

Shaderx6 Advanced Rendering Techniques

The latest edition of this bestselling game development reference offers proven tips and techniques for the real-time rendering of special effects and visualization data that are useful for beginners and seasoned game and graphics programmers alike. Exploring recent developments in the rapidly evolving field of real-time rendering, GPU Pro6: Advanced Rendering Techniques assembles a high-quality collection of cutting-edge techniques for advanced graphics processing unit (GPU) programming. It incorporates contributions from more than 45 experts who cover the latest developments in graphics programming for games and movies. The book covers advanced rendering techniques that run on the DirectX or OpenGL runtimes, as well as on any other runtime with any language available. It details the specific challenges involved in creating games across the most common consumer software platforms such as PCs, video consoles, and mobile devices. The book includes coverage of geometry manipulation; rendering techniques, handheld devices programming, effects in image space, shadows, 3D engine design, graphics-related tools, and environmental effects. It also includes a dedicated section on general purpose GPU programming that covers CUDA, DirectCompute, and OpenCL examples. In color throughout, GPU Pro6 presents ready-to-use ideas and procedures that can help solve many of your daily graphics programming challenges. Example programs with downloadable source code are also provided on the book's CRC Press web page.

Important elements of games, movies, and other computer-generated content, shadows are crucial for enhancing realism and providing important visual cues. In recent years, there have been notable improvements in visual quality and speed, making high-quality realistic real-time shadows a reachable goal. Real-Time Shadows is a comprehensive guide to the theory and practice of real-time shadow techniques. It covers a large variety of different effects, including hard, soft, volumetric, and semi-transparent shadows. The book explains the basics as well as many advanced aspects related to the domain of shadow computation. It presents interactive solutions and practical details on shadow computation. The authors compare various algorithms for creating real-time shadows and illustrate how they are used in different situations. They explore the limitations and failure cases, advantages and disadvantages, and suitability of the algorithms in several applications. Source code, videos, tutorials, and more are available on the book's website www.realtimeshadows.com.

Focusing on Direct3D 8.x, this book shows a wide array of specialized vertex and pixel shader programming tricks from industry experts.

GPU Pro4: Advanced Rendering Techniques presents ready-to-use ideas and procedures that can help solve many of your day-to-day graphics programming challenges. Focusing on interactive media and games, the book covers up-to-date methods for producing real-time graphics. Section editors Wolfgang Engel, Christopher Oat, Carsten Dachsbacher, Michal Valient, Wessam Bahnassi, and Sebastien St-Laurent have once again assembled a high-quality collection of cutting-edge techniques for advanced graphics processing unit (GPU) programming. Divided into six sections, the book begins with discussions on the ability of GPUs to process and generate geometry in exciting ways. It next introduces new shading and global illumination techniques for the latest real-time rendering engines and explains how image space algorithms are becoming a key way to achieve a more realistic and higher quality final image. Moving on to the difficult task of rendering shadows, the book describes the state of the art in real-time shadow maps. It then covers game engine design, including quality, optimization, and high-level architecture. The final section explores approaches that go beyond the normal pixel and triangle scope of GPUs as well as techniques that take advantage of the parallelism of modern graphic processors in a variety of applications. Useful to beginners and seasoned game and graphics programmers alike, this color book offers practical tips and techniques for creating real-time graphics. Example programs and source code are available for download on the book's CRC Press web page. The directory structure of the online material closely follows the book structure by using the chapter numbers as the name of the subdirectory.

