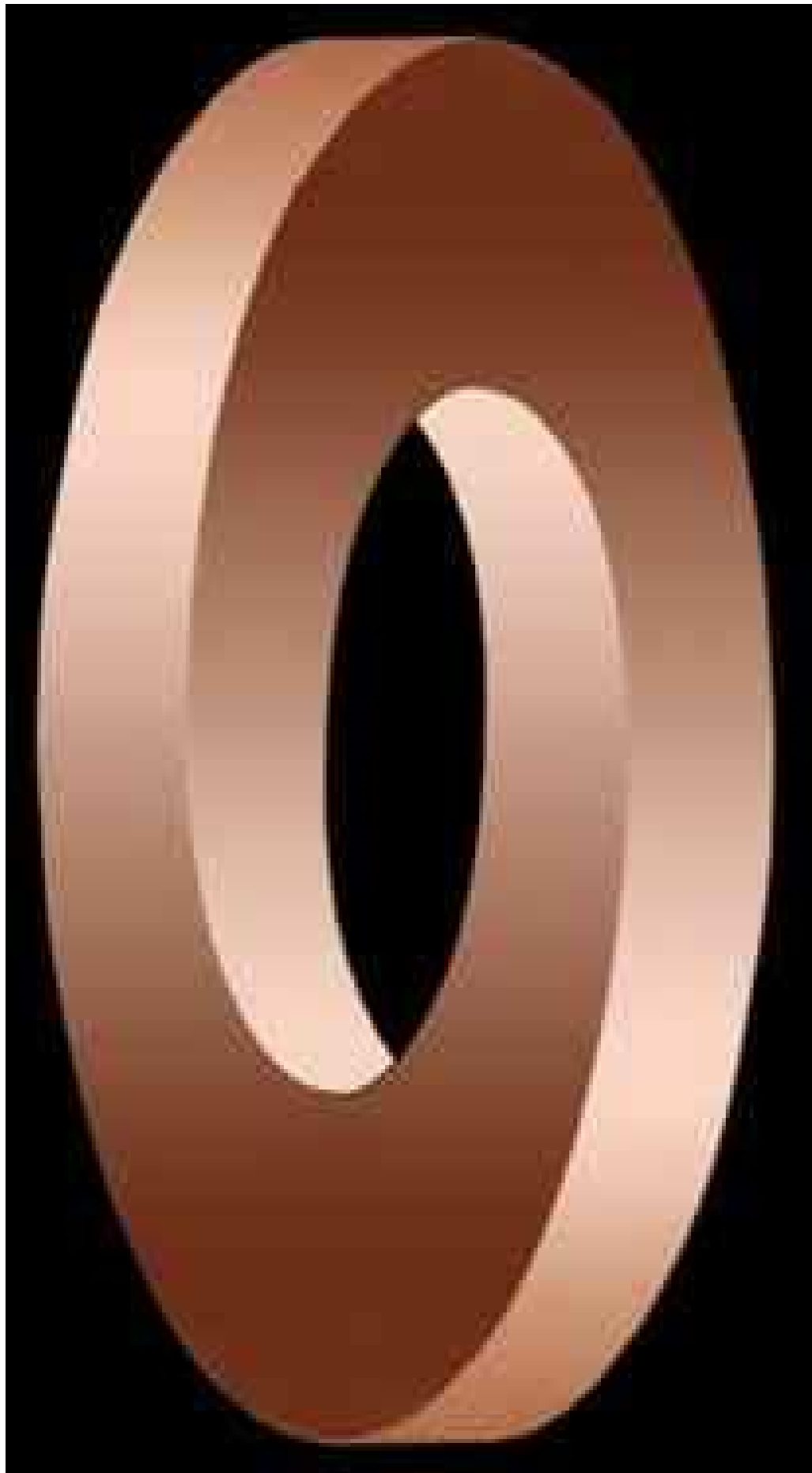
Zoek de baby



Zoek de 7 dolfijnen





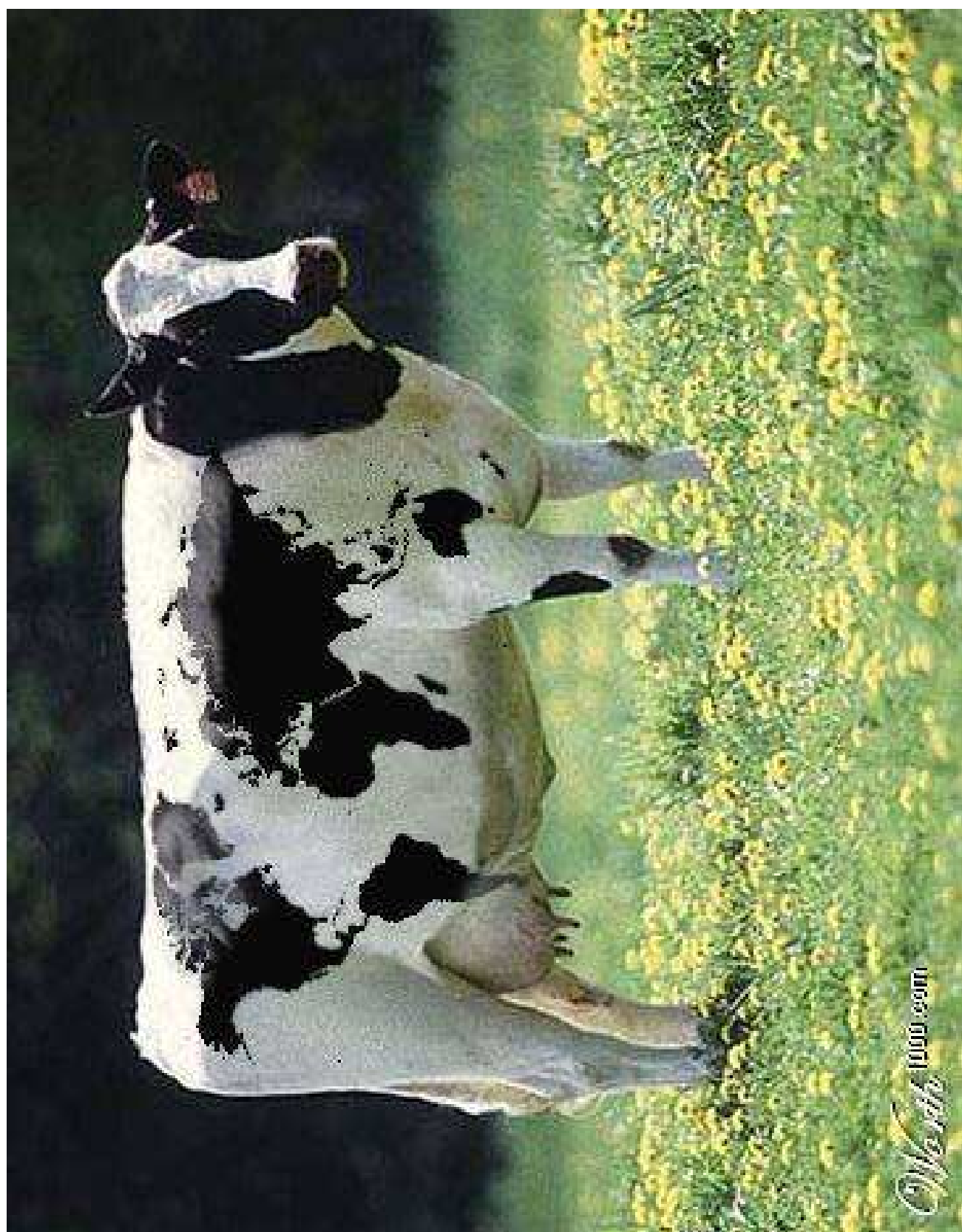










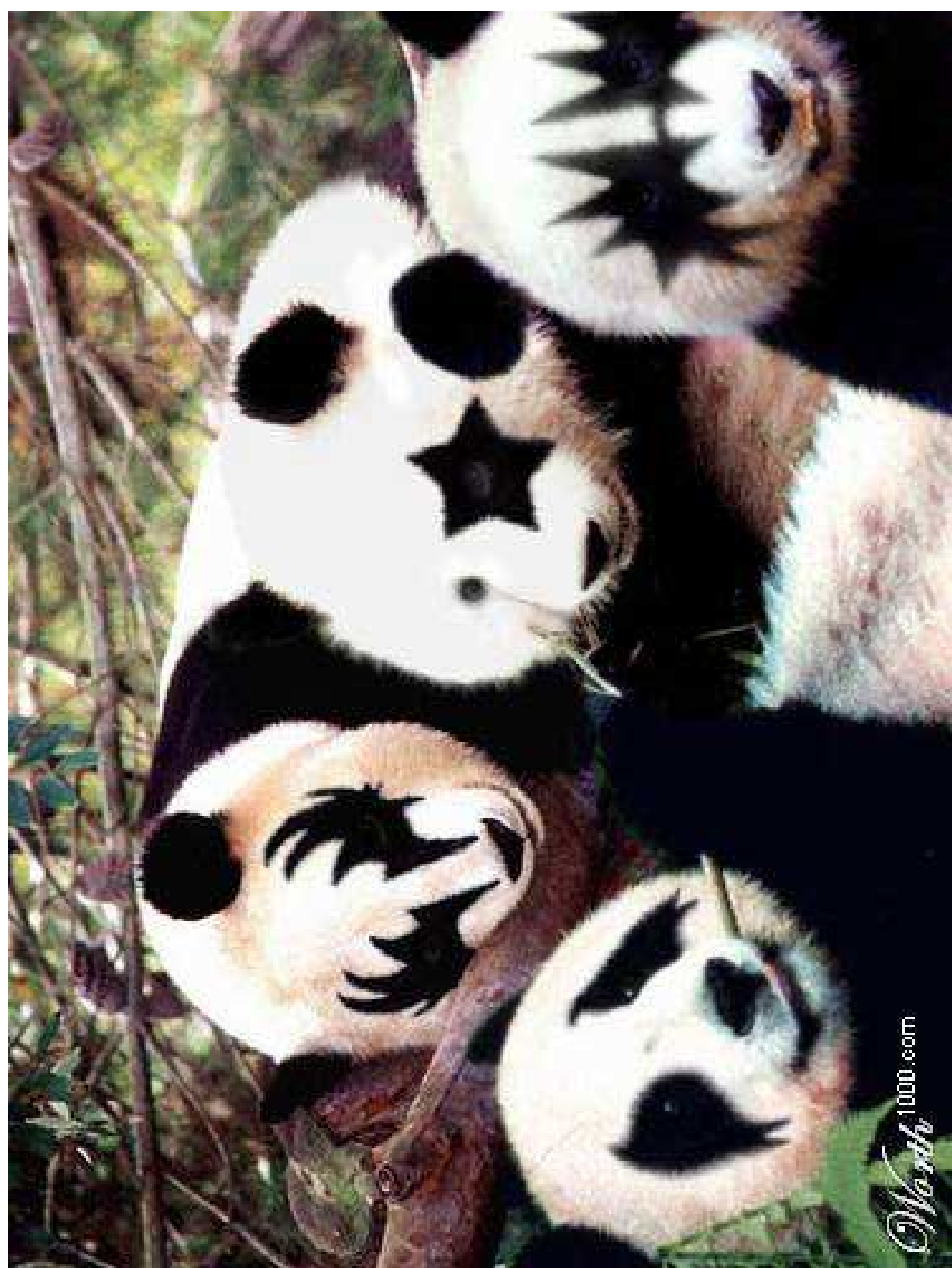


©Wendy 1100.com





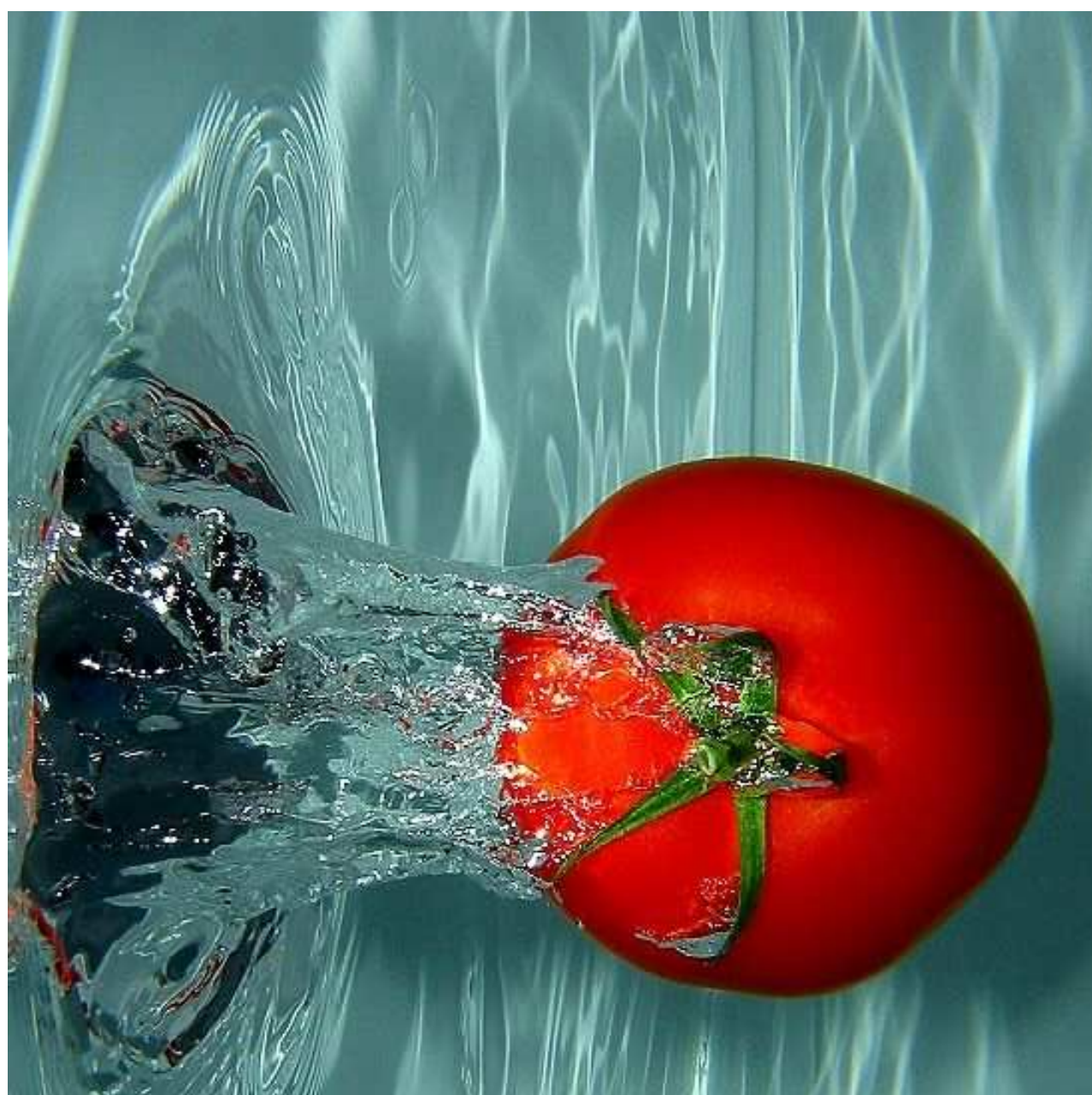
















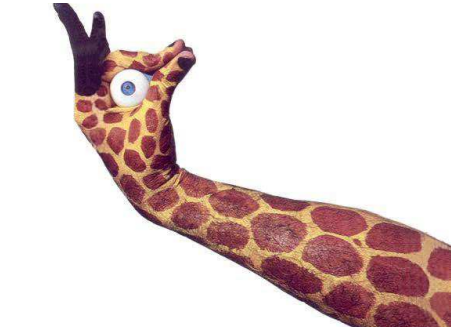
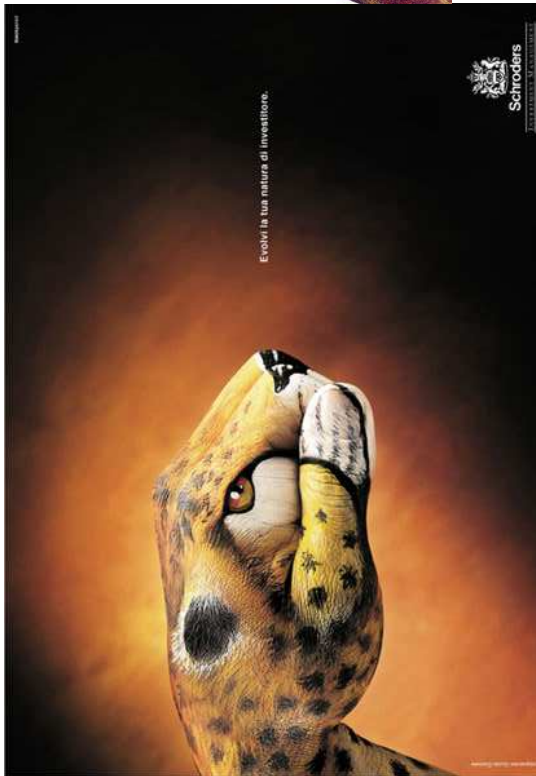
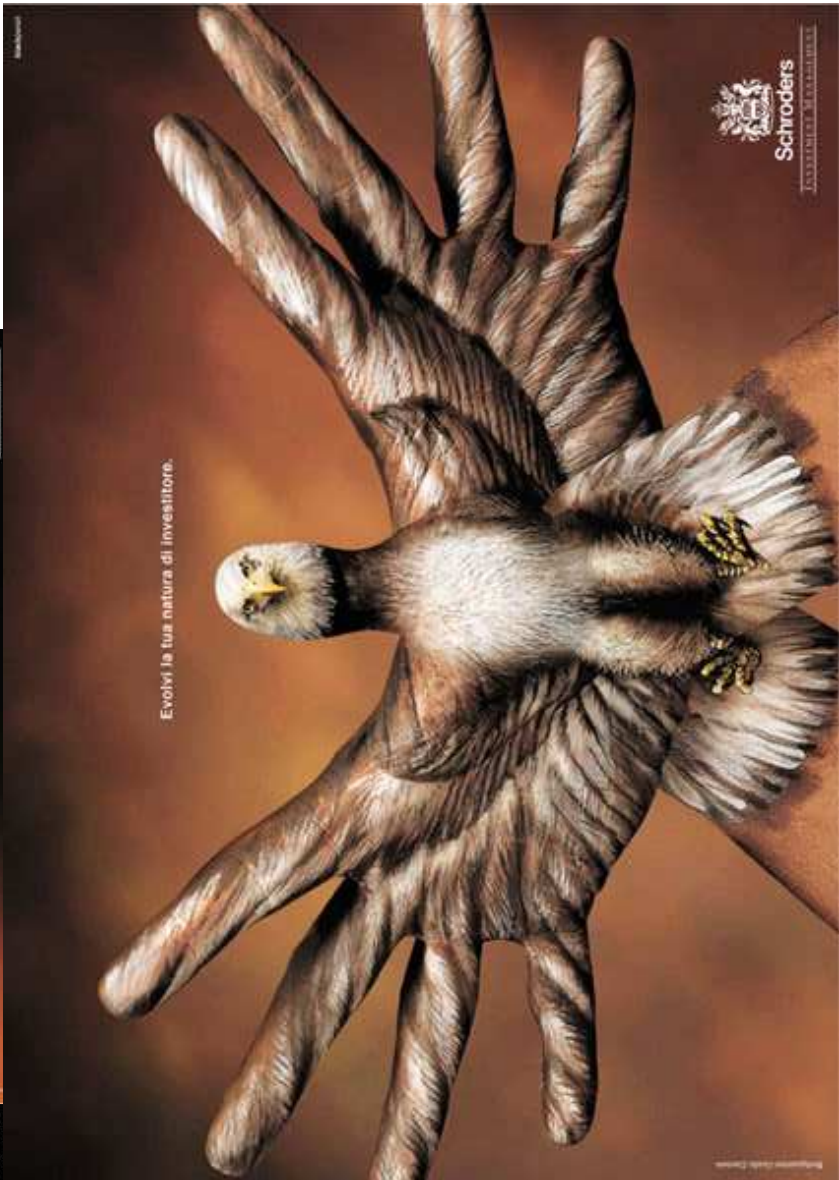




