WESTCOAST LIGHTING INSIDER

HLB and Atelier Ten Venture into VR

by Lois I. Hutchinson | Apr 16, 2019 | WCLI Feature Article | 0 comments

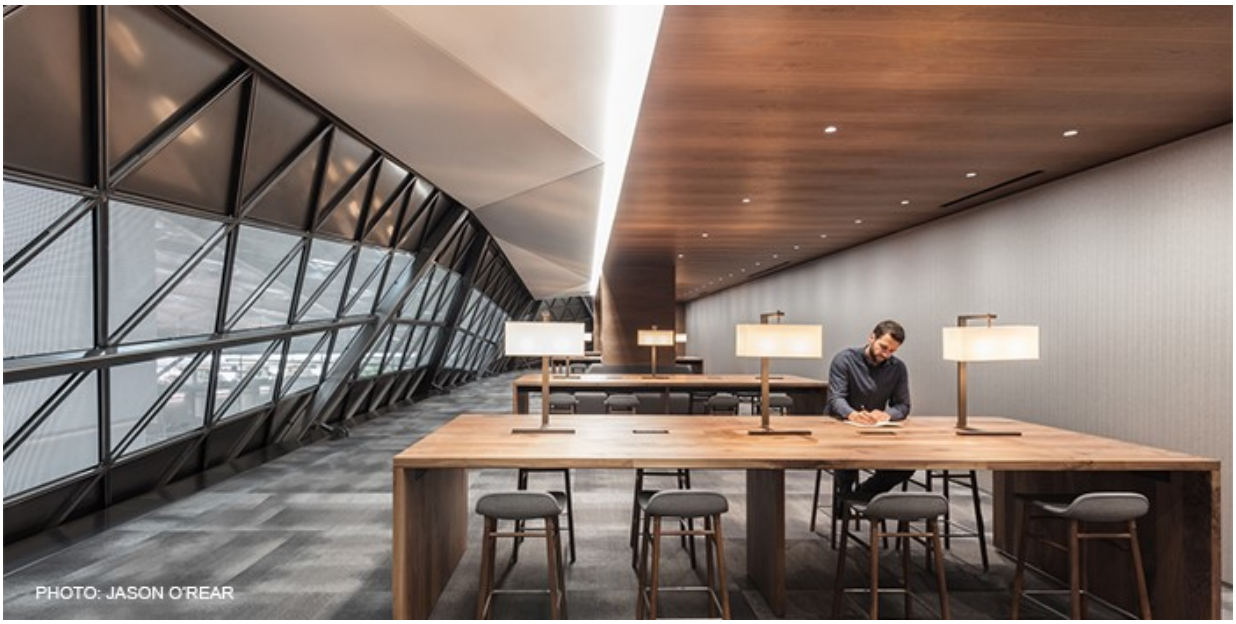
Gensler's concept for Nvidia's corporate HQ springs from the triangular form, clearly reflected in the sculptural roof. Perimeter glazing, high ceilings, skylights and interior finishes bring light in and through the facets of the 250,000 sq ft floor plan. Both HLB

Lighting Design and Atelier Ten – which developed the electric lighting and daylighting designs, respectively – took full advantage of Nvidia's Iray VR rendering software to explore options, confirm conventional calculations, and help the client visualize how the electric and natural lighting marry day to night.

Though not concealed, HLB's electric lighting follows the structural design. Diffuse skylights provide the bulk of the daytime lighting in the open-plan offices, and indirect pendants, bouncing light off beams and skylights, echo that suffusive flavor at night. "The ceiling is playing the part of a fixture itself as a big reflector, and providing that same diffused light," said Vasudha Rathi, an associate at HLB in San Francisco. (HLB Principal Hayden McKay, Rathi, Alesia Pope, John Keyes, and Angela McDonald all share a 2018 Illumination Award of Merit from the Illuminating Engineering Society and a LUX Award of Excellence from the IES San Francisco Section.) "Everything was painted out white, so it acts as a nice, diffuse reflector."