GPU Pro 5

Direct3d ShaderX

Programming Vertex and Pixel Shaders

GPU Zen 2

Information Modelling and Knowledge Bases XXI

Inhaltsangabe: Einleitung: Um die Realität in der Computergrafik so gut wie möglich nach zustellen, sind realistisch anmutende Schatten unerlässlich. Je realistischer die Szenen werden, desto weniger Fehldarstellungen kann man sich erlauben. Schatten geben dem Betrachter in einer virtuellen Umgebung eine genauere Vorstellung von der Objekt-Objekt-Beziehung und unterstützen den räumlichen Eindruck. Im Rahmen dieser Bachelorarbeit werden die zwei bekanntesten Herangehensweisen Shadow Mapping und Shadow Volumes diskutiert und implementiert. Die Vor- und Nachteile dieser werden intensiv erläutert. Des Weiteren werden Möglichkeiten aufgezeigt, welche die genannten Techniken visuell verbessern und beschleunigen können. Von der Vielzahl an Erweiterungen von Shadow Mapping werden die Techniken Perspective Shadow Mapping, Light Space Perspective Shadow Mapping, Cascaded Shadow Mapping und Dual Paraboloid Shadow Mapping genauer erläutert. Zu den Shadow Volumes werden die beiden Verfahren Z-Pass und Z-Fail genau erklärt und implementiert. Des Weiteren wird der Algorithmus anhand eines Minimalbeispiels erläutert und auf Probleme eingegangen.

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Thoroughly revised, this third edition focuses on modern techniques used to generate synthetic three-dimensional images in a fraction of a second. With the advent of programmable shaders, a wide variety of new algorithms have arisen and evolved over the past few years. This edition discusses current, practical rendering methods used in games and other applications. It also presents a solid theoretical framework and relevant mathematics for the field of interactive computer graphics, all in an approachable style. The authors have made the figures used in the book available for download for fair use. :Download Figures.

3-D graphics development is an engaging, rewarding process that gives developers the opportunity to flex their creative muscles. However, it can also be intimidating to those on the outside. A follow-up to Direct2D, Direct3D tears down the barriers to entry. Requiring only a background in C++, author Chris Rose will guide you through the process of developing your own 3-D applications. This updated and expanded second edition of Book provides a user-friendly introduction to the subject, Taking a clear structural framework, it guides the reader through the subject's core elements. A flowing writing style combines with the use of illustrations and diagrams throughout the text to ensure the reader understands even the most complex of concepts. This succinct and enlightening overview is a required reading for all those interested in the subject . We hope you find this book useful in shaping your future career & Business.

Pixel shaders are some of the more powerful graphic tools available for XAML programmers, but shader development bears little resemblance to traditional .NET programming. With this hands-on book, you'll not only discover how to use existing shaders in your Windows Presentation Foundation (WPF) and Silverlight applications, you'll also learn how create your own effects with XAML and Microsoft's HLSL shading language. In the process, you'll write, compile, and test custom XAML shaders with the Shazzam Shader Editor, a free utility developed by author Walt Ritscher. The book includes XAML and C# sample code, and Shazzam contains all of the sample shaders discussed. Learn how shaders help you extend the GPU's rendering capabilities Explore prevailing shader types, such as color modification, blurring, and spatial transformation Get a quick tour of the shader features, and use pre-built effects on image elements in your application Examine the XAML ShaderEffect class to understand how WPF and Silverlight use shaders Learn about the shader-specific tools available in Visual Studio and Expression Blend Get up to speed on HLSL basics and learn how to create a variety of graphics effects

Introduction to 3D Game Programming with DirectX 11

GPU Pro 6

GPU Pro 360 Guide to Shadows

Vertex and Pixel Shader Tips and Tricks

Transactions on Computational Science IX

The latest edition of this bestselling game development reference offers proven tips and techniques for the real-time rendering of special effects and visualization data that are useful for beginners and seasoned game and graphics programmers alike. Exploring recent developments in the rapidly evolving field of real-time rendering, GPU Pro 7: Advanc

Exploring recent developments in the rapidly evolving field of game real-time rendering, GPU Zen assembles a high-quality collection of cutting-edge contributions for programming the GPU. Rendering (Patrick Cozzi)1. Adaptive GPU Tessellation with Compute Shaders by Jad Khoury, Jonathan Dupuy, and Christophe Riccio2. Applying Vectorized Visibility on All frequency Direct Illumination by Ho Chun Leung, Tze Yui Ho, Zhenni Wang, Chi Sing Leung, Eric Wing Ming Wong3. Non-periodic Tiling of Noise-based Procedural Textures by Aleksandr Kirillov4. Rendering Surgery Simulation with Vulkan by Nicholas Milef, Di Qi, and Suvaranu De5. Skinned Decals by Hawar