# Towards the Troublems...



- Real world photo from P. Bourkes homepage









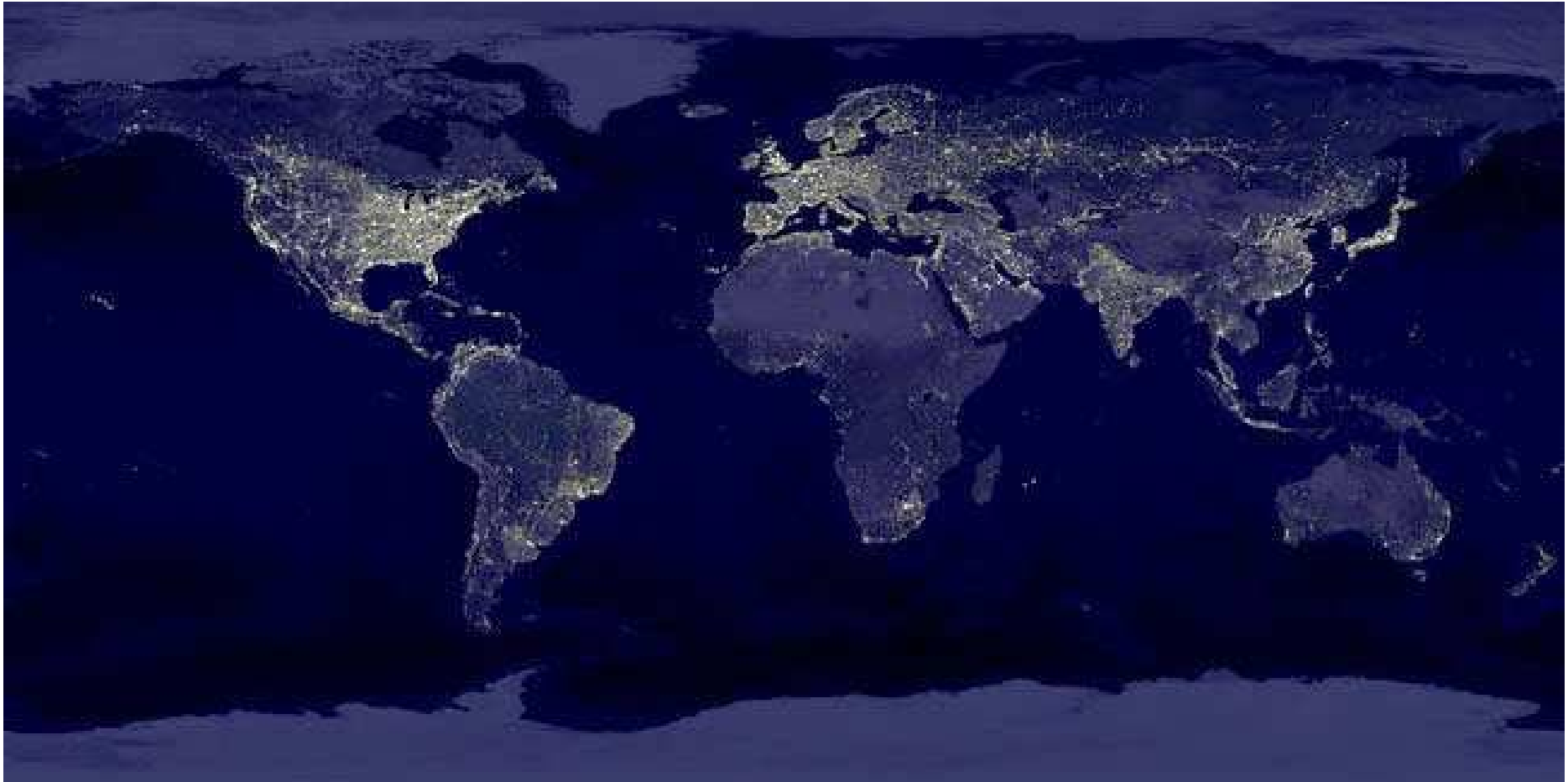




**AH!**



# Earth in the Night **AHA!**

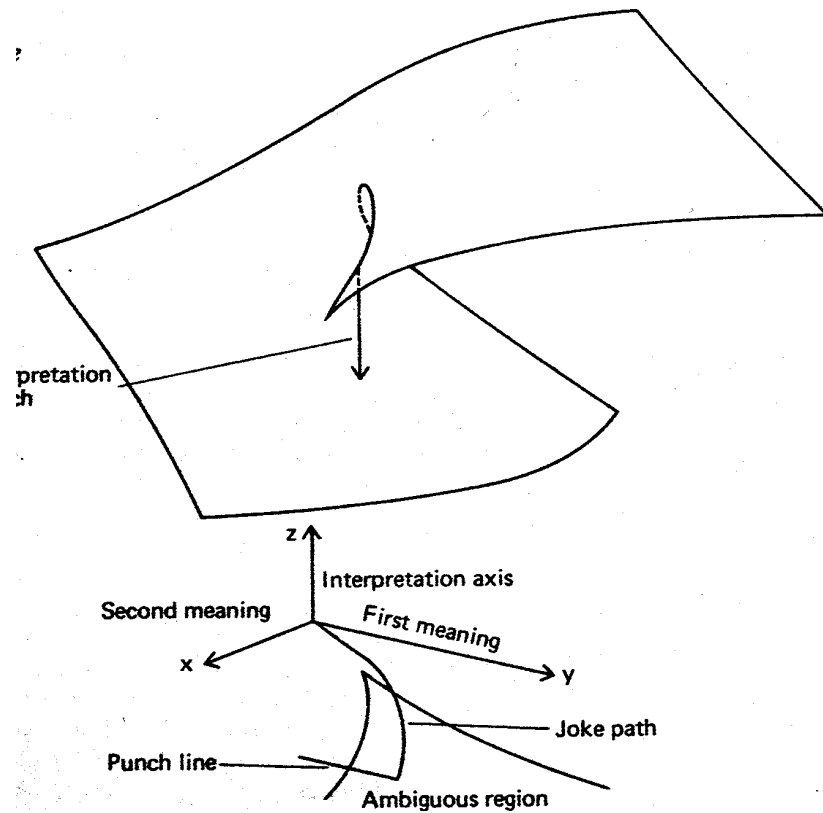


<http://antwrp.gsfc.nasa.gov/apod/ap001127.html>

**HAHA!**



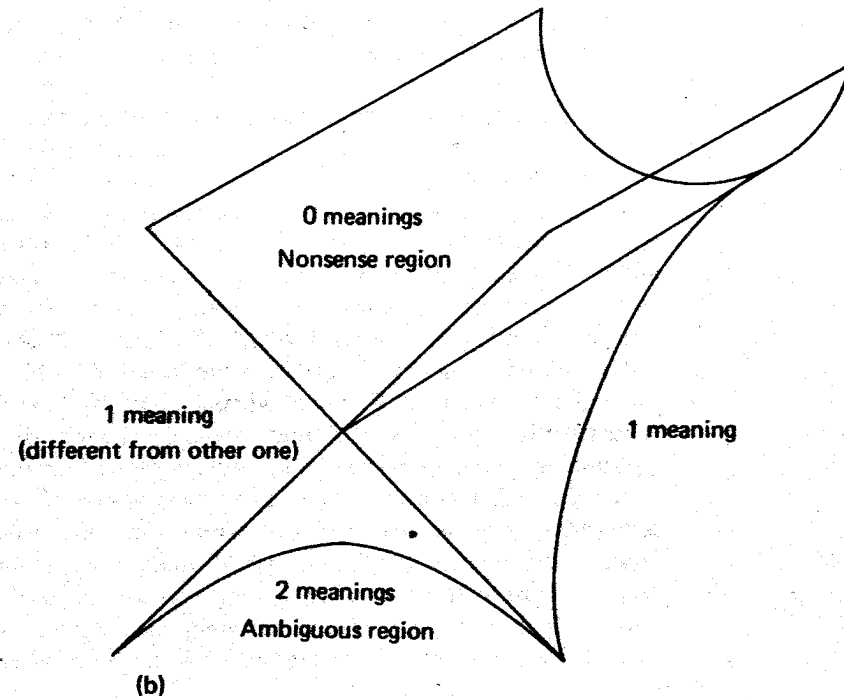
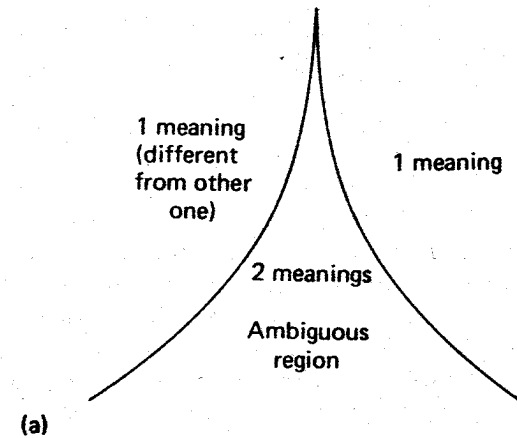
# Model of a Joke



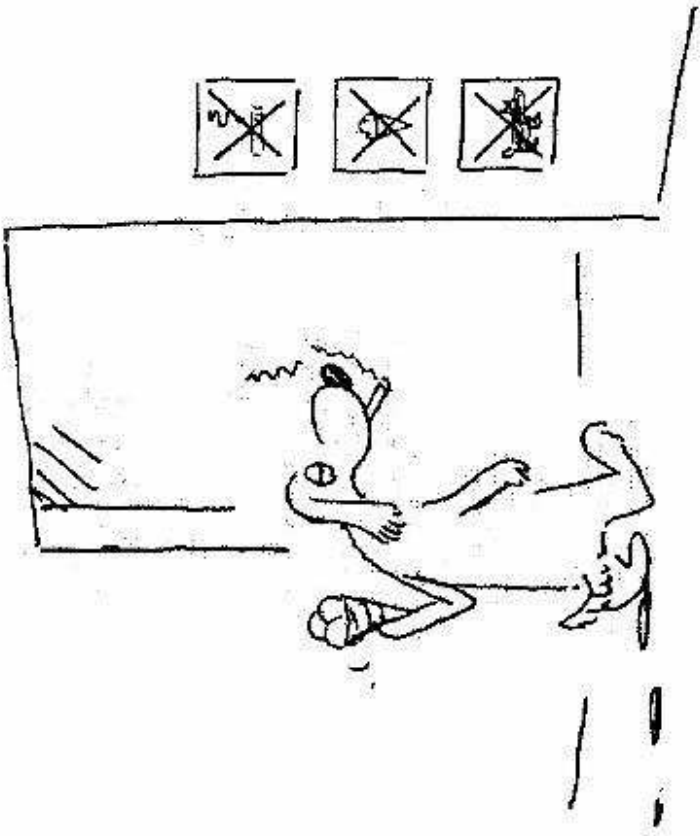
- A catastrophe theory model of joke, J. A. Paulos

# Ambiguity...

- Meanings
- Signs
- Semiotics...
- Bakhtin theory:
- Popular culture







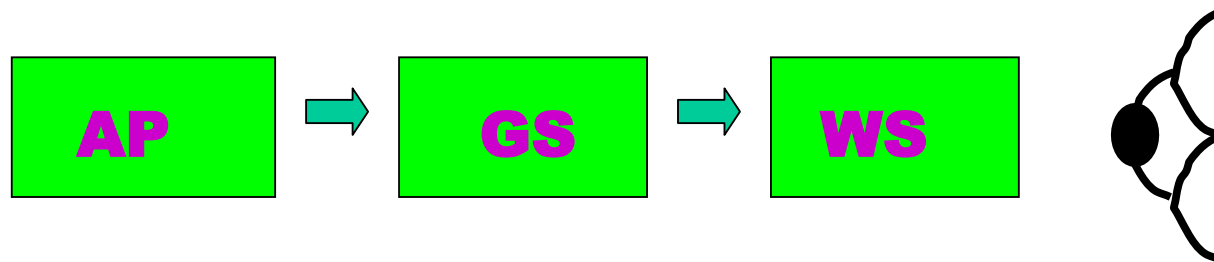


# Agenda

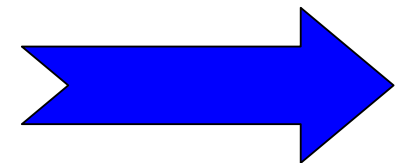
- 1. Internet Foklore, Popular Culture (done)
- 2. On Better Model of a Human Being
- 3. Towards the *Troublems* of Humor Theory
- 4. Rennaissance Analogy for WWW
- 5. Information Visualization Metaphors
- 6. Conclusions
- 7. Discussion (Top Unpleasant Question)

# On Model of a Human Being

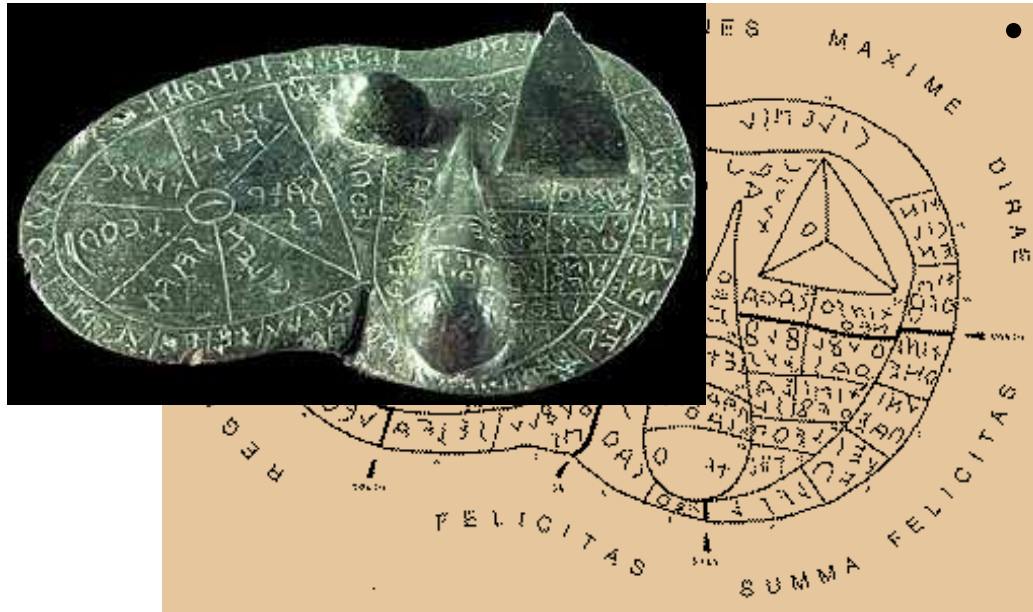
- Controlled Error: Model, Algorithm... Solution



- Computer Graphics >> Visualization  
 $\varepsilon \rightarrow 0$  >>  $\varepsilon \rightarrow \text{infinity}$



