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MARCH/APRIL 2019

Cities in Motion:
Ups and Downs in the
Mobility Revolution
by Jack Skelley

Performative
Skyscraper
by Scott Johnson

The Future.
The Human Experience.
Interview with Brian Boyl
by Meagan Goold

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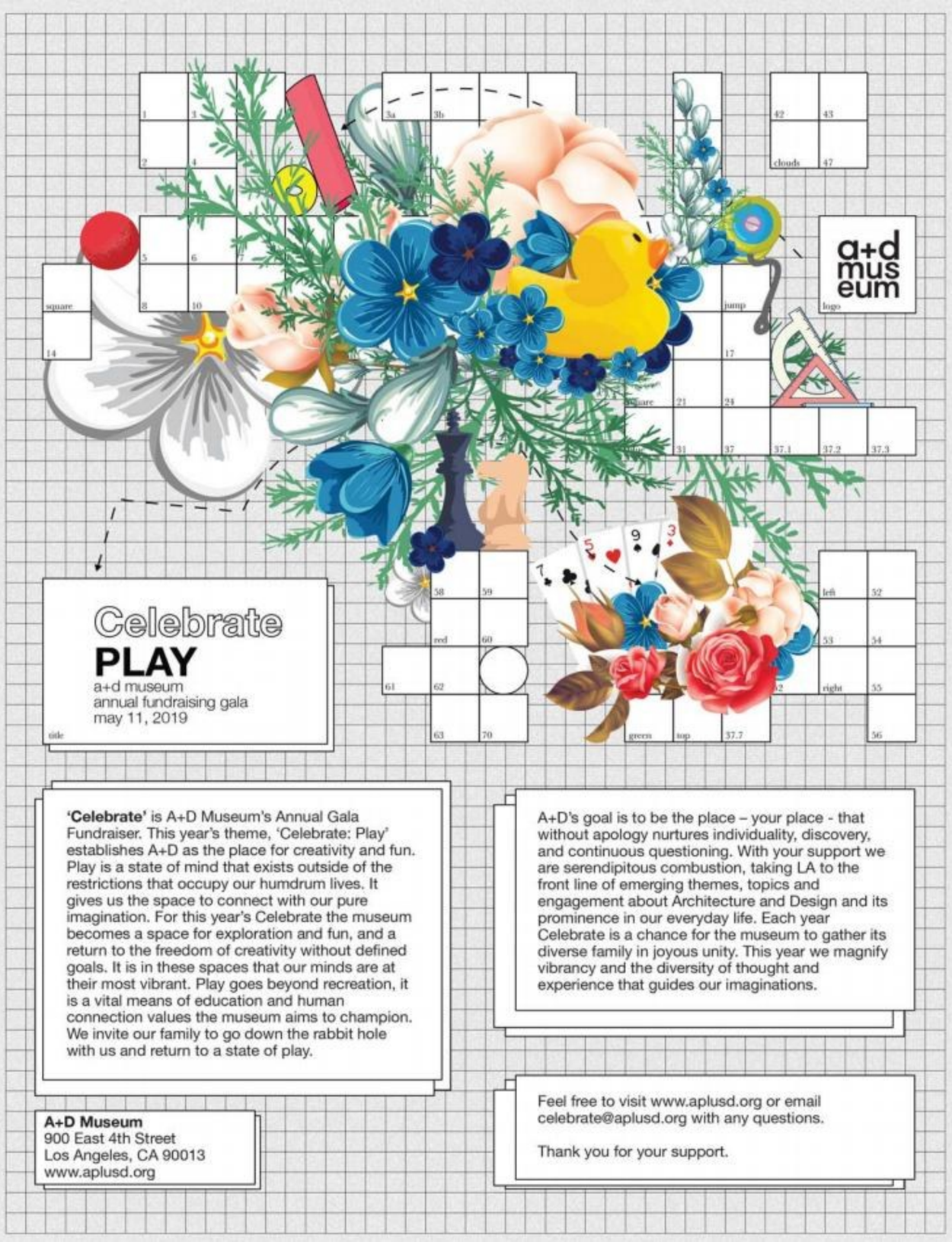

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Michael Webb Michael Webb has authored more than twenty books on architecture and design; most recent titles include *Architects' Houses and Building Community: New Apartment Architecture. A memoir Moving Around: A Lifetime of Wandering* will be published October 2018. Webb serves as FORM's resident book critic.

