

The big movie studios are like fantastic walled cities, enterable only by royal fiat. But instead of gaining passage with a signet ring and galloping off on a noble steed, you present a valid photo ID that is cross-checked on a half-dozen lists and, if you're lucky, a little golf cart trundles up to whisk you past hundreds of employees—shouting into walkie-talkies, carrying racks of costumes or whizzing around in golf carts of their own.

On a 100-acre lot that spreads from downtown Burbank to the green foothills of the San Gabriel Mountains, Warner Brothers runs an enormous operation that has, in recent years, brought us *Harry Potter* and *The Matrix*. This summer *Charlie and the Chocolate Factory* comes out with scenes set in chocolate rivers and between candy walls. All of these are created in the studio's own shop, which provides the majority of the artwork used in Hollywood productions; few of the other studios still run any sort of set building division, Warner Brothers is the only one with a scenic art department.

The shop feels like a saner version of the puppetmaker's loft in *Blade Runner*. Located in a large silo that houses a maze of high-ceilinged work areas, it is lined with wooden catwalks, crammed full of 75 years of plaster dust and discarded props—giant faux-glaciers peek out from behind a stack of plastic sheets, gargoyles and a stuffed Tweety Bird perch overhead. In the scene shop a 30-ft.-tall canvas is held up by an antique-looking elevator pulley system and four artists are spread out along its 100-ft. width, painting an eerie pastoral backdrop for a sci-fi film remake. In another workshop reproductions of the original, iconic black, red and gold doors to Mann's Chinese Theatre—soon to be fitted into the renovated building—are propped up next to archival photographs. The fiberglass room, whose interior is so coated with splinter-sized shards that it looks like it's wearing a deadly pelt, is in one corner of the architectural molding library, a floor-to-ceiling repository of columns, brackets, friezes and more. Long used by architects and interior designers—and especially popular with Las Vegas

casinos—the moldings can be vacuformed in plastic or cast in fiberglass, plaster or concrete.

Four years ago an architect approached the shop with no thoughts of Georgian columns or classic Greek balustrades. Greg Lynn was looking for a place to fabricate what would become his seminal project for the Wexner Center—*Predator*. With its software-enabled birth and B-movie bravado, *Predator* gave corporal shape to the binary dreams of a generation of young architects enthralled with new technology, and pointed them towards a place to make their own creations into reality. Now, in Los Angeles, a loose band of thinkers and co-conspirators—most of whom discovered one another's work while teaching at UCLA and SCI-Arc and all possessing the mathematical acuity to push the software beyond a world of easy curves—are engaged in figuring out this next step to real digital design: fabrication.

If architects really are the new rock stars then Lynn is the group's lead singer and its drummer is the intense, intellectual David Erdman and his compatriots at servo, driving the beat and pounding out nervy variations. Its electric guitarist, given to brilliant, and occasionally bewildering, solos is Hernan Diaz Alonso of Xefirotech, winner of this year's MoMA/PS1 Young Architects Program. Facing down a glowing bank of synthesizers, filters and keyboards, are Marcelo Spina of Patterns, who is designing SCI-Arc new café, and Heather Roberge and Jason Payne of gnuform. Looping in ideas on, respectively, landscape and botany, these inquisitive, experimental designers push the concerns of the group onto unexpected side streets.

After *Predator* was fabricated at WB, a connection was forged between the studio shop and the designers, who also began looking to other local set shops. "I think it's the reason architecture is good in town right now," says Lynn, "it's the proximity to these shops...they're hungry enough to try something new with us. And here, schools have to have a CNC mill and a laser cutter and a vacuform machine." It's a serendipitous combination. The local architecture schools provide space and support to experiment. A set of innovative local industries—film, auto, aerospace—are constantly developing

new technologies. And, crucially, the film and auto industries have a high demand for props, sets and prototypes, which has given rise to a satellite industry of shops that often do work for both worlds. There are places like C-Tek, a car prototyping shop that made the futuristic vehicles in *Minority Report* and did glasswork for Eric Owen Moss' Culver City buildings, and spectrum3D, another car prototype shop that worked on *I, Robot*. Directors and set designers are, in turn, enamored of architecture, looking to people like Lynn and Alonso to consult on films that depict futuristic worlds.

Besides working on a similar scale, experimental architecture and film sets are both dealing with impermanent structures, which means much looser tolerances. "We're doing a lot of one-offs. They have to be done very, very quickly and relatively cheaply, often on a large scale. All of those things are inverted everywhere else—it's expensive, the parts are small and they take a long time," says Erdman. Industrial fabricators are used to doing enormous runs for big companies like Kodak and IBM; traditional architecture needs to worry about perfection down to the millimeter. But here, the tolerances are about an eighth to a quarter of an inch and the projects call for a limited run—say, five or ten pieces—which make the prop shops an excellent resource.

Lynn used Maya, a suite of software initially created for the film industry, to render the grotesquely beautiful *Predator*, then bought a room-sized CNC milling machine—larger, he says, than his current Venice office—to cut the oddly-shaped molds out of oven-insulating foam. For the next step, Lynn went to WB, which already had experience translating computer-generated forms into reality. They printed artist and collaborator Fabio Marcaccio's images onto sheets of plastic, then vacuformed them around the CNC-made molds which were joined together to create the menacing sculpture-meets-structure, an installation big enough to walk through. The work that the shop did was an odd combination of computer and craft, "It's almost a third medium, it's a fantastic collision of worlds," says Lynn.

