Keynote Address

A Vision for Visualization

Frederick P. Brooks, Jr.
Department of Computer Science
University of North Carolina at Chapel Hill

Scientific Visualization is not yet a discipline. We have no general theory, much less one tied to the realities of human perception. We have few generalized recipes. At present, we have a collection of ad hoc techniques and a collection of fine examples that show the power of computer graphics techniques to illuminate and convey scientific truth. The best of them also show power to compel the imagination and to delight the heart with their beauty. Understanding how to achieve illumination will require systematic exploration of *many different techniques*, and systematic evaluation of rules of thumb.

The right visualization depends upon what question one is asking. I see us supplementing the present techniques, which proclaim *"See what I can see!"* , with visualization systems that program *"Let's see what I can see!"* and even, *"See what you can see in my data."*

A visualization is an experience, not an image, and modern graphics offers a sort of user-directed dynamic visualization that no medium has ever before offered. What is the potential of this new medium? How do we use it?

A scientific visualization has to be designed, just as a book or paper does. New work by Bergman focuses on the design process, sees sketching of possible visualizations as the starting step, and provides facilities for making true-to-scale sketching easy, by automatic extraction of precise numbers from a database.

Scientific visualization surpasses all other computer graphics in the pre-eminent obligation for *truthfulness* in what it conveys. Sadly, we have not always disentangled our art from show business, whose primary obligation is to please. We will look at a few examples, and ask, "How can we avoid misleading our viewers?" The role of *background music* has to be part of this study.

Biographical Sketch

Frederick P. Brooks, Jr., is Kenan Professor of Computer Science at the University of North Carolina at Chapel Hill. He grew up in North Carolina, graduated summa cum laude in physics from Duke and took his S.M. and Ph.D. in computer science at Harvard under Howard Aiken.

He joined IBM upon graduation and was one of the architects of the IBM Stretch and Harvest computers.
From 1961-65 he was Corporate Project Manager for the System/360, including development of the System/360 computer family hardware, and the Operating System/360 software. For this work he shared the National Medal of Technology with Bob Evans and Erich Bloch, and received the IEEE Computer Society MacDowell Award, and others.

He joined UNC in 1964, where he founded the Department of Computer Science and chaired it for its first 20 years. His research has been in computer architecture, software engineering, and interactive 3-D computer graphics ("virtual reality"). His best-known book is The Mythical Man-Month: Essays on Software Engineering.

Dr. Brooks has served on the National Science Board and the Defense Science Board. He is a member of the National Academy of Engineering, a foreign member of the Royal Netherlands Academy of Arts and Sciences, and a Fellow of the American Academy of Arts and Sciences. His career work has been recognized by the John von Neumann Medal of the Institute of Electrical and Electronic Engineers.