

# THE DIGITAL STONE PROJECT

by William V. Ganis

Situated between New York City and Philadelphia near Trenton, New Jersey, the Digital Stone Project (DSP) houses the most comprehensive collection of Computer-Numeric-Controlled (CNC) mills and lathes used exclusively in the service of art. This nonprofit entity was formed from a preexisting institution, the Johnson Atelier (JA) Stone Division. Through the late 1990s and in the beginning of the new century, the Johnson Atelier Stone Division, directed by Walter Dusenbery and Christoph Späth, assembled this array of stone-carving equipment. In the autumn of 2003, the Atlantic Foundation (the Johnson Atelier's administrators) ceased operation of its internationally acclaimed foundry, including the digital stone sculpting studio. The Atlantic Foundation's stated plan was to disassemble the machinery and sell the equipment piece by piece to the architectural stonecutting industry.

The JA Stone Division directors and their clients understood that the closing of the stone studio would mean the loss of a unique resource, and quickly began to examine ways to preserve it. The challenge was to convince the Atlantic Foundation of the value of keeping the studio intact (even if operated by

another organizational entity) and to accept a buyout at a fair market price. The high prices of new equipment would have made reassembling such a plant nearly impossible. The Atlantic Foundation agreed to sell all the equipment for half a million dollars—a relative bargain—but a difficult sum for several mid-career sculptors to raise.

The Digital Stone Project resulted from a collaboration of the Stone Division directors together with sculptors Jon Isherwood, Barry X Ball, Robert Michael Smith, Lawrence Argent, Lauren Ewing, Michael Rees, and Donald Guarnieri contributing their own money (anonymous donors made up the difference) to purchase the equipment from the Atlantic Foundation. After nearly a year following the JA studio's closing, it reopened during July 2004 as the not-for-profit Digital Stone Project.

*On pages 22 and 23: Different stages of carving Shower by Carole Feuerman, Rosa Aurora marble; depicting ways the machines can remove material, from core-drilling to rough sawing and rotary tools.*



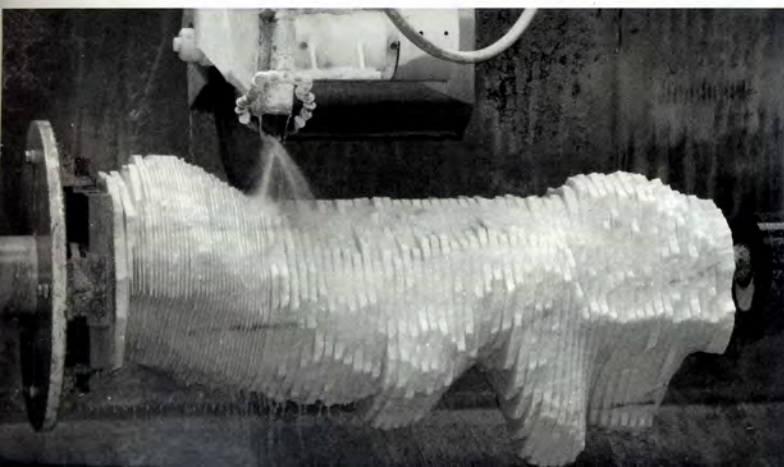
The DSP's 10,000-square-foot studio includes three overhead cranes, several laser scanners, a robot diamond wire saw for roughing out complex contours, a bridge saw for making precision block cuts, and three separate custom-fitted CNC milling machines. The studio also includes a host of handheld power and traditional tools for finishing each project.

Works executed on these machines range from huge public installations to personal sculpture, and attest to the many capabilities of this equipment. For instance, *Common Ground* (2004), a work designed by Wopo Holup, includes organic relief patterns of indigenous vegetation that were milled into a total of 400 marble tiles set into the walls of the intersection of Northern Boulevard and the Brooklyn-Queens Expressway. Almost half (\$490,000) of this million-dollar project was budgeted for robotic milling. Commissioned by the Department of Transportation, *Common Ground* had the largest budget of any public art project awarded by the state of New York.

In another high-profile public endeavor, several hundred marble elements were cut on the facility's equipment for the restoration of New York City's Tweed Courthouse. Working with the Georgia Marble Company, surviving architectural

elements were laser-scanned so that exact replicas could be made to replace those lost or ruined over the years.

