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Part I Color and Composition

CHAPTER 1 Color Management

Author: Jeff Mottle

Introduction

What is Color Management?

What Color Management is Not

Why Do You Need Color Management?

Color Management Pipeline

The Color Management Process

Color Management Theory

How We See Color

Lighting

Color Spaces

Gamuts

What Are Profiles?

Workflow

Calibration and Profiling

Profiling Monitors, Printers, Scanners, Cameras

Process

Hardware Software

How to Calibrate/Profile a Monitor

Color Management Process in Production

Using Color Management in PhotoShop

Color Management in 3D Production

Challenges

Summary

CHAPTER 2 Composition

Author: Ernest Burden

Introduction

POV

Tell a Story

- What I'm Making and for Whom I'm Making It
- Content
 - Who?
 - Who Is My Subject
 - Who Is My Audience
 - What?
 - What Is the Project, Cues to Purpose/Use
 - When?
 - Time of Day
 - Time of Year
 - Where?
 - Location, Location, Location—Context
 - Why?
 - What an Effectively Composed Rendering Can Do
 - How?
 - Bridge to Section on Visual Devices...
- Tools
 - Line
 - Lines of Force, Arrows, Paths
 - Form
 - Massing, Surface, Weight and Balance
 - Color
 - Defining Depth, Mood
- Canvas
 - Perspective
 - Choosing Good Views
 - Avoiding Common Mistakes
 - Faking
 - Limiting Vanishing Points—Why and Why Not
 - Framing
 - Choosing Frame Orientation and Aspect
 - Placing Your Subject for Best Impact
 - Bordering
- Summary

Part II Materials

CHAPTER 3 Advanced Mental Ray Shaders

Author: Joep Van Der Steen

- Basic rules for rendering with mental ray
- Introduction for materials
 - Mental ray material
 - SSS type of materials

- Arch & Design and car paint materials
- Promaterials
- Special Purpose materials
- Conclusion
- Introduction for shaders and maps
 - Custom 3ds Max shaders
 - Lume shaders
 - Mental ray shaders
 - Production shaders
 - Conclusion
- Working with materials and shaders (sample files)
 - Introduction
 - New shaders in 3ds Max 2010
 - Tips for rendering backgrounds
 - Tips for trace depth
 - Tip for Physically Correct Illuminated Surface
 - Tip for wraparound shader
 - Tip for displacement vs height
 - Tip for layered (blended) materials
 - Tip for Matte Material with Daylight and exposure control
 - Mib black body shader
 - Raytype switcher shader
 - Third party, diffusion shader
 - Tips for motion blur
 - Mr shader element

CHAPTER 4 **Advanced Unwrapping**

Author: Lukas Dubeda

- Introduction
- What Is UVW Space?
- 0-1 space
- Multiple UVW Spaces
 - Compatibility Issues and Hidden Traps
 - What Are Barycentric Coordinates?
- The Mathematics Behind UV Mapping and Projections
- How to Avoid Pitfalls When Planning to Unwrap Complex 3D Shapes
- What to Look for Before Planning the UV Web
- How to Successfully Analyze Best Solutions for Given Mapping Problems
- Available Software Solutions for Complex Unwrapping Tasks
 - UV Layout
 - Unwrella
 - Flatiron
 - UV Packer
 - Other Available Solutions

A Few Other Non-obvious Ways of Unwrapping
How to Use Cloth Simulation to Unwrap Meshes
Using Morphing to Lay Out UV Grids
Summary

CHAPTER 5 Texture Painting

Author: Leigh van der Byl

Introduction
Getting Started – Understanding Surfaces
Observing the Real World
Time and Weathering
Human Influence
Gathering References
Surface Properties
How Shaders Work with Textures
Diffuse / color
Specularity and Reflectivity
Bump and Displacement
Transparency
Incandescence
Ensuring Consistency between Textures
Working with Photoshop
Managing Files Efficiently
Texture Size
Preparing Photographs
Putting Textures Together
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Part III Lighting

CHAPTER 6 Physically Based Materials

Author: Pierre-Felix Breton

The typical problem
Estimating the diffuse color of materials
Measuring colors
Using a digital camera: getting closer to the “right” color with proper calibration
Using a spectrophotometer: ultimate accuracy
Linear color workflow (gamma correction)

- Estimating the specular reflectivity of materials
 - Physically based Shaders internal
 - Law of conservation of energy
 - Angular dependency / Falloff Curve
 - Measuring specular reflectivity
 - Using a digital camera: HDR photography
 - Using a Luminance Meter
- Applying the measured colors in the 3ds max user interface
- Glass & Glazing

