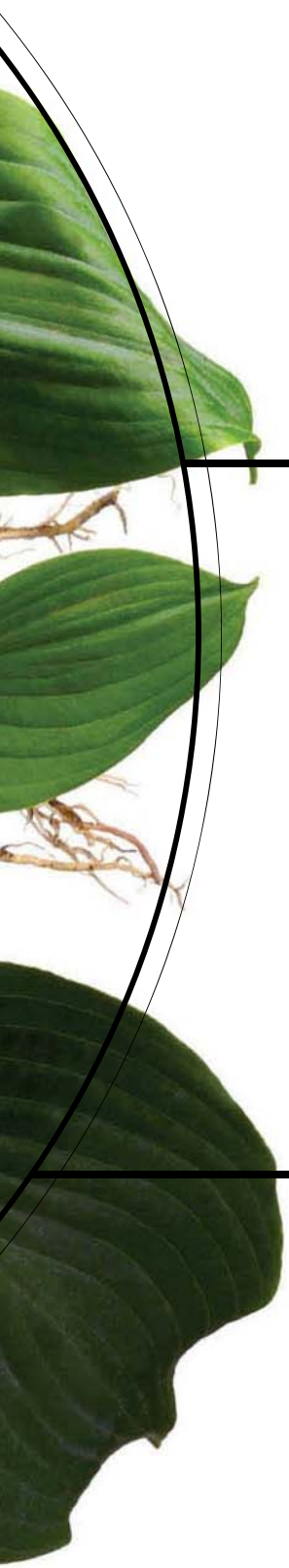
ARCHITECT

←AIR CONDITIONER

THE THIRD ANNUAL **R+D AWARDS**



THE WINNERS OF THE **THIRD ANNUAL R+D AWARDS** SHOW THAT EVEN WHILE THE ECONOMY IS DOWN, TECHNOLOGY IS FLOURISHING.

R+D

RESEARCH AND DEVELOPMENT may seem like luxuries right now, what with the global economy struggling to right itself. But if the third annual R+D Awards are any indication, the bust is motivating a major boom in architectural technology. Certainly, this year's jurors—Lauren Crahan, Craig Hodgetts, and John Ronan, profiled on page 73—proved acutely aware that limited resources are inspiring a new trajectory in the building sciences. They spent two days paging through 110 entry binders, selecting 13 winning projects and products that do more with less.

Skidmore, Owings & Merrill (SOM) won four awards and was involved in a fifth; the firm's well-documented and innovative projects proved so disparate that the jury saw no connection during the blind judging. (Before the ARCHITECT staff revealed the winners' identities, the jury extensively praised one SOM entry, the Sustainable Form-Inclusion System, for its indie, "noncorporate" approach.) Manufacturers, too, earned major recognition this year. A recyclable broadloom carpet backing, a new method for installing roofing membranes, and an aluminum joist system for decks all exhibited a level of practicality that was too ingenious to be ignored.

Turn the page, and judge for yourselves.

TEXT BY KATIE GERFEN AND AMANDA KOLSON HURLEY
PHOTO BY DAVIES + STARR
STYLIST: THOM DRIVER FOR HALLEY RESOURCES

→ CENTER FOR ARCHITECTURE SCIENCE AND ECOLOGY

ACTIVE PHYTOREMEDIATION WALL SYSTEM

GREEN WALLS HAVE BEEN touted as a balm for cubicle-weary office workers for years, but the Center for Architecture Science and Ecology—a collaboration between Rensselaer Polytechnic Institute and Skidmore, Owings & Merrill—has created a new prototype that would work with a building's existing HVAC system to reduce energy loads and improve indoor air quality. The Active Phytoremediation Wall System is a modular wall system of pods housing hydroponic plants. Because the plants' roots are exposed, instead of being buried in soil, the plants' air-cleaning capacity increases by 200 to 300 percent.

Air moves through a perforated air intake duct—a series of mini-jets are being developed to encourage airflow—and directly over the root system. This allows the rhizomes on the roots to essentially digest airborne toxins—VOCs, particulate matter, and other biological and chemical pollutants—without the plant itself becoming toxic (which is what happens when the toxins are taken in solely through the leaves). The cleaned air then flows out of each pod through a series of clean air ducts and is reintroduced to the environment.