CAUTIONARY VISIONS

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Meagan Goold
Managing Editor

"Actually, I didn't make that decision. My machine made that decision." Not science fiction, rather the opening quote to Scott Johnson's feature, Performative Skyscraper. I couldn't help but pause when I read it as I considered all the ways in which technology or machines have made decisions for me today, and the decisions it will be helping me make tomorrow and in the future. In this issue, FORM Magazine's talented contributors take a closer look at these themes.

Jack Skelley examines the "mobility revolution" from flying cars to autonomous vehicles. What do advances in mobility mean for our personal convenience, for our cities, and the way our cities are designed?

Scott Johnson shares an excerpt from his book *Performative Skyscraper Tall Building Design Now* and although originally published in 2014 the topic, the challenges, the innovations are thoughtfully presented and just as relevant today.

And Josh Cooperman reminds us in Vantage Point, Home of the Future, that we've always been imagining the future. That we have always been searching for ways to integrate technology into our daily lives.

Finally, in a conversation with ArtCenter professor Brian Boyl he shares where he sees the future of design going, what it means for students and institutions of learning, and the power of human relationships. I was struck by something he said, "Through failure, you learn how to adapt the system to get to a better place."

Which brings me to one final thought, our January/February 2019 issue. Form Magazine failed to print a large portion of Michael Franklin Ross' feature LA's BADdest Best Architecturally Designed. The article unceremoniously ended after the 1920s, which meant our readers missed out on the 1930s thru the 2010s. There is no reasonable excuse for how this error occurred and we apologize to our readers, our dedicated contributing editor/writer Michael Franklin Ross, and the notable panel members who gave their valuable time and energy to the project. In this humble spirit, we bring you LA's BADdest Best Architecturally Designed in its entirety here, in our March/April issue.

May the future be bright and may tomorrow have no mistakes in it.

Meagan Goold

Cities in Motion: Ups and Downs in the Mobility Revolution

by Jack Skelley

From flying taxis to autonomous vehicles, new mobile technology is taking us to a future that might be either The Jetsons or Blade Runner. The future could see frictionless solutions to congestion and carbon pollution, or it could unleash a dystopia of mobile chaos, with people living in endlessly circulating self-driving pod-cars, for example. But even as corporations, engineers and planners confront with the future, new mobility is re-shaping cities right now.

"Advances in mobility will change the way cities are designed, from actual transit to the way we park and operate our businesses," says Mark Anzmendi, Executive Vice President of car-sharing firm SPLT. "Carpooling for greater density, advances in parking technology to reduce footprint and street congestion, and artificial intelligence to know when people work and deduce traffic and parking patterns will all mean greater flexibility and more humanistic urban planning." SPLT is a commuter carpooling service owned by Bosch, whose goals are humanistic to be sure. It enters a marketplace grappling with Bird Scooters and LimeBikes, and planners bracing for autonomous vehicles.

Private Enterprise and Public Responsibilities

One such planner is Los Angeles Department of Transportation (LADOT) General Manager Seleta Reynolds. "Technologies like autonomous vehicles and dockless bikeshare can be part of the solution, but only if we — government, the public sector, and the public — intentionally guide and nudge them toward the future that we want," she recently told The Planning Report. "If all that 'the future' gets us is vehicles that are autonomous and electric, but still sit in soul-crushing traffic for more than 100 hours a year, then we won't have achieved much. As code becomes the new concrete, we need to engage in challenging conversations about managing demand, pricing infrastructure, and delivering a system that works for everyone."

The transportation terrain is only getting larger, and deeper. Elon Musk's Boring Company has proposed a system of car tunnels beneath Los Angeles, with vehicles going up to 130 miles per hour. The recent demonstration of a 1.14-mile tunnel revealed obvious flaws: It depends on individual, private cars rather than longer pods that could carry more people; its construction costs are much larger than first announced; it would create congestion at surface car-tunnel elevators; and it depends on unlikely political support and environmental permits to bore under neighborhoods. As transportation experts Streetsblog reported after the test, "A full build-out of the concept could end up being a private uncontested highway system mirroring the congested public one for use only by a very rich few."