CHAPTER 7 Lighting Analysis Tools

Author: Tod Stephens

- Introduction
- Differences between 3ds Max and 3ds Max Design
- Terminology
- Scene Requirements for Lighting Analysis
 - Model Geometry Requirements
 - Air-tight Model with Ground Plane
 - Using Proper Scale Units
 - Fixing Flipped Normal's
 - Fixing Unwelded Vertices
 - Checking for Overlapping Surfaces
 - AutoCAD and Revit File Considerations
 - Mental Ray Rendering Engine
 - mr Settings – Final Gather, GI, Caustics
 - Reducing Render Times with Distributed Bucket Rendering and Reusing/saving Final Gather Maps
 - Exposure Control
 - mr Photographic Exposure Control settings
 - Daylight System Requirements
 - mr Sun, mr Sky
 - Environment ap: mr Physical Sky
 - Sky Model requirements (Perez all-weather or CIE Model)
 - Artificial lighting with Photometric Lights, mr Sky Portals
 - Weather Data File
 - Weather Data File (EPW file format) to Drive the Daylight System
 - US Department of Energy Website
 - EnergyPlus Energy Simulation Software
 - EPW File Content
 - View and Download Weather Data Directly Using a Weather Data Layer File in Google Earth
 - Real-time Weather Data Request and File Format Considerations (CSV and IWECC)

- Materials Requirements
 - Physically-based ProMaterials and Arch & Design Materials
 - Reflectance and Transmittance Properties
 - Glazing, LBNL database
 - Converting Optics 5 Radiance Material to 3Dds max A&D Material
- Using the Lighting Analysis Assistant
 - General Tab
 - Lighting Tab
 - Materials Tab
 - Analysis Output Tab
- LEED Certification Considerations
 - LEED v2.2 Credit 8.1 Daylight and Views: OPTION 2 – Simulation
 - Procedure for Providing Documentation to US Green Building Council
 - New LEED 2009 Requirements to be announced February/March 2009)
- Step-by-Step Process for Lighting Analysis
 - Tutorial with Screenshots
- Summary

CHAPTER 8 Render To Texture

Author: Louis Marcoux

- The Multiple Purposes of Rendering to Texture
 - Save Render Time
 - Prepare Scenes for Real-Time Needs
 - Reduce Materials Complexity
 - Save Light Solution to Vertex Color
- Render to Texture Workflow
 - Understanding of the Render-to-Texture Process
 - Types of Materials Components
 - UVW Mapping Data Flow
 - Material Data Flow
 - Exposure Control and Bit Depth
 - Planning Texture Resolution
 - Network Rendering of Textures
- Saving Render Time with Rendered Textures: Practical Examples
- Preparing Scenes For Real-Time Rendering: Practical Examples
- Summary

CHAPTER 9 Advanced Mental Ray Lighting

Author: Darren Brooker

- Introduction
 - Why Mental Ray?
 - What Constitutes Advanced Lighting?

- Interior Lighting
 - Different Light Sources: exterior / interior
 - mr Sky Portal
 - Ambient Occlusion
 - Caustics
 - Tutorial
- Match Lighting
 - Background Plates
 - Reference Data
 - HDR Images
 - Further Lighting Reference
 - Production Shaders
 - Tutorial
- Relighting
 - Why Relight?
 - Panorama Exporter
 - Floating Point Images
 - Tutorial
- Summary

CHAPTER 10 Advanced V-Ray Lighting

Author: Brian Smith

- Introduction
 - Why V-Ray
 - Speed vs. Quality
- Critical Configurations
 - Controlling Adaptive Algorithms
 - Test Renders
 - Production Renders
- Controlling Noise
 - Renderings
 - Animations
 - Progressive Path Tracing
- Controlling system resources
 - Static vs. Dynamic Geometry
 - VRayProxy
 - VRayDisplacementMod
- Advanced Lighting Techniques
 - Exteriors
 - Interiors
 - Animations with moving objects
- Summary

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CHAPTER 11 Reactor

Author: Mir Vadim

- Introduction
- User Interface
 - Simulation Properties
 - Solvers
- Rigid Bodies
 - Types
 - Property Editor
 - Simple Rigid Body Simulation Set-up
- Soft Bodies
 - Reactor Soft Body Modifier
- Cloth
 - Reactor Cloth Modifier
- Ropes
 - Reactor Rope Modifier
- Wind
- Water
- Real Time Review Model
- Summary

