A Vision for the Future Of CGL

One ongoing theme to be enhanced by a New Media appointment will be the quality of the user's experience. In the twenty-first century the products of computer scientists are responsible for much of the quality of each citizens' every-day environment. Currently, most research is targeted toward making certain that computational artifacts in these environments are technically correct and efficient, but very little thought is given to the quality of the experience they provide. That is, I am pretty certain that my great-grand-children will be surrounded by technical artifacts incorporating significant amounts of computation, and that the responses of these artifacts will be reliable. But will that world, regardless of how well it works, be worth living in? I think about the quality of the experience I have while operating a bank machine, and my response is, 'If there is a special circle of hell for computer scientists, its occupants will be required to withdraw money from bank machines, *forever*!' While walking through the departure and arrival concourses of airports I imagine all the commercial messages enhanced by personalization, by high speed network links to databases, by digital media and by all the other technologies provided by computer science, and I want to wake up from the nightmare. New Media research, social cultural and technical, is essential if we are going to bequeath to our descendants a life worth living. A New Media chair at Waterloo, together with his or her research program, will allow us to develop algorithms, heuristics and values that will inform the education of students who will create the future. They must have the eclectic experiences that an environment like CGL offers, to free their imaginations so that humanity can avoid the narrow technical path that leads to nightmares.

Just kidding!

Craig's Vision

For most of its five decade history, computer graphics sought to answer the challenge of photorealism: the accurate depiction of physical reality. Recent work in film and interactive entertainment shows that many of the fundamental problems in photorealism have been solved satisfactorily. Just as painters were motivated to pursue abstraction after the invention of photography, we now face a much subtler and more interesting challenge: that of unlocking the computer's potential not merely to reproduce but to communicate, to inform, to enlighten, to entertain and to inspire.

The computer is truly the ultimate medium for art and communication. Through graphics, interaction, and networking, computers can lead us to new modes of expression that were not previously possible. A sustained research program in New Media will unlock the computer's full potential and drive a new generation of media production and consumption. To this program we will bring our complimentary research on perception, attention, visualization, 2D and 3D art and design, animation, and user interfaces. A Chair in New Media can act as a focal point, providing a context and direction for many of these individual projects.

Bill's Vision

Computer graphics and HCI sit exactly where computer science affects, for better or worse, the life of real people. As such it necessarily makes contact with almost every discipline, from fine art to economics. For a small group like CGL our research reach is limited by the inability of any professor to be truly expert in more than two or three disciplines. At present it is impossible to predict what new disciplines will be represented in the expertise of the chair and the ancillary hires, but we hope they overlap little with our current range because the stimulation of new points of view inevitably opens up new vistas, and spurs conjunctions of ideas that link up very diverse phenomena.

This is a very unspecific vision, and rightly so, because our past experience has been that cross-fertilization between disciplines produces the best research, and especially at the interface where malleable systems as different as humans and computers meet. It is, however, possible to give some specific examples. In a society of fact surplus, humans need technologies that can create knowledge and beauty from the chaos of facts.

Visualization is only a first step, and a baby step, toward achieving that goal. Currently, it provides too little perception and consumes too much cognition. I can imagine big new society-transforming steps in that direction produced by the collaboration between present CGL members and the prospective New Media chair.

Another possible vision lies in the interaction of perception and memory. In daily life perception and memory merge instantly and seamlessly into a model of the immediate environment that humans use for decision and action. Visionaries imagine the networks of the world as a vast memory prosthesis that can instantly enlarge the contents of any individual memory into the memory of all society. But the process is far from seamless. Not too put too fine a point on it, in 2008 web content is read by users in order to store its contents in the reader's long-term memory, which is only a minimal improvement on a dictionary or encyclopedia. To realise the potential of the internet it is necessary to move the acquisition of information by a human onto the time scale of perception, about a hundred milliseconds. To do so we must rethink the architecture of computers and the architecture of the social contexts in which they are used, which will require us to draw on computer science, physics, psychology and sociology, not to mention art, design and rhetoric. I can equally imagine a prospective chair who would be able to take substantial steps toward such a goal.