

# Teaching Art with 3D Software

Michele Matossian

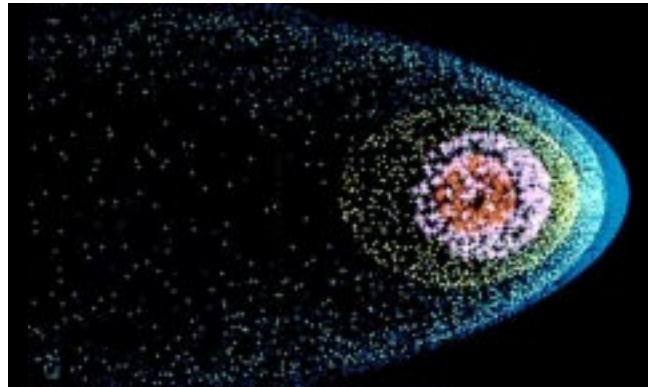
Author, 3ds max 6: Visual QuickStart Guide  
Lecturer, Department of Media Technology and Design  
Hagenberg College of Information Technology  
University of Upper Austria School of Applied Sciences  
3d@lightweaver.com www.lightweaver.com

## Abstract

Now that the field of 3D computer graphics has come of age, 3D artists have sophisticated tools at their fingertips for designing complex games, stunning effects, beautiful scenes, or to reveal the secrets of nature. At the same time, 3D software programs are an excellent vehicle for students to discover both science and art.



“Taj Mahal” Advertising graphic for Kinetix  
© 1997 Michele Matossian



“Comet” Advertising graphic for Precision Visuals, Inc.  
© 1985 Michele Matossian

## 1 Introduction

I began my career as a computer graphics artist in 1985. I created advertising graphics for a start-up in Colorado and tested PC paint packages for a research lab at Harvard. But although this was a very exciting time to be in computer graphics, I found the tools to be too limiting and decided to go to art school until they matured.

A few years later, when I was teaching painting at the University of Michigan, I was surprised to find that many of my colleagues viewed computer graphics with suspicion and/or disdain. Some of their disregard no doubt had to do with academic politics. Budget lines for painting positions were being cut for positions in computer graphics. Accomplished professors of traditional media were being turned down for tenure despite good exhibition records. Aesthetics was also a problem. Much of the early computer art was stronger technically than it was artistically. At the same time, most desktop programs only produced low-resolution grayscale images — a far cry from the touch of a painter’s brush.

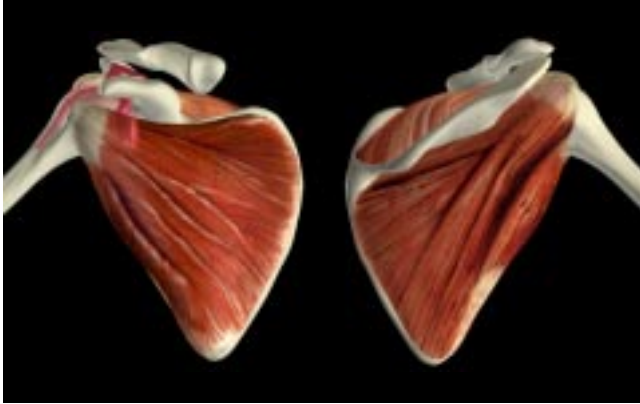
With the release of Photoshop in 1990, some of my colleagues began to see the possibilities of digital painting as an artistic medium. Desktop 3D programs began to emerge, inspiring my own return to the field in 1995. Today, sophisticated 3D software packages provide tools for exploring the dimensions of space and time, and new ways to manipulate form, light and movement.