Cities are creating more real solutions in the realm of microtransit. Anaheim, for example, just launched FRAN – Free Rides Around (the) Neighborhood – a unique fleet of Polaris GEM electric vehicles hailed on-demand (like Lyft and Uber) via smartphone app. The service is operated by the city's transportation agency, not by a private company. It is highly local and "place-based," meaning it adds mobility to a specific ½-mile radius of the city enjoying a commercial and residential development boom. FRAN branded to express the character of that neighborhood, with vehicle designs rooted in Anaheim's history and culture. Such public services arrive as high-profile private services have failed. Chariot, an app-based shuttle service recently shut down due to profitability problems after Ford purchased it for $65 million. Successful ride-hailing services such as Uber and Lyft are often viewed as a threat to public transportation agencies, stealing customers and precious revenue.

Anaheim Resort Transportation Executive Director Diana Kotler believes microtransit will develop primarily as a public service. "The private sector is struggling to fill the void," says Kotler. "Each jurisdiction must decide whether a public agency will operate and fund microtransit in an environment so new that there are few policy guidelines." She notes that the various modes of the past few decades – private car, bus, rail – have operated independently, but that in the future, "microtransit will connect them all."

The Flying Cabs Are Coming

Helping to mediate between public planners and the private companies are third-party experts such as Urban Land Institute. In 2019, for example, ULI Los Angeles will host a "mobility summit" intended to focus on the role technology can play to help "implement creative mobility solutions that reduce congestion and create less stress on the environment."

This Mobility Summit will convene real estate developers, technology providers, transportation companies and public planners to address the new world of "enterprise carpooling, smart parking, smart streets, autonomous valet parking, first and last mile assets, and smart EV charging." Many of these issues were addressed at ULI Los Angeles' recent VerdeXchange / FutureBuild convention, with sessions on street curbs, "complete streets" (including bike lanes and pedestrian vitality), and "autonomous, aerial mobility" – yes, flying robo-cabs.

This is the dramatic future that Audi, Rolls Royce and other corporations previewed at the 2019 Consumer Electronics Show in Las Vegas. Uber and Bell Helicopter unveiled a flying car design – one among many that could operate in a public right-of-way that will extend 1,500 feet up into the air.

This hybrid-electric aircraft, called Nexus, plans to test flying car designs by 2020 and launch a commercial service in 2023, according to The Guardian. The enterprise is part of UberAir and its Uber Elevate program, which aims "to reduce individual car ownership and change the way people travel in urban areas with, for instance, Uber Pool ride-sharing and Uber Jump electric bikes." UberAir intends initial launch locations for its flying taxis in Dallas and Los Angeles.

And at the November, 2018 Drone Week in Amsterdam, Audi, Airbus and Italdesign presented a flying taxi combining traits of a self-driving electric car with a passenger drone. A 1:4 scale model of the flying/driving robo-car had its first public test flight at the event, according to Japanese NDTV: "The flight module accurately placed a passenger capsule on the ground module, which then drove from the test grounds autonomously." All these new technologies are coming soon, or are already here. The question is whether they will compound transportation crises or become positive solutions above and below ground.

"The future will depend largely on whether we get the policies right for managing that space," said LADOT's Reynolds.

"I grew up with the American Dream on my mind."

Carlo Caccavale
Executive Director-AIA/LA

On why he moved to the United States

"It has nothing to do with biology. It has to do with design"

Michael Franklin Ross
Architect, FAIA and writer
Referring to his book, *Beyond Metabolism: The New Japanese Architecture*

"It is an idea to visually represent the ideas of theoretical physics. It is an attempt to take things out of your own mind and your own ego. To see through the mind of the universe."

Timothy Robert Smith
Fine Artist and Muralist
Defining multi-dimensionalism

Exerpts from The Arch Podcast, www.formmag.net

PERFORMATIVE SKYSCRAPER

By Scott Johnson

"Actually I didn't make that decision. My machine made that decision."-- Franklyn Berry, engineer for a Ned Kahn sculpture in Playa Vista, California in response to a question by the architects.