DoghramachiEnvironmental Effects (Wolfgang Engel)1. Real-Time Fluid Simulation in Shadow of the Tomb Raider by Peter Sikachev, Martin Palko and Alexandre Chekroun2. Real-time Snow Deformation in Horizon Zero Dawn: The Frozen Wilds by Kevin ÖrtengrenShadows

(Maurizio Vives)1. Soft Shadow Approximation for Dappled Light Sources by Mariano Merchante2. Parallax-Corrected Cached Shadow Maps by Pavlo Turchyn3D Engine Design (Wessam Bahnassi)1. Real-Time Layered Materials Compositing Using Spatial Clustering Encoding by Sergey Makeev2. Procedural Stochastic Textures by Tiling and Blending by Thomas Deliot and Eric Heitz3. A Ray Casting Technique for Baked Texture Generation by Alain Galvan and Je Russell4. Writing an efficient Vulkan renderer by Arseny Kapoulkine5. glTF - Runtime

3D Asset Delivery by Marco HutterRay Tracing (Anton Kaplanyan)1. Real-Time Ray-Traced One-Bounce Caustics by Holger Gruen2. Adaptive Anti-Aliasing using Conservative Rasterization and GPU Ray Tracing by Rahul Sathe, Holger Gruen, Adam Marrs, Josef Spjut, Morgan McGuire, Yury Uralsky

This updated bestseller provides an introduction to programming interactive computer graphics, with an emphasis on game development using DirectX 11. The book is divided into three main parts: basic mathematical tools, fundamental tasks in Direct3D, and techniques and special effects. It includes new Direct3D 11 features such as hardware tessellation, the compute shader, dynamic shader linkage and covers advanced rendering techniques such as screen-space ambient occlusion, level-of-detail handling, cascading shadow maps, volume rendering, and character animation. Includes a companion CD-ROM with code and figures. eBook Customers: Companion files are available for downloading with order number /proof of purchase by writing to the publisher at info@merclearning.com.

This book covers essential tools and techniques for programming the graphics processing unit. Brought to you by Wolfgang Engel and the same team of editors who made the ShaderX series a success, this volume covers advanced rendering techniques, engine design, GPGPU techniques, related mathematical techniques, and game postmortems. A special emphasis is placed on handheld programming to account for the increased importance of graphics on mobile devices, especially the iPhone and iPod touch. Example programs and source code can be downloaded from the book's CRC Press web page.

Advanced Rendering Techniques
Real-Time Rendering

Introduction to 3D Game Programming with DirectX 12

Level of Detail for 3D Graphics

Shadow Algorithms Data Miner

Preface -- Foreword -- Part I: Generation -- 1. Introduction -- 2. Mesh Simplification -- 3. Error Metrics -- Part II:

Application -- 4. Runtime Frameworks -- 5. Catalog of Useful Algorithms -- 6. Gaming Optimizations -- 7. Terrain

Level of Detail -- Part III: Advanced Issues -- 8. Perceptual Issues -- 9. Measuring Visual Fidelity -- 10. Temporal

LOD -- Glossary -- Bibliography Mesh simplification -- Simplification error metrics -- Run-time frameworks -- A catalog of useful algorithms -- Gaming optimizations -- Terrain level of detail -- Perceptual issues -- Measuring visual fidelity -- Temporal detail.

A definitive guide to shader programming teaches techniques like shadow mapping, displacement mapping, and high-dynamic lighting, which allows game programmers to create unique games and graphics. Original. (Advanced)

This book gathers all the content from the GPU Pro series (Vols 1-7; 2010-2016) into a convenient single source anthology covering 3D engine design in computer graphics. It covers ready-to-use ideas and procedures that can help solve many computer graphics programming challenges. The articles by leading programmers contained in this volume focus on engine-level optimization techniques useful for modern games.