The pods themselves are made from vacuum-formed plastic, and the form allows the maximum amount of air to reach the root rhizomes while using the minimum amount of material. On top of that, it creates a beautiful base for the plants. "I would move into an office with that instantly," juror Craig Hodgetts said.

The wall system can be installed in large commercial interiors, but works equally well in small settings—a four-module system in an apartment would have the impact of 800 to 1200 house plants. The first test-bed site will be PSAC II, an emergency response center in New York designed by the local office of SOM, where it will be the aesthetic centerpiece of the lobby. "Usually, remediation is either technically believable or aesthetically pleasing, but not both," said John Ronan. "This one's both." **K.G.**

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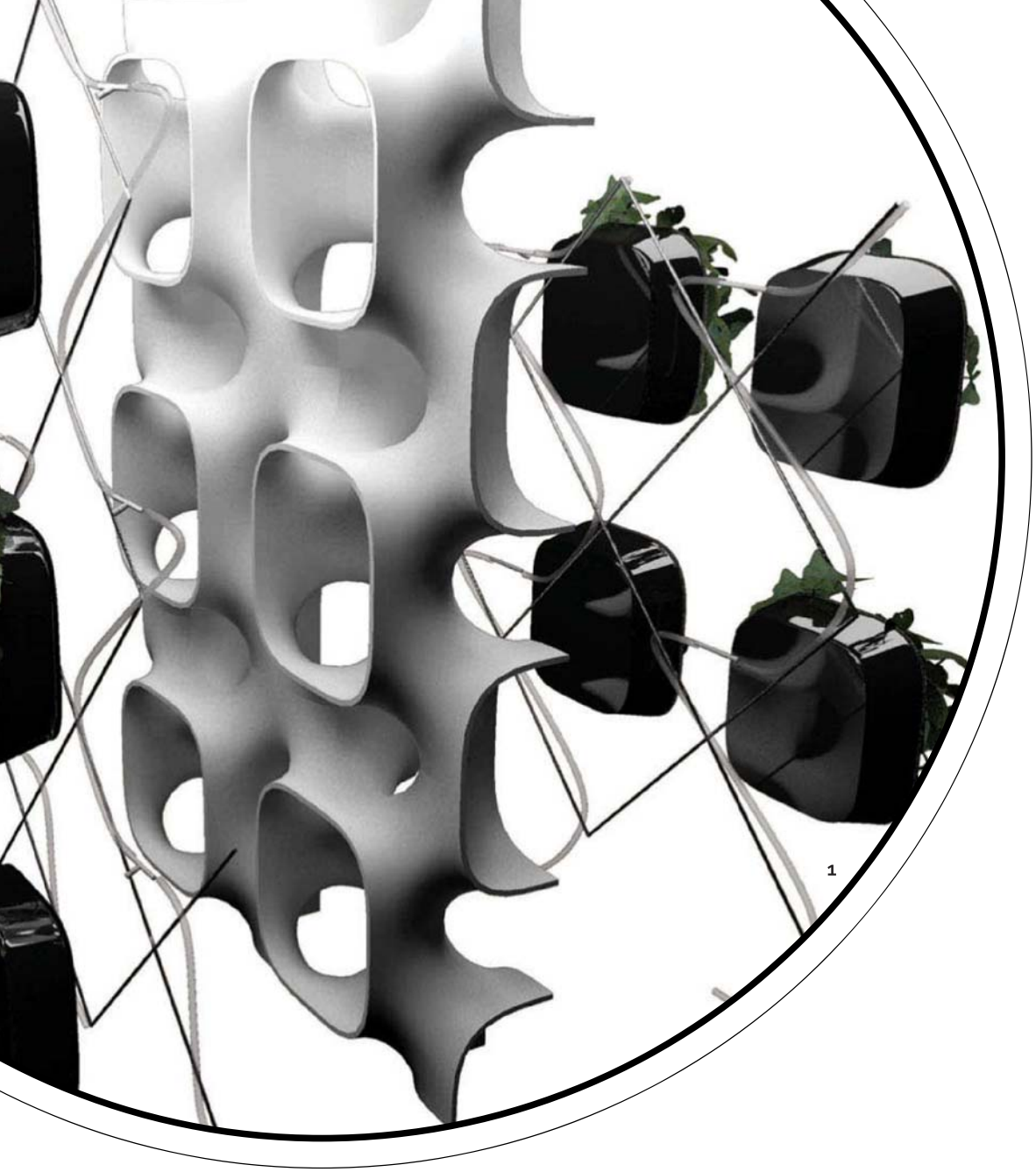


