



Cornell University
Program of Computer Graphics

Fall 2019
T/TH 11:15am-12:05pm + Lab
Milstein Auditorium

Visual Imaging in the Electronic Age

Virtual and Augmented Reality

ART 2907, ARCH 3702, CS 1620, ENGRI 1620
Donald Greenberg

No part of today's digital environments is changing faster than VIRTUAL (VR) and AUGMENTED (AR) REALITY. Initially focused on gaming, these powerful immersive technologies are now being improved so rapidly that they are impacting the entertainment, simulation, education, medical, and design industries to name a few. As mobile phones have changed the telephone and photography industries, VR and AR may become our most popular means of communication between humans and certainly between man and the machine.

What is not realized is that VR & AR technologies are only in their formative stages, somewhat analogous the difference between the early computer graphics of the 1960s to digital cinema of today. It is not just the exponential increase in compute power and bandwidth but the convergence of many disciplines which enable this improvement and growth. Devices being created, from goggles and glasses to multiple-resolution displays depend on perspective imaging, color science, perception and the understanding of the human visual system, computer science, graphics algorithms, human-computer interfaces, hardware manufacturing, as well as the fundamentals of math, physics, and chemistry. All of the topics above except the fundamentals are covered in this course. This year new topics such as multi-resolution displays, digital cameras which create 3D images, foveal rendering algorithms and how signals from the retina are interpreted by the human brain will be included.