Thoroughly updated, this fourth edition focuses on modern techniques used to generate synthetic three-dimensional images in a fraction of a second. With the advent of programmable shaders, a wide variety of new algorithms have arisen and evolved over the past few years. This edition discusses current, practical rendering methods used in games and o

Advanced Global Illumination

A Comprehensive Guide to Creating HLSL Pixel Shaders for WPF and Silverlight Applications

Tricks of the 3D Game Programming Gurus

ShaderX7

ShaderX5

This book focuses on advanced rendering techniques that run on the DirectX and/or OpenGL run-time with any shader language available. It includes articles on the latest and greatest techniques in real-time rendering, including MLAA, adaptive volumetric shadow maps, light propagation volumes, wrinkle animations, and much more. The book emphasizes techniques for handheld programming to reflect the increased importance of graphics on mobile devices. It covers geometry manipulation, effects in image space, shadows, 3D engine design, GPGPU, and graphics-related tools. Source code and other materials are available for download on the book's CRC Press web page.

GPU Pro3, the third volume in the GPU Pro book series, offers practical tips and techniques for creating real-time graphics that are useful to beginners and seasoned game and graphics programmers alike. Section editors Wolfgang Engel, Christopher Oat, Carsten Dachsbacher, Wessam Bahnassi, and Sebastien St-Laurent have once again brought together a high-quality collection of cutting-edge techniques for advanced GPU programming. With contributions by more than 50 experts, GPU Pro3: Advanced Rendering Techniques covers battle-tested tips and tricks for creating interesting geometry, realistic shading, real-time global illumination, and high-quality shadows, for optimizing 3D engines, and for taking advantage of the advanced power of the GPGPU. Sample programs and source code are available for download on the book's CRC Press web page. Success in today's IT environment requires you to view your career as a business endeavor. In this book, you'll learn how to become an entrepreneur, driving your career in the direction of your choosing. You'll learn how to build your software development career step by step, following the same path that you would follow if you were building, marketing, and selling a product. After all, your skills themselves are a product. The choices you make about which technologies to focus on and which business domains to master have at least as much impact on your success as your technical knowledge itself--don't let those choices be accidental. We'll walk through all aspects of the decision-making process, so you can ensure that you're investing your time and energy in the right areas. You'll develop a structured plan for keeping your mind engaged and your skills fresh. You'll learn how to assess your skills in terms of where they fit on the value chain, driving you away from commodity skills and toward those that are in high demand. Through a mix of high-level, thought-provoking essays and tactical "Act on It" sections, you will come away with concrete plans you can put into action immediately. You'll also get a chance to read the perspectives of several highly successful members of our industry from a variety of career paths. As with any product or service, if nobody knows what you're selling, nobody will buy. We'll walk through the often-neglected world of marketing, and you'll create a plan to market yourself both inside your company and to the industry in general. Above all, you'll see how you can set the direction of your career, leading to a more fulfilling and remarkable professional life.

This updated bestseller provides an introduction to programming interactive computer graphics, with an emphasis on game development using DirectX 12. The book is divided into three main parts: basic mathematical tools, fundamental tasks in Direct3D, and techniques and special effects. It shows how to use new Direct12 features such as command lists, pipeline state objects, descriptor heaps and tables, and explicit resource management to reduce CPU overhead and increase scalability across multiple CPU cores. The book covers modern special effects and techniques such as hardware tessellation, writing compute shaders, ambient occlusion, reflections, normal and displacement mapping, shadow rendering, and character animation. Includes a companion DVD with code and figures. eBook Customers: Companion files are available for downloading with order number/proof of purchase by writing to the publisher at info@merclearning.com. FEATURES: • Provides an introduction to programming interactive computer graphics, with an emphasis on game development using DirectX 12 • Uses new Direct3D 12 features to reduce CPU overhead and take advantage of multiple CPU cores • Contains detailed explanations of popular real-time game effects • Includes a DVD with source code and all the images (including 4-color) from the book • Learn advance rendering techniques such as ambient occlusion, real-time reflections, normal and displacement mapping, shadow rendering, programming the geometry shader, and character animation • Covers a mathematics review and 3D rendering fundamentals such as lighting, texturing, blending and stenciling • Use the end-of-chapter exercises to test understanding and provide experience with DirectX 12

