

WILLIAM **BROWNING**  
VISHAAN **CHAKRABARTI**  
LAURIE **OLIN**  
SUSAN **RODRIGUEZ**  
CRAIG **SCHWITTER**

CHAPTER 2

## DEFINING SUSTAINABILITY EXPANSIVELY

A sustainable building is much more than one that uses energy efficiently. A recurring theme in the following interviews is social sustainability in design—that is, making places that work just as hard to earn the goodwill of users as they do to turn the electricity meter backward. A building may accomplish this task by celebrating a community's history, supporting local economic development, or even resonating with the qualities that make us fundamentally human. The result is enduringness. This chapter concludes with a discussion of how the social experience of a building may inform engineering innovations in turn.



# BILL BROWNING

**BILL BROWNING** COFOUNDED TERRAPIN BRIGHT GREEN WITH ARCHITECTS RICK COOK, BOB FOX, AND CHRIS GARVIN IN 2006. THE NEW YORK- AND WASHINGTON, DC-BASED CONSULTANCY PURSUES, AS BROWNING PUTS IT, "INTEGRATED WHOLE-SYSTEM SOLUTIONS" TO SUSTAINABLE DESIGN CHALLENGES. TWO OF TERRAPIN'S BEST KNOWN APPROACHES TO SUSTAINABILITY ARE BIOMIMICRY, USING NATURE AS A SOURCE FOR INNOVATION, AND BIOPHILIA, CONNECTING PEOPLE WITH NATURE. AT THE TIME OF THIS *VISION+VOICE* INTERVIEW, GSA AND TERRAPIN WERE STUDYING IMPROVEMENTS TO HUMAN HEALTH AND PRODUCTIVITY IN BIOPHILIC ENVIRONMENTS.

AFTER TRAINING IN ENVIRONMENTAL DESIGN AND REAL ESTATE DEVELOPMENT, IN 1991 BROWNING ESTABLISHED GREEN DEVELOPMENT SERVICES AT THE ROCKY MOUNTAIN INSTITUTE, THROUGH WHICH HE PARTICIPATED IN MULTIPLE FEDERAL SUSTAINABILITY INITIATIVES. HE ALSO WAS A FOUNDING BOARD MEMBER OF THE U.S. GREEN BUILDING COUNCIL. INDEED, BROWNING IS CONSIDERED ONE OF THE MOST IMAGINATIVE VOICES IN SUSTAINABILITY TODAY. IN CONVERSATION HERE, BROWNING EXPLAINS THE PHILOSOPHY BEHIND HIS EXTENSIVE WORK FOR THE FEDERAL GOVERNMENT, WHICH RANGES FROM SUSTAINABLE SECURITY TO DISASTER RELIEF. HE ALSO DESCRIBES SEVERAL WAYS IN WHICH THE BIOMIMICRY AND BIOPHILIA CONCEPTS SUPPORT SUSTAINABLE DESIGN STRATEGIES, AND PROVIDES MORE DETAIL ON HIS ONGOING MEASUREMENTS OF BIOPHILIA AND PRODUCTIVITY WITH GSA.

**BILL BROWNING:** As a research field, biomimicry literally means asking, How does nature do that?

We're working on a 3-million-square-foot building in New York City, trying to figure out environmental reference standards for it. So, we used as our basis a project called Mannahatta, which maps Manhattan's ecosystems back to 1609. We asked, What was this ecosystem doing on this site?

One of the building's problems is that annually it uses millions of gallons more water than it should. In the lowest levels of the building we found a set of sump pumps that seemed to have been running continuously for 80 years. The water quality was phenomenal in there, so we assumed it was a stream. When we then looked at the Mannahatta map, it revealed that that stream is still flowing into the basement of the building. For 80 years it has been pumped out and put down the storm drain.

That 45 million gallons of water a year now can be used for cooling towers, for toilet flushing; it can be used in the fabric of the building rather than being thrown away. That's one example of [establishing environmental reference standards by] asking what the ecosystem was doing. And we've taken several steps further. The forest on this site was sequestering 3.7 tons of carbon on an annual basis, so now the question is how this building could potentially sequester 3.7 tons of carbon a year. Similarly, we're looking at putting substantial gardens on the roof as a mechanism for bringing back the biodiversity of this site.

This is moving beyond net-zero energy or LEED ratings. Saving 30 percent of the energy against some ASHRAE standard ultimately feels arbitrary, right?

It takes a creative client to think this way, but when we start digging in like this, several things happen. One is, you inherently wind up with a much higher LEED rating, because you're thinking in much more integrated, holistic terms. You also are thinking in terms of the services a place can provide.

Unfortunately, in many cases people look at LEED as a design tool as opposed to what it really is, which is a measuring tool. It doesn't tell you what to do; it gives you measurements to check your performance. One of the things we insist on doing with our clients is first stepping back and setting goals: What's important about energy usage? What's important about water? What's important about the experience of the occupants in the building?