“Midwinter Light” Oil on Canvas, 72” x 46”  
© 1987 Michele Matossian

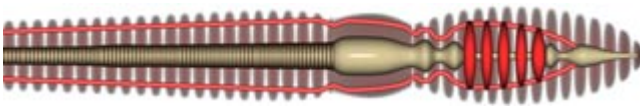
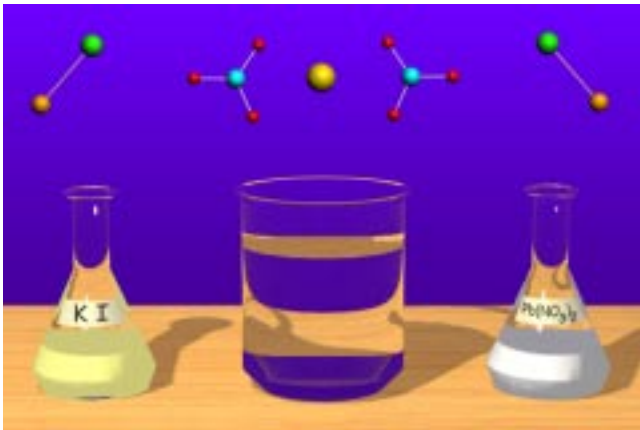
## 2 The Art of Teaching Science

Scientific visualization is a field that has benefited enormously from 3D graphics. Anatomical structures, chemical interactions, complex dynamics and celestial mechanics can all be presented with greater clarity when you show them from different angles.



**“Shoulder Anatomy” for UCSF Medical Center  
© 1999 Michele Matossian**

One of my favorite “SciVis” applications is science education. 3D animations make terrific teaching aids for bringing alive scientific principles through classroom demonstrations. Modeling and animating natural phenomena in 3D helps students truly master the material and gain appreciation of nature’s design.



**“Chemical Reaction”, “Earthworm” and “The Seasons”  
Created for Autodesk Education © 2000 Michele Matossian**

## 3 The Science of Teaching Art

The principles of design are applicable to all fields of art. By combing traditional art principles with 3D computer graphics, students of engineering, multimedia, computer graphics and fine arts can learn to create more pleasing and effective designs.



**“Apples” © 2003 David Zuderstorfer**

In the course that I teach at the University of Upper Austria, I combine studio art teaching methods with 3D technology. To stimulate visual thinking, I start by showing images from museum websites, such as the Louvre, the National Gallery of Art, the Metropolitan Museum of Art, and the Kunsthistorisches Museum Vienna, and online collections, such as Artchive, Artcyclopedia, CGFA, and the Web Gallery of Art. Rather than following historical timelines, we focus our discussion on visual elements, such as light, space, value, composition and color. Afterwards, the students start collecting their own galleries of art.

From the lecture hall, we move to the “atelier” where the class proceeds like any beginning drawing course. Students loosen up with gesture drawing and concentrate on blind contour drawings. Using viewfinders, they draw negative space in order to develop their compositions. Doing caricatures of their classmates usually gets a lot of laughs. After studying straight line contour drawing, perspective, and value scales, most students are surprised to find how well they can render cups, apples, draperies, and each other.



**“Cup” © 2003 Christian Hanl**



**“Final” © 1999 Marcus Wegerer**

Interspersed with lessons in the atelier are long sessions in the computer lab. The objects that were studied in line and value are modeled in wireframe and then shaded in grayscale. I stress composition from the beginning, so that students get in the habit of considering the whole picture. Lighting is always a part of this consideration. Over the years, I’ve found it helpful to give very specific assignments, such as front, side and back lighting, and to limit the number of lights to no more than three sources.

One of the most successful assignments over the years has been the apple project. After drawing an apple in simple contour, blind contour, cross contour, straight line contour, and limited values, students usually find it easy to translate their knowledge into highly accurate 3D models. Once created, the surface texture of the apple comes under the microscope. Speckles, bruises, drops of water and reflections are closely observed and fiercely attempted.