GPU Pro

GPU PRO 3

ShaderX6

HLSL and Pixel Shaders for XAML Developers

Creating a Remarkable Career in Software Development

In GPU Pro5: Advanced Rendering Techniques, section editors Wolfgang Engel, Christopher Oat, Carsten Dachsbacher, Michal Valient, Wessam Bahnassi, and Marius Bjorge have once again assembled a high-quality collection of cutting-edge techniques for advanced graphics processing unit (GPU) programming. Divided into six sections, the book covers rendering, lighting, effects in image space, mobile devices, 3D engine design, and compute. It explores rasterization of liquids, ray tracing of art assets that would otherwise be used in a rasterized engine, physically based area lights, volumetric light effects, screen-space grass, the usage of quaternions, and a quadtree implementation on the GPU. It also addresses the latest developments in deferred lighting on mobile devices, OpenCL optimizations for mobile devices, morph targets, and tiled deferred blending methods. In color throughout, GPU Pro5 is the only book that incorporates contributions from more than 50 experts who cover the latest developments in graphics programming for games and movies. It presents ready-to-use ideas and procedures that can help solve many of your daily graphics programming challenges. Example programs with source code are provided on the book 's CRC Press web page.

Information modelling and knowledge bases have become crucially important subjects in the last few decades. They continue to be increasingly relevant, not only in academic communities, but in every area of commerce and society where information technology

Welcome to ShaderX6, the latest volume in the cutting-edge, indispensable series for game and graphics programmers. This all-new volume is packed with a collection of insightful techniques, innovative approaches to common problems, and practical tools and tricks that provide you with a complete shader programming toolbox. Every article was developed from the research and experiences of industry pros and edited by shader experts, resulting in unbiased coverage of all hardware and developer tools. ShaderX6: Advanced Rendering Techniques provides coverage of the vertex and pixel shader methods used in high-end graphics and game development. These state-of-the-art, ready-to-use solutions will help you meet your everyday programming challenges and bring your graphics to a new level of realism. This collection offers time-saving solutions to help you become more efficient and productive, and is a must-have reference for all shader programmers.

Get Real-World Insight from Experienced Professionals in the OpenGL Community With OpenGL, OpenGL ES, and WebGL, real-time rendering is becoming available everywhere, from AAA games to mobile phones to web pages. Assembling contributions from experienced developers, vendors, researchers, and educators, OpenGL Insights presents real-world techniques for intermediate and advanced OpenGL, OpenGL ES, and WebGL developers. Go Beyond the Basics The book thoroughly covers a range of topics, including OpenGL 4.2 and recent extensions. It explains how to optimize for mobile devices, explores the design of WebGL libraries, and discusses OpenGL in the classroom. The contributors also examine asynchronous buffer and texture transfers, performance state tracking, and programmable vertex pulling. Sharpen Your Skills Focusing on current and emerging techniques for the OpenGL family of APIs, this book demonstrates the breadth and depth of OpenGL. Readers will gain practical skills to solve problems related to performance, rendering, profiling, framework design, and more.

Real-Time Rendering, Fourth Edition

ShaderX4

GPU Pro 360 Guide to Lighting

GPU Pro 360 Guide to Rendering

GPU Pro 2

Today is the greatest time in history to be in the game business. We now have the technology to create games that look real! Sony's Playstation II, XBOX, and Game Cube are cool! But, all this technology isn't easy or trivial to understand - it takes really hard work and lots of Red Bull. The difficulty level of game programming has definitely been cranked up these days in relation to the skill set needed to make games. Andre LaMothe's follow-up book to Tricks of the Windows Game Programming Gurus is the one to read for the latest in 3D game programming. When readers are finished with Tricks of the 3D Game Programming Gurus-Advanced 3D Graphics and Rasterization, they will be able to create a full 3D texture-mapped, lit video game for the PC with a software rasterizer they can write themselves. Moreover, they will understand the underlying principles of 3D graphics and be able to better understand and utilize 3D hardware today and in the Tricks of the Windows Game Programmin Gurus, 2E takes the reader through Win32 programming, covering all the major components of DirectX including DirectDraw, DirectSound, DirectInput (including Force Feedback), and DirectMusic. Andre teaches the reader 2D graphics and rasterization techniques. Finally, Andre provides the most intense coverage of game algorithms, multithreaded programming, artificial intelligence (including fuzzy logic, neural nets, and genetic algorithms), and physics modeling you have ever seen in a game book.

