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# COURSE NOTES 62

## Fundamentals and Overview of Computer Graphics

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# SIGGRAPH 1993 Course #62

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# Fundamentals and Overview of Computer Graphics

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## Course Description

This course will start with a historical perspective of computer graphics and an introduction to the fundamental concepts. The current state of the industry and important trends will then be briefly discussed. The remaining 3/4 of the course is a survey of topics. Emphasis is on breadth of coverage, rather than on teaching the technical details. The guiding principle will be to give attendees an intuitive understanding of many concepts instead of the details of introductory issues.

Although this course will not supply the details, it will supply references to them. The course notes are intended to be useful as a reference source to determine where to look for an in-depth discussion of particular topics.

### COURSE LEVEL

Beginning. We will explain basics like "what's a pixel?". There will be no in-depth analysis.

### WHO SHOULD ATTEND

This course is for technical professionals and managers who are unfamiliar with computer graphics, and who desire a general understanding. It is also for those that have heard terms like "pixel", "CSG", "Z buffer", and "trackball", and would like a more global context in which to make sense of them and understand how they fit together. This course is not for those who want to learn specifics like how a Bresenham vector algorithm works, or how to best code a 3D transform.

### PREREQUISITES

No background in computer graphics or mathematics is required. Some exposure to computers and programming would be helpful. The course fee is mandatory.

## Speaker Biographies

### RICHARD M. FICHERA

Richard has worked extensively in systems and processor technology consulting as well as working on specialized emerging semiconductor technology studies. He has over twenty years of experience in the computer industry in fields such as software engineering, hardware architecture, processor technology, scientific computing, distributed systems technology, scientific visualization, and graphics technology. He has operational experience ranging from contributing engineer to V.P. of marketing at a rapidly growing technology company.

Richard's education includes a combined Operations Research, Statistics, and Computer Science B.S. from U.C. Berkeley, and Graduate studies in Econometrics and Policy Planning.

## **DR. ANDREW GLASSNER**

Dr. Andrew S. Glassner is a Member of the Research Staff at the Xerox Palo Alto Research Center (PARC). He received his BS from Case Western Reserve University, and his MS and PhD from the University of North Carolina at Chapel Hill. Dr. Glassner's research interests are directed towards efficiently creating realistic and expressive three-dimensional images, models, and animation. His technical publications include papers on creative modeling, texture mapping, and ray tracing, as well as techniques for color manipulation and digital sound editing.

In addition to research papers, Glassner is a prolific author of both technical and popular books and articles. He is the author of "3D Computer Graphics: A Handbook for Artists and Designers", which describes the fundamentals of computer graphics without using any equations or programs. He edited "An introduction to Ray Tracing", and created the popular series "Graphics Gems", for which he edited the first volume and serves as series editor. He is currently working on a new textbook, "Principles of Digital Image Synthesis", to be published by Morgan-Kaufman in 1994. Glassner is a popular international lecturer on different aspects of computer graphics.

Glassner also writes fiction (primarily short stories), and has recently written his first book for children. His other interests include art (calligraphy, drawing and painting in various media, printmaking, paper-making, and Celtic knotwork), music (jazz piano), literature, and the outdoors (hiking and camping).

## **OLIN LATHROP**

Olin Lathrop is one of the two founders and V.P. of Research of Cognivision Inc., a company specializing in data visualization software and services. His current interests are in visualization algorithms and techniques, and learning how to best present information for human understanding. He previously worked at Apollo Computer on the graphics architecture of the DN10000VS workstation, and at Raster Technologies designing 3D graphics products such as the model One/380 and the model One/25-S. Mr. Lathrop is an occasional lecturer on computer graphics and data visualization at conferences and universities, but also enjoys teaching the basics to newcomers in the field. He received his B.S. ('78) and M.Eng. ('80) in electrical engineering from Rensselaer Polytechnic Institute.

## **CARL MACHOVER**

Carl Machover is president of Machover Associates Corporation; a consultancy which provides a broad range of management, engineering, marketing and financial services world-wide to computer graphics users, suppliers and investors. Application areas served include CAD, CAM, CAE, CIM, business, slidemaking, art, animation, graphic arts, multi-media, process control, technical documentation, visualization, virtual reality, engineering and scientific. He is also an Adjunct Professor of Computer Graphics at Rensselaer Polytechnic Institute, and Past-President of NCGA.

Mr. Machover is an internationally recognized expert in computer graphics. He is on the editorial advisory boards of many industry publications. He has written numerous articles on computer graphics, has conducted computer graphics seminars

and lectures world-wide, is editor of the "C4 Handbook", co-editor of the "CAD/CAM Handbook", co-author of "Japanese Computer Graphics Industry and Markets", consulting editor of McGraw Hill Book series, "Visual Computing", and associate editor of WSPC "Information Display" series. In 1988, Mr. Machover received the North Carolina State University Orthogonal Award, he was inducted in the FAMI Computer Graphics Hall of Fame, and was given the NCGA Vanguard award in 1993.

He graduated as an electrical engineer from Rensselaer Polytechnic Institute, and has over three decades of experience. He is a Fellow of the Society for Information Display (former National President), and the Computer Graphics Pioneers (former "Chief Old Timer"), among other professional societies.