# Etruscan Liver, Cholera in London



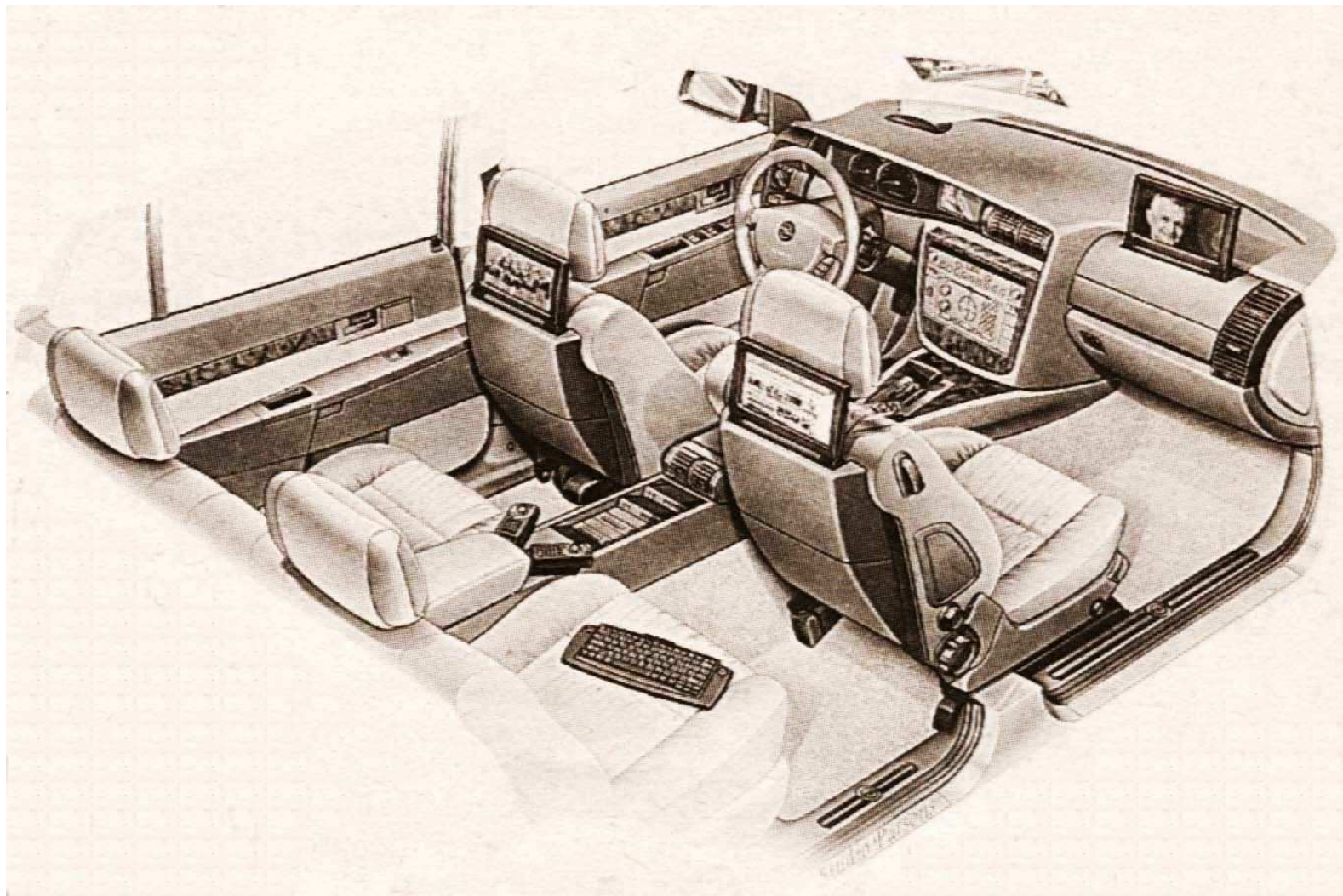
- **Sheep Liver & Names of Gods**

• <http://www.ou.edu/class/ahi4163/files/bronz12.html>



The idea of representing data visually has been around for much longer than computer based visualisation. The linking of the spread of cholera to water supply provides an early example of the use of visualisation in problem analysis. During the 1853-54 cholera outbreak in London, Dr. John Snow identified a large grouping in the Soho area. He went on to plot the homes of the 500 victims who died in the first 10 days of September 1854 on a map of the area. This simple representation of the data he had collected showed that the grouping of cholera sufferers in the area was centred round a particular water pump. Investigation of this water pump established that it had been contaminated by a leaking cesspool.

# Opel OMEGA





# Bratislava



# Chatam Sófer M. by J. Krizik

- WCH?





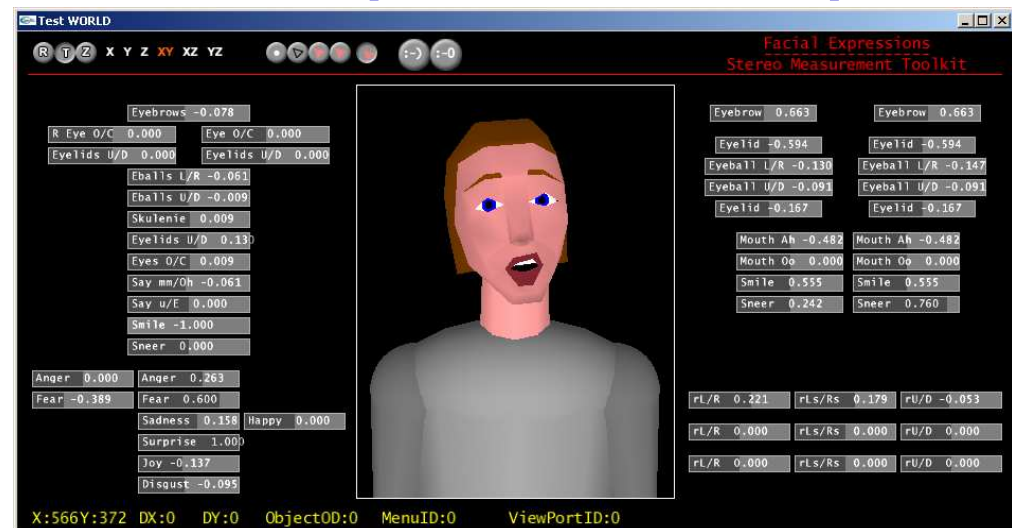
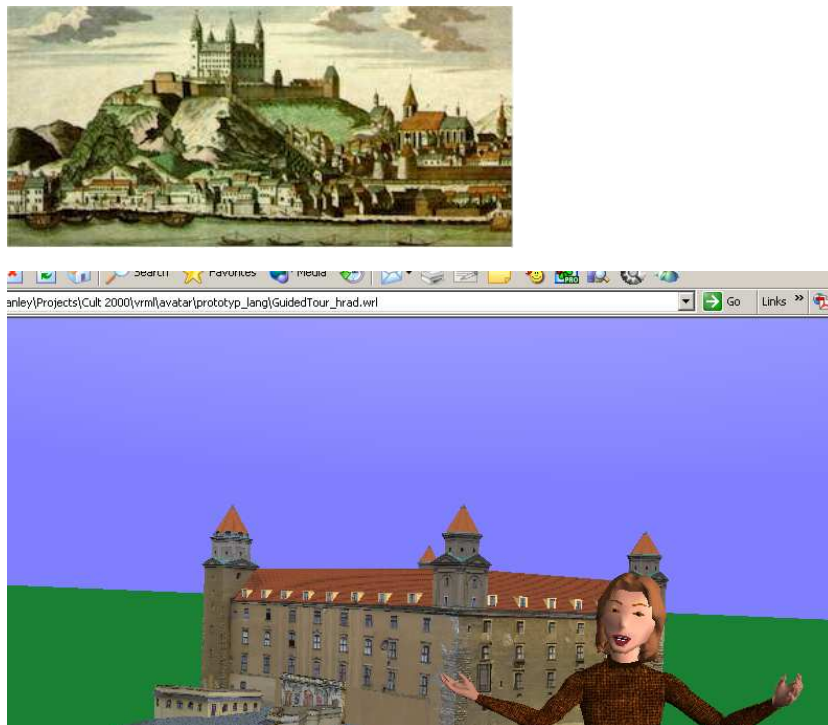
# Virtual Heart of Central Europe, Culture



- Awarded by EuroPrix Quality Seal  
[www.VHCE.info](http://www.VHCE.info)

- 330 kEUR, 150 kEUR from EC, ready to submit – Pirelli Award
- follow-up 2005-2006 (SK, SI, PL, CZ), submitted, 256 kEUR

# Navigation & Cooperation in VEs: Virtual Bratislava (2002-2004)



<http://www.sccg.sk/~projects/>

- 900 000 SKK, 506 000 SKK from Slovak government, APVT agency
- Follow-up 2005++
- Key researchers M. Zimanyi, S. Stanek & P. Kubini

# Metaphor

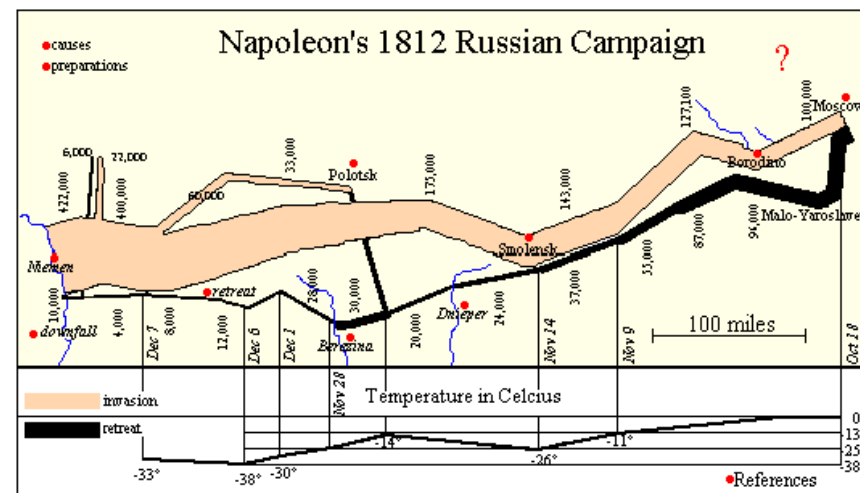
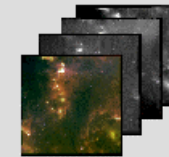
- **Confrontation of Meanings**
- **Pritaca, comparison...**
- **For example, desktop metaphor, GUI**
- **...Sweeping, D&C, Simulated Annealing...**
- **Recall Koestler & bisociation**
-

# March of the Napoleon Army

Computer-generated Visualization

## 1. Introduction to Visualization

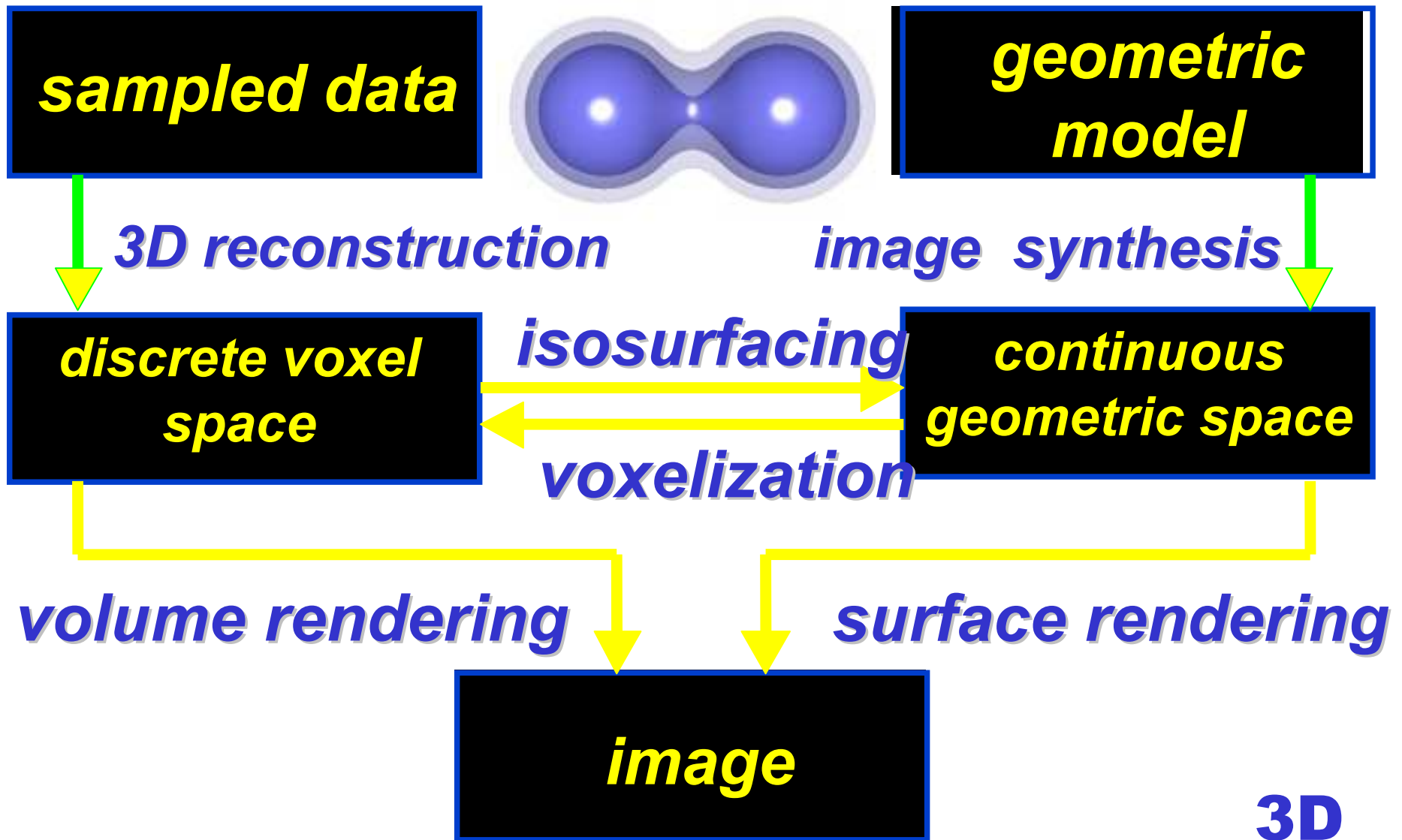
### Examples of Visualization



This graphic is an adaptation of M. Charles Joseph Minard's „March of the Napoleon Army" by Sunny McClendon, as part of an Information Design Class at the University of Texas at Austin.

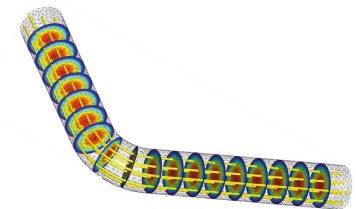
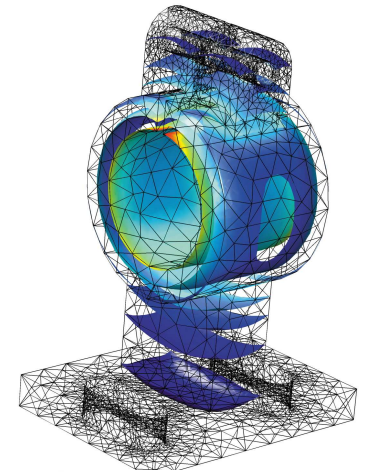
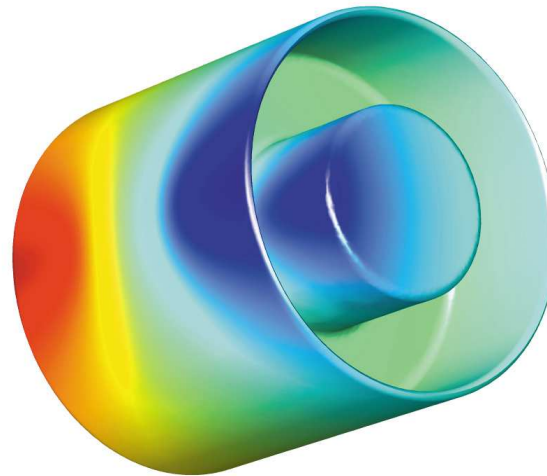
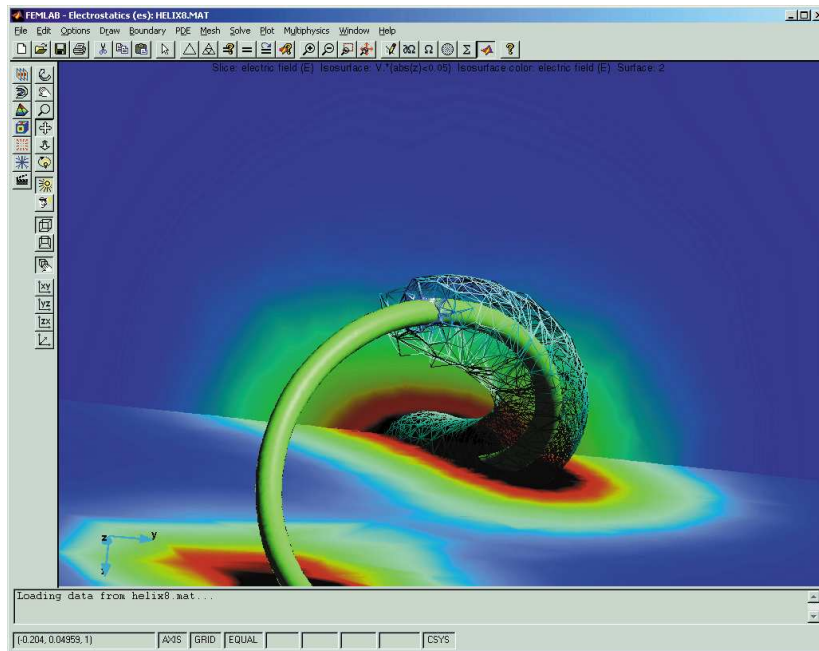
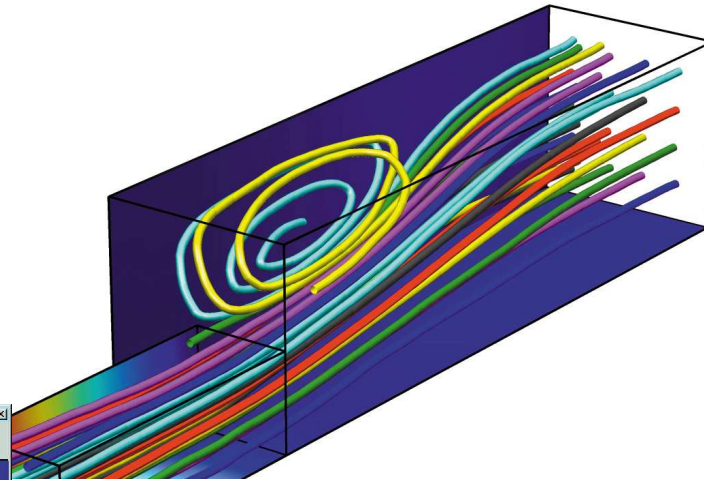
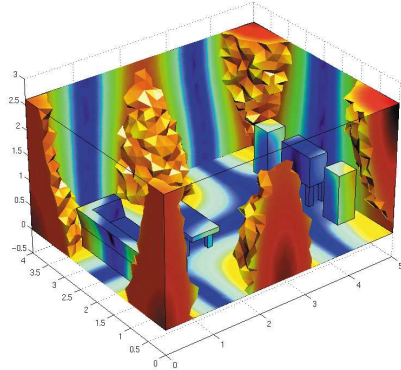
1D

# Volume .. Surface



# MatLab: [www.femlab.com](http://www.femlab.com)

moreD





# Viz-Course Contents

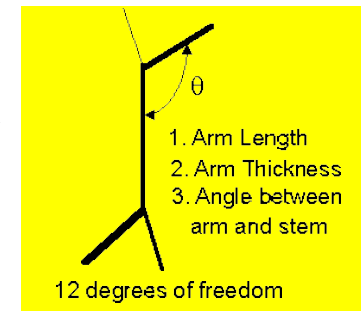
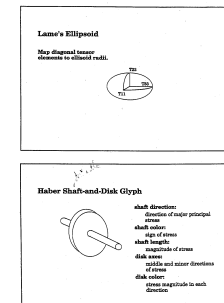
- **1. Introduction, motivation**  
reference model, scenarios, graphics and visualization difference
- **2. Data**  
data types, coordinate representations, data connectivity
- **3. Mathematical models and languages**
- **4. Representation**  
scalar, vector, tensor, multivariate, using color, glyphs
- **5. Visualization software**
- **6. Information Visualization**  
graph drawing, algorithm animation, ...
- **7. Recent Directions**  
data sonification, visualizing relativity, NPR in scientific visualization...