The client's role in an integrated process is having a clear understanding of what they want, and that may take some back and forth with the design and construction team. A charrette is really just the beginning of that ongoing process. If you just do a charrette and leave, then it may or may not stick. It's really important that you've got the right stakeholders in the room, and that everybody's engaged.

I think of a number of reasons why the government should be involved in sustainability. The obvious one is resilience. We need durability in a government, particularly in terms of the military's disaster relief. The military is one of the few organizations that has the logistical capability, the equipment, and the manpower and knowledge base to be able to deliver humanitarian relief in a timeframe and scale that really makes a difference.

GSA can make a difference in several areas. One is helping set goals. Even though it's not a GSA project, take the new National Renewal Energy Laboratory building as an example. The project had a clearly articulated set of performance goals right up front, and the Department of Energy was willing to let the design team figure them out without massive intervention. That took place within the framework of the Federal Acquisition Regulation. They did not have to modify their policies and procedures to do it.

There are a number of groups within the federal government that have been key in leading innovation in green building. A lot of the technologies we use today came out of the Lawrence Berkeley National Laboratory or National

Renewable Energy labs, like compact fluorescents and low-E windows. These were developed in federal labs and then put out in the mainstream.

GSA has been a key player in this conversation, in helping lead research on environmental performance and human performance not just for its own buildings but all federal buildings. That work is enormously helpful for the private sector, as well, because buildings research is one of the least funded areas of research in any industry. Yet the building industry is one of the biggest chunks of our economy.

Biophilia explores the innate need of humans to connect with nature. Terrapin is in year six of a multi-year experiment [with GSA environmental psychologist Judith Heerwagen, among others] that looks at a building that has biophilic design elements. We're tracking 4,000 people who moved into that building and another 3,000 people who did not. Looking at daylight, looking at views, looking at temperature, looking at indoor air quality, looking at ergonomics, looking at all of these different conditions, we are seeing real differences in people's productivity and health outcomes.

The measures of productivity that we're interested in are typically the ones that a company has already been tracking over time, such as absenteeism or rate of transactions. And the numbers are huge: In an office building, office workers' salaries are 90 times the energy cost per square foot, and yet so much of the conversation about green buildings has to do with energy. People are the real cost, so focusing on quality of the indoor environment and on giving people this connection to nature is really the way to enhance a building.

Now in biophilia research, we're getting into direct health impacts: this is the part of the brain that is processing an image when you're looking at a blank wall; you're getting a low opiate reaction; the brain's wandering around; it's trying to focus. Give people a view of beautiful nature or even just a tree with a leaf moving, even for a few seconds, and it captures

BIOPHILIC DESIGN IS NOT JUST ABOUT BRINGING PLANTS OR ANIMALS INTO A BUILDING. SOME RESEARCHERS HAVE BEEN DEVELOPING A PATTERN LANGUAGE BASED ON NEUROLOGICAL AND PHYSIOLOGICAL RESPONSES WE'RE MEASURING.

your attention; the brain refocuses; it moves processing to the back of the visual cortex. You can see the endocrine cascade, the balance of cortisol and serotonin in the body, heart rate—all of those pieces come together. Simply, we're seeing that biophilic design effects profound physiological changes that impact human performance.

Biophilic design is not just about bringing plants or animals into a building. Some researchers have been developing a pattern language based on neurological and physiological responses we're measuring. One that is commonly understood is the concept of providing refuge spaces. Another spatial condition would be prospect, where you have a view out across an area; it may be slightly elevated, and even better if that view includes a nature scene. If you put prospect and refuge together in the same building, you elicit a very strong reaction from its occupants. There are classic examples of architecture in which those concepts are paired.

I'm very happy that GSA has been delving into the whole field of biophilia, because that's what sustainability is really about. It's not about a building, it's about how the connection between nature and the built environment supports people's health and well-being.



# VISHAAN CHAKRABARTI

WHEN HE SAT ON THE JURY OF THE 2010 GSA DESIGN AWARDS, **VISHAAN CHAKRABARTI** HAD JUST LAUNCHED THE CENTER FOR URBAN REAL ESTATE AT THE GRADUATE SCHOOL OF ARCHITECTURE, PLANNING AND PRESERVATION AT COLUMBIA UNIVERSITY. THE INNOVATIVE NEW PROGRAM EXAMINES EMERGING AND EXPERIMENTAL DESIGNS OF SUSTAINABLE INFRASTRUCTURE AND AFFORDABLE HOUSING, AS WELL AS THE FINANCING AND POLICY MECHANISMS THAT PROMOTE MIXED-INCOME, GREEN DEVELOPMENT. BETWEEN 2005 AND 2009 CHAKRABARTI SERVED AS THE EXECUTIVE VICE PRESIDENT FOR DESIGN AND PLANNING FOR THE RELATED COMPANIES. PRIOR TO THAT HE DIRECTED THE MANHATTAN OFFICE OF THE NEW YORK CITY DEPARTMENT OF CITY PLANNING. IN 2012 *METROPOLIS* MAGAZINE FEATURED CHAKRABARTI IN ITS SPECIAL "GAME CHANGERS" ISSUE. HE IS A PARTNER OF SHOP ARCHITECTS AND AUTHOR OF THE JUST-PUBLISHED BOOK *A COUNTRY OF CITIES*.