Welcome to ShaderX7: Advanced Rendering Techniques, the latest volume in the cuttingedge, indispensable series for game and graphics programmers. This all-new volume is packed with a collection of insightful techniques, innovative solutions to common problems, and practical tools and tricks that provide you with a complete shader programming toolbox. Every article was developed from the research and experiences of industry pros and edited by shader experts, resulting in unbiased coverage of all hardware and developer tools. ShaderX7 provides coverage of the vertex and pixel shader methods used in high-end graphics and game development. These state-of-the-art, ready-to-use solutions will help you meet your daily programming challenges and bring your graphics to a new level of realism. This collection offers time-saving solutions to help you become more efficient and productive, and is a must-have reference for all shader programmers

This book presents techniques to render photo-realistic images by programming the Graphics Processing Unit (GPU). We discuss effects such as mirror reflections, refractions, caustics, diffuse or glossy indirect illumination, radiosity, single or multiple scattering in participating media, tone reproduction, glow, and depth of field. The book targets game developers, graphics programmers, and also students with some basic understanding of computer graphics algorithms, rendering APIs like Direct3D or OpenGL, and shader programming. In order to make the book self-contained, the most important concepts of local illumination and global illumination rendering, graphics hardware, and Direct3D/HLSL programming are reviewed in the first chapters. After these introductory chapters we warm up with simple methods including shadow and environment mapping, then we move on toward advanced concepts aiming at global illumination rendering. Since it would have been impossible to give a rigorous review of all approaches proposed in this field, we go into the details of just a few methods solving each particular global illumination effect. However, a short discussion of the state of the art and links to the bibliography are also provided to refer the interested reader to techniques that are not detailed in this book. The implementation of the selected methods is also presented in HLSL, and we discuss their observed performance, merits, and disadvantages. In the last chapter, we also review how these techniques can be integrated in an advanced game engine and present case studies of their exploitation in games. Having gone through this book, the reader will have an overview of the state of the art, will be able to apply and improve these techniques, and most importantly, will be capable of developing brand new GPU algorithms. Table of Contents: Global Illumination Rendering / Local Illumination Rendering Pipeline of GPUs / Programming and Controlling GPUs / Simple Improvements of the Local Illumination Model / Ray Casting on the GPU / Specular Effects with Rasterization / Diffuse and Glossy Indirect Illumination / Pre-computation Aided Global Illumination / Participating Media Rendering / Fake Global Illumination / Postprocessing Effects / Integrating GI Effects in Games and Virtual Reality Systems / Bibliography

Special Issue on Voronoi Diagrams in Science and Engineering

The Complete Effect and HLSL Guide

The Passionate Programmer

Tricks of the Windows Game Programming Gurus

GPU Pro 360 Guide to Image Space

This project-oriented facilities design and material handling reference explores the techniques and procedures for developing an efficient

facility layout, and introduces some of the state-of-the-art tools involved, such as computer simulation. A "how-to," systematic, and methodical approach leads readers through the collection, analysis and development of information to produce a quality functional plant layout. Lean manufacturing; work cells and group technology; time standards; the concepts behind calculating machine and personnel requirements, balancing assembly lines, and leveling workloads in manufacturing cells; automatic identification and data collection; and ergonomics. For facilities planners, plant layout, and industrial engineer professionals who are involved in facilities planning and design. Wolfgang Engel ' s GPU Pro 360 Guide to Shadows gathers all the cutting-edge information from his previous seven GPU Pro volumes into a convenient single source anthology that covers various algorithms that are used to generate shadow data. This volume is complete with 15 articles by leading programmers that focus on achieving good visual results in rendering shadows. GPU Pro 360 Guide to Shadows is comprised of ready-to-use ideas and efficient procedures that can help solve many computer graphics programming challenges that may arise. Key Features: Presents tips & tricks on real-time rendering of special effects and visualization data on common consumer software platforms such as PCs, video consoles, mobile devices Covers specific challenges involved in creating games on various platforms Explores the latest developments in rapidly evolving field of real-time rendering Takes practical approach that helps graphics programmers solve their daily challenges