# Visualization of Data

- 1D, 2D, 3D: **Rendering**
- 4D: **Animation (Juran.)**
- nD - in general: **Open Problem**
- Glyphs, faces by statistician Herman Chernoff
  - <http://people.cs.uchicago.edu/~wiseman/chernoff/>
- other metaphors: terrain, garden, IFS...

# Glyphs

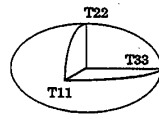
- **UNICODE glyphs: A, @, 7,  $\alpha$ ,  $\beta$ ,  $\gamma$ ,  $\delta$ ,  $\Sigma$ ,  $\theta$ ,  $\omega$ ... ?, \*, §, ...**  
**symbolic information**
- **Visualization glyphs**



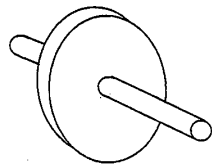
# Visualization Glyphs

## Lame's Ellipsoid

Map diagonal tensor elements to ellipsoid radii.



## Haber Shaft-and-Disk Glyph



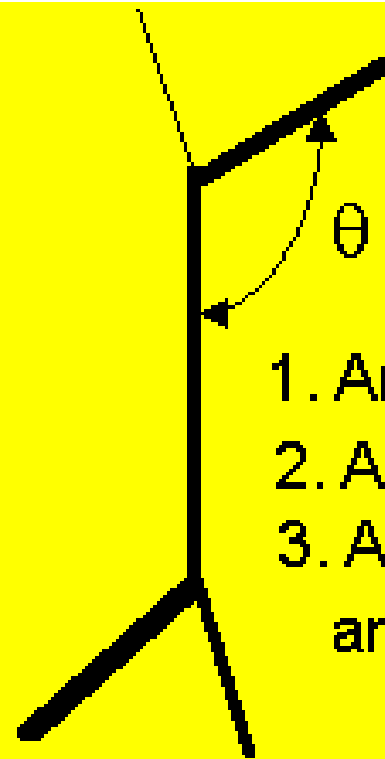
**shaft direction:**  
direction of major principal stress

**shaft color:**  
sign of stress

**shaft length:**  
magnitude of stress

**disk axes:**  
middle and minor directions of stress

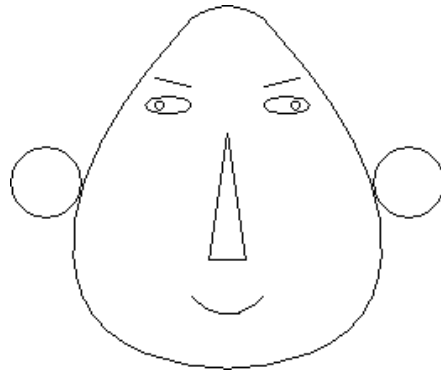
**disk color:**  
stress magnitude in each direction



1. Arm Length
2. Arm Thickness
3. Angle between arm and stem

12 degrees of freedom

# Chernoff Faces



20D

- [http://www.epcc.ed.ac.uk/epcc-tec/documents/SciVis-course/SciVis.book\\_47.html](http://www.epcc.ed.ac.uk/epcc-tec/documents/SciVis-course/SciVis.book_47.html)

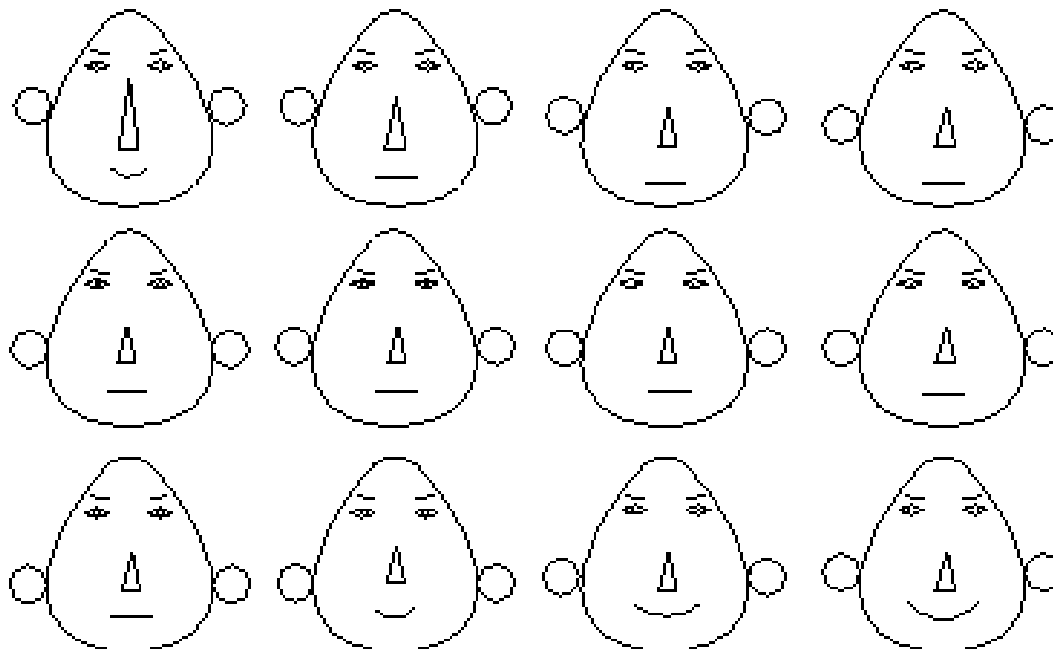


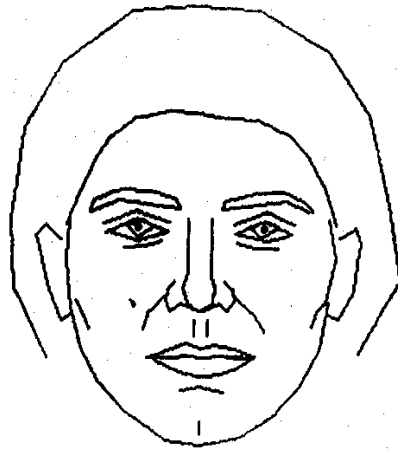
Table 1: Description of facial features of Chernoff face

Dimension	Facial Feature
1	Face width
2	Ear level
3	Half face height
4	Eccentricity of upper ellipse of face
5	Eccentricity of lower ellipse of face
6	Length of nose
7	Position of centre of mouth
8	Curvature of mouth
9	Length of mouth
10	Height of centre of eyes
11	Separation of eyes
12	Slant of eyes
13	Eccentricity of eyes
14	Half length of eye
15	Position of pupil
16	Height of eyebrow
17	Angle of brow
18	Length of brow
19	Radius of ear
20	Nose width

# Facial Representation of nD Data?

Fig.3:

A  
neutral  
nose  
face.



**362D**

- **Susan Brennan, 1985 and**

<http://www.sccg.sk/~ferko/VISFORUMABSTRACT.pdf>

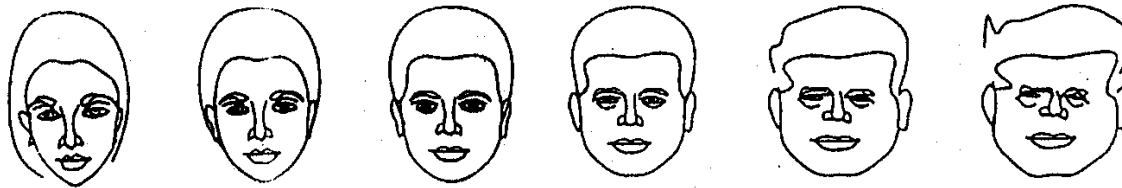


Fig.1: E. Taylor and Kennedy during changing their faces.

Fig. 4.1



Fig. 4.2



Fig. 4.3



Fig. 4.4



Fig. 4.1 - 4.4: An example of four step generation of the caricature. Figure 4.1 represents a data snapped from the real image of the former president R. Reagan.



# Reagan

- 
- .

Fig. 4.1



Fig. 4.2



Fig. 4.3

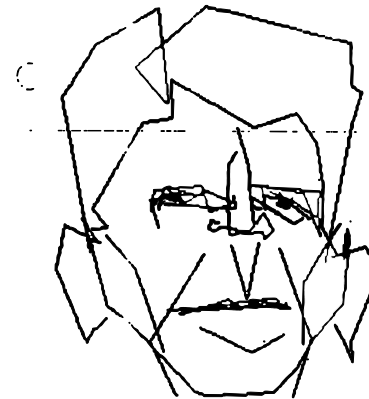


Fig. 4.4

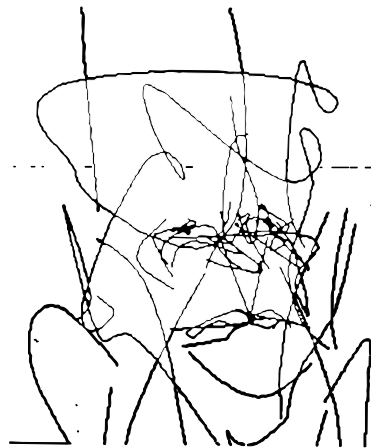
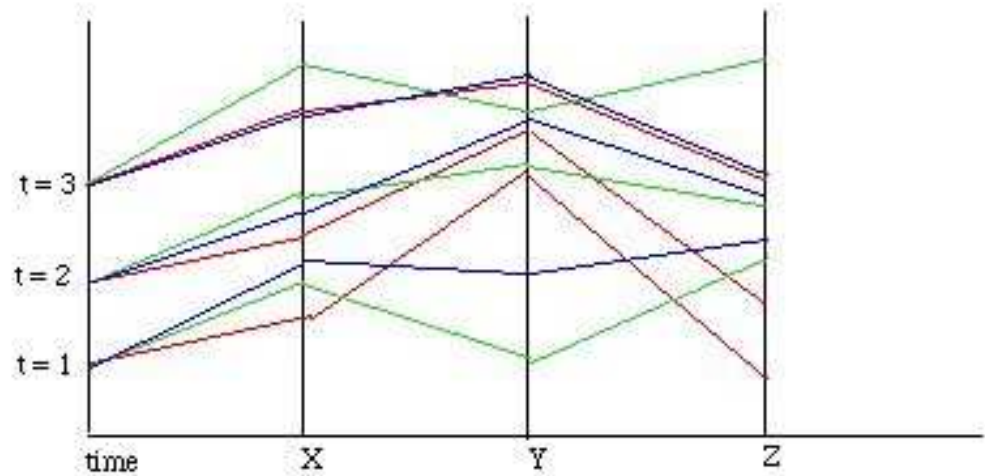


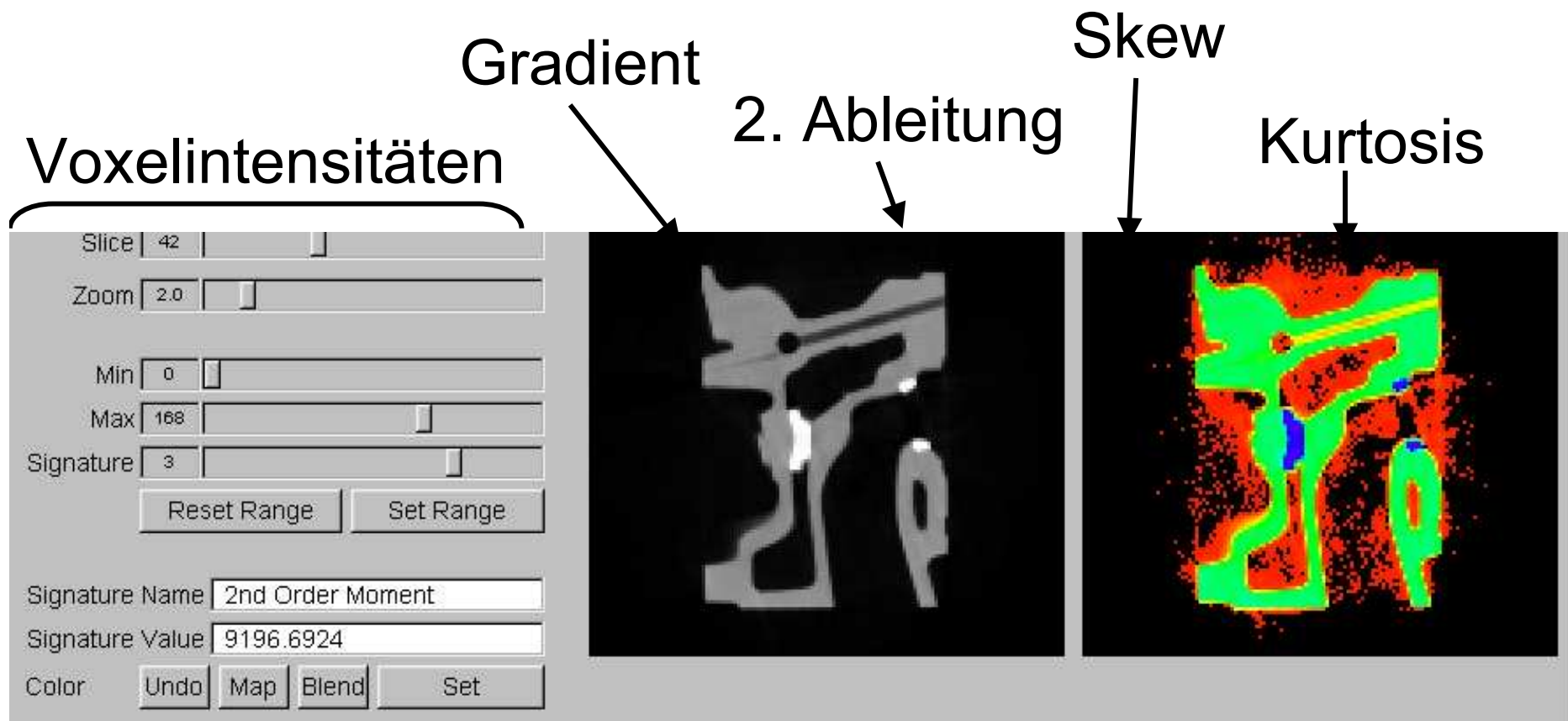
Fig. 4.1 - 4.4: An example of four step generation of the caricature. Figure 4.1 represents a data snapped from the real image of the former president R. Reagan.