FROM HIS OFFICE ON COLUMBIA'S UPPER MANHATTAN CAMPUS, CHAKRABARTI DISCUSSES THE RELATIONSHIP BETWEEN GOVERNANCE STRUCTURE AND SUSTAINABLE DEVELOPMENT—NOTING, FOR EXAMPLE, THE DIFFICULT INTERAGENCY COLLABORATION REQUIRED OF PLANNING A GREENER AMERICAN MEGALOPOLIS. ZOOMING IN ON PROPERTY-SCALE DEVELOPMENT, CHAKRABARTI THEN ANALYZES THE RELATIONSHIP BETWEEN ENVIRONMENTAL PERFORMANCE AND OVERALL BUILDING QUALITY, FOCUSING ON BOTH SITE SELECTION AND ARCHITECTURAL STRATEGIES FOR ENSURING COMMUNITY USE.

**VISHAAN CHAKRABARTI:** The Center for Urban Real Estate's mission is to advocate and research sustainable communities. We're exploring how to build a more robust, mixed-income, and transit-oriented kind of density, in order to accommodate growth that we're seeing domestically and internationally.

We have many decades of real estate data about what customers want, and we have data about buildings' energy use. Our program also is involved in speculation—of whether the land that we have available to us is being used in the way that it really should be used. As a design school, we have the ability to think about futures that could unfold if we had different policies and attitudes regarding land use.

Mayors share our interest in exploring these issues of growth, because they impact every mayor as a manager. There's not the luxury of politicization. Mayors tend to be interested in the best uses of land and infrastructure—in how their cities can grow in a sustainable way while building the tax base.

Today about 70 percent of the American population lives in seven or eight mega-regions. Those regions tend to cross state lines, but they have common needs in terms of infrastructure, housing, and so forth. Our governing structure isn't ideal for serving this population, and that's why it's harder for state and federal agencies to deal with issues like high-speed rail, which we're seeing in other advanced countries.

I think we have a particularly acute set of challenges right now in terms of building the infrastructure we need. If you think back to the Eisenhower administration and the passing of the Federal Highway Act, there was clearly an understanding about why the government would actively try to spread out the population. Now we are in a reverse mode: people are moving into cities, and much of the landmass of the country is actually decanting population. And yet we don't have that same kind of Eisenhower-era imperative that says, If we're to compete in a global economy, then we should be

building the infrastructure that supports densification. I'm not sure we have an overall governance structure that's really up to the challenge.

Even so, I'm seeing Secretary Donovan and Secretary LaHood working together much more. The White House has been trying to organize urban affairs under an umbrella, so agencies that impact cities and municipalities work across their departments. I'm very encouraged by those kinds of activities at the federal level.

Even if it does not have a direct hand in major infrastructure investments, I believe GSA could play a very significant role in this phenomenon. Daniel Patrick Moynihan believed in great civic architecture—of train stations, for instance, as a way to incentivize people to use mass transit. The experience of the public realm would have both dignity and efficiency, in that case.

For that reason, I was thrilled to be a juror [of the 2010 GSA Design Awards]. Some of the work was extremely impressive, the border stations especially. There's other work that was more pedestrian. But to me, the important thing is that there is this great effort to bring in an independent body of experts who can really look at and influence what the government is doing.

It's obvious to most people that if you live near a city, use mass transit, and live in smaller housing, then your costs are less. People vote with their wallets. Moreover, true environmentalists understand that the impact of living in a city is far, far less than living on a farm in Vermont. Even if that farm in Vermont has solar panels and windmills, it's a highly auto-dependent lifestyle and the structure itself is highly inefficient in terms of heating and cooling. We're going to see the American Dream change.

Choosing a location in the heart of a city, saying that the city matters, is one way of deploying federal building resources that strengthen our densifying cities. Then there's

the making of those sites into inviting urban destinations. We should be building projects and selecting sites that are responding to population change and reinforcing our strengths. We also should be helping cities that are struggling more than the New Yorks and San Franciscos of the country. You're starting to see some life revive in places like Buffalo or Charlotte, for example.

