

# CGI lighting, scanning deliver more realistic face (w/ Video)

July 6 2013, by Nancy Owano

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(Phys.org) —Gaming and movie leaders might in the past have put up with CGI faces with that wax-museum look reminding users that the faces are anything but real, but this is a new day with advanced technologies that can make faces look very real. Computer generated imagery (CGI) expertise can perform facial imagery wonders. A team of collaborators with expertise that includes computational illumination and photography for graphics have developed a technique to produce CGI faces that look true, down to the skin cell level. Call it ultra-realistic skin simulation.

The team, led by Abhijeet Ghosh of Imperial College London and Paul Debevec of the University of Southern California, are able to make the virtual face so realistic that the renderings detail it all, pores, blemishes, wrinkles, bumps, and shadows. They do this through a special [lighting](#)

[system](#) and camera. Ghosh, Debevec and team simulate light reflecting off human skin. Each simulated light source is split into four rays, one that bounces off the epidermis, and three that penetrate the skin to different depths before being scattered.

Ghosh presented this system earlier this year at the Games and Media Event at Imperial College London. His [talk](#), "Light Stage Based Acquisition of High Resolution Facial Geometry and Appearance," discussed "polarized spherical gradient illumination," and "ways of measuring layered skin reflectance including surface and subsurface scattering using a small set of measurements under controlled illumination." He also discussed the results of measuring skin microgeometry at the resolution of a few microns for a high-resolution (16K) rendering of skin, for increased facial realism.

Using a special scanner, Ghosh and Debevec took high-resolution images of [human skin](#) from volunteers' cheeks, chins, and foreheads. The detailed renderings of skin—combined with the simulated lighting technique—produced overall impressive results.

Gaming and [entertainment companies](#) are likely to show interest in their technology approach but, [according](#) to a *New Scientist* report, the cosmetic industry has also relayed interest to Ghosh. He said he sees a time when consumers will go to a kiosk for face-scanning. Then software can show what the [skin](#) would look like with a particular foundation, for example, in a form of virtual try-before-you-buy.

**More information:** [gl.ict.usc.edu/Research/Microgeometry/](http://gl.ict.usc.edu/Research/Microgeometry/)  
[gl.ict.usc.edu/Research/DigitalIra/](http://gl.ict.usc.edu/Research/DigitalIra/)  
[ict.usc.edu/prototypes/digital-ira/](http://ict.usc.edu/prototypes/digital-ira/)

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