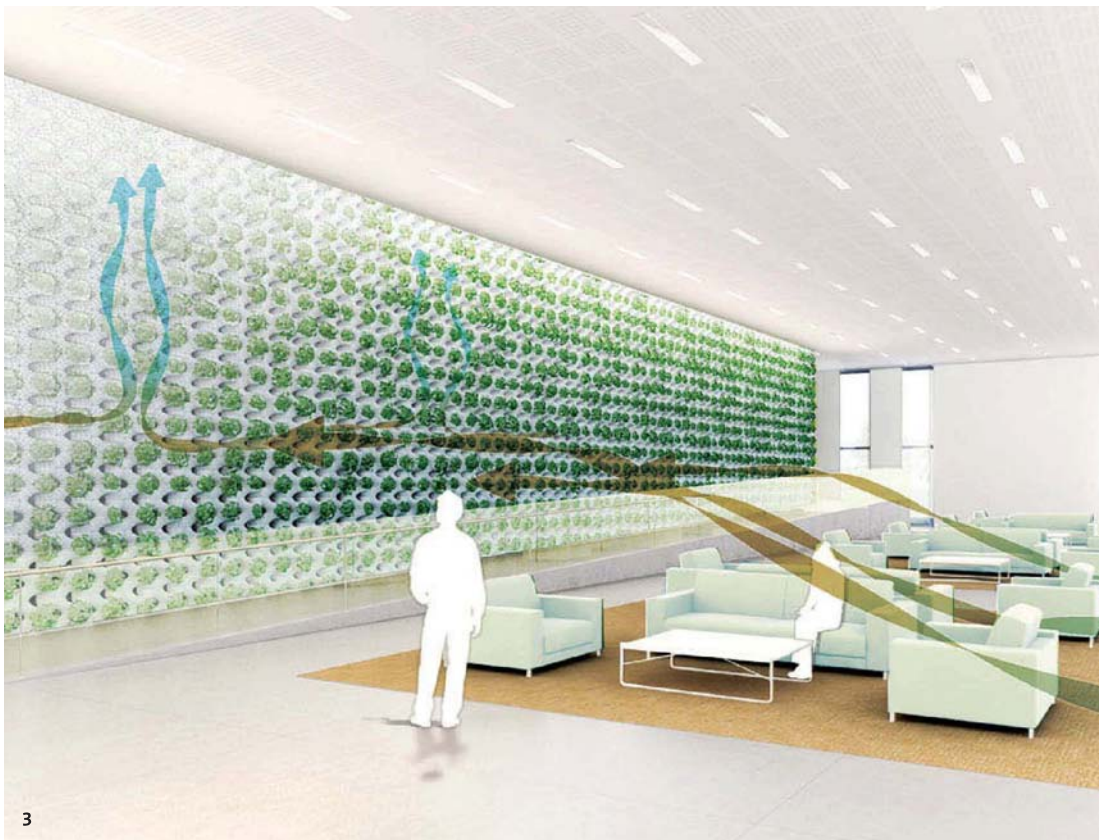
1. The Active Phytoremediation Wall System consists of hydroponic plants in bio- and phyto-filtration pods. The pods are installed in a modular screen which serves as a plenum and as ductwork for air movement. A support frame holds the pods in place and a drip irrigation system supplies fresh water to each plant. The roots are exposed to the air and receive water through absorbent wicks that are filled by reservoirs supplied by the drip system.

2. The system can be populated with foliage plants like ferns, or with crawling plants such as ivy or moss.

→ ACTIVE PHYTOREMEDIATION WALL SYSTEM (CONT.)