I think site selection within a specific city is very important, too, because if you build a big courthouse somewhere that is necessary and situate that courthouse on its site properly, then it can start to support street-level retail. It can start to support a whole bunch of things around it just by the sheer volume of its activity, its design, and its transparency.

I've always believed that the right relationship between government and its people should be that public-sector action inspires and motivates the right kind of private-sector reaction.

In architecture, as a field we've had a tendency to focus on the bells and whistles—green roof, solar panels, all that kind of stuff. But the fact of the matter is, if you take every possible sustainability measure you can think of and put it in a building and then put that building in a suburban location, then the carbon footprint of that building and its average worker is very poor compared to those of the workers commuting to a 1930s office in the heart of Manhattan.

The whole culture around an office park is systemically consumptive: the way people get to work, where they live in order to be near that office park, the heating and cooling they use along the way, the irrigation of lawns. Green mechanisms—the active sustainable technologies—are actually just at the margins of what we should really be pursuing in terms of carbon footprint.

Energy performance is very important, but it needs to come in conjunction with a holistic look at our buildings and communities to really understand the overall carbon footprint. So, when I think about measuring the success of

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a building, I think we should be evaluating it in terms of energy, in terms of urbanism, in terms of innovation, even in terms of cultural critique. Those are important aspects of what good architecture should be doing, in addition to energy performance.

The city is the silver bullet. The question is how to respond to that. Obviously, the federal government has a responsibility to serve the entire population, including populations that may live very far from the city, so this argument is not going to pertain to every case. But I think you are seeing the potential, even in small gestures, to support the move to a denser, more city-centered world. Maybe support comes in the form of putting a parking lot in back of a building and figuring out how to get people to relate more to the sidewalk. Whatever the example, ideas about dignity in the urban environment can have impact. And that starts to impact not just energy usage, but also issues like public health and obesity, or economic prosperity in the surrounding community.



# LAURIE **OLIN**

MASTER PLANNER OF LONDON'S CANARY WHARF, DESIGNER OF THE WASHINGTON MONUMENT GROUNDS, AND RESPONSIBLE FOR THE REVITALIZATION OF BRYANT PARK IN NEW YORK CITY, LANDSCAPE ARCHITECT **LAURIE OLIN** HAS CREATED SOME OF THE MOST ENDURING CONTEMPORARY PUBLIC SPACES AROUND THE WORLD. HIS INDEPENDENT CAREER BEGAN IN 1976, WHEN HENRY COBB OF I.M. PEI & PARTNERS INVITED HIM TO JOIN THE DESIGN TEAM OF THE JOHNSON & JOHNSON BABY PRODUCTS CORPORATE CENTER. THAT SAME YEAR HE AND THE LATE ROBERT HANNA ESTABLISHED THE STUDIO HANNA/OLIN, WHICH TODAY IS KNOWN AS OLIN. ANOTHER ONE OF THE COMPANY'S EARLY PROJECTS IS THE 16TH STREET TRANSITWAY IN DENVER, AND OLIN LIKENS THE TRANSITWAY'S COMMUNITY GOODWILL TO "SUSTAINABILITY[, WHICH] IS NOT JUST BUILDING WELL. IT'S GETTING CULTURAL BUY-IN FOR SOMETHING SO THAT IT GETS TAKEN CARE OF."

OLIN SERVED ON THE DESIGN TEAM OF THE JOHN JOSEPH MOAKLEY UNITED STATES COURTHOUSE, A SEMINAL PROJECT FOR GSA'S DESIGN EXCELLENCE PROGRAM THAT WAS LED BY PEI COBB FREED & PARTNERS. MANY OF THE LANDSCAPE STRATEGIES EMPLOYED FOR THE BOSTON COURTHOUSE'S SITE, SUCH AS THE STORMWATER FILTRATION AND REGIONAL MATERIAL SOURCING ALSO DESCRIBED IN THIS *VISION+VOICE* INTERVIEW, ARE STILL FOUNDATIONAL SUSTAINABILITY SOLUTIONS FOR THE PROFESSION.

**LAURIE OLIN:** One of the problems with sustainability is there are so many ways to define it. It could be about materials and life-cycle costs, for example. When we did the Denver Transit Mall 26 years ago, I proposed 12 blocks of polychromatic granite pavement. People were just horrified, because they thought it should be asphalt or concrete. And I had several reasons for saying no. One was, having lived in Europe for quite a few years, I had thought we wanted to build something that people would love and that would endure. Granite would endure.

Well, that is one aspect of sustainability. Two years ago, when a community business group in Denver wanted to refresh the mall and make some repairs, I made proposals to change some things and the preservation community came out of the woodwork and prevented us from doing it. They wanted it the way it was; it's theirs; it's a tourist attraction; it is beautiful; they love it. So sustainability is not just building well. It's getting cultural buy-in for something so that it gets taken care of.

