

In this 25th anniversary issue of the METROPOLIS magazine the staff selected fourteen events over the past twenty-five years which they considered were significant in improving the world of design.

Rick Smith Joins Frank Gehry - 1991

A former IBM engineer introduces CATIA software into the design process and pushes architecture into a new era

By Laurie Manfra
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"If you watch me draw--actually draw--you'll see it's a frantic kind of searching," Frank Gehry said in an interview published in the 1985 monograph *Frank Gehry: Buildings and Projects*. By the mid-1980s--after the success of his cardboard furniture and Santa Monica home but before Bilbao--Gehry's relationship with the two-dimensional drawing surface had grown uneasy. Evidence could be found not only in his office--strewn with tattered half-built models in paper, cardboard, wood, and plastic--but in the forms of his residential projects completed after 1978. Like his Post-Modern contemporaries, Gehry was breaking from convention, and in doing so he had defined the need for a new tool.

In 1989 Gehry formed what would become a long-term partnership with James Glymph, the managing architect who would make it possible for him to build increasingly unconventional forms. Two years into the partnership, Glymph was searching for a way to construct the Walt Disney Concert Hall, a project that was fraught with delays and wasn't completed until 2003. As colleagues recall, Glymph cold-called potential members of the design team and

wound up contacting Rick Smith, an IBM consultant and specialist in the precision rendering program CATIA developed in the 1980s by a French aerospace company.

Smith had dabbled in architecture as an undergraduate in the 1970s, back when the only 3-D modeling program available ran on a computer that occupied most of a room and had a dozen little gray switches that had to be flicked on in sequence. By the early 1990s he was an industry expert and he leaped at the opportunity to integrate CATIA into Gehry's process.

Immediately he went to work full-time on a trial basis as a consultant in the Los Angeles office. But contrary to later accounts of the Gehry practice during those years, integrating the software was far from seamless. "There was a lot of reluctance," Smith says. "The architects were just not convinced that it would work."

Gehry's staff included renderers and model makers trained in the centuries-old tradition of pencil drafting. "They were realizing there was a change in the industry coming with this computer, and none of them were trained in it," Smith says. Like Gehry, they were accustomed to using their eyes and hands to bring the boss's "dream images" to life. The computer's simplistic wire-frame models--archaic by current standards--paled in comparison to their worked-over drawings, ingrained with lead and erasures. Smith explained to them that the jarring on-screen image was actually "a representation of a three-dimensional object flattened and electronically projected onto a plane of glass." The purpose of the software was to enhance the designer's ability to think in 3-D with a "fourth-dimension capability" that allowed users to rotate and analyze the computer image.

Gehry's designs were pushing the boundaries of two-dimensional expression. And though his process would remain palpable and tactile (he boasted that he didn't even know how to turn a computer on), translation to the scale he needed depended on the aid of Smith's crude but emerging virtual environments. "Often the contractors looked at Frank's physical model and 2-D drawings, and a lot of them said it just couldn't be built," Smith says.

Fortunately for Gehry, Smith had considerable experience teaching the technology's benefits to solution-driven engineers. Straight out of college he landed a job as a CADAM (computer-aided design and manufacturing) operator at Lockheed Aircraft Company, working on the L-1011 TriStar commercial airliner. (CADAM was a precursor to CATIA.) Shortly thereafter he taught CADAM to engineers at one of Avondale Industries' shipyards, facilitating the construction of oil tankers. These experiences made him uniquely qualified to translate Gehry's aerodynamic-looking designs. Smith devised a way to input the architect's massing models into the computer by dragging the probe of a mechanical arm over each crumpled edge.

While his working relationship with the in-house model builders flourished, the drafters increasingly objected to the new mode of production. Ultimately, he got around this problem by delivering--directly to the model builders--a series of printed sections cut vertically and horizontally through the 3-D image, which they used as templates for constructing buildable models of Gehry's "dream images." Gehry then reviewed it, made adjustments by hand, and returned the model to Smith, who input the changes and began the model-building process again until the penultimate vision was realized.

The Guggenheim Bilbao proved to be the first successful large-scale application of CATIA in architecture. But nearly a decade since its completion, issues raised in response to Smith's pioneering process remain unresolved. Before Bilbao there was no precedent for architects and engineers working collaboratively on a single master document, a digital 3-D rendering. If the field continues to follow in the footsteps of industrial design, then this theoretical "3-D master model" is where architecture is headed. Smith foresees a day devoid of that all too familiar scene: the contractor leafing furiously through sheets of architectural drawings.