At dusk, the open offices covert to 4000K electric lighting at far lower levels, gradually and subtly. The unusual configuration of the ceiling might appear unfriendly to an indirect lighting scheme, but the high ceilings (12 to 36 ft AFF) soften hotspots. "The thought process was how to align those fixtures. From our calculations we figured out what the spacing between the rows needed to be. But then, in terms of orientation we were trying to understand, do we play off the primary structural members; do we play of the secondary structural members?"

Overall, the pendants "go away." Gensler's architectural plan may feel complex, but the facets are symmetrical and repeated, so lighting layouts could be replicated with a limited fixture palette, according to Rathi.



Downlights are minimal and spotlighting is limited to soaring circulation spaces and the cafe. Some slot lighting reinforces the lines of the architecture and lights vertical surfaces well. The hospitality-feel “core” areas include a research library with a birchwood ceiling, a lounge, and the bar. Here, coves and decorative fixtures at 3000K create entirely different, more-intimate spaces.

Next-gen tech

VIDEO COURTESY NVIDIA

Gensler and Nvidia partnered here to develop Nvidia's modeling software and architectural visualization tools. Nvidia's Iray rendering and light simulation software uses specific data on structure and materials, including photometric files, to create interactive, photographic-quality images. Nvidia also supplied cloud-based data processing, so designers could evaluate design changes and changing daylighting conditions on the fly. "It allowed us to fail faster, if you will, and our designers saw the results of the team's work and considered alternate solutions immediately," wrote Gensler Firmwide Creative Media Manager Scott DeWoody. "This process helped us solve substantial design issues, like the tricky situation of harmonizing the daylighting and artificial lighting together in Nvidia's massive open workspace, quickly and efficiently."

HLB designers are accustomed to using Revit models, AGI, and other software to evaluate lighting. What was unique here was that all the lighting that was modeled in Revit had accurate photometric information and orientation, explained Rathi. (This was back in 2014–15 when few lighting manufacturers were creating Revit families.) Multiple renderings produced by translating the model from Revit to 3D Studio Max to Iray confirmed the more-limited AGI calculations.

Similarly, the Iray renderings provided confirmation for the daylighting design calculations. Kristen DiStefano, associate director at Atelier Ten in San Francisco, led the environmental design team, modeling energy consumption and occupant comfort. Atelier Ten also managed the project's LEED Gold certification. "We had a mandate from the client that they wanted this well daylit space, so usable daylight is very important from the experiential perspective for their occupants. But we also had to ensure, because all their occupants work on computers and screens, that there wasn't any glare within the project. So we had to have usable daylight that had to be visually comfortable." DiStefano reports that, due to abundant daylighting, lighting energy use post-occupancy is averaging around 20–25% of connected load.

Gensler put forward the triangular skylight geometry, but DiStefano's team refined the dimensions, placement, and materials. "We didn't want them to allow in direct sunlight, so they have a translucent inner layer to diffuse light coming into the space. And then we did a lot of daylight analysis and visual comfort analysis to inform recommendations on all of those pieces of the design."