That is an aspect that is rarely talked about—getting the citizenry devoted to the public realm and wanting to keep it, maintain it, share it, repair it. Many years ago J.B. Jackson wrote a wonderful essay, in which he said he felt that every American was entitled to a landscape that was ecologically healthy, socially just, and spiritually rewarding. How about that? Well built, ecologically sound and healthy, socially just—it's for everyone and it's open and it's accessible and it is affordable, and it makes you feel good about being alive alongside your fellow citizens and participating in the future of the community. I mean, those are fabulous ideas. And I believe it and our firm believes it. Sustainability means financially sustainable, ecologically sustainable, culturally sustainable, and physically sustainable.

The Moakley courthouse was a nice project in lots of ways, partly because I saw it as a chance to give a piece of the waterfront back to the citizens of Boston and to help

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make the Fan Pier development take off. The courthouse was turning itself open to the city, and we wanted to do the park so well that it would set a standard for what came afterward. I wanted it to be open, I wanted it to be a nice place to sit and to stroll through, and I wanted it to say, Come here, this is for you. And despite the security problems, it turned out to be a really nice and simple project.

I wanted to use all native plants from the region, which we did, and I wanted to have stuff that could take on winter conditions on the Boston Harbor. That gets you to thinking about New England very deeply. I wanted it to be made of granite from Maine. We wanted to be able to have the snow and ice go right into the ground or into the harbor without any pollution.

If you want to talk about sustainability, you're not talking about short-term gain. You are talking about the long haul. And that means you need to plan well, build well, and maintain things. And those are habits that we lost somewhere along the line. Returning to them shouldn't be painful, it should be a joy. But it is taking awhile to get everybody back onto that page.

I want to build things preservationists would fight to preserve. I want to build things that are that good. I want them to be beautiful, I want them to be socially accessible, and I want them to be productive.

I think the federal government has a great opportunity to show leadership in the creation of public spaces. And by that I mean it doesn't have to be the most avant-garde, but it sure shouldn't be rear garde. It should be doing work that is the state of the art of its moment. Because it makes places outdoors and indoors for American citizens to use to govern ourselves, the federal government therefore needs to make places that are welcoming, gracious, well built, and have character and have some spirit of where they are.

A lot of people, when they go to places like courthouses or interact with government in general, are under stress. They are worried; they think something might happen to them; they are dealing with authority. So to be welcoming, to be reassuring, to be solid, to not be frivolous and silly, but also not to be grim and hostile, is one of the principal roles of public space in a federal facility.

A public space wants to be functional and have ease of use, but it also should be generous in its spirit. It's for Americans, it's for citizens, it's for the workers who pass through it and use it everyday. I think it's important that those be good places. To cheap out on that is to hate yourself. To dislike our government is to hate oneself. I like to think we're a generous nation. If you're going to make a mistake, then err on the side of generosity.

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In our practice we have had numerous public projects where attempts at community outreach are made. It's hard for a designer—unless it's a town that you have lived in for awhile and really know—to come to a city and quickly get the vibration of what is going on on the ground, in the neighborhoods and in the business community and the government.

And so you need help. Quite often it's the savvy client who organizes a community and designer to meet one another. They will immediately hold a getting-to-know-you session where the public is introduced to a project and to us. We say a little bit about ourselves and then solicit the public for

their feelings, thoughts, and ideas from the very beginning. So you start out asking before you start telling, which is always a good idea.

The best community outreach allows citizens to take our measure. But it also allows us to try to elevate them. We expose them to things from around the world that we're aware of, and that we'd like them to know.

Landscapes are what we share. Buildings are not necessarily shared by everybody. In fact, they are private. And we think of what goes on in most buildings, except for some civic buildings, as private. So, if I build something out in front of my building, even if it's private property, you probably see it and it probably affects you. Landscape has this public quality; the bad air on my project doesn't stop at the property line, it may drift over to you.

So when we do public parks or city streets or university campuses, we are thinking about and caring about a vast array of people with different needs even more so. Whether the project is public or private, this approach is not some kind of crazy utopian thinking. For me, citizenry is not a myth; citizens are my client.

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## SUSAN RODRIGUEZ

AS A FOUNDING PARTNER AND DESIGN PRINCIPAL IN ENNEAD ARCHITECTS, **SUSAN RODRIGUEZ** DESIGNS BUILDINGS FOR CULTURAL, EDUCATIONAL, AND CIVIC INSTITUTIONS INCLUDING GSA'S FORTHCOMING FEDERAL COURTHOUSE IN HARRISBURG, PENNSYLVANIA. SHE HAS BEEN RECOGNIZED FOR INNOVATIVE DESIGNS FOR CITIES AND CAMPUSES AROUND THE COUNTRY, AND FOR BROADENING SUSTAINABILITY TO INCLUDE SOCIAL EQUITY. HERE SHE DISCUSSES THAT CONCEPT IN LIGHT OF THE HARRISBURG COURTHOUSE, ARGUING THAT DESIGNING FOR "RECIPROCITY" WITH A COMMUNITY—IN THIS CASE, TRANSLATING THE CITY'S UNIQUE LANDSCAPE FEATURES AND HISTORY INTO ARCHITECTURAL DESIGN—INCREASES A BUILDING'S CHANCES OF LONG-TERM SUSTAINABILITY.