One of my most compelling classes at Harvard years ago was with William Le Messurier, the noted structural engineer who designed some of America's best-known tall buildings. While we did not discuss architectural design per se, his pedagogical approach to explaining the structural design of his own buildings was intellectual, exploratory and flexible. His usual pattern was to pace in front of the chalkboard, stopping frequently to exchange cigarette and chalk between his two hands in order to diagram a yet additional and different way to analyze the same building he had just been discussing. In the end, he seemed to be searching intuitively for both the most comprehensive and efficient way to think about the structure of a tall building. Notwithstanding the intermingled smoke and chalk dust which hung in the room, there was a kind of elegance to his central act. From this, and events which followed, we learned that there are multiple vantages from which to consider the same phenomenon, in this case, tall buildings. While Le Messurier did the work mostly in his head and on the chalkboard, the design profession years later, armed with performative criteria and high-powered tools, is still looking for a comprehensive and efficient approach to the design of tall buildings.

Following the university years, I had the pleasure of apprenticing with a number of architects well-trained in the design of tall buildings, the last of which was Philip Johnson. In that period, while many things were important to us in design, I cannot count among them comprehensiveness and efficiency. Suffice it to say that, as design architects for any given project, we acted as the leader of a large team of consultants, most of whom we had selected. We generally made conceptual drawings of the buildings with their limited consultation, after which, the drawings were sent around for review by the team. The direction of the design was set and engineering and more specialized studies would then commence. Another architectural firm generally produced the construction documents and as our work progressed, we reviewed and commented on the final outcomes. Since then, tall buildings have changed, our expectations of their performance levels and our ability to measure them have changed, the tools with which we design them have changed, and the interdependence of architecture and engineering has changed.

At Johnson Fain, we have produced many tall buildings over the course of three decades and consistently track the latest developments in the field. The considerable research we did surrounding a dispute between the overseers of the Nasher Sculpture Center and our clients at Museum Tower in Dallas (glass technologies, shading strategies, energy effects, wind testing, structural engineering, nanotechnology, coatings, films, tints and yes, bird habitats) suggested to me that we should record some of our findings in a broader context.

This focus on the latest developments has also necessarily led us away from attention to only the tallest recorded buildings or buildings which are recycling conventional design strategies to buildings that represent experimentation in the realms of climate and energy, biomimicry and urbanism. While tall building design, as architects know, is a legacy of accumulated knowledge, it finds its place in the history of the type for what it invents and how it foretells the development of the next generation of tall buildings as architecture.

Why do I call this design pursuit "performative"? Marc Schiler, an architect and professor at the University of Southern California School of Architecture, proposes an apt definition of performative: "In architecture, a performative facade is one which brings about an event, by its very existence, such as automatic shielding from the sun, or lighting an adjacent space or rejecting certain wavelengths." In addition to a definition like Schiler's which speaks to certain mechanics of performance, here, performative as I use it, refers to a broader trend in the architectural community to see design as multi-functional and measurable. This is particularly true in tall building design owing to the scale of its enterprise and the importance assigned therein to achieving high levels of performance. This state of affairs is, no doubt, encouraged by the presence of the computer, in particular, parametric practices, which work to share information, deconstruct

Al Bahr Towers designed by the London offices of Aedas and Arup

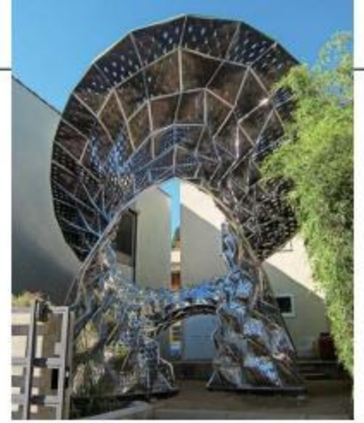
former architectural hierarchies and substitute more quantitative thinking for formerly esoteric design strategies. Additionally, the language of today's overwhelming interest in sustainability and energy management is measured in levels of performance. Whatever else might matter to architects in the design of tall buildings, performativity is today's signature theme.

While these new priorities reflect shifting concerns within cultures at large, the vocabulary of tall buildings, the challenges they are poised to address and the criteria by which they are evaluated have changed dramatically in a short space of time. As an architect who practices, teaches and writes, I, and those around me, feel the pull of new forces in these settings as we work to investigate, explicate and design new tall buildings. Our tools are more precise and we are now asked to measure results from our buildings and weigh these measurements within a matrix of competing goals. Sometimes there is a presumption that these measurements imply overall excellence in architecture. This kind of infatuation with performativity is perhaps just the latest expression of our pervasively scientistic culture which is also fond of conflating science, value and morality.