3. The air purification process works as follows: Ventilated outside air is brought into a building by the HVAC system. Oxygen is used up and toxins are added as the air is affected by people, finishes, and other contributors to poor indoor air quality. As the polluted air moves through the phytoremediation wall—largely by natural air circulation flows—the root rhizomes digest the toxins and replenish the oxygen. Clean air is then returned to the interior environment.

4-6. The wall is currently undergoing a rigorous testing process. Test pods are vacuum-formed (4) and assembled, as are pieces of the modular duct framework which manage airflow through the system. Plants are installed, and the system is assembled (5) and then placed in a testing chamber (6) to measure the air-cleaning power of different plant species and the overall effectiveness of the system.



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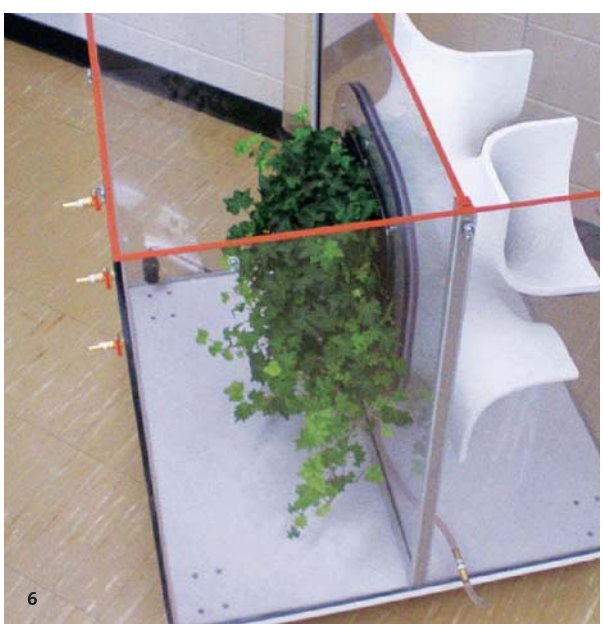

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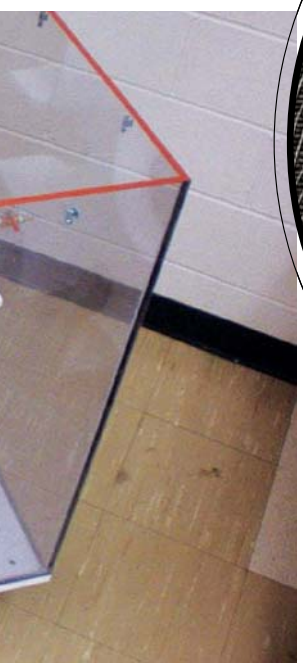
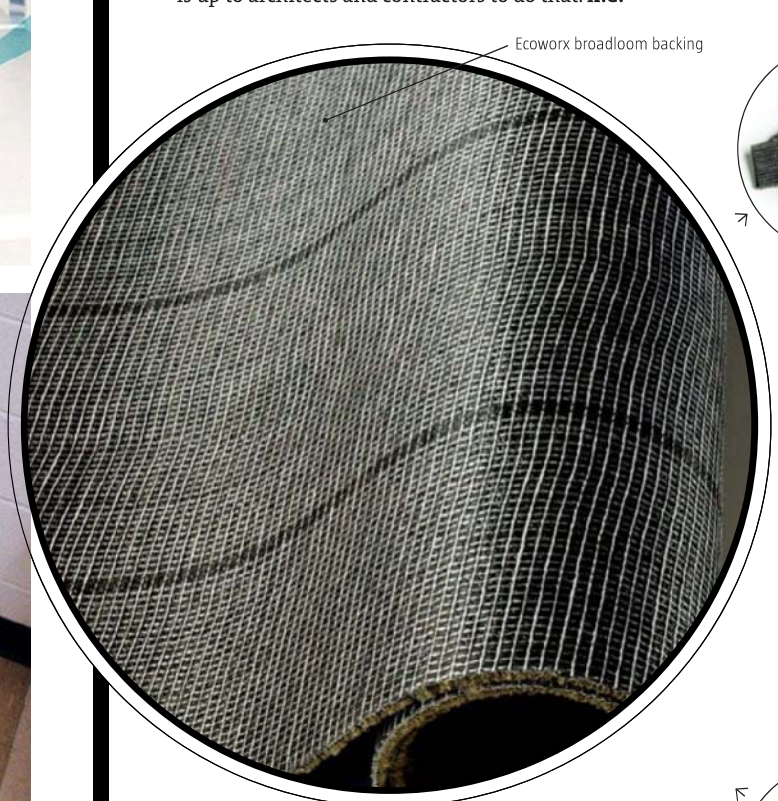
ECOWORX BACKING FOR BROADLOOM CARPET