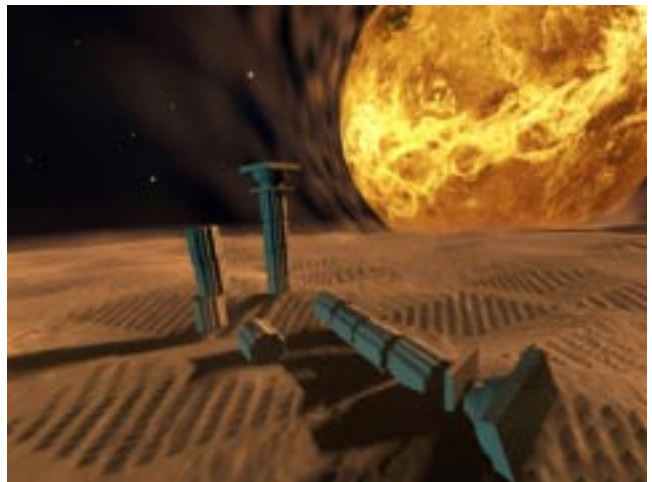
**“Vanitas and Vermeer” © 2004 Michele Matossian**  
**This work incorporates “Vanitas” 1634 by Pieter Claesz,**  
**“Lady Writing a Letter with her Maid” 1670 by Jan Vermeer,**  
**and “Girl with a Red Hat” 1668 by Jan Vermeer**

To practice their observational skills, sometimes I’ll ask students to introduce their objects into a highly realistic still life painting, such as a Dutch master, in order to create a digital matte painting. By using matte/shadow materials to cast shadows and reflections onto the objects in the scene, the students can convincingly insert apples, cups, knives, paintings and other elements into the scene.

Another project that the students enjoy involves telling a story in a single image. The story can be from a dream or fantasy, or describe a concrete experience. But no matter what the content, the work must demonstrate the application of design principles.



**“Fingered” © 1999 Joreg Diessel**



**“Story” © 1999 Joreg Patiss**

## References



EDWARDS, BETTY. 1999. *The New Drawing From the Right Side of the Brain*, J.P. Tarcher.

BOTHWELL, DORR AND MAYFIELD, MARLYS. 1991. *Notan: The Dark Light Principle of Design*, Dover Publications.

COOKE, HEReward LESTER. 1978. *Painting Techniques of the Masters*, Watson-Guption Publications.

ELLIOTT, STEVEN D., STROMBERG, STEVE AND MATOSSIAN, MICHELE. 2000. *Modular Content Design Standards*, Autodesk White Paper.

HAGEN, MARGARET A. 1986. *Varieties of Realism: Geometries of Representational Art*, Cambridge University Press.

HAWTHORNE, MRS. CHARLES W., 1960. *Hawthorne on Painting*, Dover Publications.

HAINES, F. MERLIN, 1956. *Tone and Colour in Landscape Painting*, Pitman Publishing Corporation.

HENRI, ROBERT, 1923. *The Art Spirit*, Lippincott.

HEARN, DONALD AND BAKER AND M. PAULINE, 1997. *Computer Graphics: C Version*, Second Edition. Prentice Hall.

ITTEN, JOHANNES 1977. *The Art of Color: The Subjective Experience and Objective Rationale of Color*, John Wiley & Sons, Revised Edition.

LAUER, DAVID A. AND PENTAK, STEPHEN, 1999. *Design Basics*, Wadsworth Publishing, 5th Edition.

MATOSSIAN, MICHELE, 2004. *3DS MAX 6: Visual QuickStart Guide*, Peachpit Press.

PARRAMON, JOSE M, 1991. *Light and Shade*, Watson-Guption Publications.

SAMUELS, MIKE AND SAMUELS, NANCY, 1975. *Seeing with the Mind's Eye: The History, Techniques and Uses of Visualization*, Random House.

WEST, THOMAS G., 1997. *In the Mind's Eye: Visual Thinkers, Gifted People With Dyslexia and Other Learning Difficulties, Computer Images and the Ironies of Creativity*, Prometheus Books.

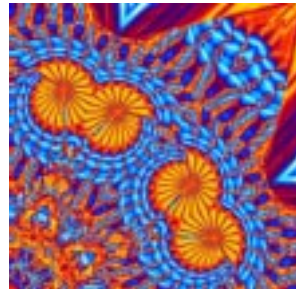
WOLFE, TOM, 1976. *The Painted Word*, Bantam



**“Cloudbank”**  
© 2004 Michele Matossian



**“Sun Mandala”**  
© 2004 Michele Matossian



**“Shoulder Anatomy” and “Mandala 71.22”**  
© 1999, 2004 Michele Matossian



**“Apple and Cheese”**  
© 2001 Michele Matossian