CHAPTER 12 Particle Flow and Space Warps

Author: Pete Draper

- Introduction to Particle Flow
 - The Command Bar
 - Emission
 - System Management – Particle Limits and Integration Step
- New Particle Features in 3ds Max 2010
 - Lock/Bond
 - Presets
 - Birth Texture, Birth Paint & Initial State
 - Shape Operator
 - Groups
- Particle View
 - The Particle View Event Display and Depot
 - General Navigation
 - Particle View Menus
 - Particle and Event Properties
 - Different Particle Distribution Methods
 - Wiring Up Operators and the Flow of Particle Data

- Copying Versus Instancing
- Particle Geometry Types and Polygon limitations
- Particle Shape Types
- Space Warp Overview
 - Force Based Space Warps and Their Use within Particle Flow
 - Collision-based Space Warps and Their Use within Particle Flow
- Creating Your First System
 - Creating the Particle Flow icon in Particle View vs. the Viewport
 - Viewport & Render Comparisons
 - Core "Frequently used" Operators
- TUTORIAL - Scattering Geometry to Form Trees
 - Creating the Distribution Geometry and Materials
 - Creating Random Variations of the Same Material
 - Setting Up the Lighting and Shadows for the Billboard Particles
- TUTORIAL - Creating a Crowd Sequence to Populate Scenes
 - Setting Up the Base-Animated Sequence
 - Setting Up the Multiple Character Materials
 - Adding Random Variations to the Materials
 - Setting Up the Geometry
 - Creating the Base Particle System Distribution
 - Creating Crowd Interaction (particle / particle interaction)
 - Creating Basic Agent "Intelligence"
 - Final Simulation
- TUTORIAL - Populating a City with Traffic
 - Setting Up the Base Scene
 - Creating the Base System and Setting Up Constraints
 - Setting Up Car Agents
 - Setting Up Car Agent Behavior (traffic lights)
- TUTORIAL - Creating a Construction Sequence
 - Breaking Up the Original Mesh
 - Setting Particle Positions
 - Offsetting the Particles
 - Animating the Construction Procedurally with Space Warps
 - Creating the MAXScript to Bake the Sequence
 - Baking Down the Animated sequence
 - Setting up Cameras and Final Animation
- Summary

CHAPTER 13 Rigging

Author: Michele Bousquet

- Introduction
- Overview of Rigging Process
 - Steps
 - Working with Pre-rigged Models
 - Common Needs and Solutions

Character Model Design

- Examples of Good and Bad, and Why

- Building Good Models from Scratch (will refer to the poly modeling chapter)

- Creating good Models from Bad

 - TUTORIAL: Create Good Model from Bad (same model used later in chapter): Simple Man in a Clean Suit

Skinning

- What Skinning Is

 - Vertex Weight Relationship with Bones

 - Weighting of Multiple Bones (shoulder, hip)

- Skinning Tools

 - Biped Module

 - Skin Modifier

 - TUTORIAL: Simple Skinning Exercise with Walking Biped (clean suit man)

- Troubleshooting

 - Common Problems with Shoulders and Hips

 - TUTORIAL: Continue with previous skinning exercise, improve skinning at joints

 - Biped vs. Bones, Skin vs. Physique

Animation

- Realistic Walking

 - Components of a Walk

 - Simple Techniques to Make a realistic walk

 - TUTORIAL: A Really Good Walk Cycle

- Real People

 - Persons Carrying Stuff (briefcase, purse)

 - Ponytails, Hats, and Other Bouncy Stuff (better word than 'stuff')

 - Persons Standing around (looking at watch, shifting weight, etc.)

 - TUTORIAL: Real People Carrying Stuff (can you think of a better word than stuff?)

 - TUTORIAL: Real People Doing Different Motions

- Advanced Topics (not in book, only on website)

 - Re-using Motions for Multiple Characters

 - Mixing Motions for Realistic Variety

- Summary

Part V Workflow

CHAPTER 14 Revit Integration

Author: Scott Rosenbloom

- Introduction

 - A Brief Discussion: What is Revit?

 - CAD vs BIM (AutoCAD vs Revit)