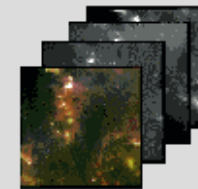
# Parallel Coordinates

- INSELBERG, A. DIMSDALE, B. 1990. "Parallel Coordinates: A Tool for Visualizing Multi-Dimensional Geometry," Proc. of the First IEEE Conference on Visualization. 361 (1990).
- <http://www.caip.rutgers.edu/~peskin/epriRpt/ParallelCoords.html>

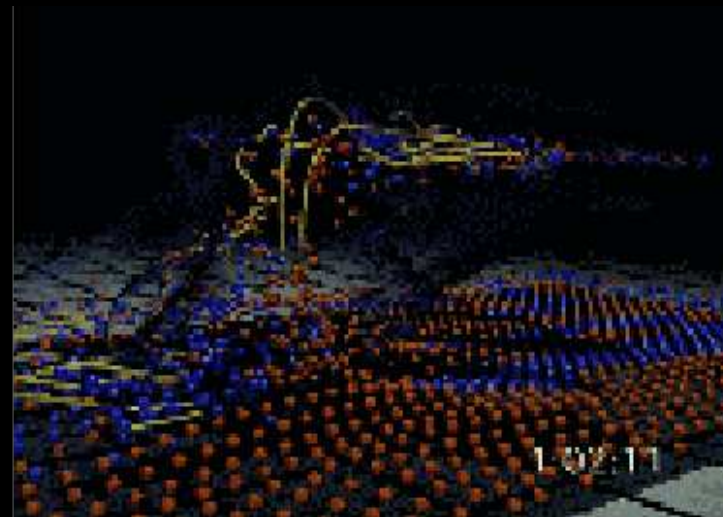
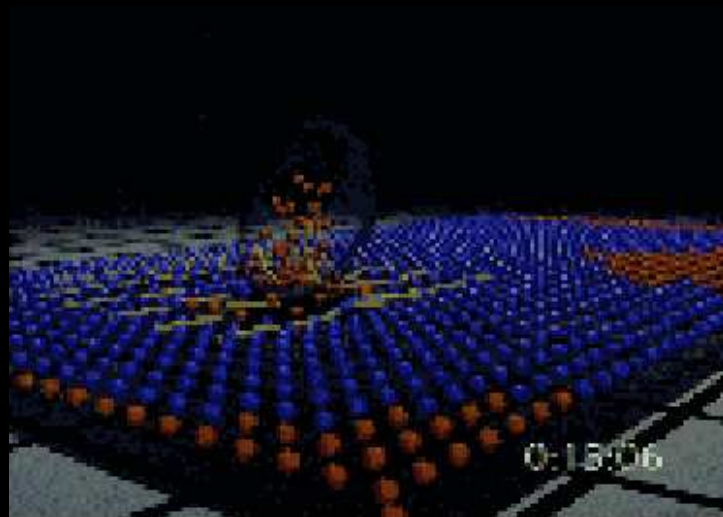


# Volumendarstellung (19), Dr. Bartz



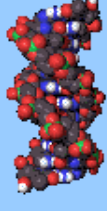


## Examples of Visualization



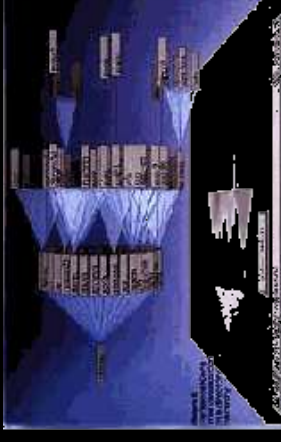
„Study of a Numerically Modeled Severe Storm“, Video by Williamson, Robert et al.  
(Department of Atmospheric Studies and NCSA).

## 2.4 Examples



Complex data sets and their visual counterparts, e.g.

- scientific visualization
- proteins
- software
- web pages

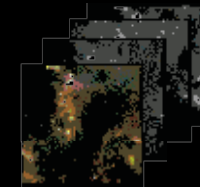


Perspective Wall and Cone Tree: from CACM April 1993, Information Visualizer by Robertson, Stuart and Mackinlay.

3 April, 2000

Page 19

- *Used even in movies: CSIs, Assa, Hackers 2, Amelie de Montmartre...*



## Examples of Visualization



Bauch, Kaiser, Steinkamp. Visualization of Internet Access at the University of Paderborn. Project Work.

25 Mai, 2000

Page 16



[illegible]

Figure 1

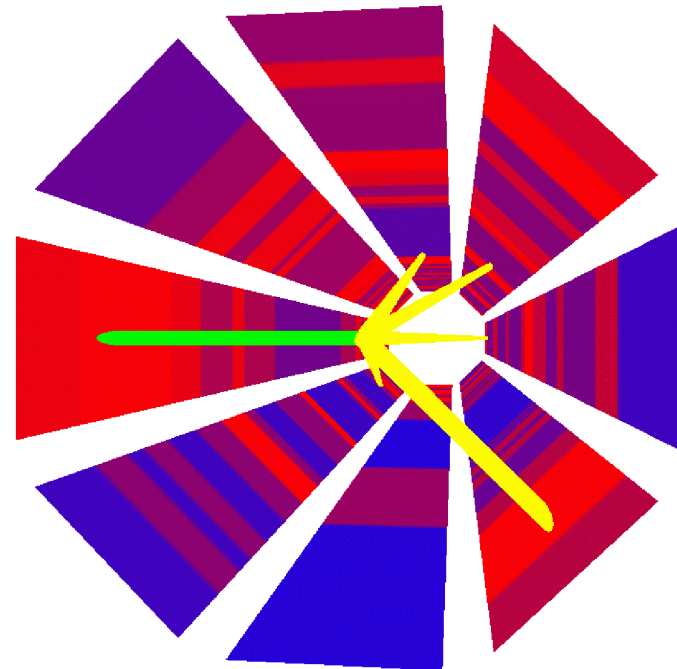
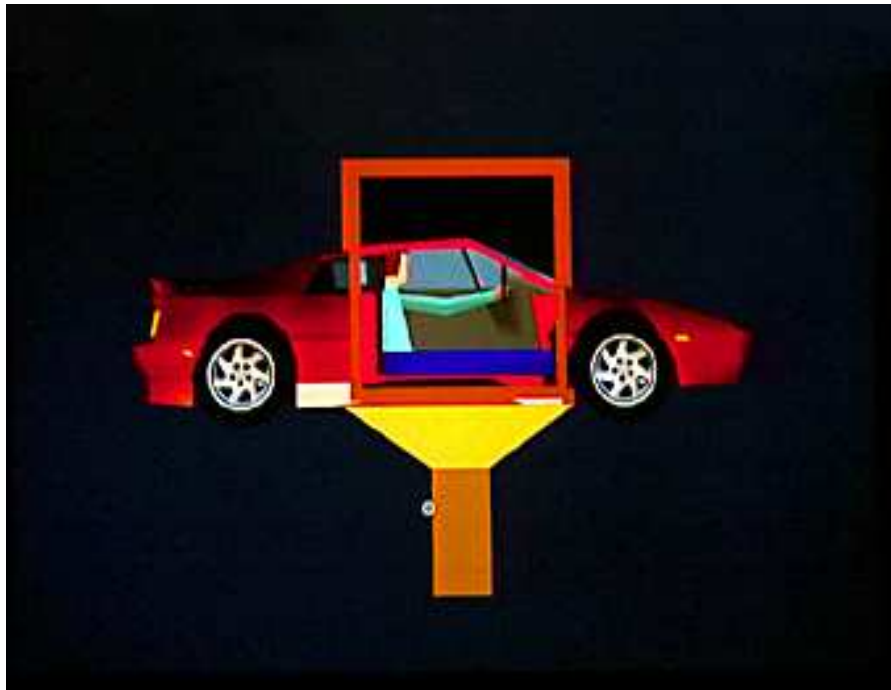
Figure 2

From: S.G. Eick and J.L. Steffen,  
Proc. Vis'92, IEEE Comp. Soc. Press

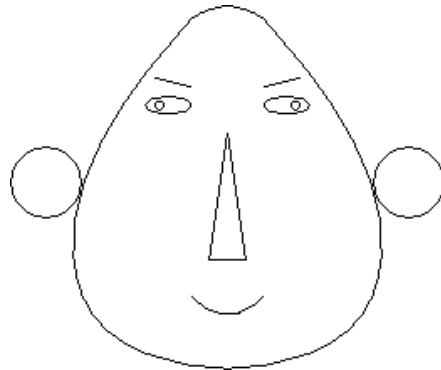
Page 15

# Visualization Magic...

- Magic Mirror by Jerome Grosjean et al.
- Magic Tunnel by Bernhard Reitinger et al.



# Chernoff Faces



20D

- [http://www.epcc.ed.ac.uk/epcc-tec/documents/SciVis-course/SciVis.book\\_47.html](http://www.epcc.ed.ac.uk/epcc-tec/documents/SciVis-course/SciVis.book_47.html)

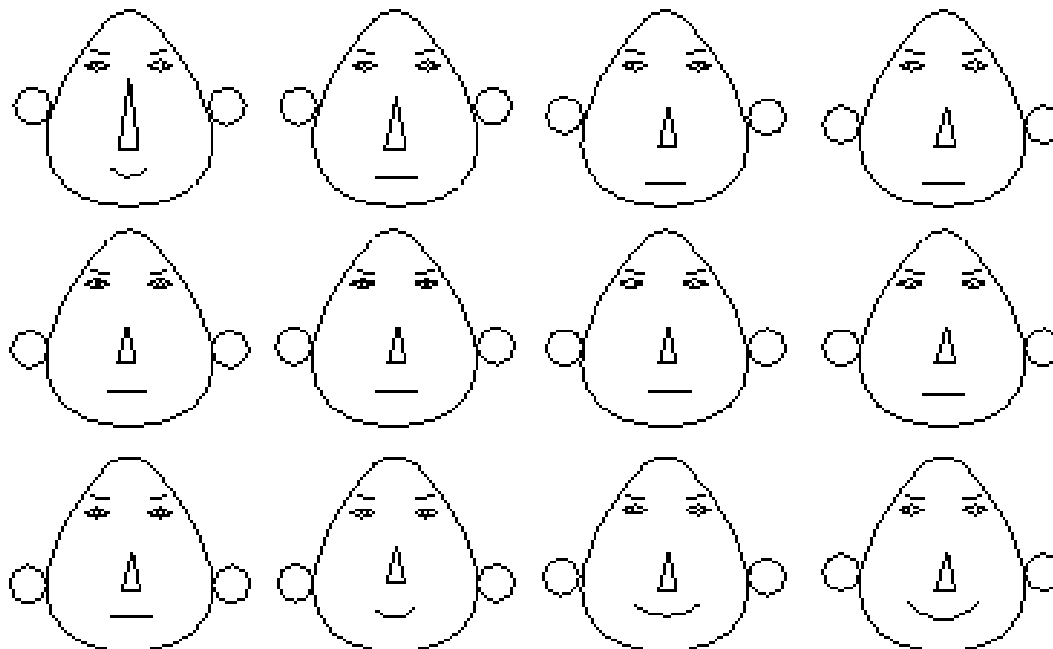


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11	Separation of eyes
12	Slant of eyes
13	Eccentricity of eyes
14	Half length of eye
15	Position of pupil
16	Height of eyebrow
17	Angle of brow
18	Length of brow
19	Radius of ear
20	Nose width

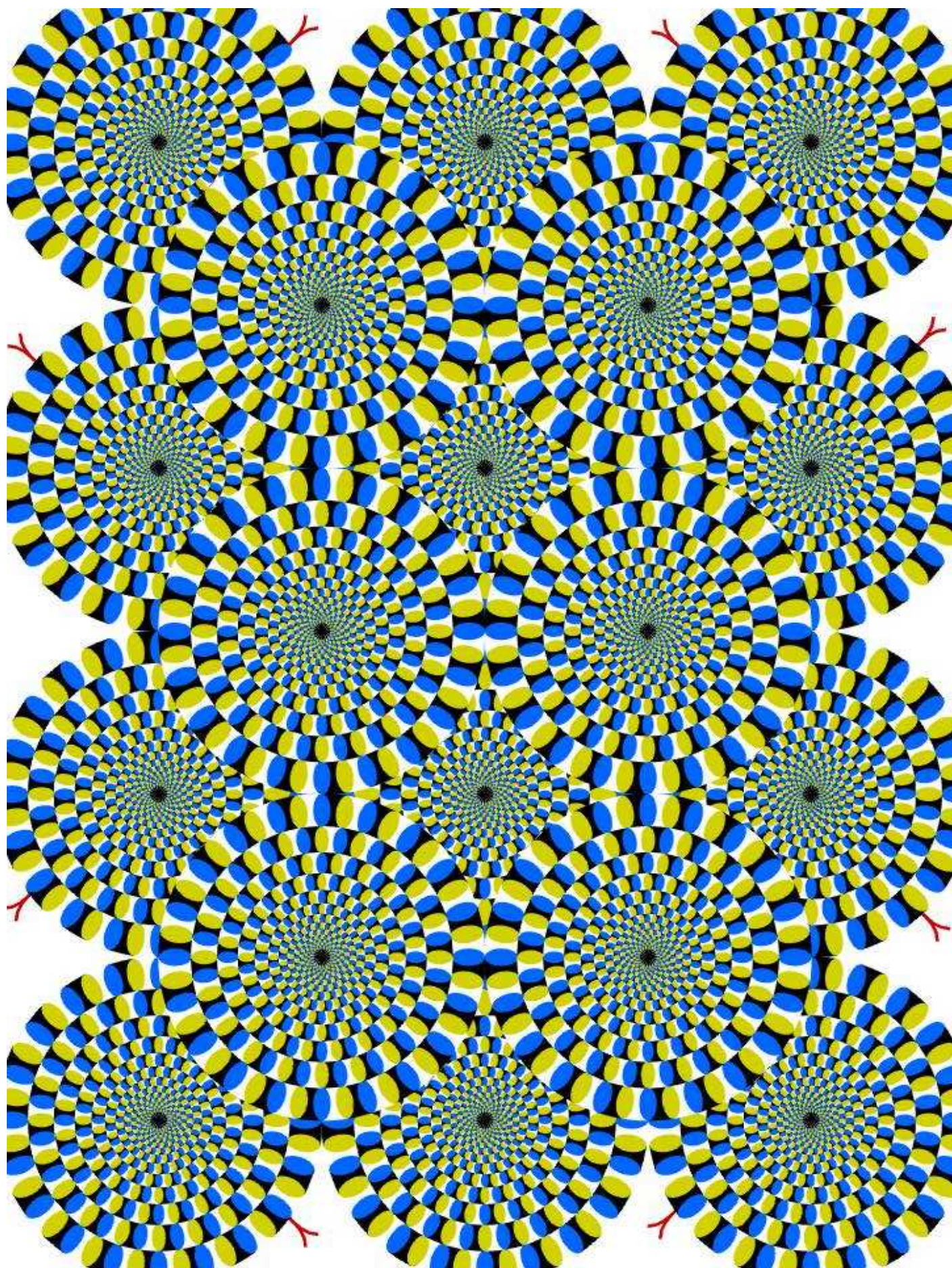


# NPR Visualization



- <http://mrl.nyu.edu/projects/image-analogies/artistic.html> (SIGGRAPH 2001)