Many works executed on the computerized equipment are rescalings and material realizations of works otherwise created by traditional or "analog" means. For example, Patricia Cronin's *Memorial to a Marriage* (2003) was originally modeled in clay, and the artist provided a plaster cast that was laser-scanned. This process created a three-dimensional electronic model that could be used by CNC machines. Once the marble material was selected, the digital carving process first blocked out and then refined this funerary sculpture. Using data fed to the machines, contour cuts were initially made, and then the material was sawed, drilled, and routed on the facility's five-axis mill with ever-increasing precision as finer and finer tools were installed. In another instance of monumental rescaling, in 2006 the DSP finished a massive pediment project for the Schermerhorn Symphony Center in Nashville, Tennessee. A one-third-size plaster model sculpted by Washington, D.C., artist Ray Kaskey was laser-scanned and the final limestone pediment was executed at 60 feet long, 9 feet high, and 2 feet of relief for its final architectural realization.





figurative *Memorial to a Marriage* took about three months to accomplish with the machines (and hand-finishing) as opposed to an estimated year if the work was executed entirely by artisans.

Some sculptors have engaged these resources because they retain verisimilar qualities even when images are greatly scaled. For instance, Jon Isherwood enlarged fingerprint patterns that were cut into large boulders for a site-specific work titled *Prints and Passages / Match / Mismatch* (2003) at the Bureau of Criminal Apprehension in St. Paul, Minnesota. While this work could have been carried out by hand carving, in this case the computerized process offers conceptual resonance since it yields an “objective” form and mirrors the investigatory processes of the crime labs within. The digitized fingerprint is an index of an index kept in databases that are searched and compared electronically in such police laboratories.

In other works executed on the facility’s lathes, Isherwood infuses the properties of one material in another. Works such as *Temptress* (2003) start out as plaster models that are laser-scanned. In this case, the Swanson red marble that is cut on the robotic lathe retains the plaster’s organic irregularity and slump. The loose spontaneity of shaping and cutting plaster is captured in this transubstantiation and enlargement; viewers are unaccustomed to seeing marble “behave” as such. On the other hand, Isherwood adds regular, machine-perfect incisions and designs to these organic forms. Works such as *Virtuoso* (2005) announce the digital process

Concerning all the works mentioned in this text, the machines can only do so much and are often not ideal for finishing surfaces. Artisans are ultimately reintroduced for the fine work needed to complete all these pieces—the smoothing of final forms, delicate appendages, undercuttings, and additions of minute details. The digital process offers certain economic advantages, since the machines are relatively fast for traditionally heavy and tedious work such as blocking-out. Only in executing fine details, textures, and finishes does the craftsman become less expensive than the machine. In Cronin’s case, her

*On this page: Shower by Carole Feuerman, Rosa Aurora marble.*

*Opposite, top: St. Elizabeth of Hungary by Rob Neilson, white marble.*

*Opposite, bottom left: Memorial to a Marriage by Patricia Cronin (2003).*

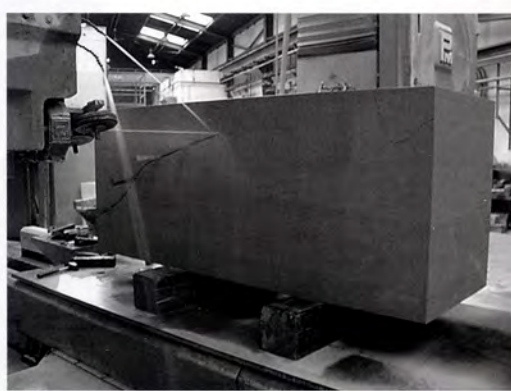
*Opposite, bottom right: Whispers by Lawrence Argent (2001).*

inherent in their creation through precise striations applied atop subtle planar distortions. Recent works by Isherwood, such as *Aletheia* (2007), include marks of the artist's hand once pressed into the clay or plaster source and now seemingly impossibly plied into Champlain marble. Made by every child handling clay or dough, these inchoate forms are familiar to us all. Works from this series are made uncanny not just by their material transformation, but because the indexical imprints are both fantastically enlarged and photographically real.