 - Why Revit Will Become the Standard

- Architectural Visualization Features of Revit (and how far to take your design before moving to 3ds max) – Mental Ray
 - Photometric Lighting and Sky Portals
 - ProMaterials
- Revit Integration with 3DS MAX
 - Terminology and Key Elements
 - The Old: The DWG Method: How to Bring a Model from Revit to 3DS MAX
 - Exporting from Revit
 - Importing into 3DS MAX
 - The Pros and Cons of the DWG Method
 - ProMaterials and Mapping (con)
 - File Link Manager (pro)
 - Lighting (con)
 - Object Organization (con)
 - File Size (pro)
 - The New: The FBX Method: How to Bring a Model from Revit to 3DS MAX
 - Preparing Exterior and Interior 3D Views in Revit
 - Camera tool
 - View Templates and the Visibility/Graphics Dialog Box
 - Exporting the Exterior and Interior FBX Files from Revit
 - Importing the Exterior FBX Model into 3DS MAX
 - The FBX Import Dialog Box - Updating the Plugin and Editing Presets
 - File and Folder Creation at Import
 - Simplifying the Model with a MAXScript
 - An FBX Version of the File Link Manager
 - Imported Revit Object Organization
 - Importing the Interior FBX Model into 3DS MAX
 - Imported Revit Objects – Cameras
 - Creating a new Daylight System
 - Setting mr Photographic Exposure Control Exposure Control
 - Automatically Assigning a mr Physical Sky to the Environment Map
 - Creating mr Sky Portals
 - Imported ProMaterials and Changing to a New Material
 - Importing New and Changed Objects from Revit to 3DS MAX
- Rendering
 - Revisiting Mr Photographic Exposure Control
 - Indirect Illumination in the Render Setup Dialog Box
- The Pros and Cons of the FBX Method
 - ProMaterials and Mapping (pro)
 - File Size (con)
 - File Link Manager (con)
 - Lighting (pro)
 - Object Organization (pro)
- Summary

CHAPTER 15 Advanced Poly-Modeling

Author: Todd Daniele

Introduction to Poly-Modeling Theory

Using Quad Polygons

Ngons and Triangle Polygons (I presume "ngons" is a word)

Why They Are Bad

How to Eliminate Them

Edge Loops and Edge Rings

Techniques and Application

How to Shift/Drag at the Polygon Sub-Object Level

How to Shift/Drag at the Vertex Sub-Object Level

How to Shift/Drag at the Border Sub-Object Level

How to Shift/Drag at the Element Sub-Object Level

How to Shift/Drag at the Edge Sub-Object Level

Constraints and the Benefits of Using Them

3Ds Max Modifiers: How to Implement Modifiers into Your Workflow While Modeling

Bend Modifier

Twist Modifier

Level of Detail: How to Use L.O.D. Wisely to Optimize Your Scenes

Prioritizing Objects According to Location and Size.

Exercise - Modeling an Ornate Writing Desk

Poly-Modeling Curved and Scalloped leg details with proper mesh flow (Sub-D Modeling)

Poly-Modeling Detailed Desk Handles and Hardware (Sub-D Modeling)

Modeling Flat Surfaces--Splines/Extrusion

Application of Techniques to Other Architectural Elements: Exterior Trims, Moldings, Carved Stone and Wood

Summary

CHAPTER 16 Managing Large-Scale Projects

Author: Spine 3D

An Introduction to Managing Large-scale Projects

Understanding the Scope of the Project

Kickoff Meeting with the Client

Budget Management

Facets of Production

Selecting a Project Manager

Establishing Lead Contacts for Each Consultant Working with the Client

Coordinating Project Files

Establishing Timelines and Benchmarks

Setting Up Your Production Team	
Selecting the Creative Lead	
Determining Number of Artists for Support Team	
Planning Workflow	
File Clean-up and Organization	
Process Meeting	
Establish Modeling Methods	
Lighting Technique Techniques?	
Assign Particular Task Leads	
Modeling	
Lighting and Textures	
Landscaping and Entourage	
Post Production	
Communication	
Internal	
Internal Requests between Teams	
Communicating Client Comments and Requests to Other Team Members	
External	
File Submittal via FTP or Email	
Feedback from Client	
Via Email	
Via Telephone	
3rd Party Applications (Cozimo)	
Personal Meetings	
Breaking Down the Creative Brief	
Creative Kick-off Meeting	
Brainstorming Concepts	
Scene Setups	
Client Approval	
Storyboarding (
Animatic	
Client Approval	
Coordinating Filming of Aerial Footage	
Clearing Flight Paths	
Confirming Approaches to and from the Targets	
Determining the Best Time of Day for Lighting Conditions	
Coordinating Green Screen Video and Lifestyle Shoots	
Arranging the Film Crew	
Director	
Director of Photography	
Key Grip	
Grips	
Selecting Talent	
Casting Calls	

- Coordinating Styling with Client
- Scheduling Studio Space and Other Locations
 - Obtaining Clearance to Film on Site
- Post-Production
 - Compositing
 - Green Screen
 - Camera Matching
 - Rendered Layers
 - Editing
- Accounting
 - Collecting Final Payments
- Packaging and Final Delivery
 - File Format Specifications
 - Submittal for Duplication
- Summary

