

Ateliers Jean Nouvel



Ask Andrew Hartness what it's like to work for a genius, and he'll tell you it's fraught with challenges. "A typical workday is very hectic," he says. His boss, he explains, is architecture guru Jean Nouvel, owner and artistic director of Paris-based Ateliers Jean Nouvel and one of the most respected and well-known architects in the world. Because Nouvel's business takes him away from Paris frequently, he's rarely in the office, and when he is, his time is limited and extremely valuable. What's more, on nearly all the facility's projects Nouvel changes the design from what he originally instructed, and often those changes are voiced to Hartness and his colleagues just hours before they're scheduled to show final imagery to the client.

3ds max® software enables renown design facility to bring to life outstanding and compelling designs of architecture guru Jean Nouvel

At first glance, one might question why a person would put up with such a stressful job. But for Hartness and his colleagues, the opportunity to work for one of the best contemporary architects in the world more than compensates for the stress associated with it. "Jean Nouvel is an architectural genius," Hartness states.

Of course, the fact that Hartness has a 3D design system that enables him to reshape a structure as quickly and easily as though he were modeling with clay, and then render the imagery just as quickly, is an added bonus. That 3D design system is Discreet® **3ds max®** software. "**3ds max** allows me to make changes in situations requiring real-time performance," Hartness says. "When I have Jean Nouvel sitting with me, proposing changes, I need to make the most of his time and effect those changes quickly. In **3ds max** I can change views, materials, and the model's mesh composition in seconds and then create a high-quality render using the software's scanline renderer. And the fact that the files are compatible with (Autodesk®) AutoCAD® software, our office's design program, is another benefit."

Because of the speed at which Hartness works in **3ds max**, he has become the "emergency room doctor" of the facility's 3D department. "When a project reaches a crisis situation—Jean Nouvel will be here in two days, or our client presentation deadline is approaching—project managers come to me for help," Hartness says. "Even if I don't know how the project works, I need to understand it as quickly as possible and, using **3ds max**, make it visible in 3D."

A case in point is the *City Metropolitana* project currently in the design phase for client El consorci -Zona Franca de Barcelona. The assignment was to design the façade of the *Zona Franca Hospitalet* facility—a 240-foot-wide-by-1700-foot-long mixed-use building comprising office

space, a gym, and a small shopping mall with a park in the middle. "Jean Nouvel asked the project manager to imagine the façade was a Gaudi-esque head with long, wavy hair blowing in the breeze, and then he gave him a sketch he had drawn on a piece of scrap paper," Hartness recalls. The project manager had to apply Nouvel's thought process based on this abstract, organic idea. He also had to present the client with a design that accurately represented Nouvel's sketch, and had to ensure the design was not just structurally feasible, but also within the client's budget.

By the time the project manager went to Hartness for help, Hartness had only a week in which to translate the sketch into 3D for presentation to Nouvel. "After I got the sketch, I allowed myself my usual panic attack," Hartness jokes, "then I brought three colleagues in on the project to help me." The next thing he did was ask himself how they could build a façade that looked more or less like Nouvel's sketch, but that could easily and quickly be changed into something Hartness thought Nouvel might want it changed into once Nouvel saw the initial 3D design.

Hartness knew from the project manager's instructions that the "wavy hair" on the façade was to be built from wavy slats of metal. After building the structural model in 3D using the architect's AutoCAD drawings as reference, Hartness and his colleagues designed a 1700-foot-long façade comprising flat, wavy slats of metal using the lofting tools in **3ds max**. However, with just two days left until show time, Hartness discovered that limitations with his computer prevented him from displaying and outputting the image in its entirety. To rectify the situation they re-created the façade by drawing splines all over the model. They then adapted the spline resolution to the views required. Because the isometric view of the ensemble would have required more than 3 million polygons, the modeling team simply used renderable splines without lofts. The final image was scanline-rendered at 8000x3000 pixels.

In addition to the spline tools in **3ds max**, Hartness and his colleagues also relied on the software's loft-modifying tools. "When you loft you start out with a line that you torque in the middle by twisting it or changing its scale at very precise articulation points using surface and path parameters and deformation options," Hartness explains. "If you have a slat that's barely twisted, you can ask **3ds max** to loft it with very few points of articulation, which enables you to save a lot of polygons." Using the lofting tools, Hartness says he was able to be precise in terms of the amount of wave in the slats, and at the same time save on polygon count so that he could display large portions of the façade.

Also indispensable for this project were the soft selection modeling options and modifier tools in **3ds max**,

which were used to individually manipulate the lofted slats to give them more aesthetic diversity. "When you select a node or a point on a surface, you can ask that the area surrounding that node or point be affected as well, and specify the percentage by which it should be affected," Hartness explains. "So, when you move a node or a point, the points surrounding it follow based on what you specified.

