Alongside small tech’s ascendancy, artists describe what they see at the revolution

If you can’t see something, how do you know it’s there? That’s the conundrum raised by FLW, artwork created by Ken Goldberg, a UC Berkeley engineering professor, and Karl Bohringer, who teaches microelectromechanical systems at the University of Washington.

Viewable only through a microscope, this 1:1 million scale model of Frank Lloyd Wright’s Fallingwater mansion was etched from silicon using MEMS fabrication technology. With Fallingwater’s creation in 1936, Wright pioneered the use of the cantilever—a horizontal structure supported at one end, like a diving board. Today, of course, cantilevers are the enabling structure in many MEMS devices.

Goldberg and Bohringer created FLW in 1996 to challenge assumptions about artifacts that are so distant in scale they can’t be seen with the naked eye. FLW, Goldberg said, was an exercise in “telesternology”—how we know what we know when our perception is technologically mediated, in this case by a microscope.

Heady stuff, but worth considering. After all, FLW was a seminal work in the realm of small tech art.

From da Vinci’s scientific masterworks to the Dadaists of the 1910s to the collaborations between avant-garde artists and Bell Labs engineers in the late 1960s, the intersection of technology and art has been a fertile breeding ground for creative expression. Nearly all technological progress results, intentionally or not, in new artistic tools. This was most recently seen with the invention of the personal computer and the Internet, a revolution resulting in entirely new media.

While FLW is perhaps the only MEMS art to have made the gallery grade, numerous microsystems researchers have fabricated creative structures on the micron scale. The same year Goldberg and Bohringer rebuilt Fallingwater, a team of monster movie buffs at UCLA etched out a MEMS micro-Godzilla. And in 1997, Cornell University researchers built a silicon guitar no bigger than a single cell. The strings could be plucked by an atomic force microscope. Unlike FLW, however, these two pieces were intended more as creative demonstrations of MEMS technology than fine art.

As MEMS have become more available and less expensive, artists have begun incorporating microsystems in macroscale kinetic sculptures. Indeed, in order for artists to explore and experiment with any new technology they must have access to it. Take digital illustration, for example. Arguably, Adobe Photoshop yielded an onslaught of bad fantasy art until PCs became cheap enough for talented artists to get their hands on the mouse.

And that leads directly into the state of the nanoart. With nanotechnology still in its fetal stages, nanoart is primarily limited to computer-generated illustrations of worlds that don’t yet exist. Nanomedicine researcher and Zyvex scientist Robert A. Freitas Jr. curates the Nanomedicine Art Gallery on the Foresight Institute’s Web site (www.foresight.org/Nanomedicine/Gallery). The site features renderings by various artists that range from intricately detailed depictions of “nanorobot species” to psychedelic humanoids boasting nano-enabled wings.

“Artwork in this gallery should be appreciated as expressions of each artist’s unique creative impulses and insights,” Freitas writes on the site. “Some works may be highly interpretive or impressionistic, while others may attempt to achieve photographic realism or the precise rendering of a technical engineering illustration.”

Freitas’ gallery provides just a taste of the terabytes of nano-related illustrations available online. While most of the work is reminiscent of pulp science fiction book covers, there is a growing number of gems that provide a vivid glimpse of the nanoscapes that may lie ahead. For example, photographer/illustrator Conley Jay’s Hollywood-worthy digital image of a nanobot injecting a red blood cell with medicine earned the artist a 2002 Novartis and Daily Telegraph Visions of Science Photographic Award.

Far from the realm of RAM and reason hangs the work of Italian artist Bruno d’Arcevia. Inspired by the research of Mauro Ferrari, professor of internal medicine and mechanical engineering at Ohio State University, d’Arcevia painted a series of 10 epic paintings reminiscent of the Renaissance masters but depicting figures from Greek and Norse mythology interacting with small tech devices. For example, Miracle of Fire shows the Goddess of Fire harnessing electricity from the environment to drill a stone tablet symbolizing a silicon wafer.

Freitas’ comment about this issue on his Nanomedicine Art Gallery could be the manifesto of all nanoartists: “All images are presented with the understanding that they are ‘artist’s conceptions’ which may or may not entirely reflect the technical nanodevice designer’s original intent—or the ultimate engineering reality.”

Or surrealism, as the case may be. ●