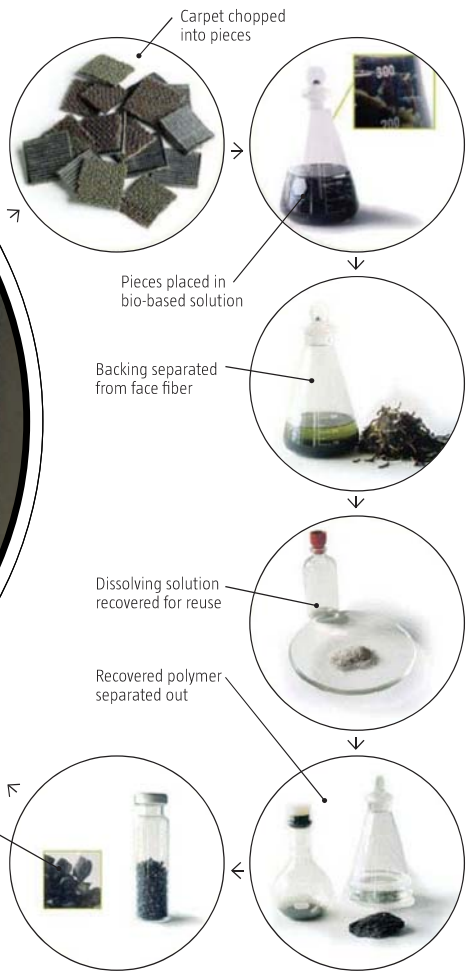


SHAW INDUSTRIES MADE A COMMITMENT to cradle-to-cradle principles when it released its Ecoworx backing for modular carpet tile, a product that could be split from the nylon face fiber at a tile's end of life and recycled into new backing. But when the company tried to apply the same technology to its broadloom carpets, it realized that the system simply did not translate. So the company's materials engineers set to work creating a new system, one that dissolves the carpet into its original components.

The process involves shredding the carpet and immersing the pieces in a bio-based solution. The nylon face fibers detach and can be turned into caprolactum, which is the base for new nylon fibers. The solution-covered backing pieces are then heated; the solution evaporates and is reconstituted elsewhere, ready to be used again in the dissolution of more carpet. The backing pieces are then ready to be used to create new Ecoworx backing for new broadloom carpet. The ingenuity of the process intrigued the jury—"I was really impressed that they had the whole system worked out," Craig Hodgetts said. "They have the chemistry going for them."

The final element that had to be engineered was the carpet's durability. The face fiber is made from fleece, which wears out quickly, so the engineers created a woven outer reinforcing layer and a special adhesive to extend the carpet's life. Even so, John Ronan pointed out, "Carpet is a very limited life material. So, I think it makes it more important that you recycle it and how you recycle it." But recycling only works if the carpet is returned to Shaw, and it is up to architects and contractors to do that. **K.G.**





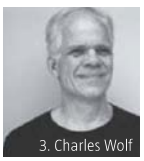
Ecoworx backing for broadloom carpet was engineered as a cradle-to-cradle product, which can be reclaimed at the end of the product's life cycle, broken down into its component pieces, and completely recycled into new commercial-grade carpet.