In an environment in which so much can now be measured, the fields of science and engineering emphasize performance while the continuing development of digital software applications enables this emphasis. The elaboration of a window-wall to reduce incident solar heat gain, the reshaping of a floor plan to reduce aerodynamic wind vortices or the creation of glass products which selectively minimize certain light wavelengths and maximize others are examples of this. In an environment in which so much information is shared, competition in the marketplace is naturally heightened and the ability to measure and record outcomes is frequently used to support claims of achievement and distinction. The digital realm naturally draws our attention to the latest and largest spectacle.

Structural and circulation systems have leant themselves to rapid digital optimization. The variability of climate both locally and globally as well as a shifting view of what actually constitutes energy efficient design has meant that activities directed toward producing sustainable strategies in new tall buildings is ongoing and becoming increasingly sophisticated. These are organized around familiar natural resources such as the sun, whether concerning daylighting, heat control, photovoltaic conversion or heliostatic applications.

EDITT Tower Singapore Ken Yeang T. R. Hamzah & Yeang



The Bloom project designed by Doris Sung, Ingalill Wahlroos-Ritter and Matthew Melnyk

A key development has been the phenomenon of multiple engineering disciplines such as structure, lighting and HVAC and energy generation converging at the building envelope in one large unified solution. In architectural applications, these systems are most akin to the morphogenesis of biological materials wherein form and performance are functionally linked. Michael Weinstock aptly describes this interdependence in Self-Organisation and Material Constructions: "Biological organisms have evolved multiple variations of form that should not be thought of as separate from their structure and materials. Such a distinction is artificial, in view of the complex hierarchies within natural structures and the emergent properties of assemblies. Form, structure and material act upon each other, and this behavior of all three cannot be predicted by analysis of any one of them separately." Wind can be captured and convert kinetic energy into electricity. Double skin solutions control both solar radiation and provide natural venting and air supply systems. The integration of structure into the exterior skin is an emerging topic as is the recognition that with embedded electronic systems, skins can communicate in different ways and to different ends. Integrated biomass and vertical farming are increasingly the subject of new building explorations.

The application of digital algorithms has paved the way for measurement and optimization, highly complex form development and rapid prototyping as widespread standard procedures. The history of the tall building is intrinsically linked to improvements in technology, new materials and innovations in design and construction. Developing technologies in areas such as biomimesis and nanotechnology are yielding more responsive and high-performing materials and systems. Computer-based optimization at many levels, the tendency toward off-site fabrication, under efficient and high-performance conditions, and standardization all bring the potential for energy efficiencies, high-quality building systems and longevity to the tall building project.

Manitoba Hydro Place designed by Kuwabara Payne McKenna Blumberg Architects and assisted by Transsolar

The carbon emissions which derive from the operation of buildings, including tall buildings, are said to be over 40 per cent of total emissions from all sources. These emissions are the result of a significant depletion of fossil fuel reserves and materially contribute to the effects of global warming. Energy figures are largely based upon "energy-in-use" accounting and while disturbingly high, generally fail to consider embodied energy costs in the construction of a building, the broader costs of manufacturing energy at its source, or the longer-term effects of the building operation over time.

Building form, geometry and orientation are among the most important factors in describing a tall building's appetite for energy as well as major cost drivers for each project. With modern parametric design tools, building form can be optimized for structural performance, energy efficiency, spatial appropriateness and constructability.

The urban context for tall buildings is enormously relevant to the conversation of comprehensive sustainability. The presence of a mixed-use tower, or even a single-use tower in a walkable mixed-use neighborhood, is inevitably tied to the overall energy costs for transportation, recreation, work and residence. Mixed-use buildings can share essential programs, achieve higher levels of utility, better integrate recycling of waste heat and water and reduce peak service loads.

The redistribution of the world's population from rural to urban settlements means that tall buildings will become more important than ever. Digital optimization of buildings can ensure a better quality of life, safe conditions, climate optimization, and importantly, provide an opportunity to contribute responsively to the local cultural landscape.