• Final Fantasy



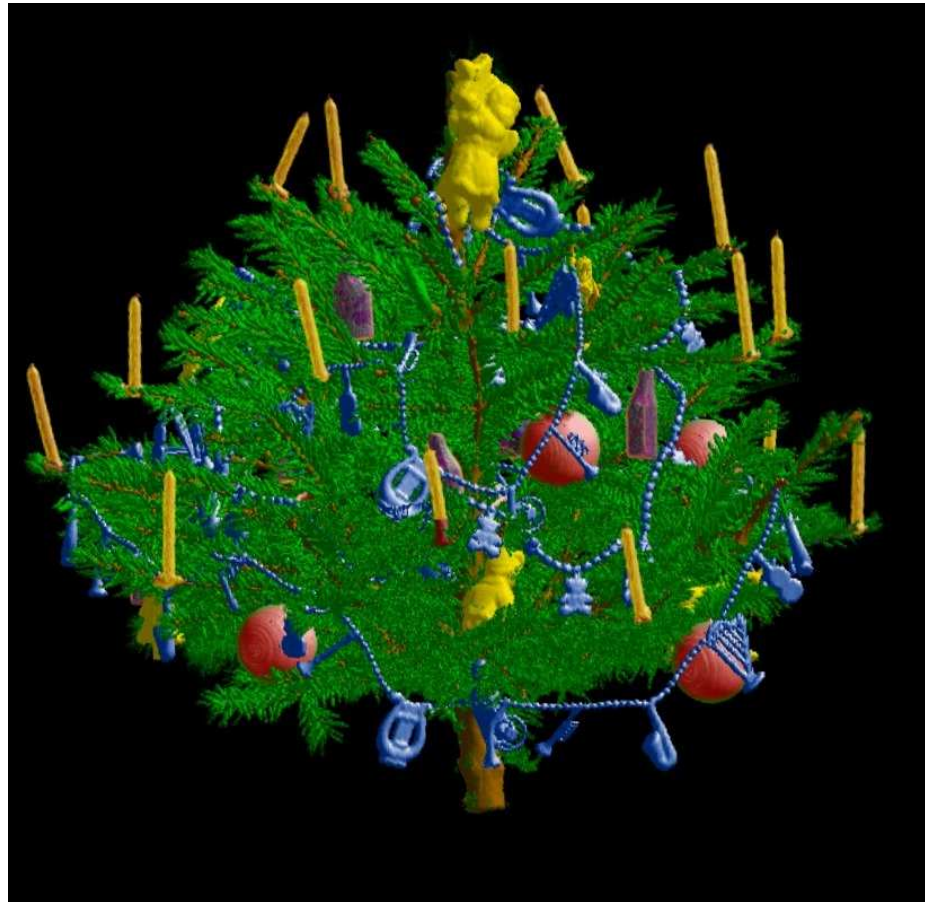


# IMAGINATION/VR



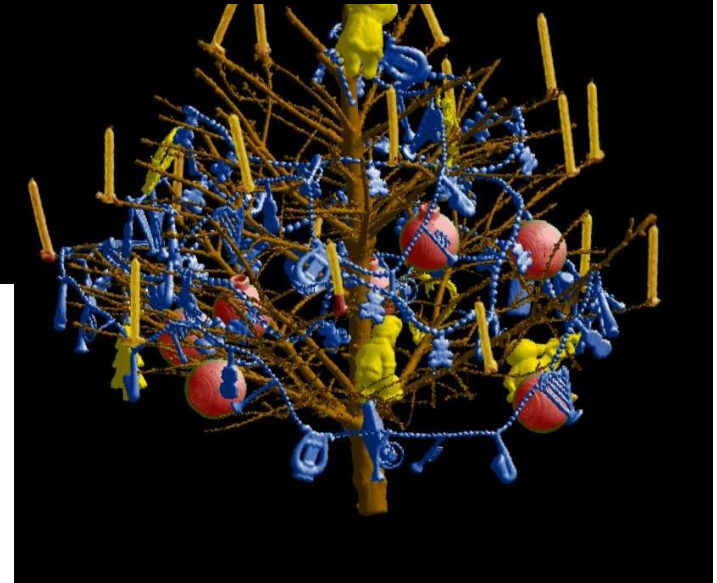
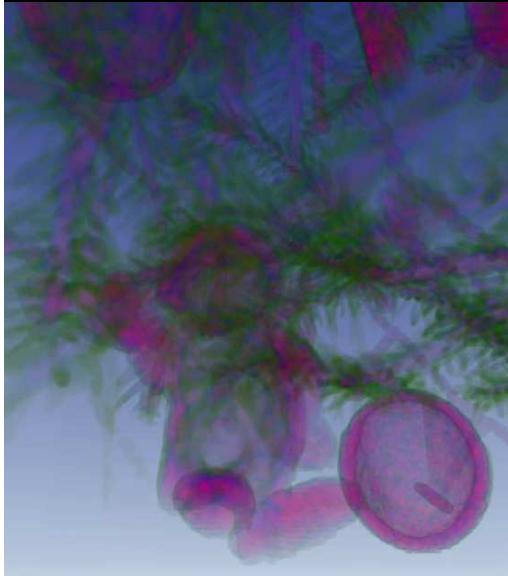
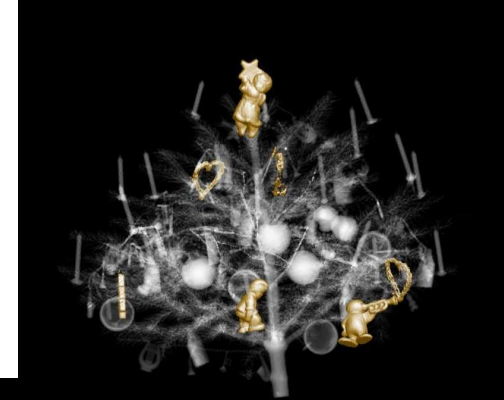
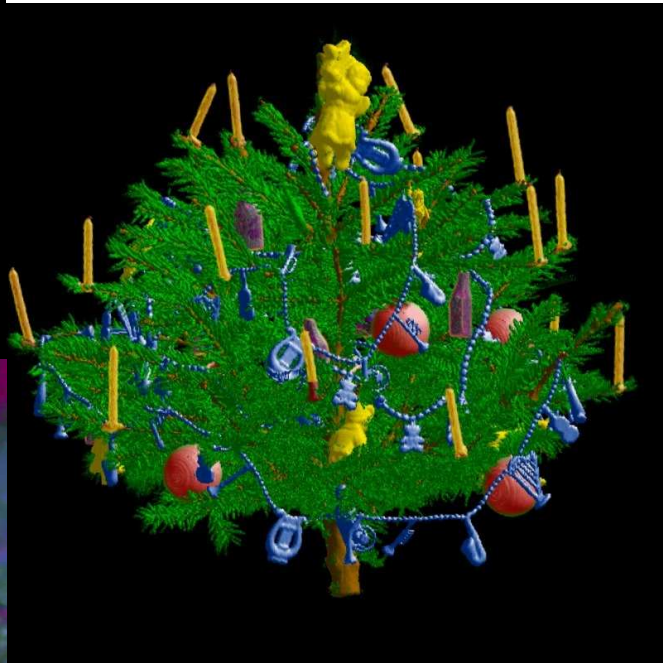
# Xmas Tree in Heaven

- Christmas Tree Awarded Case Study, TU Vienna

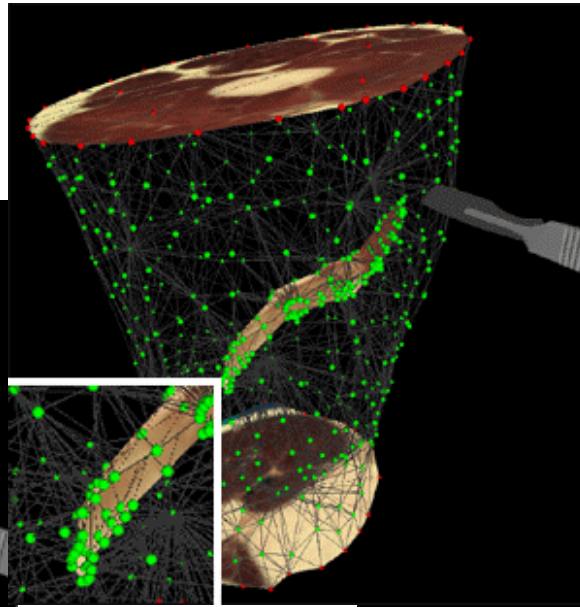
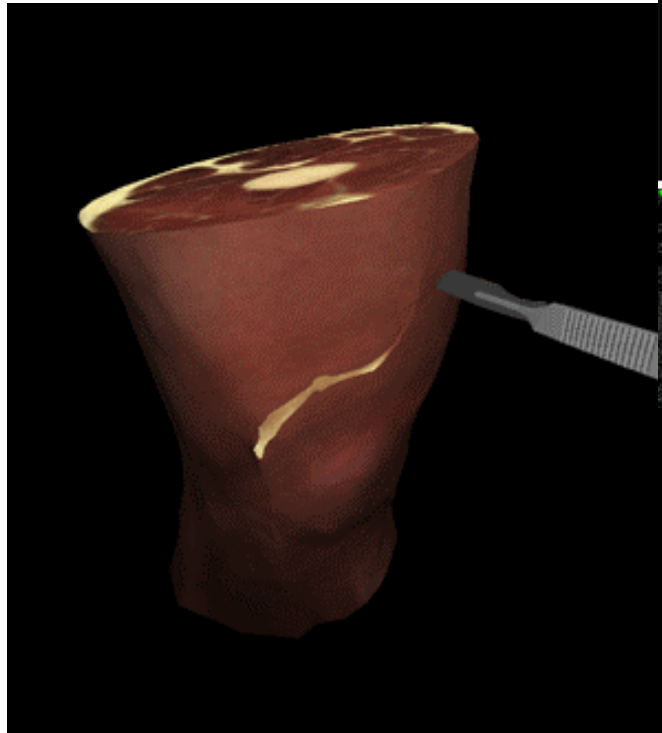




# Xmas Tree in Heaven



<http://graphics.ethz.ch/~bielser/artist>



# Compare Reality - Synthesis

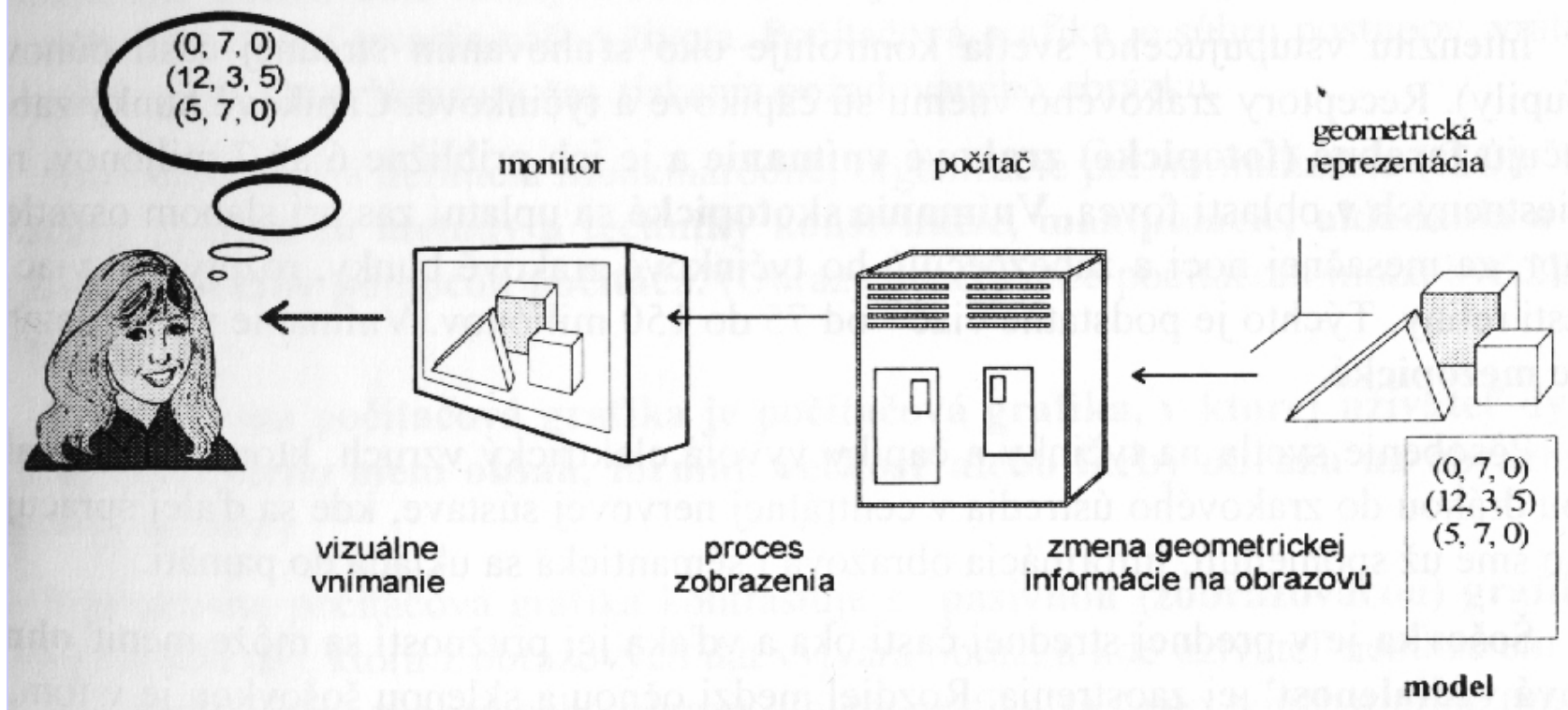
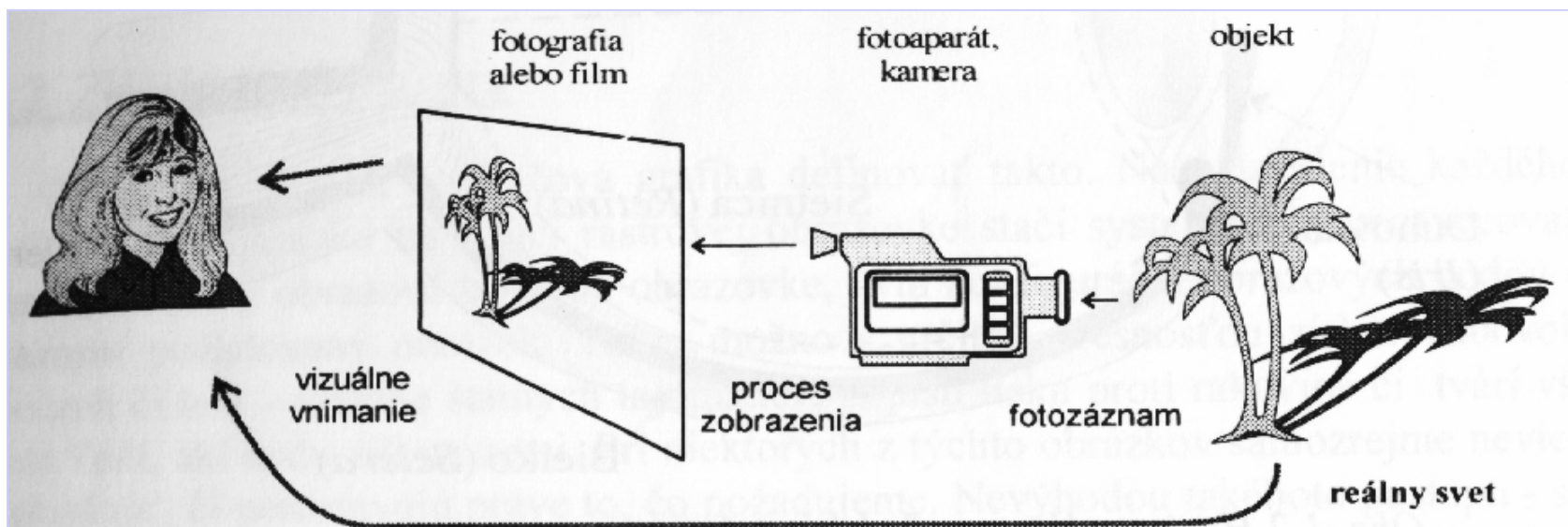


Photograph



Rendering using the discrete method





# CG Functional Unit

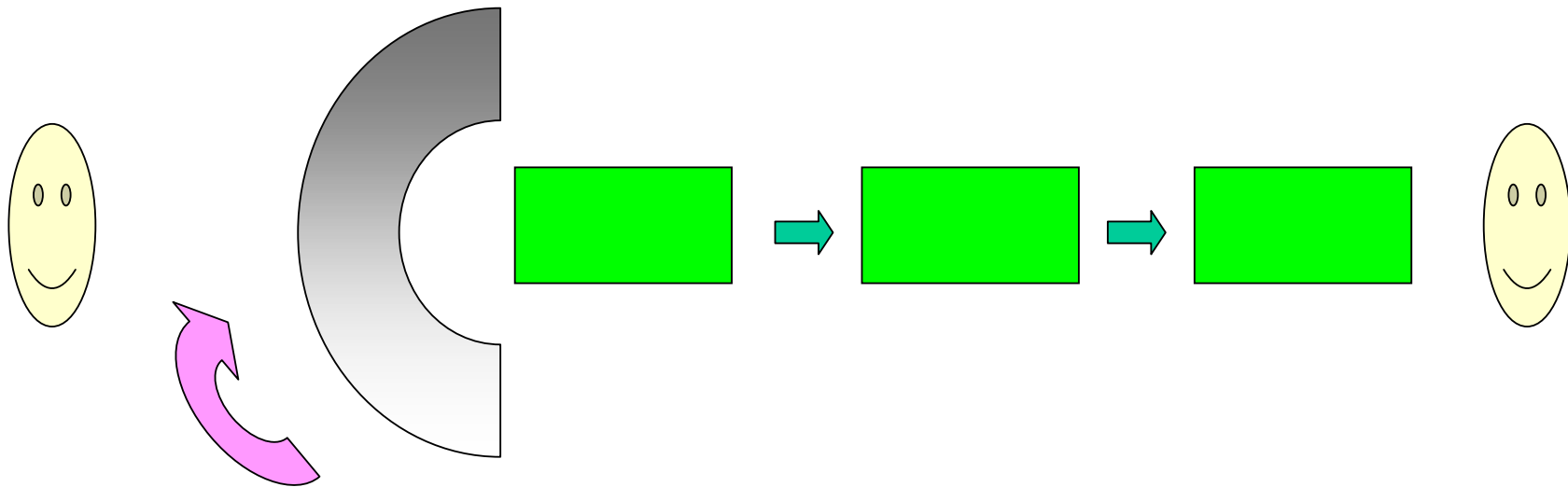
- **known model**
- **wireframe or surface representation:** geometric transformations, visibility calculations, interpolations and raster manipulations
- **photorealistic quality:** the lighting and rendering equations solved to simulate the illumination, shading, shadows, natural and synthetic textures and colors
- **viewing:** parallel or perspective projections) create the image space
- **animation:** kinematic & dynamic data compute/capture, hierarchy of motions, interpolations in the scene and in the resulting sequence of frames (fps)

# Photography ~ computer graphics

- **ISO: Computer graphics:** methods & techniques for construction, manipulation, storage and displaying pictures using computer.
- [Dobkin97]: Computer graphics is a radiometrically weighted counterpart of computational geometry
- 8D (x, y, z, t) (r, g, b, transparency)
- Schnellkurs

# Serious Unambiguous Messages

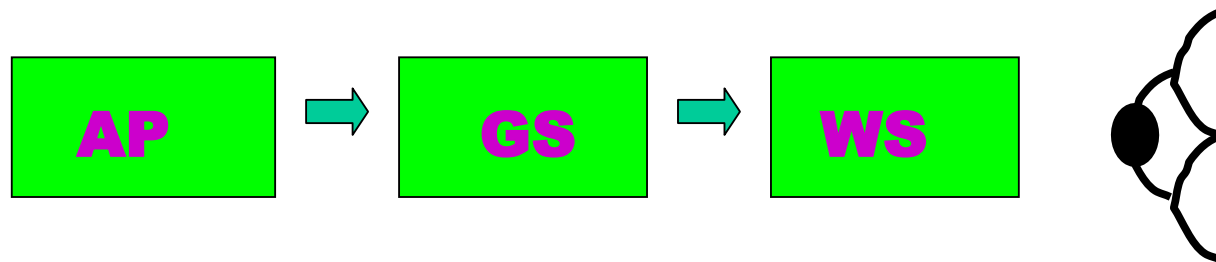
- White box... Black Box: known to unknown
- Problem, model, algorithm, software, results...