In another example of the DSP's scaling capabilities, Lawrence Argent included huge mouths in his *Whispers* (2001) installation situated at the University of Denver in Colorado. In this work, the lips were laser-scanned from real people. The resulting data was used to sculpt these large mouths through a stone-milling process. Despite their exaggeration in limestone, these sculpted mouths retain verisimilar features, including the skin texture and folds of their life models. Another Argent public sculpture sited in Denver, *Pillow Talk* (2000), includes a stack of Colorado Yule marble pillows—the precise forms attained through laser-scanning create a transformation in which stone uncannily seems to sag, dimple, and fold like batting and fabric.

Barry X Ball was one of the first artists to experiment with these robotic machines. In 1998, he started to learn what new possibilities this equipment afforded him. Compelled by these technological prospects, his work has since radically changed. For instance, Ball distorts laser-scanned representations of fellow artist Lucas Michael (2000–2006) to create fantastical personas in enduring stone. In the virtual environment, Ball anamorphically stretched Michael's likeness and added grotesque details such as a javelin-stretched cranium, flayed neck flesh, and subtle (and excruciatingly regular) ribbing patterns on the face. From this electronic file, Ball had a piece of Pakistani onyx the color of raw beef cut on the digital lathes to create a techno-mannerist portrait. Because these instruments cut and grind the stone, rather than reducing it through a traditional chipping-away process, Ball can use stone heretofore nearly useless for





sculpture. He uses colorful stones that contain inclusions, flaws, and voids that would fracture uncontrollably with traditional carving techniques. In onyxes and marbles, Ball creates baroque busts with dynamic veins, voids, and “camouflage” patterns.

Robert Michael Smith’s works are realized primarily through computer processes as he “sculpts” in the virtual environment of three-dimensional modeling software. Smith completes many of his forms through rapid prototyping, but these machines yield only small pieces made of resins and plasters. The DSP machines complement rapid prototyping insofar as digital works may be accomplished in beautiful materials and larger sizes. For instance, Smith’s organic *Gynefleuroceraptor* (2003), a reinterpretation of the ancient, multibreasted Diana of Ephesus, was created in Rhino 3D modeling software, enlarged to nearly 2 feet and fulfilled in a subtly veined and luminous marble through cutting and grinding on a robotic lathe. This piece has an exacting natural geometry that is impossible to produce with the human hand. Executed on the machine, Smith maximizes the digital precision to give this marble a cool sexuality.

Founding sculptors Jon Isherwood, Lauren Ewing, and Barry X Ball continue to create stoneworks at the facility, and Christoph Späth

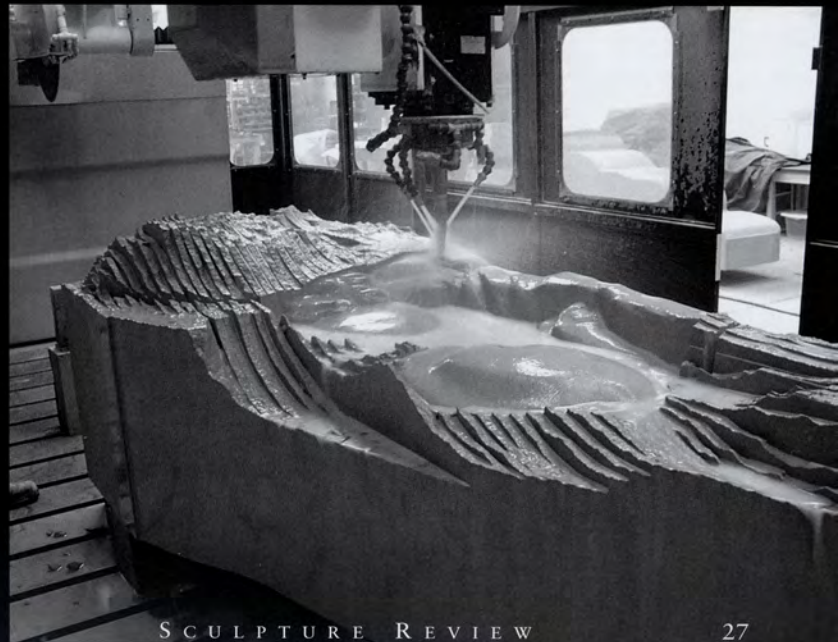
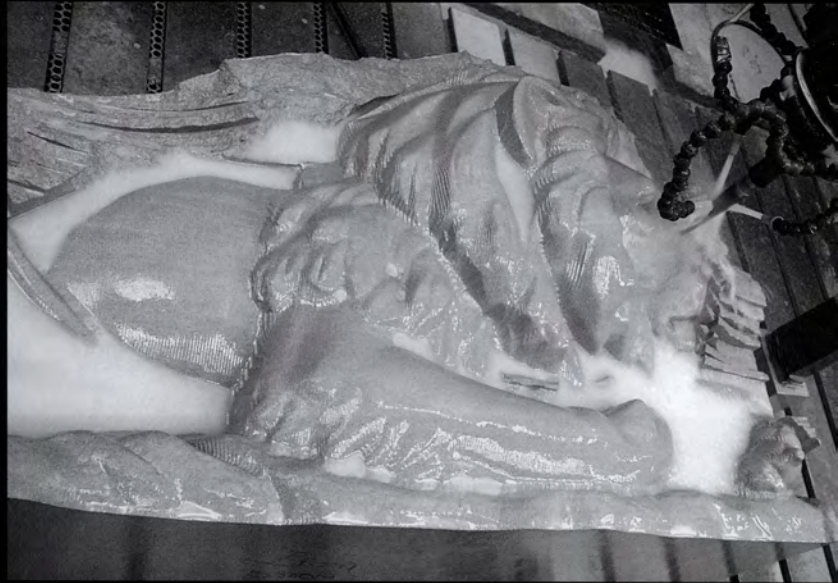