Wolfgang Engel ' s GPU Pro 360 Guide to Image Space gathers all the cutting-edge information from his previous seven GPU Pro volumes into a convenient single source anthology that covers various algorithms that operate primarily in image space. This volume is complete with 15 articles by leading programmers speaks to the power and convenience of working in screen space. GPU Pro 360 Guide to Image Space is comprised of ready-to-use ideas and efficient procedures that can help solve many computer graphics programming challenges that may arise. Key Features: Presents tips & tricks on real-time rendering of special effects and visualization data on common consumer software platforms such as PCs, video consoles, mobile devices Covers specific challenges involved in creating games on various platforms Explores the latest developments in rapidly evolving field of real-time rendering Takes practical approach that helps graphics programmers solve their daily challenges

This book provides a fundamental understanding of global illumination algorithms. It discusses a broad class of algorithms for realistic image synthesis and introduces a theoretical basis for the algorithms presented. Topics include: physics of light transport, Monte Carlo methods, general strategies for solving the rendering equation, stochastic path-tracing algorithms such as ray tracing and light tracing, stochastic radiosity including photon density estimation and hierarchical Monte Carlo radiosity, hybrid algorithms, metropolis light transport, irradiance caching, photon mapping and instant radiosity, beyond the rendering equation, image display and human perception. If you want to design and implement a global illumination rendering system or need to use and modify an existing system for your specific purpose, this book will give you the tools and the understanding to do so.

Real-Time Shadows

Practical Rendering and Computation with Direct3D 11

Beginning Direct3d Game Programming

OpenGL Insights

Shadow Volumes und Shadow Mapping mit OpenGL/GLSL

2006 FrontLine Award Winner. The ShaderX series provides a complete toolbox of cutting-edge advanced graphics hardware and software techniques for all levels of graphics programmers, from novices to graphics gurus. With the increasing pixel shader power of current graphics cards, techniques that were once done on the CPU or simply avoided due to their expense are now possible, and this latest volume of the ShaderX series is filled with articles that provide methods for performing these techniques. The collection covers state-of-the-art, shader rendering techniques that will bring your graphics to a new level of realism.

Throughout the book you'll find a plethora of all new, ready-to-use solutions and tools for the many graphics programming challenges you face everyday. These solutions will save valuable programming time, helping to make you more efficient and productive. Throughout the collection you'll find: How to simulate cloth on the GPU; How to use ambient occlusion efficiently in a game environment; Several global illumination approaches suitable for current hardware platforms; How to do real-time caustics on the GPU; Several ways for how to make your shadow penumbra software for shadow volumes and shadow maps; Tips for using the D3DXEffects framework efficiently and how to integrate post processing; Real-time damage system that uses a damage map to store damage data; Snow rendering; Procedural generation of textures; Tricks, tips, and techniques for super shader, a light map precomputation tool that stores radiosity light maps, and a system for debugging and optimizing applications, and much more... This is an indispensable series that should be on ever graphics programmer's bookshelf!

Direct3D 11 offers such a wealth of capabilities that users can sometimes get lost in the details of specific APIs and their implementation. While there is a great deal of low-level information available about how each API function should be used, there is little documentation that shows how best to leverage these capabilities.