ENNEAD WAS KNOWN AS POLSHEK PARTNERSHIP ARCHITECTS UNTIL 2010; RODRIGUEZ HAS BEEN WITH THE FIRM SINCE 1985 AND A PARTNER SINCE 1998. AMONG HER AWARD-WINNING PROJECTS ARE THE LYCEE FRANCAIS DE NEW YORK, FRANK SINATRA SCHOOL OF THE ARTS, NEW YORK BOTANICAL GARDEN INTERNATIONAL PLANT STUDY CENTER AND PFIZER PLANT RESEARCH LABORATORY, WESTCHESTER COMMUNITY COLLEGE GATEWAY CENTER, AND A NEW COURTHOUSE, ON STATEN ISLAND, FOR NEW YORK STATE CIVIL AND CRIMINAL SUPREME COURTS AND RICHMOND COUNTY CRIMINAL COURTS. RODRIGUEZ ALSO ACTIVELY PROMOTES DESIGN IN THE PUBLIC REALM, LECTURING ON HER WORK AND SERVING ON MULTIPLE BOARDS AND GSA'S NATIONAL REGISTRY OF PEER PROFESSIONALS.



**SUSAN RODRIGUEZ:** Our practice is founded on designing buildings in the public realm, which by their very nature demand engaging with people; connecting with place and connecting with community are essential. Our design process is collaborative by nature, based on research into a project's unique physical, social, economic, and historical issues, which inform our thinking and our decision making. Every project is a first: a unique solution to a unique overlay of circumstances. One needs to have a deep curiosity about a place to make an important, lasting building.

Public works are very complex endeavors that require collaboration with our clients, which are often public agencies or cultural or educational institutions; with our engineers and other special consultants; with the specific community; and among ourselves. Creating a federal courthouse with GSA means shaping an environment that is infused with symbolic gravitas and serves diverse users' functional requirements. All of my projects require a commitment to the potential of bringing life to a community. When charged very explicitly with creating public space, you must really capture people's imaginations:

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you are creating a bit of magic that enlivens daily experiences. Public space takes on a life of its own, after all. Defining the relationship between a building and its surroundings—revealing or concealing the program within—is meaningful to me. Articulating that relationship greatly affects the public's understanding of the building's purpose, and its physical and symbolic place in the city landscape.

For example, recently I designed the Frank Sinatra High School of the Arts in Astoria, Queens. We conceived of the building as an urban stage to highlight the talent and creativity of the students. The transparency of the principal facade provides an exciting transition between urban life and student activity within the building, showcasing performing students to passersby as well as framing views of the city for the students.

Here and in all my public buildings, my goal is to heighten anticipation: to get a person feeling engaged and curious enough to walk in the front door and find out more. While modern-day security may not allow someone actually to pass through the front door, transparency suggests the reciprocity of inside and outside and ensures an understanding of the purpose and experience of a building.

Building performance must be part of an overarching vision for a project. Sustainability is quite broad as a topic; it encompasses not only quantifiable and robust systems, technology, and metrics, but also the health of a community. A building that makes a great symbolic and civic contribution and becomes a focal point for the community stands the test of time in a variety of ways, qualifying it as sustainable—lasting and enduring.

Some of the best buildings raise consciousness of where you are physically and temporally, whether through contrast or complementarity. A building is a chess piece in a whole network of activity, and it can be a catalyst for change. It can revitalize a neighborhood that is failing. Insightful

consideration of the place is key. How do you integrate a very large building into an intimate context? What if a building's program is completely antithetical to its place—can it engage its context? These have been among the central factors we have considered in the design of the Harrisburg courthouse.

GSA's commitment to preliminary analysis has been an especially exciting aspect of working on the project and essential in answering these questions. We had a very healthy period to look at the history of the city, the impact of this building on its immediate context and the larger Susquehanna River watershed, and to look at local material procurement. Moving in and through the Harrisburg courthouse will make one conscious of where you are in the world; there will be breathtaking views of the city and the Susquehanna River. This consciousness is crucial, because the building signals support for the local economy and for the natural environment at an important intersection of river and topography. We are also considering reestablishing an ecosystem on the rooftops and engaging them as public spaces that are truly integrated into the usage of the building, and rethinking the typical parking lot as a tool for improving the watershed and the local ecosystem.