"That's something I appreciate," says Roberge. "Their shop, the majority of their work is handcrafted, more old school. Despite the fact that

it's firmly rooted in new technology, it's not pure—there's a lot of handiwork."

Roberge and Payne, both professors at UCLA, fabricated one of their first gnuform projects at the WB shop. It was an unusual design brief: Create a bar-slash-reception desk for the Beverly Hills offices of a risqué new cable channel, No Good TV. The pair went for a highly tactile design, making a geometric model inspired by the undulating red velvet curtains that would hang behind the bar. "All the curves are strategically located," says Payne, "it makes people want to get up against it, massage it." The bar's panels rely on friction to hold together, with folds that provide rigidity and structure.

"A lot of work going on in contemporary architecture is related to topology and the study of surfaces," says Payne, "Heather and I have become increasingly interested in the spaces between the panels—we want to design the most beautiful, interesting joint." They turned to botanical illustrations, especially the work of Arthur Harry Church, to examine organic joints—for example, when a leaf and stem connect, they mold into one another; there are no architectonic joints in nature. Without the current software and fabrication processes, gnuform would have found it impossible to recreate these joints in plastic. By milling the shapes on UCLA equipment and using the WB shop to vacuform the panels, Roberge and Payne were able to do what they estimate could have been a \$40,000 job for just \$400.

"When they get to know you, they care about your projects and are accommodating in terms of price," Roberge says. All of the architects now regularly use the studio's shop for classwork, sending students to Brian Supernant, the head of the 'staff shop', who oversees the vacuform equipment. "They encourage students to watch what's going on, why something is heating at the rate it, what's good about the geometry of your form and what's bad," Payne says.

"I've noticed [the students] more and more in the last couple of years," says Supernant, a soft-spoken man who clearly relishes his inadvertent role as teacher. "It's always the day before it's due, they'll come in going: 'Do you work on Saturdays?' Mostly four or five come in together because they want to

put all the projects on the same pull." Each pull-in which molds are laid down on the vacuform machine and covered with a sheet of plastic that is heat-shaped around the forms—costs around \$100; students working on small-scale projects can go in on a pull together. "That's what makes the WB such a great asset," says Erdman, who teaches technical seminars at UCLA with a servo partner, Marceilyn Gow. "They're willing to experiment with it. You're not going through a huge, belabored engineering process to try something—it's more like a shop. They charge you each time they try, and if it doesn't work then you just need to buy some more material and try again."

Erdman and his servo partner, Marceilyn Gow, teach technical seminars at UCLA—each one focuses in on a problem that the firm has explored. Their students learn how to do the fabricating themselves on UCLA's smaller machines so that they're familiar with the craft aspect. This year's seminar took Eames' famous soap bubble studies as a point of departure and played with the idea of deviations from a cube. Some of the thinking found its way into servo's next project, an upcoming exhibition display called *Dark Places* for the Santa Monica Museum of Art. Composed of eight 45-foot strands that weave together to produce different volumes and surfaces—roofs, walls, countertops, floating floors—it has, according to Erdman, "this more eerie, grotesque sensibility," and a sense of aggression. "Because vacuforming is always working with sheets...we're trying to figure out how you can get it to reverberate between something more like a sign to something more spatial and volumetric."

Rejecting the straightforward cleanness and modularity of that perennial Southern California architectural trend—Modernism—this architecture of complexity has a sense of showmanship influenced by its proximity to Hollywood. Diaz Alonso, who echoed Lynn's *Predator* in a 2002 installation, *Emotional Rescue*, a web-like tunnel of copper tubes partially covered in an inner layer of plastic formed at the WB and an outer layer of shrink-wrapped plastic, and filled with slowly decaying roses, shows a decidedly un-Modernist romanticism. For his PS1 installation, which will be fabricated at spectrum3D, his usual melancholy becomes lighter, more playful. There is an ease to the

design, the payoff from all those earlier experiments. "I think people are developing their own signatures," says Lynn. "Three or four years ago, the stuff looked almost the same; like software, you need experience before you can finesse it and do something new with it."

For a 2004 exhibition at LA architecture gallery M&A (Materials and Applications) titled *Land Tiles*, Spina wanted to use the combo of computer and craft—"technology plus concrete"—to produce what he calls a micro-landscape. "We're looking into a notion of landscape that didn't exist, trying to produce the effect and representation of landscape by creating contour and terrain out of 144 aggregate pieces," Spina says. Using today's CNC machines, it is possible to create a series of varied parts, each with small modulations; it's a step beyond the blob that all of these architects are taking. *Land Tiles* uses this idea of a geometric system, as does Spina's café for SCI-Arc. "There I'm also working on a micro-architecture, but one that will play in close relation to the body...I'm interested in that possibility of hybridity between things that are more designed, that are continuous but offer diversity - a rhythmic fluidity between systems."

By creating geometric systems where each variation grows out of the previous one, these computer-rendered designs are able to achieve an unexpected sense of life, but without the local set shops they would have been very difficult to build. "It's great being in LA," Spina says, "it's not just by chance that it happened here... When you go to the lot, it's a big trip, and it's all so secret...it's like you're entering into another world where anything can happen." At the intersection of architecture and art, film and fabrication, for a moment a few of the city's many worlds become one fantastic kingdom.