- Knowledge++ (electric circuits... CFD... Big Bang/humor theory)
- Labyrinth and Mouse (standard brainstorming creatology)

# On Model of a Human Being

- Problem – Application Program - Solution



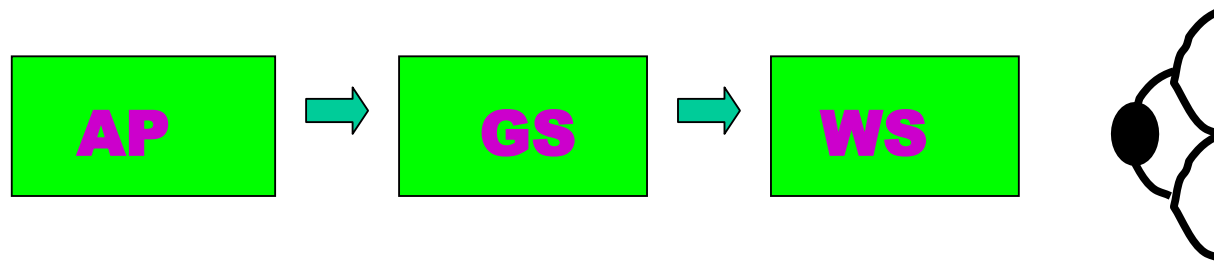
**GUI**

**HVS**



# On Model of a Human Being

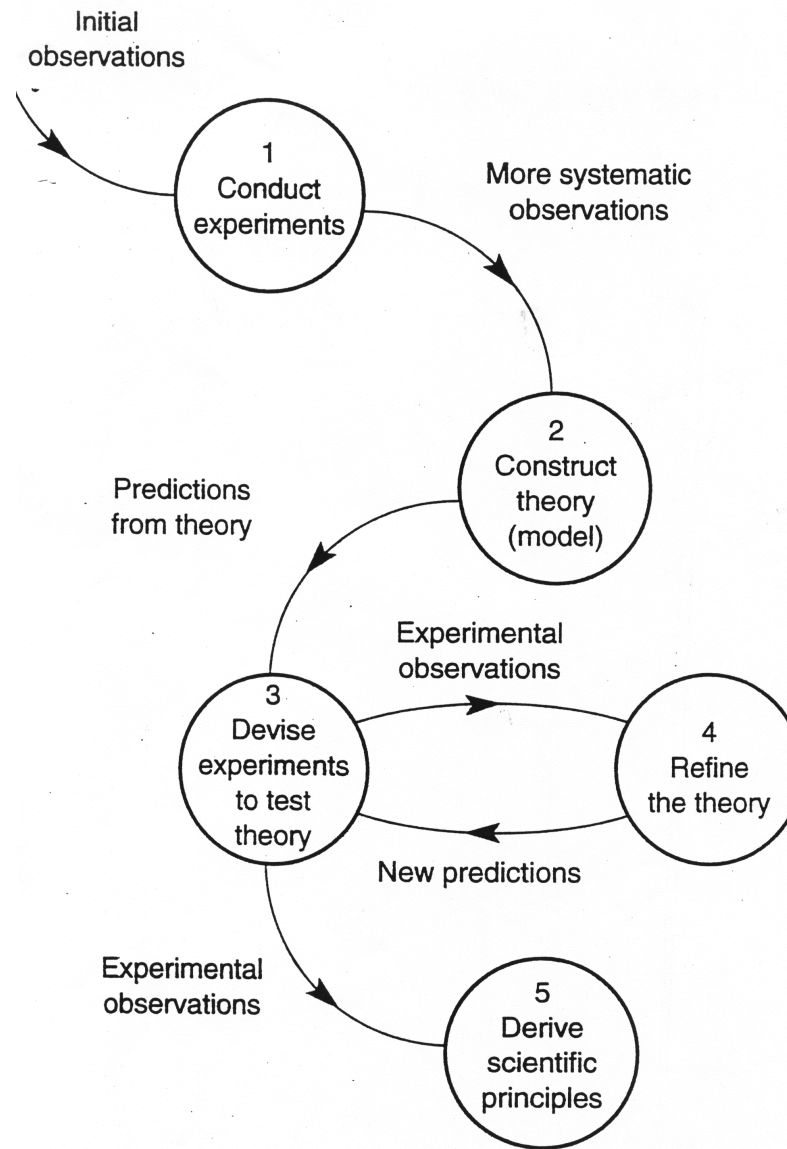
- Application Programmer - GS Author - User



- Triple Schizophrenia in
- Computer Graphics Reference Model (ISO)

# Science

- Discovery



**Figure 1.1** The nature of scientific analysis.

# Design

- Invention

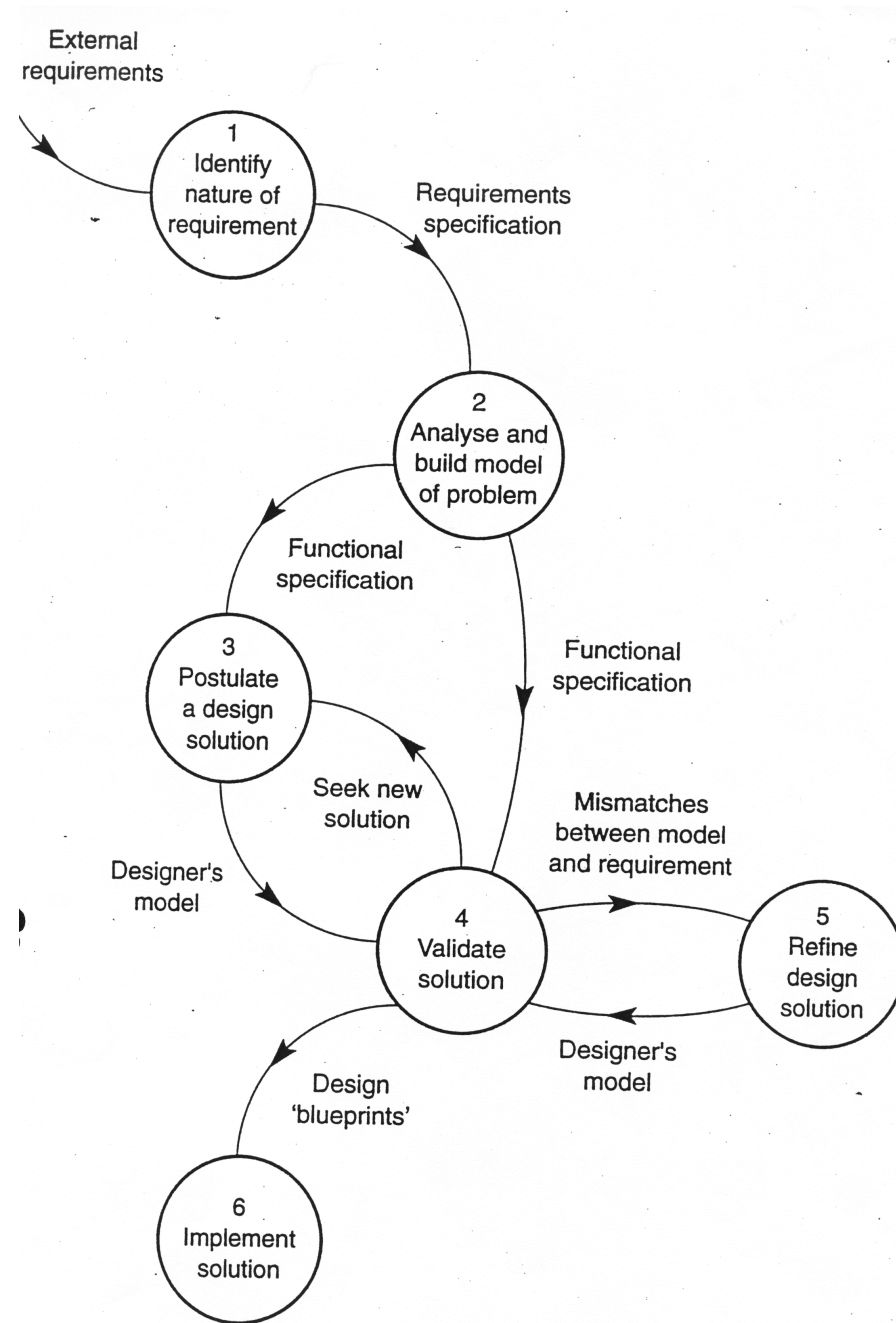


Figure 1.2 A model of the design process.

# SIGGRAPH Slide Show



## 1991 SIGGRAPH Educators' Slide Set

Editor  
Steve Cunningham  
California State University Stanislaus



S I G G R A P H • 9 1

## ShutterBug Credits

Produced by Tom Williams and H. B. Siegel, with the assistance of  
M. W. Mantle

All images rendered with PhotoRealistic RenderMan 3.2

Copyright Pixar, 1990

Produced for Computer Graphics, Principles and Practice, Second  
Edition, by Foley, van Dam, Fierer, and Hughes

Copyright Addison-Wesley, 1990

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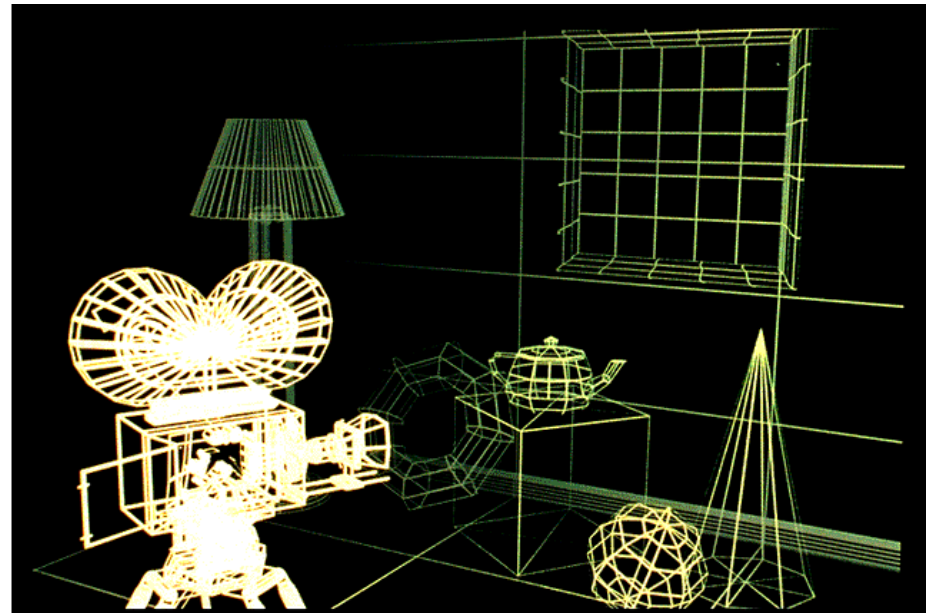
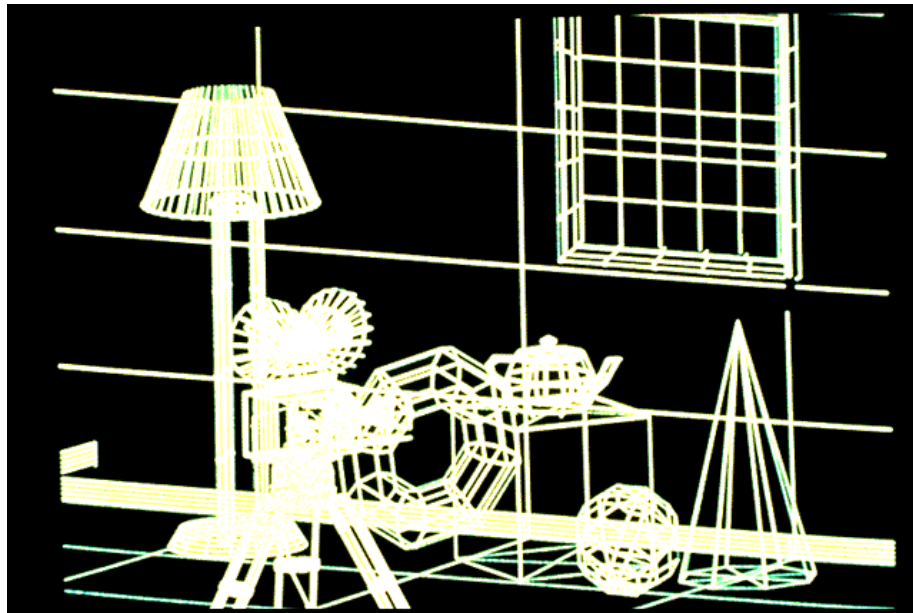
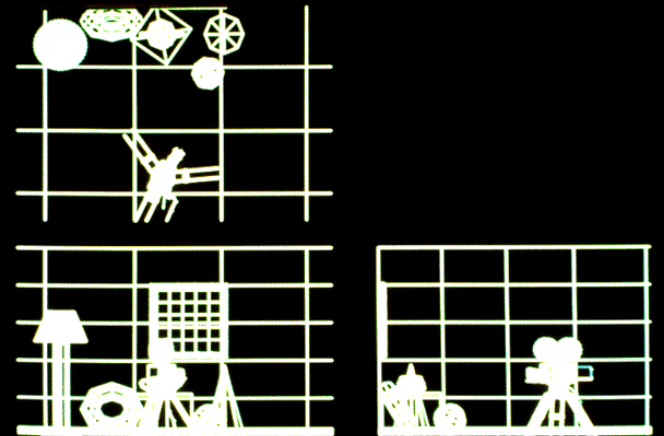
## The Shutterbug Rendering Progression

This sequence illustrates the progressive refinement of rendering  
algorithms.

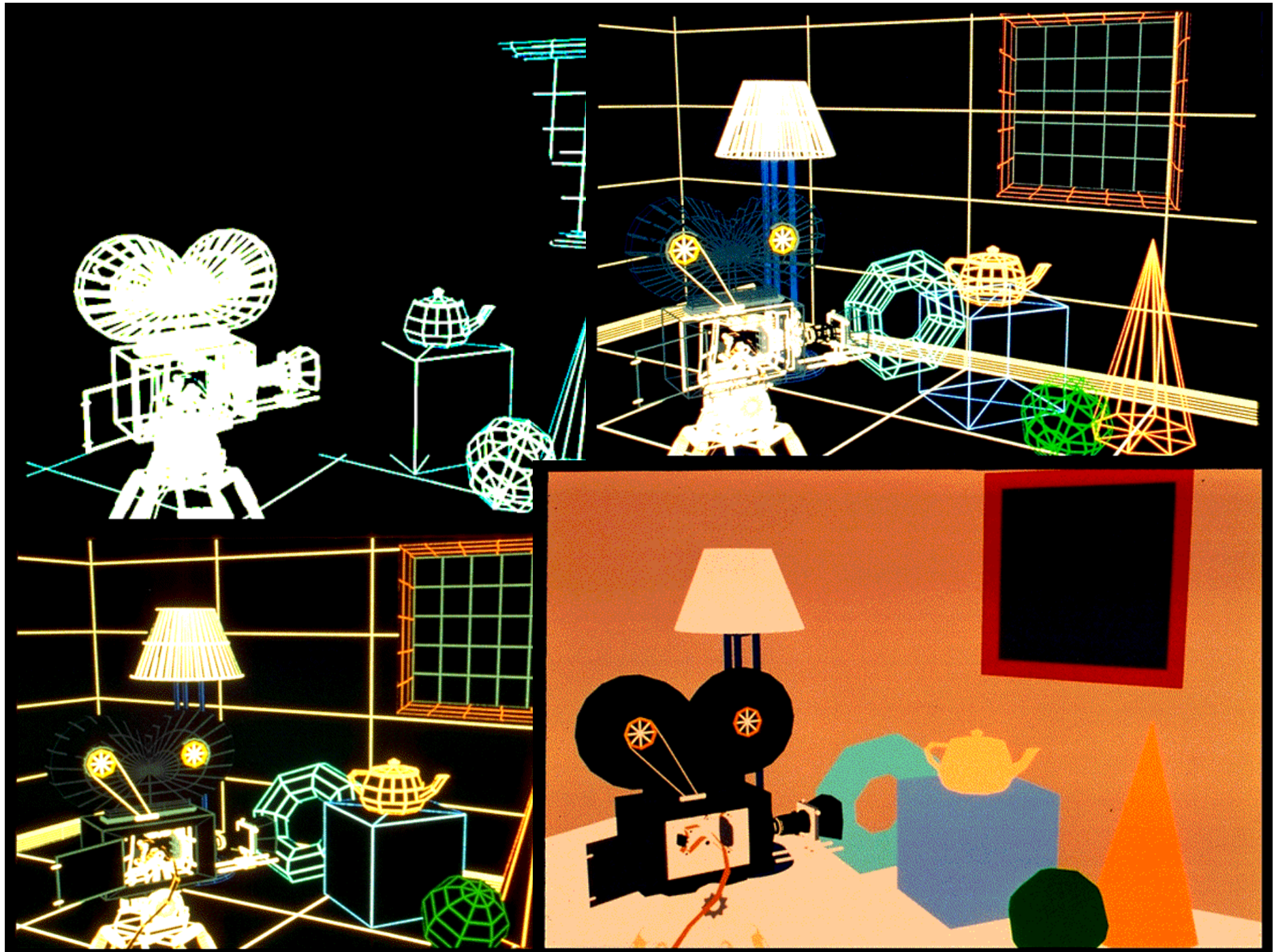
The images range from wire frames to photo-realistic renditions  
including reflections and shadows.

The rendering algorithm affects the quality and information conveyed  
by the image, independent of the underlying three-dimensional model.