In terms of urban design, that the site for the courthouse is not part of the city's urban center is a challenge in Harrisburg. Its immediate context is defined by public housing and a mission to the south, with abandoned houses and low-scale development to the north and west. Even so, it provides opportunities to extend the city north and reconnect with views to the surrounding landscape while underscoring the importance of the federal judicial system. So we have conceived this building as a means to enhance public experience and form a northern gateway.

For the massing of the building, we had to reconcile the grandeur and dignity of the federal courts with the low scale of surrounding buildings. Vestiges of the rows of

townhouses and dense residential fabric that once defined the site remain in evidence. It also was important to locate the taller portion of the courthouse to limit shadows on the neighborhood and newly created landscape—to integrate the local and federal presence at this intersection. Connecting with place and connecting with community to create a more accessible condition is very important in today's society.

Every place has a past. In Harrisburg, our site is removed from downtown. So how do you extend downtown into another part of the city, especially when the city historically has trended toward less density? Part of our process has been to understand Harrisburg: We have thought long and hard about the significant architectural and cultural spaces within Harrisburg. Arriving by train in the central terminal is one of those memorable experiences. Closer to our site is a magnificent late-19th-century market. It's beautifully expressive of its structure, and people love it. We also looked at the Capitol building, which is grand and monumental and a real expression of its time and purpose. These precedents inspired our design and have visibly informed a 21st-century federal courthouse. In addition to the architectural is the historical context. The Harrisburg site is located on what seems to be an undistinguished avenue, but it once was a primary artery: the high point of the city and the ridge that split the watershed. It was the main thoroughfare that ran from the reservoir to the Capitol. Our research also brought to light that train tracks adjacent to our site were part of a historic network that elevated Harrisburg's prominence as a city and facilitated the largest military encampment during the Civil War. Later, in the 1940s, the neighborhood marked the center of jazz culture in the region. All told, through our design we are trying to illuminate the city's assets and attributes, to reveal its unique history to the public, and to provide for an optimistic future.

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## CRAIG SCHWITTER

**CRAIG SCHWITTER** JOINED THE BATH, UNITED KINGDOM, OFFICE OF BURO HAPPOLD IN 1992 AND HE FOUNDED THE ENGINEERING FIRM'S NORTH AMERICAN PRACTICE IN NEW YORK IN 1999. THAT OPERATION NOW ENCOMPASSES MULTIPLE ENGINEERING DISCIPLINES, AS WELL AS LIGHTING DESIGN AND SUSTAINABLE CONSULTING AND MASTER PLANNING. IT ALSO HAS GROWN TO OVER 200 STAFF BASED IN BOSTON, CHICAGO, SAN FRANCISCO, AND, FINALLY, LOS ANGELES—WHERE A TEAM WORKED ON THE GREEN MODERNIZATION OF GSA'S PRINCE JONAH KUHIO KALANIANA'OLE FEDERAL BUILDING IN HONOLULU. HERE, SCHWITTER EXPLAINS THAT THE PJKK PROJECT'S ENVIRONMENTAL PERFORMANCE RELIED PRECISELY ON SYNERGIES BETWEEN SPACE PLANNING, WORK CULTURE, THE BUILDING ENVELOPE, AND MECHANICAL SYSTEMS, WHICH ENGINEERS AND DESIGNERS IDENTIFIED COLLABORATIVELY.

FURTHER DEMONSTRATING SCHWITTER'S HOLISTIC APPROACH TO SUSTAINABILITY, HE HAS LED BURO HAPPOLD'S LAUNCH OF THE ADAPTIVE BUILDING INITIATIVE AND G. WORKS. PARTNERSHIPS WITH HOBERMAN AND HR&A ADVISORS, RESPECTIVELY, THE ENTITIES DEVELOP CUTTING-EDGE ACTIVE GREEN TECHNOLOGIES, ENERGY EFFICIENCY RETROFIT PLANS, AND OTHER EFFORTS TO LOWER THE CARBON FOOTPRINTS OF BUILDINGS. GLIMPING SUSTAINABILITY INVENTIONS IN THE PIPELINE, SCHWITTER EMPHASIZES THAT BOTH PHYSICAL AND SOCIAL SCIENCES WILL BE RESPONSIBLE FOR THE NEXT GENERATION OF ENVIRONMENTAL GAINS.

**CRAIG SCHWITTER:** The engineer's role in a building project has changed very much over the last 20 years—evolving from one where we're very concentrated on structural engineering to one, today, that's more about performance. We've shifted away from tactile issues.