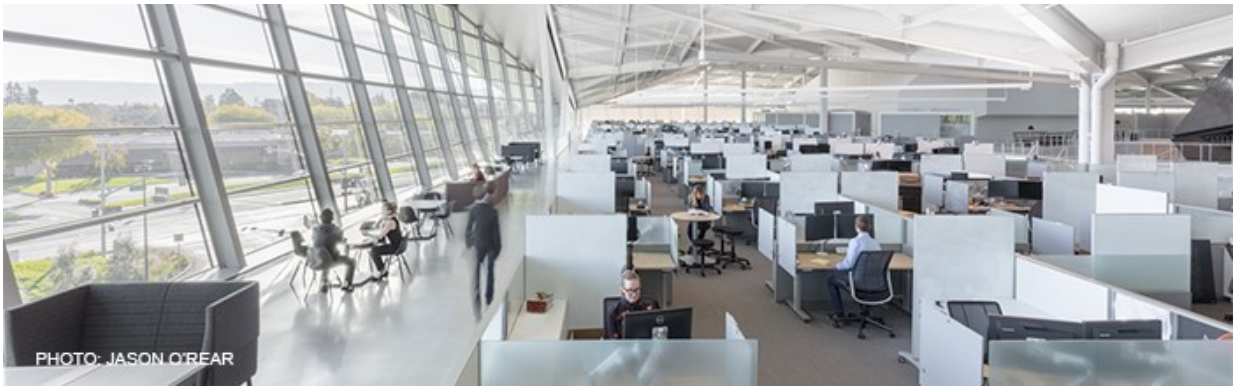


PHOTO: JASON O'REAR

Modeling daylighting dynamics

Working with DIVA-for-Rhino (a Radiance-based, raytracing plugin) accommodates the roof geometry, occupant points of view, and shifting daylight throughout the day and throughout the year; helping the team meet targeted illuminance levels without exceeding tolerances. DiStefano explained that the team sought diffuse skylights to spread daylighting through the space while mitigating brightness from the skylights themselves. “We went over to Gensler’s office, and we looked at a series of glass samples to find one that had the best diffusing effect…. without adding to glare when you looked at it directly. It was interesting because we had a lot of samples that had the same exact specifications, but not all of them performed visually in the same way.”

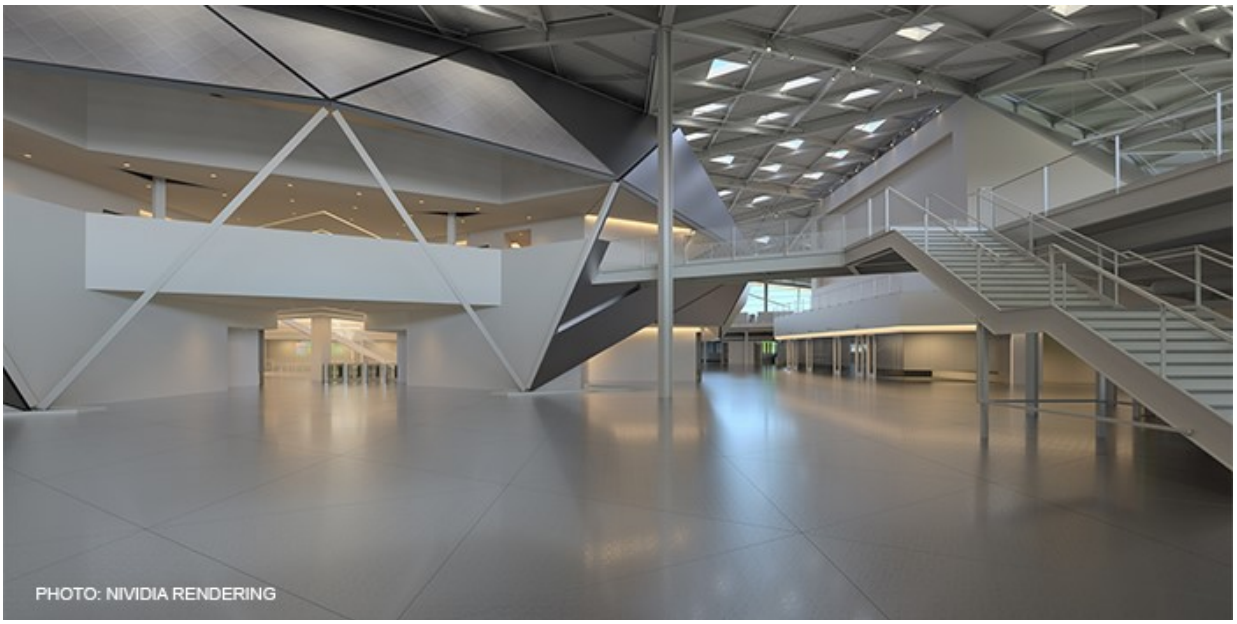


PHOTO: NIVIDIA RENDERING

Atelier Ten was performing point-in-time and annualized analyses to inform performance aspects of the daylighting design; in parallel, Gensler was working with Nvidia’s team in developing the rendering software. “There were points when we were working together to

compare the results in terms of light levels that we were getting out of both softwares. But I think it was very effective for the client and the architectural team to be able to see those visualizations, in addition to having data about light levels throughout the space."
She particularly valued the ability to compare options in finishes and how interior volumes conduct light throughout the space.

