

" Digital Sculpture: The Move to Digital Stone and Outsourcing to China"

During the past couple of decades the introduction of new media with emerging digital technologies has allowed for the development, design, presentation, promotion, experimentation and manufacture of three-dimensional forms in conjunction with traditional sculptural processes and materials. Broader aesthetic issues and the historical significance of sculpture in relation to the Electronic Revolution have impacted growing numbers of sculptors worldwide. While Digital Sculpture was a strictly grass roots endeavor during the last decade of the Twentieth Century it has evolved as an academic discipline and focus of international exhibitions

Although styles of work seem exceptionally diverse despite the use of similar technologies there appears to be a nexus relative to the evolution of life forms and issues of consciousness driven by 21st Century scientific developments specifically artificial intelligence, genetic engineering, robotics and nanotechnology.

Strong stylistic relationships to 20th Century abstract modernism, surrealism as well as conceptualist concerns are also apparent in the works of many digital sculptors such as Michael Rees, Keith Brown, Elona Van Gent, Dan Collins, Christian Lavigne, Mary Bates Neubauer, Mary Hale Visser and Robert Michael Smith.

These sculptors are included in the "International Rapid Prototyping Exhibition," curated by Mary Hale Visser and Robert Michael Smith, was originally shown at New York Institute of Technology, Old Westbury, New York; The Rourke Art Museum, Moorhead, Minnesota; and Southwestern University, Georgetown, Texas. The exhibition has since been traveling with RP sculptures newly printed at some venues including the University of Houston at Clear Lake; Pennsylvania State University, University Park, Pennsylvania; Yeditepe University, Istanbul, Turkey; and Manchester Metropolitan University, United Kingdom.

Internet communication advances such as E-mail and the Web have been most significant to connect these geographically diverse artists to work together to develop sculptural ideas, share knowledge of emerging technologies and arrange exhibitions. E-mail has replaced traditional artists' meeting spaces such as local bars and cafes. Virtual sculpture files are transmitted via the Internet to be simultaneously manufactured by machines at various locations throughout the globe.

"Intersculpt", the international biennial events for digital sculpture was first organized in 1993 by Ars Mathematica has been developed through the cooperation of FastUK and many curator/artists including Christian Lavigne, Keith Brown, Dan Collins, Robert Michael Smith and Michael Rees. In the latest of these simultaneous biennial exhibitions, telemanufactured works have been

shared by artists located across the globe and realized by RP machines at international venues in Paris, France; Philadelphia, Pennsylvania; Auckland, New Zealand; Dakar, Senegal; Singapore; Hong Kong, China; Manchester, United Kingdom; New York, New York; New Orleans, Louisiana; Columbus, Ohio; Tempe, Arizona; and San Francisco, California.

The introduction of stereolithography during the late Eighties revolutionized design for the aerospace, military and automotive industries. CAD files are virtually sliced to minutely thin cross sections of the prototype model. These sections direct a laser at a bed of light-sensitive slurry to consecutively cure the cross sections to a hardened resin reproduction.

However, few sculptors could afford access to this dynamic process. During the past five years several low-cost rapid prototype systems have emerged that produce various materials such as resins, plastics, waxes and powders. These newer RP systems function similarly to stereolithography by virtually slicing CAD models then printing each layer into a material matrix. These economical systems allow sculptors worldwide to experiment with computer assisted design and manufacture of sculpture.

Although CNC (computer numerically controlled) milling has existed for several decades it has continued to be the least expensive process for producing large-scale sculptures from digital files. It is also the most effective process to create sculptures in traditional materials such as foam, plastics, wood, metals and stone as well as new composite materials. A rotary mill or drill bit is directed by digital 3D file where to cut and not cut into the material surface. The bit is driven by motors and a gantry system to enable access to carve the various sections of material.

The Digital Stone Project located in Hamilton, NJ boasts the world's premiere facility to carve any type of stone to any scale from digitally produced files. It was at these facilities that I produced three marble sculptures originally designed in a CAD program: Amaranthe I, Ephesiancybergin, and Gynefleuroceraptor. Amaranthe I and Ephesiancybergin were later enlarged to 6-feet, CNC cut in foam by Digital Atelier, Hamilton, NJ and coated with a polyurethane skin to withstand weather for presentation at outdoor sculpture exhibitions.

Essentially, it is now possible to produce digitally designed sculptures at any scale in any traditional sculptural material at many global locations simultaneously. Each reproduction is as accurate as the first since every piece is custom built from the original digital file. There is no loss of detail or accuracy due to traditional issues of mold breakdown, enlarging miscalculations or disparity of craftsmanship. Customs and shipping costs can be eliminated whenever digitally capable manufacturers are available near the site of a commission or exhibition.

Traditional processes can now easily and inexpensively be outsourced to other international production facilities. Last year I brought a rapid prototype model of “Gynefleuroceraptor” to a stone carving company based at China. The Chinese artisans accurately enlarged this sculpture to 3-feet cubed with a 3-foot tall base in China Black granite. Production costs including shipping to USA were a small fraction of production costs anywhere in America or Europe. Similar facilities are available to produce any work in wood and bronze as well as any stone.

Throughout history artists have consistently adapted new technologies to present classic concepts with a fresh vision, to discover the most successful design solutions for new construction materials/processes, and to visually engage philosophical debates within every culture. The resulting role of the artist has been to humanize technology.

Robert Michael Smith

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www.sculpture.org International Sculpture Center

www.sculpture.org/documents/complab/comp.htm Links to Digital Sculpture articles

www.sculpture.org/RMS Robert Michael Smith sculptures

www.rpsculpture.org International Rapid Prototyping Exhibition

www.intersculpt.org InterSculpt, international digital sculpture biennial events

www.kreysler.com Kreysler & Associates, CNC custom milling company

www.atelier.org, The Digital Atelier, enlarging and CNC sculpture production company

www.rhino3d.com Rhino, industrial design and engineering CAD program