Written by active me

Wolfgang Engel ' s GPU Pro 360 Guide to Rendering gathers all the cutting-edge information from his previous seven GPU Pro volumes into a convenient single source anthology that covers real-time rendering. This volume is complete with 32 articles by leading programmers that focus on the ability of graphics processing units to process and generate rendering in exciting ways. GPU Pro 360 Guide to Rendering is comprised of ready-to-use ideas and efficient procedures that can help solve many rendering programming challenges that may arise. Key Features: Presents tips and tricks on real-time rendering of special effects and visualization data on common consumer software platforms such as PCs, video consoles, and mobile devices Covers specific challenges involved in creating games on various platforms Explores the latest developments in the rapidly evolving field of real-time rendering Takes a practical approach that helps graphics programmers solve their daily challenges

Shadow Algorithms Data Miner provides a high-level understanding of the complete set of shadow concepts and algorithms, addressing their usefulness from a larger graphics system perspective. It discusses the applicability and limitations of all the direct illumination approaches for shadow generation. With an emphasis on shadow fundamentals, the book gives an organized picture of the motivations, complexities, and categorized algorithms available to generate digital shadows. It helps readers select the most relevant algorithms for their needs by placing the shadow algorithms in real-world contexts and looking at them from a larger graphics system perspective. As a result, readers know where to start for their application needs, which algorithms to begin considering, and which papers and supplemental material should be consulted for further details.

Manufacturing Facilities Design and Material Handling

Advanced 3D Graphics and Rasterization

GPU Pro 7

GPU Pro 4

GPU-Based Techniques for Global Illumination Effects

The 9th issue of the Transactions on Computational Science journal, edited by François Anton, is devoted to the subject of Voronoi diagrams in science and engineering. The 9 papers included in the issue constitute extended versions of selected papers from the International Symposium on Voronoi Diagrams, held in Copenhagen, Denmark, June 23-36, 2009. Topics covered include: divide and conquer construction of Voronoi diagrams; new generalized Voronoi diagrams or

properties of existing generalized Voronoi diagrams; and applications of Voronoi diagrams and their duals in graph theory, computer graphics, bioinformatics, and spatial process simulation.

The topic of *The Complete Effect and HLSL Guide* is shader development and management, and therefore it is written for any developers who have some interest in being efficient at using and integrating shaders within their applications. This book is written to serve as both a teaching and reference manual, making it a must-have to everybody from hobbyist programmers to professional developers. The approach taken throughout *The Complete Effect and HLSL Guide* makes it the perfect book for anyone who wants to integrate shaders into their application and take advantage of the power of the DirectX effect framework and the HLSL shading language. The following topics are covered: * Introduction to both the HLSL shading language and effect file development including their detailed syntax and use. * Complete reference along with performance considerations to every HLSL and assembly shader instructions. Introduction the DirectX Effect Framework and complete overview to its API. * Optimization tips and tricks to make the best out of your shaders. * Coverage of all the main components of the Effect Framework in addition to putting the pieces of the puzzle together allowing you to develop a shader management framework.

Shader X5 Advanced Rendering Techniques is the newest volume in this cutting-edge, indispensable series for game and graphics programmers. This all new volume is packed with articles covering state-of-the-art shader techniques and tools written by programming professionals from around the world. These authors have a wealth of knowledge and experience in the field, and each section is edited by an industry expert to ensure the highest quality and usefulness! The collection is broken into nine comprehensive sections. The geometry section covers improved N-Patches, how to generate dynamic wrinkles on animated meshes and much more. In the rendering section you will discover how to generate a tangent space ordinate system in the pixel shader, how to setup an area light for games, and a variety of other techniques. Practical and useful multi-frustum shadow maps like Cascaded Shadow Maps and Queried Virtual Shadow maps are covered in the shadow section. The environmental techniques section features the beautiful volume particle approaches: Rain and Godrays under water. The global illumination section covers techniques that should work in next-gen games. The new mobile section lays out the basics of shader driven next-gen mobile development and some advanced effects tailored to the devices. Many shader-relevant engine design decisions are covered in the 3D Engine Design section. It also deals with post-processing effects, how to design shader plugins, and how to bind shader data. The Beyond Pixels and Triangles section covers a printf for the pixel shader, random number generator on the GPU, and many more.