I think the PJKK project is an interesting example here. It's a large, midcentury federal office building and courthouse, and the federal office component was very inefficient. The project really started with performance, first in analyzing how people work today. Engineers in our Los Angeles office worked hand in hand with the architects to re-plan the space. We also found that we could take away mechanical equipment—we didn't need as much ventilation, as old standards for workplaces led to overcooling. We were able to create an atrium in the building and not lose square footage for working. And that's great, because that yielded a better interior for the end user.

Another major aspect of the building that we looked at was the facade. The facade leaked, which also led to a lot of overcooling in the building. You might ask why an MEP engineer is looking at the facade? But that's exactly why building projects nowadays are aimed at performance, because the facade is responsible for so much of a building's energy consumption. By working with the design team, we were able to improve the envelope performance so that the mechanical systems didn't have to work as hard. Integrated design is necessary to tackle those problems.

When you talk about integration, you must see all kinds of different inputs and pressures and design drivers in the process. Data-driven design, evidence-based design, is becoming more relevant as we can measure data and we can understand how those data affect outcomes for the final building.

We used to be able to only do models to verify a building's design, like with computational fluid dynamic software. Today we're able to do it in real time: We are able to give

ourselves real data during the design process. And today we can turn these around iteratively within a design process. That's a big change for design. It's a combination of that evidence-based approach, plus a political, formal, and economic approach that really ties everything together.

If it weren't for the amount of data that we are collecting, minute by minute, second by second, we wouldn't be able to do this. It drives us as engineers. There's a desire to uncover evidence and make decisions based not purely on formal means, but by tying it to things we can measure.

Going back to PJKK, I would say what is most exciting about it is this is achievable. It is not bleeding edge, it's achievable. By putting together a series of practical ideas, we can really change the footprint of energy use, and we can accomplish it on a much wider scale than one building. I don't think anybody is pushing back on what we're talking about. We need more examples of what good looks like and we need to make sure we keep pushing efficiency and quality as part of the future of GSA.

In terms of systems themselves, lighting control is something in the range of 15 to 20 percent of the energy performance of a building. And the shift from incandescent to LED is not quite understood yet in terms of building design, but it will have a significant impact.

I also see a lot of development in facades in the future. Much of a building's energy profile is controlled by the quality of facade selection and the quality of facade control. It's the logical and likely point to start with. That means better shading, better performance. This idea of iterative design—the ability to process data very quickly—is having a lot of effect on envelope designs.

Active facades, which change over the course of a day, are going to become real, too. These allow transparency at times to let light in, and then become opaque to keep heat out.

Facades are already evolving, but I think this is an area where we're going to see a lot of progress over the next 10 years.

Adaptation in facade systems is one thing we're working on, as part of our Adaptive Building Initiative. We have a series of ideas about how facades can change with respect to their environmental criteria—how you can actually shape light and shape thermal transfer through a facade system actively. This is a very important concept, and it treats the facade not as one giant piece, but as pixelated. So your window or your wall almost has a mind of its own: It can become transparent for you when views or sunlight enhances your productivity, and at times it can become opaque when you either need privacy or you need a thermal buffer.

The next real area for improvement is not building systems. It's the behavior of the building's occupants, because designing something does not necessarily mean it's performing the way you anticipated. And this actually puts a lot of pressure on a building owner, because the building owner can't just get a design and not operate it efficiently. The operation of the building is just as important as the design.

Now, how does that affect a building owner? How does that affect a facilities manager? Well, the facilities manager might understand that opening windows at certain times actually decreases the energy performance of a building; maybe they want to have times where the building needs to be more sealed, which isn't something that you would necessarily think of.

The technologies for gathering these data are rapidly reducing in price. A strong data and measurement and verification program can map those aspects of a building and allow a client to tune a building around the performance needs of the inhabitants.

There's a lot of experience to say that individual occupant behavior can change very rapidly in buildings. The idea that your office has to be 70 or 71 degrees every day, every

WE ARE ABLE TO GIVE OURSELVES REAL DATA DURING THE DESIGN PROCESS. AND TODAY WE CAN TURN THESE AROUND ITERATIVELY WITHIN A DESIGN PROCESS. THERE'S A DESIRE TO UNCOVER EVIDENCE AND MAKE DECISIONS BASED NOT PURELY ON FORMAL MEANS, BUT BY TYING IT TO THINGS WE CAN MEASURE.

minute, is starting to erode. Moving forward, we'll have to change occupants' perspective and behavior about how they can control the environment—where you get data and process data and then you comment on the data through your handheld device, through your computer. When I'm on my way to my office, for example, do I turn on my computer or heating system when I know I am 20 minutes away? Those are aspects of tying yourself into a workplace that are going to make behavior play an important role in improving the energy performance of offices in the future.

How onerous is it for you to check your iPhone or your Blackberry for a news story? We've made that part of our everyday lives. Now we have to integrate the process of tuning a building's performance to the everyday life of building ownership and habitation. To somebody that understands the benefit, it is not onerous at all.