Culture Study:
Designed by the London offices of Aedas and Arup, the Al Bahr Towers in the center of Abu Dhabi's downtown are highly mechanized and built in the monumental materials one would expect of two 25-story institutional office buildings. In the context of the extreme Gulf climate, it was clear to the designers that the most significant measure they could take would be to protect the buildings from direct sunlight. Since dark glass or permanent shading would compromise visibility, a state-of-the-art operable skin was developed to shade the glass in times of direct sun. This "dynamic mashrabiya" acts as solar "flowers" which open and close depending on the position of the sun. Each tower's 2000 shading units are constructed from 15 components that form a triangular, Teflon-coated fiberglass mesh set in an aluminum and stainless-steel frame. These frames are mounted on the exterior of the window walls in the areas of maximum solar radiation and are activated by photo-sensors.

Solar Study:
In the Bloom project, a 20-foot-tall shade canopy designed by Doris Sung, Ingalill Wahlroos-Ritter and Matthew Melnyk, the surface is populated with metal flaps shaped to capture the sun's rays throughout the day. With the use of digital analysis, the size of the flaps and openings are optimized to shade and ventilate the area beneath the structure. In order to create the thinnest possible shell, lightweight structural framing is incorporated directly into the shell, creating a monocoque skin assembly. As a result, and in the form of a multifunctional skin, a bio-responsive system both shades the interior as well as ventilates it. Much research in these technologies is underway with the prospect of achieving widespread architectural application in the future.

HVAC Study:
Manitoba Hydro Place is the headquarters tower for Manitoba Hydro in Winnipeg Canada which is known for extreme winter and summer temperatures. Although winter temperatures there can be well below zero for days on end, the skies are frequently sunny. Designed by Kuwabara Payne McKenna Blumberg Architects and assisted by Transsolar, the building maximizes passive solar, wind and geothermal energy.
While appearing as a single 18-story tower, Manitoba Hydro Place is actually two towers which intersect at the northern end of the site at a solar chimney. The chimney draws air out of the building during the warmer months and in winter, exhaust air is drawn to the bottom of the chimney by fans where heat is recovered and used to preheat incoming cold air. At the other end, the towers splay to reveal three south facing 6-story atria. These glass atria collect solar heat to augment winter heating and, through a louver system in the glass wall, naturally ventilate during the summer. At the long glass elevations of the building, a double-skin system combines manually operated windows in the interior curtainwall combined with automated exterior wall vents controlled by the building management.

In this way, employees can affect their own comfort while management oversees overall building efficiency and operations.

Urban Study:
In New York's Battery Park City, Michael Van Valkenburgh's outdoor garden, Teardrop Park South, has been illuminated by an array of three heliostats mounted atop the Verdesian, an adjacent 23-story residential tower. The park is located at the base of the U-shaped Riverhouse and receives no sunlight for many months. James Carpenter and Davidson Norris of New York's Carpenter Norris Consulting have devised the plan and designed the 8-foot diameter heliostats to reflect oval beams of sunlight onto particular benches and trees within the park. While the system captures and redirects solar energy in useful ways, it does not raise the ambient light levels in the park.

Pearl River Tower in Guangdong, China designed by Adrian Smith and Gordon Gill

System Integration Study:
One of the most remarkable new tall buildings, and winner of the World's Best Tall Building for 2011 by the Council on Tall Buildings and Urban Habitat, is the KfW Westarkade building in Frankfurt. This tower of modest height employs a highly integrated window wall which exploits wind and natural ventilation to an advanced degree. Berlin's Sauerbruch Hutton designed the building for one of Germany's major banks, KfW, which funds many of Germany's ambitious energy-conservation programs.
The 10-story tower has a flowing form which

WOHA's Wong Mun Summ and Richard Hassell designed, Iluma

responds to the prevailing wind direction and consists of a sawtooth-shaped window wall which captures the wind for natural ventilation. Inside the wall is a cavity as deep as 28 inches which encloses automated blinds to control solar gain and glare. The exterior window is comprised of fixed tempered glass panes while the interior glazing is operable. At the exterior return are colorful ventilation flaps which are controlled by a roof-mounted weather station that monitors wind speed and direction and controls the flaps. The cavities fill with air and then enter the interior office space by way of the operable windows and/or vents at the perimeter of each floor. The air is ultimately exhausted through the negatively-pressurized corridors at the building core.