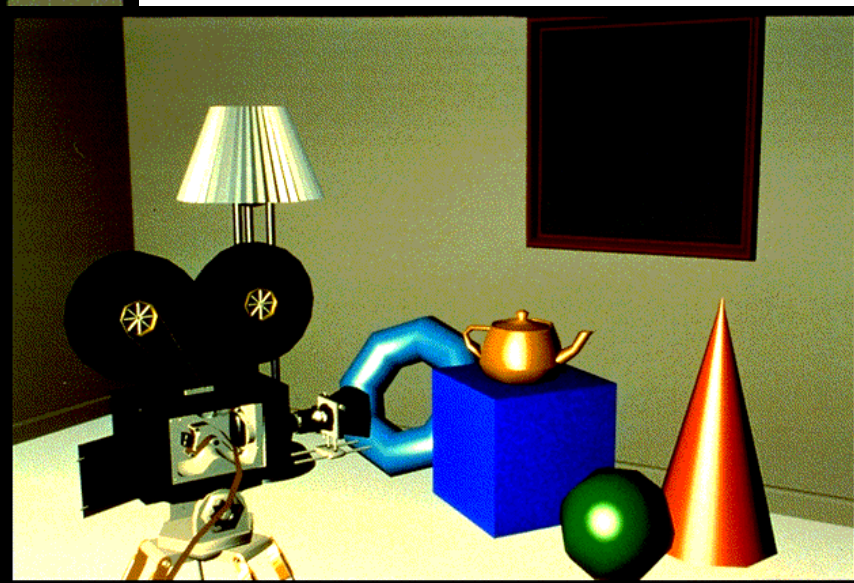
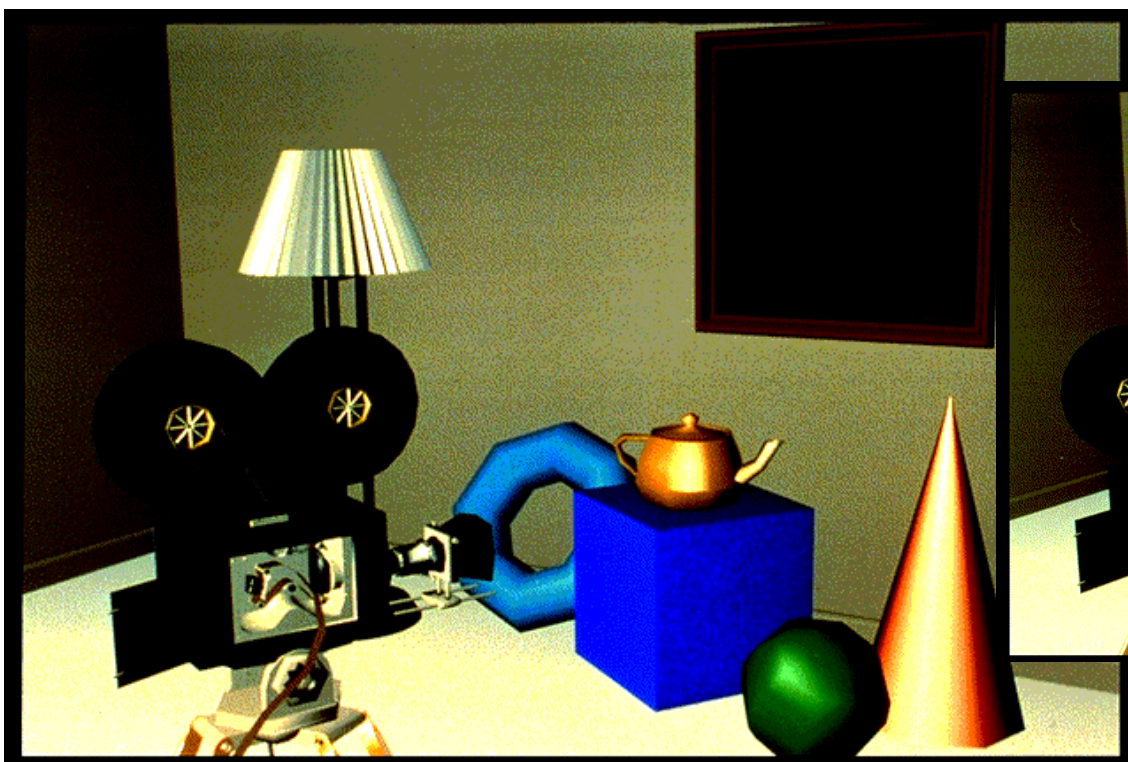
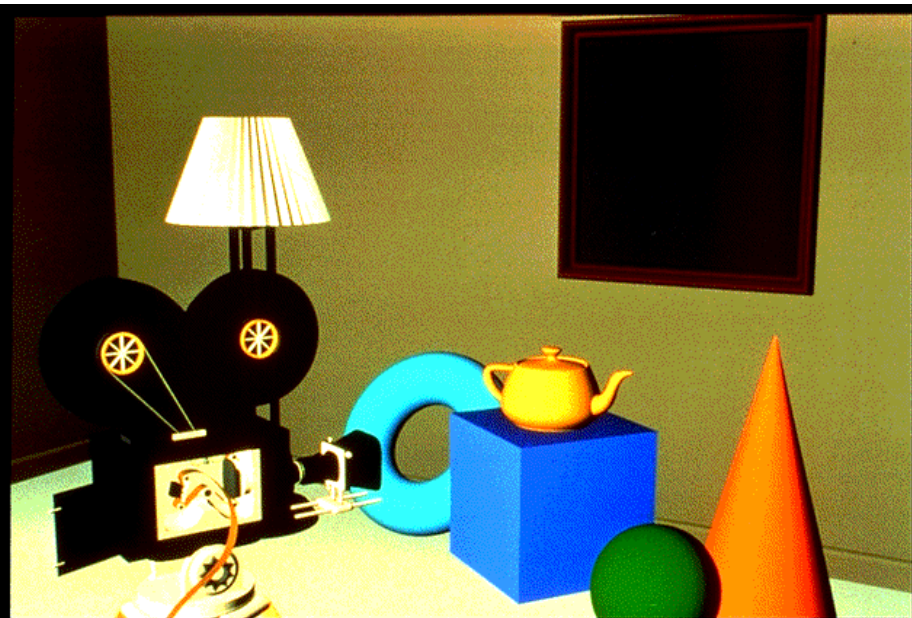
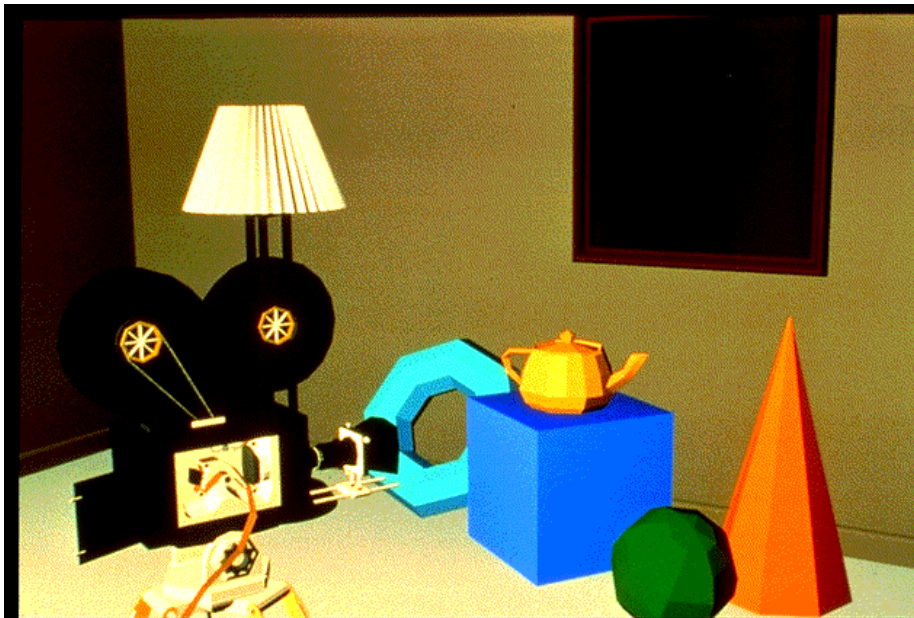
★ S I G G R A P H • 9 1



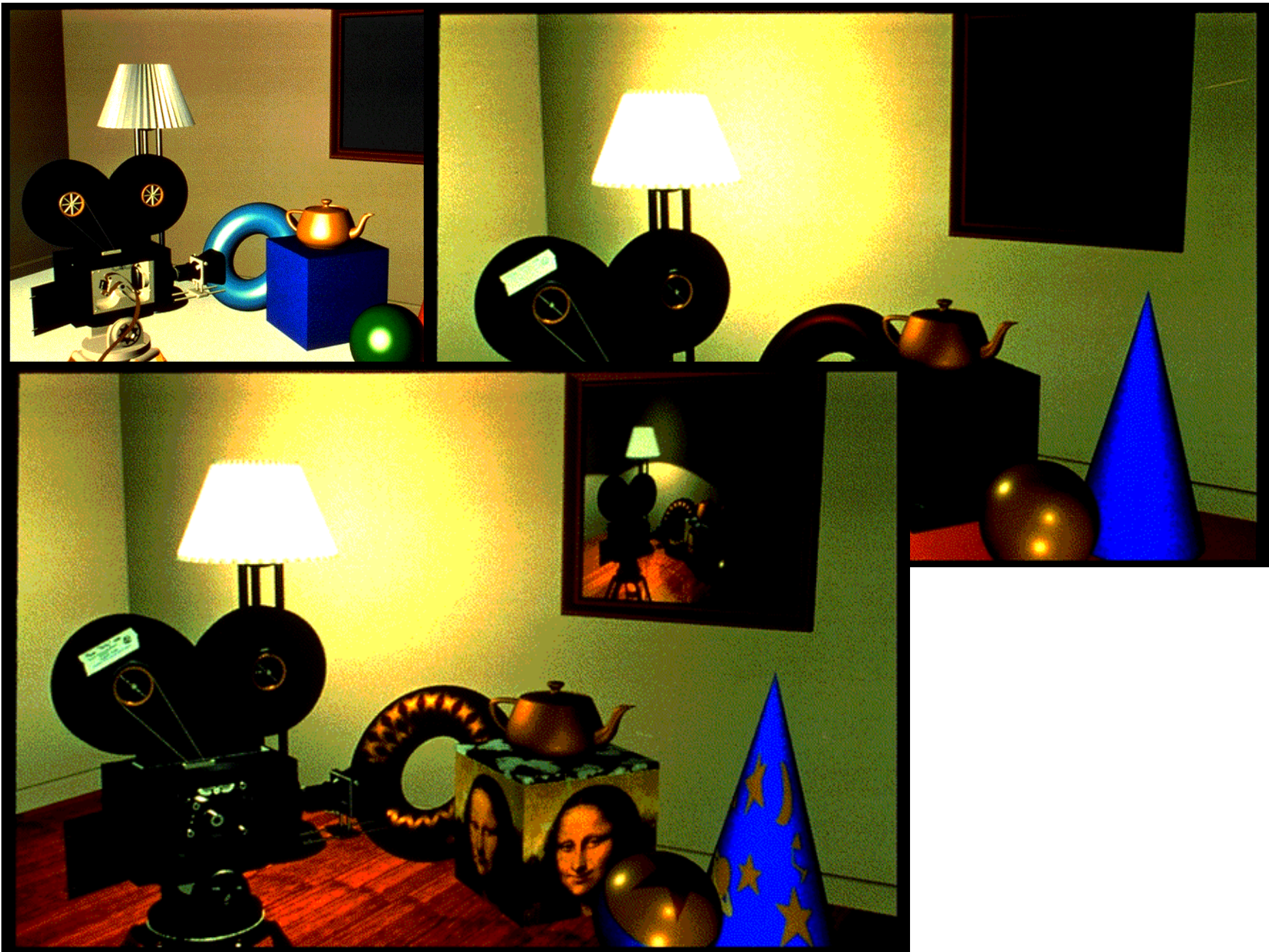




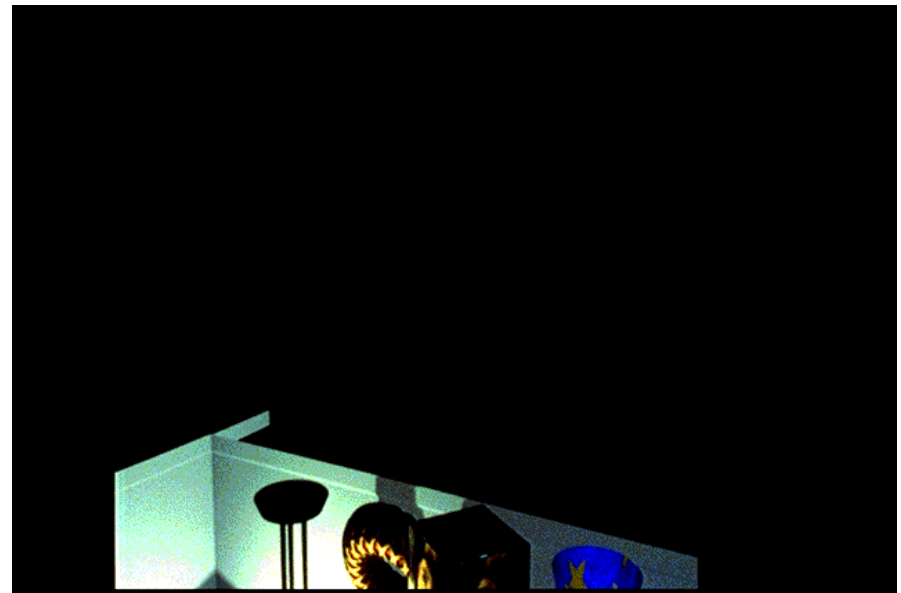
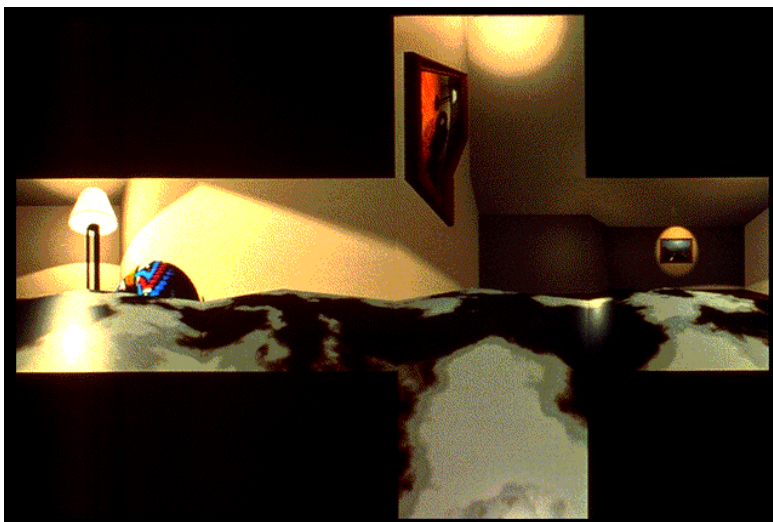
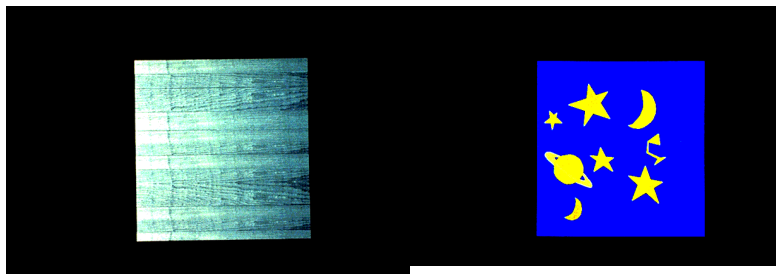












# Conclusions... partial

- **Humor is undefined at all**
- **We have just the general theory from Bakhtin and a formal model... and a lot of practical joy**
- **How to encode ambiguities - our proposed solution based on the bisociation idea by A. Koestler**
- **Significant part of web communication**
- **Bakhtinian understanding: laughter culture**

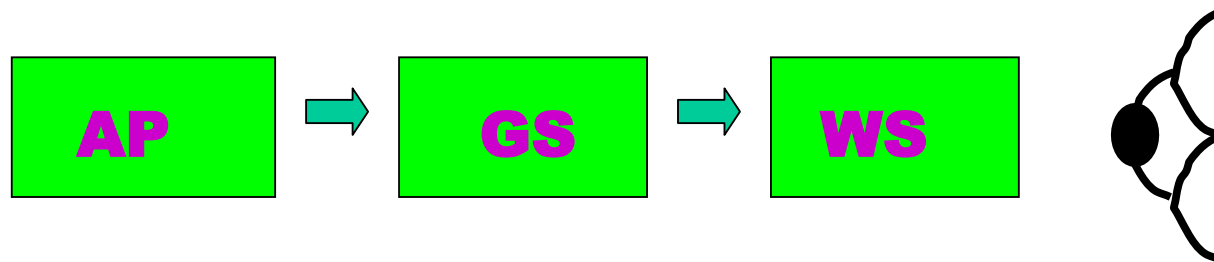


## Conclusions... partial

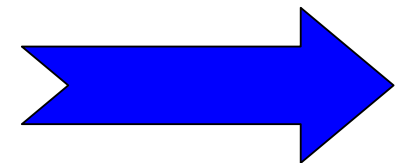
- **AH, AHA, HAHA**
- **Laughter culture in the sense of Bakhtin lives in cyberspace and we shall overcome with folklore in the neverending fight with nonhumanity and stupidity**
- **Visualization metaphors**
- **Computer graphics reference model**

# On Model of a Human Being

- Controlled Error: Model, Algorithm... Solution



- Computer Graphics >> Visualization  
 $\varepsilon \rightarrow 0$  >>  $\varepsilon \rightarrow \text{infinity}$



# Conclusions...

- Your web page, [www.sccg.sk/~ferko](http://www.sccg.sk/~ferko)
- [pg.netgraphics.sk](http://pg.netgraphics.sk), cvicenia ~ hands-on
- [www.sccg.sk/~samuelcik/darilkova](http://www.sccg.sk/~samuelcik/darilkova)
- Computer graphics reference model
- Visual information processing  
motivation and methodology
- Thank You for Your attention



# **Smiechová kultúra IT a Úvod do počítačovej grafiky**

**Andrej FERKO**

**Comenius University Bratislava**

**14. februára 2006, FMFI UK**