CREDITS

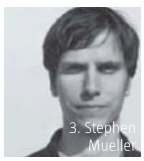

1. Anna Dyson

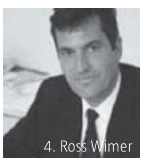

1. Carl Galioto


2. Jeff Wright


3. Charles Wolf


3. Kathryn Dean


3. Stephen Mueller


4. Ross Wimer


5. Jon Bailey

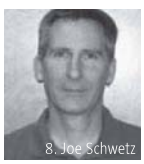

5. Michael Lyle

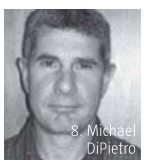

6, 12. Craig Hartman


6, 9. Eric Long


6, 9. Mark Sarkisian

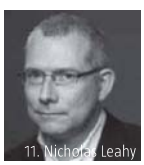

7. Lisa Iwamoto, Craig Scott


8. Joe Schwetz


8. Michael DiPietro


10. Regine Leibinger


10. Frank Barkow

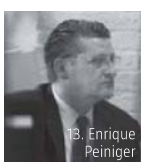

11. Nicholas Leahy


11. Michael Ludvik


12. Carrie Byles


12. Leo Chow


12. Mark Schwettmann


13. Enrique Peiniger


13. Jean Sundin

1. ACTIVE PHYTOREMEDIATION WALL SYSTEM (PG 48)
Principal Investigators Center for Architecture Science and Ecology (a collaboration between Rensselaer Polytechnic Institute (RPI) and Skidmore, Owings & Merrill)—Anna Dyson (CASE director, director of the Built Ecologies graduate program at RPI); Jason Vollen (associate professor, RPI, CASE); Ted Ngai (assistant professor, RPI, CASE); Lupita Montoya (assistant professor of mechanical engineering, RPI); Paul Mankiewicz (biologist/plant scientist, director, Gaia Institute)
Researchers EmilyRae Brayton, Ahu Aydogan
Testbed Site Public Safety Answering Center II, Bronx, N.Y.
Architect Skidmore, Owings & Merrill, New York—Carl Galioto (technical partner); Gary Haney (design partner); Peter Magill (managing partner); Rob Rothblatt (senior designer); Joseph Sacco (project manager); Carl Brown (technical coordinator); Julie Hiromoto (project team)

2. ECOWORX BACKING FOR BROADLOOM CARPET (PG 51)
Manufacturer Shaw Industries, Dalton, Ga.—Jeff Wright (senior chemist, technical development); Rick Farrar, Joey Davis, Scott Urquhart (technicians, technical development); Kellie Ballew (sustainable development engineer); Zach Breedlove (backings development engineer); Jeff Segars (technical director)

3. DYNAMIC DESCENT, NEW YORK (PG 52)
Architect Dean/Wolf Architects, New York—Kathryn Dean, Charles Wolf (principals); Stephen Mueller (project architect)
Contractor SASA Renovations
Steel Fabricator Maloya Laser
Structural Engineering Consultant Hage Engineering
M/E/P Engineering Consultant M.A. Rubiano

4. OASIS GENERATOR, DUBAI, UNITED ARAB EMIRATES (PG 54)
Architect Skidmore, Owings & Merrill, Chicago—Ross Wimer (design partner); Colin Franzen, Daria Minosyants, Dan Nowell (architecture team); Aaron Mazeika, Lauren Stromberg (structures team); Keith Besserud, Heechan Shin, Wei Wang (blackbox team); Arvidner Dang, Shweta Manchanda, Michael Smith (M/E/P team)

5. DRY JOIST AND DRY JOIST EZ (PG 56)
Manufacturer Wahoo Decks, Gainesville, Ga.—Jon Bailey (vice president); Michael Lyle (vice president, operations & business development)

6. SUSTAINABLE FORM-INCLUSION SYSTEM (PG 57)
Architect Skidmore, Owings & Merrill, San Francisco—Craig Hartman (design partner); Mark Sarkisian (structural engineering director); Eric Long (senior structural engineer)