"It's almost like you're manipulating cloth, which is nice, especially when there's something wrong with your loft and you're not sure how to work it out," he continues. "You can go into the edit mesh modifier, edit the soft selection, and work it out in a few seconds. In addition, using a densified mesh denotes materiality, a useful characteristic in the **3ds max** visual work platform. This is a good tool to use when Jean Nouvel is reviewing your design because he visualizes the skin of a building as a malleable piece of cloth, not as something hard and over-simplified." The bending and twisting possibilities of **3ds max** enabled Hartness to conform groups of slats to the curved structural design of different buildings comprising the project.

According to Hartness, Nouvel was pleased with the 3D renderings Hartness and his colleagues presented to him. True to form, however, he did ask for some changes. "He wanted to see the façade from a variety of different viewpoints," Hartness says. "But all we had to do was distribute cameras (determined by Nouvel) to those responsible for rendering by means of x-refs and coordinate what model's polygon resolution corresponded to which view. And even though we built the model with fewer polygons so that we could manipulate it in real time during the presentation to Jean Nouvel, we were still able to generate renders from varying distances and locations."

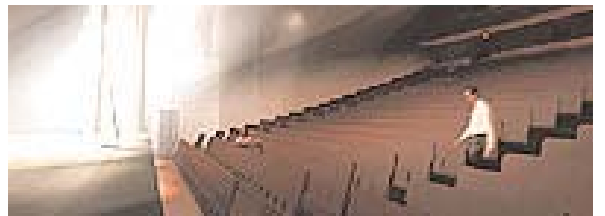
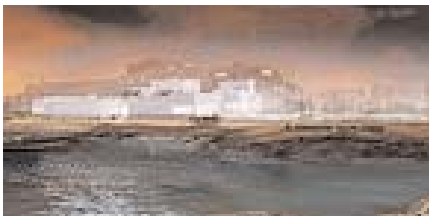
Another example of how the speed and flexibility of working in **3ds max** helped Hartness to translate a concept into 3D quickly is the project he worked on recently for the Guthrie Theater, which overlooks the Mississippi

hadn't labored over his designs for over a year, and Hartness knew that when he did at the end of the project, his ideas would have changed.

Of course, his ideas did change, as Hartness recalls. "During the first week in which I worked on this, I built a test model of a cantilever bridge using the bones tools in **3ds max**. But a few days before our deadline, Jean Nouvel suddenly dove into the project and began changing everything, and I had to follow suit in 3D," he says.

According to Hartness, Nouvel wanted to take ghost-like images from past performances and bring them to life on the walls throughout the building. "He wanted to make it look like these actors who performed at the original theater in the 1960s and 1970s were coming out of the walls, as if emerging from a fog," Hartness explains. To create the effect, Hartness used existing photos of the performers as textures, which he applied onto the **3ds max** model. Using the self-illumination capabilities of the software's scanline renderer, he created a "false radiosity" effect that gave him the ghostlike glow Nouvel wanted but without having to recalculate the radiosity whenever a change was made to the building's form.

Which brings us to the second major change Nouvel requested, which concerned the 160-foot cantilever that hung over the Mississippi River. According to Hartness, Nouvel wanted to extend the cantilever even further, to 190 feet, and modify its proportions, which changed the form and structure of all parts of the program connected to this bridge. "But thanks to the edit mesh and very in-depth material parameters in **3ds max**, manipulating the form and modifying the maps was quick and easy work," Hartness enthuses. What began as a basic redesign and four images to be completed in three weeks ended up a month and a half later as 13 images and a complete redesign of 50 per cent of the building. The folks at the Guthrie Theater were so pleased with the final design that they approved it immediately. Construction began in early September 2003.



Images courtesy of Ateliers Jean Nouvel

River in Minneapolis. "Initially, we had a contract to produce four 3D images of the proposed theater redesign for the client to show at an upcoming fundraiser, based on Jean Nouvel's ideas for the redesign," Hartness recalls. "But we discovered that the 2D drawings we got from our structural engineers which showed what could be done structurally were incompatible with the original redesign ideas Jean Nouvel had provided." Also, Nouvel

Although the Guthrie Theater was Jean Nouvel's first project in the United States, it isn't his last. The architect was recently chosen to design one of the buildings to be constructed at the *World Trade Center* site in New York City. No doubt **3ds max** software will play a role in that project as well. "**3ds max** has played an important role in many of our projects, and will continue to do so," Hartness concludes.