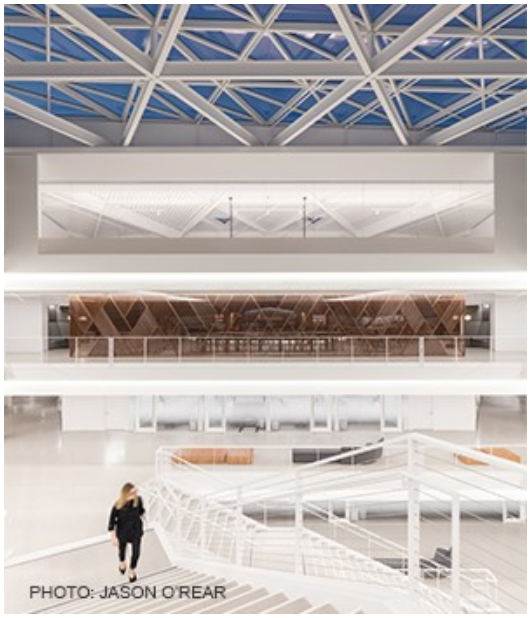
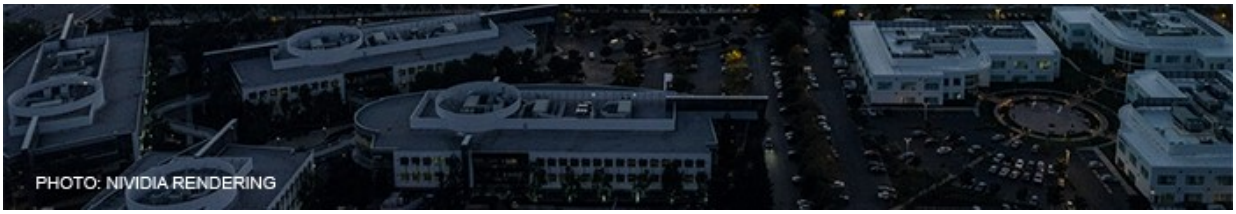


PHOTO: JASON O'REAR

High ceilings and full-height fenestration bring daylighting and views well into the floorplan, so open offices and skylights are located more centrally. A deep roof overhang on the south façade shades glazing canted sharply inward. "The desire for both views out of the building for the employees and views into the building were a big defining factor in the building concept and the desire to have a very transparent façade," DiStefano said. Reduced window-to-wall ratio on the western exposure reduces heat gain in back-of-house areas.

Overall, careful space planning allows access to sunlight where it's appropriate. "By that I mean there are locations of the building, such as the corners, which have more variable daylight, and those are specifically programmed to be flexible, collaborative spaces. And there are those that have less variability, which are programmed to be some of the fixed workstations. There was a very conscious intent.
I think Gensler did a great job of programming – having the program of the interior spaces work well with the different lighting conditions."

Both Atelier Ten and HLB Lighting are working on the even-larger phase 2 building, now under construction on the Nvidia campus in Santa Clara, CA. "We're just seeing more and more movement towards faster simulation and more simulation – virtual reality platforms that let clients see the space before it's built," DiStefano added.



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About Lois I. Hutchinson

Lois I. Hutchinson is a freelance writer specializing in lighting and energy issues. She is also the content marketing mastermind behind Inverse Square LLC, a Los Angeles–based consultancy. Contact her via lightinginsider@exponation.net with your comments and any article ideas that concern the lighting community here in the Southwest.

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