7. VOUSSOIR CLOUD (PG 58)
Architect IwamotoScott Architecture, San Francisco—Lisa Iwamoto, Craig Scott (designers); Stephanie Lin (design/installation team leader); Manuel Diaz, John Kim, Alan Lu, Tiffany Mok (design/installation team); Chris Chalmers, John Kim (scripting); Andrew Kudless (scripting consultant)
Engineers Buro Happold—Ron Elad, Stephen Lewis, Matthew Melnyk, Tom Reiner
CATIA modelling Sanjay Souki, Daniel Pataki
Installation SCI-Arc, Los Angeles—Oliver Liao, Joanne Angeles (team leaders); David O'Regan, Judson Terry, Yohei Uchino, Zarmine Nigohossian, Tim Francis, Ali Sykes, Jimmy Chan, Channah Levy, Sarah Strauch, Brett Phillips, Marisol Mejia, Liona Avery, Justin Rice, Nicholas Paradowski, Matthew Cavender, Vincent Wu
Materials Lenderink Technologies
Laser Cutting Advanced Laser
Special thanks Greg Otto

8. RHINOBOND ROOF ATTACHMENT SYSTEM (PG 61)
Manufacturer Sika Sarnafil, Canton, Mass.—Michael DiPietro (product development specialist); Joe Schwetz (director of technical services)

9. PIN-FUSE JOINT (PG 62)
Engineers Skidmore, Owings & Merrill, San Francisco—Mark Sarkisian (structural engineering director); Shea Bond, Jean-Pierre Chakar, Rupa Garai, Eric Long, Neville Mathias, Jun Racines (structural team members); Stanford University, Stanford, Calif.—Gregory Deierlein (collaborating team member)

10. TRUMPF CAMPUS GATEHOUSE, DITZINGEN, GERMANY (PG 64)
Client Trumpf, Ditzingen, Germany
Architect Barkow Leibinger Architects, Berlin—Frank Barkow, Regine Leibinger (principals); Carten Krafft (design project architect); Caspar Hoesch (construction project architect); Meredith Atkinson (design team)
Construction Management Gassmann + Grossmann
Structural Engineer Werner Sobek Ingenieure
Landscaping Büro Kiefer
Façades Arup Berlin (concept); Werner Sobek Ingenieure (realization)

11. TKTS BOOTH, NEW YORK (PG 66)
Clients Times Square Alliance; Theatre Development Fund; Coalition for Father Duffy
Architect Perkins Eastman, New York— L. Bradford Perkins, Nicholas Leahy, Charles Williams, Kazuaki Iwamoto, Shang Shuri, Zhanxi Fang, Philip Tidwell, Virginia Shou, Luke Yoo, Amra Kulenovic, Jessica Dorf, Meredith Harmon , Giaa Park (project team)
Concept Architect Choi-Ropiha Architects
Plaza Architect William Fellows Architects
Structural Engineer & Façade Consultant Dewhurst MacFarlane and Partners—Timothy Macfarlane, Michael Ludvik, David Shea, Peter Arbour, Lawrence Dewhurst, Radhi Majmudar
Preservation Architect Bresnan Architects
Construction Manager D. Haller Inc.
M/E/P Engineer Lewis Engineers
Civil & Geotechnical Engineer DMJM Harris
Lighting Consultant Fischer Marantz Stone
Design and Fabrication Engineer Haran Glass, with IG Innovation Glass
Glass Installation David Shildiner; Innovation Glass
Booth Fabrication Merrifield Roberts
Mechanical Subcontractor Trystate Mechanical
Electrical Subcontractor ASR Electrical Contractors
Pylon Fabrication Lettera Signs

12. SAN FRANCISCO DIGITAL CONTEXT MODEL (PG 68)
Architect Skidmore, Owings & Merrill, San Francisco—Craig Hartman, Carrie Byles (leadership); Mark Schwettmann, Will Marvez, Leo Chow (conceptualization/research); Alex Cruz, Mark Schwettmann, Michael Sun, John Farwell, Tsung-Lin Chen, Hyun Joo Choi, Na Young Oark, Soo Jung Park, Juan Rodriguez, David Pekema (construction/drawings)

13. LED STREETLIGHT, NEW YORK (PG 72)
Client City of New York
Prototype Team Office for Visual Interaction, New York—Enrique Peiniger, Jean Sundin; Werner Sobek; Lighting Science Group; Laslo Bodak; Clare Randall-Smith; LED Specialists
Concept Design Thomas Phifer and Partners, New York—Thomas Phifer, Christoph Timm, Joseph Sevene, Jon Benner; Office for Visual Interaction; Werner Sobek

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