

SIGGRAPH 1990

**17th International Conference
On Computer Graphics and
Interactive Techniques**

**Dallas Convention Center
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COURSE NOTES

S EDUCATION FOR VISUALIZATION

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Georgia State University

Lecturers

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Table of Contents

Introduction	i
Course Description.....	ii
Biographies of Speakers.....	iii
Course Schedule.....	iv
Experiences With Scientific Visualization Applications in an Undergraduate Computer Graphics Laboratory Course (N. Schaller)....	1
Introduction.....	1
An Interdisciplinary Approach.....	2
The RIT Computer Graphics Lab Course.....	2
The Addition of an Interdisciplinary Flavor.....	2
Course Preparation.....	3
Student Visualization Projects.....	3
Student and Faculty Reactions.....	4
Rewards.....	4
Lessons Learned/Rules for the Road.....	5
Conclusions.....	6
References.....	6
Slides.....	8
Software Technologies Research Center Profile (T. DeFanti).....	16
SofTech Programs.....	17
SofTech Resources.....	23
Economic Viability and Impact.....	29
SofTech Management Structure.....	39
Issues to Appreciate in Scientific and Educational Computer Graphic Animations (S. Rueff).....	43
The Colors of Reality (S. Rueff).....	56
Color and Image Processing.....	56
Instrument Resolution.....	59
Graphic Representation of Non-Visually Realistic Data.....	65
The Visualization Process in a Scientific Laboratory (B. Cabral).....	69
Introduction.....	69
A Model of the Visualization Process.....	70
A Suggested Curriculum for Scientific Visualization.....	74
Conclusion.....	75
References.....	76
Visualization in Scientific Computing (<u>Computer Graphics</u> Vol. 21, No. 4, November, 1987).....	77
Table of Contents.....	81
Executive Summary.....	82
Preface.....	83
ViSC:Definition, Domain and Recommendations.....	84
Appendix A:Scientific and Engineering Research Opportunities.....	97
Appendix B:Visualization Environments:Short-Term Potential.....	114
Appendix C:Visualization Environments:Long-Term Goals.....	130
Appendix D: Industrial Competitiveness.....	150

Course Description:

Visualization is a method of enhancing the communication of information, particularly multi-dimensional information, using visual techniques. It entails both image synthesis and image understanding. It encompasses techniques in computer graphics, art, design, and the particular data domain. This seminar will discuss the requirements for successful implementation of visualization techniques in the different data domains and how to educate computer scientists in these. It will focus on education for visualization at the undergraduate level, at the graduate level, and for research professionals from other fields.

Each speaker brings a particular set of experiences to the seminar. Nan Schaller will describe her experience with collaborative work between computer graphics students and science faculty in developing visualization applications, and its effects on the undergraduate course. Tom DeFanti will describe a new program which introduces science professionals to visualization through one-on-one work with his graduate students. Sylvie Rueff will share her experience at JPL and Caltech, including work on The Mechanical Universe and Project MATHEMATICS!, in describing the visual education needed by visualization professionals. Brian Cabral is active in visualization work at Livermore Labs; he will share the experience of visualization at the laboratories and will suggest a number of topics that should be introduced in undergraduate Computer Graphics courses to support this work.

Who should attend? The seminar is designed for those who teach computer graphics, but will not assume any particular set of background knowledge. Experience in course or curriculum development will be useful. Those who should take this course include persons teaching computer graphics courses in Computer Science, Engineering, or Arts programs, or who are interested in teaching visualization techniques.

Recommended background: The participants should be familiar with the general area of computer graphics, but not necessarily with visualization techniques.

Course objectives: The participants should gain an overview of basic visualization techniques and skills needed for professional work in different domains in the sciences and mathematics. They should also gain an increased understanding of methods for educating themselves and their students in these techniques.

Speaker's Biographies:

G. Scott Owen is professor of mathematics and computer science at Georgia State University. He has been using computer graphics in scientific research and education for over twenty years, and is the current chair of the ACM-SIGGRAPH education committee. His current interests include visualization techniques, computer graphics, artificial intelligence, computer science education, and computer assisted instruction. He received his B.S. in chemistry from Harvey Mudd College and his Ph.D. in physical chemistry from the University of Washington.

Steve Cunningham is professor of computer science at California State University, Stanislaus and is former chair of the ACM-SIGGRAPH education committee. He has written widely on computer graphics education and on visualization in science and mathematics education. He is particularly interested in how scientific visualization can change undergraduate computer graphics courses. He received his M.S. in computer science from Oregon State University and his Ph.D. in Mathematics from the University of Oregon.

Nan Schaller is an associate professor of computer science at the Rochester Institute of Technology, Rochester, New York. her professional interests include computer graphics and parallel computing. Schaller received a B.S. in mathematics from the University of North Carolina, an M.S. in computer science from Union College, and an M.S. in Industrial Administration from Union College. She is a member of ACM and ACM-SIGGRAPH and a recipient of one of the 1988 SIGGRAPH Educator's Grants. She is also a founding member and vice-president of the Rochester Local ACM-SIGGRAPH.

Tom DeFanti is professor in electrical engineering and computer science, co-director of the Electronic Visualization Laboratory at the University of Illinois at Chicago. He is also director of the UIC Software Technologies Research Center and an adjunct professor at NCSA. His current research interests include graphics system software development, televisualization (graphical networking), scientific visualization, virtual environments, computer animation, medical visualization, picture archiving, autostereo 3D presentation graphics and interactive performance art. He served as co-designer and curator of *The Interactive Image*. He was chair of ACM-SIGGRAPH, 1981-85, is the editor of the SIGGRAPH Video Review, and was co-editor of the special issue of *Computer Graphics* on "Visualization in Scientific Computing". He received his Ph.D. in Computer Science from Ohio State University.

Sylvie Rueff has been a member of the technical staff at JPL for over seven years. During that time she has worked on a number of JPL produced animations including the Mechanical Universe, Mathematics!, and the Voyager and Galileo projects. Her primary interests are in developing software tools for computer graphics in a scientific data analysis environment. She received a B.S. in computer science from the University of Oregon and is a member of ACM-SIGGRAPH.

Brian Cabral has been working at the Lawrence Livermore National Laboratories for over seven years. His current position is Project Engineer for the Advanced Visualization Research Project. His primary interests are in visualization algorithms, computational geometry, operating systems, and computer architecture. He has developed a number of graphics packages and volume visualization algorithms. He received his B.S. in computer science from California State University at Stanislaus and his M.S. in computer science from the University of California at Davis. He is a member of ACM and ACM/SIGGRAPH.

Course Schedule:

- 2:00 - 2:15: G. Scott Owen and Steve Cunningham: Introduction, seminar objectives and overview
- 2:15 - 3:00: Nan Schaller: Experience with visualization applications and consulting in undergraduate Computer Graphics Courses
- 3:00 - 3:45: Tom DeFanti: Visualization education for science professionals; teaching research professionals from other disciplines about visualization techniques
- 3:45 - 4:00 break
- 4:00 - 4:45 Sylvie Rueff: Visual aspects of visualization work; the visual skills a student needs to develop in order to do visualization work.
- 4:45 - 5:30 Brian Cabral: Use of visualization in an actual laboratory; what these laboratories want from new hires in this area; what Computer Graphics courses can emphasize to assist students with these skills.
- 5:30 - 6:00 General discussion and question period