CHAPTER 17 MAXScript

Author: Markus Boos

- Introduction
- Getting Started - My First MAXScript
 - Creating Objects and Changing Properties
 - Inspecting Object Properties
 - Assigning Materials to Objects
 - Moving, Rotating and Scaling Objects
- MAXScript -- Fundamental Language Concepts
 - Comments
 - Variables and Data Types
 - Scalar Data Types
 - Strings
 - Arrays
 - Vectors / Matrices
 - Printing Data to the Listener
 - Control Structures
 - Loops
 - For Loops
 - While and Do Loops
 - Conditional Statements
 - Functions
 - How to Install, Run and Use MAXScripts
- RenderPass Tool: Development of a Small Tool from Scratch
 - Creating a User Interface for the Tool
 - Tool 1: Ambient Occlusion Render Pass Setup for V-Ray and Mental Ray
 - Tool 2: Object Mask Pass Setup (black and white object mattes)
 - Tool 3: Material Reset (reset materials in scene and material editor)

Useful MAXScripts for Production
Advanced topics (not in book, only on website)
 New Scripting Features in 3ds Max 2010
 How to Write High Quality Code: Good Programming Practices
 How to Organize Script Locations and Deployment of Tools
 Version Management
 Exercise Solutions
Summary

Part VI Post production

CHAPTER 18 3D Tracking

Author: Mike Merron

Introduction
2D Camera Matching for Stills (as a precursor to the 3D stuff) BETTER WORD
 THAN "STUFF"? -e.g VVI images)
Cameras, Lenses and Film Gates and Their Effect on FOV: Why This Is
 Important
3Ds Max Camera Match Utility
Tracking History
2D Tracking
3D Solving
Lens Distortion and Correction
Geometry Tracking (Fun Time!)
Problems and Workarounds (Is this one word or two?)
3ds Max Scene Set-up
 Scale Issues
 Tips and Tricks
Rendering Concepts
Beyond Tracking
Future Tracking
Summary

CHAPTER 19 Green Screening

Authors: Ben Haworth & David Macey, Smoothe

Introduction & History
 Overview of Chapter
 History and Background on the Technique
 Examples of the Technique in Context
Setting Up a Scene
 Planning Your Shoot
 Choosing Your Chroma

- Lighting
- Things to Watch
- Creating a Key
 - Footage Preparation
 - Masking
 - Pulling a Key
 - Refining a Key
 - Composition
 - Things to Watch
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CHAPTER 20 Compositing

Author: Gary M. Davis

- Introduction - Why Composite?
- Compositing Consideration within Autodesk 3ds Max Design
 - Render Passes
 - Hiding and Unhiding
 - Layers
 - Light Sets
 - Object Properties
 - Selection Sets
 - Setting up G-Buffers
 - Object IDs
 - Material IDs
 - Render Elements
 - Mattes
 - Extracting MR Shader Elements
 - Output for Compositing Pipelines
 - File Format Considerations
 - Embedding Optional Metadata (RPF, EXR)
- Compositing
 - Combining Render Passes and Render Elements
 - Composite Operation Fundamentals
 - Transfer/Blending Modes
 - Selective Effects Using Matte Inputs
 - Depth of Field
 - Motion Blur
 - Specular Bloom
 - Color Grade
- Summary

CHAPTER 21 Video Editing

Author: Kim Lee

“Starting at the End” – Workflow Introduction

“If I Had a Hammer”: A Technical Overview of the Tools of the Editing Trade

Common Formats

Video

Film

Web/Broadband

Mobile

Acquisition

Cameras

Decks

Hardware

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Offline

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Project Scope – Standalone or Workgroup editing

“Measure Twice, Cut Once”: The Role of Editing at the Project Planning Stage

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Animatics

VO and Copy

Basic Editing Workflows

Some Basics for Non-editors

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Bins

Using Multiple Video Tracks

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“Marching orders”: The Role of an Animatic/Pre-Vis

Shooting Reference for Live Action

CGI Reference

Music Reference

Keeping Everyone in the Loop

Working with Directors, DP’s, Producers and VFX Supervisors

Building the Rough Cut

What’s an EDL and Why Do I Need It.

“If I Want Your Opinion, I’ll Give It to You”: The Approval Process

Story is Job One

Mocking Up FX

Approval Deliverables

Diplomat and Liason – Working with the client

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Embrace the Technology – Good Things for Editors to Know That Have
Nothing to Do with Editing; “All Roads Lead to Rome” – Bringing it All
Together (THINK ABOUT MAKING THIS BRIEFER)

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DI (digital intermediary)

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