On pages 26 and 27: Different stages of production of Orpheus and Eurydice by Kaskey Studio, depicting ways the machines can remove materials, from core-drilling to rough sawing and rotary tools. The Pellegrini robot wire saw roughs out the contours for the lion from raw block of limestone. The Omag 5-Axis milling machine can use both saw blade and rotary attachments.

On this page, bottom left: Trilobite by Nancy Lanni; bottom right: *Gynefleuroceraptor* by Robert Michael Smith (2003), created in Rhino 3D modeling software.

Opposite, top left: *Virtuoso* by Jon Isherwood (2005); top center: *Temptress* by Jon Isherwood (2003); bottom left: *Aletheia* by Jon Isherwood (2007).







recently completed a commission in which he designed and sculpted the entry plaza for the Emergency Operation Center of the state of New Jersey, located at the State Police Headquarters in Trenton. This plaza includes four milled monumental granite and glass sculptures. All these commissions have been important for the success of the organization since, despite its nonprofit status, it has to maintain fiscal solvency through production income.

Computer-controlled machines are becoming ever more


common (now even Sears sells an affordable, worktable-sized digital router), and more sculptors (including luminaries such as Kiki Smith and Tom Otterness) are turning to such equipment for execution of their works. In response to this climate, the DSP has an important educational mission to train the next generation of technicians and sculptors in techniques ranging from time-honored to cutting-edge technological experimentation. Affiliated institutions sponsoring student interns include Bennington College, Denver University, New





## All the artists mentioned believe that these digital technologies are dialectical

York Institute of Technology, Rutgers University, The University of Maryland at College Park, The University of North Carolina at Greensboro, and Winchester College of Art in England. Longer-term apprenticeships specializing in digital applications are another important part of the educational program, and, in conjunction with the Arts Council of Princeton and Grounds for Sculpture, the facility offers stone-carving classes. The DSP has recently added an artist residency program made possible by grants from the Geraldine R. Dodge Foundation and the New Jersey State Council on the Arts.

Despite all this technology, it would be a mistake to think of works produced at the DSP as automatic robo-sculptures. Each project offers new challenges regarding materials, tool paths, and other considerations. The artistry exists not just in the concepts and forms but in experimentation and mechanical problem solving that expand the representational capabilities, as such artists are often compelled to work collaboratively with the facility's technicians and rarely "hand off" projects for fabrication. Having said this, it is equally erroneous to locate the aesthetic of the resulting sculptures strictly in the technological feats. All the artists mentioned believe that these digital technologies are dialectical—these tools may help them realize concepts they had long envisioned, but can also drive them toward new expressive possibilities. 

---

William V. Ganis is a critic of new media arts and an assistant professor of art history at Wells College, in Aurora, New York.



*Opposite: Orpheus and Eurydice by Kaskey Studio (2006), Indiana limestone, 8 feet high at apex, for the Pediment of the Schermerhorn Symphony Center in Nashville, TN.*

*On this page, left: Rococo Scream by Barry X Ball, Mexican onyx.*

*On this page, right: Lucas Michael by Barry X Ball, (2000–2006) Pakistani onyx.*