Wind Study:
A series of three buildings by Adrian Smith and Gordon Gill, one while they were still with SOM, displays a different attitude about smooth building form, aerodynamics and wind capture. The 71-story Pearl River Tower in Guangdong, China for the Guangdong Tobacco Company is an aerodynamically advanced building mass which neutralizes eccentric wind pressures while establishing its own architectural language. The building in plan is curved to capture and direct wind into the center of the tower. At two intermediate mechanical floors, the skin recesses to receive accelerated wind into a system of wind turbines. This initial design set the stage for subsequent wind-conscious towers such as the Wuhan Greenland Center in Wuhan, China. Similarly, Smith + Gill's proposal for the Clean Technology Tower, designed as a net-zero-energy prototype, retains both the earlier aerodynamic forms and the integration of turbines at the corners of the tower where the wind vortices collect.

Biomorphic Study:
The great challenge ahead for the integration of biological systems into the tall building form is nowhere better epitomized than in the architecture of Ken Yeang. Yeang, a Malaysian architect, trained in England and practicing throughout South Asia since his return in 1976, has always focused on what he calls "bioclimatic design" as a strategy for creating environmentally responsive tall buildings. More recently, he has referred to "ecomimesis" as a way to envision a tall building functioning as nature does. Beginning in the mid-1980s, Yeang designed and built a number of tall buildings in South Asia. While often not noteworthy, they displayed his persistence in attempting to bring plant material above the ground plane into the building's vertical architecture. The most architecturally compelling remains the 15-story Menara Mesiniaga, a small and eccentric office tower completed in 1992. Located on the outskirts of Kuala Lumpur for a local IBM franchise, it represents a more complete integration of the environmental tools with which Yeang had been working. Its aspirational tone is touching and likeable and viewed now from a distance of three decades, his work exhibits the difficulty the building industry has had in absorbing the lessons of truly green architecture. While he has continued to publicize his ideas profusely and has created countless proposals for tall buildings worldwide, his work largely remains in the theoretical realm of "bioclimatic design" rather than part of the legacy of built skyscrapers.

Informational Facades Study:
Completed in 2009, WOHA's Wong Mun Summ and Richard Hassell designed the 10-story Iluma to incorporate multiple functions and to create a night-time magnet for a host of new neighborhood uses. Iluma includes a parking structure, eight-screen cineplex and a top-floor theater for live performance. The building is clad in solid and perforated aluminum panels as well as glass window wall. The applied skin, referred to as Crystal Mesh (CMesh), consists of 3,200 polycarbonate and aluminum "crystals," tessellated and clipped to a steel support frame bolted to the building's exterior wall. Two thirds of the CMesh is illuminated by way of five foot and three-foot-wide hexagonal panels, each with up to seven individually dimmable compact fluorescent lamps inside. After dark, the polycarbonate crystals housing the fluorescent lamps become pixels in the programmable media facade controlled through an advanced software system. CMesh requires custom-made content that accounts for the building's wave-like design. Ultimately, the system is designed to interactively use sensor-based input to visually communicate observers' responses through social networks, web forums or mobile-phone technology.

Scott Johnson is Founder and Design Partner of Johnson Fain, an international design firm based in Los Angeles. Projects include California towers for Twentieth Century Fox and Metro Goldwyn Mayer, the United States headquarters for Nestle and Dallas' Museum Tower. He is the author of many books, among them *Tall Building: Imagining the Skyscraper, Performative Skyscraper: Tall Building Design Now*, and Essays on Tall Building and the City.

Architectural Technologies and the Future of Practice

by Ingalill Wahlroos-Ritter, FAIA and Dr. Ewan Branda

3D printing in design research (Michael Chin, Undergraduate Degree Project)

Student assisting with a faculty research project on additive manufacturing of ceramics.

Tools embody an epistemological conundrum. Writing on the commodity fetish, Marx and Engels argued that the things that people produce take on a life of their own to which humans and their behavior adapt. "The creation of new needs in people spurs them on to find new ways of satisfying their needs, to expand their productive capacities and even to change their social relations in order to facilitate the cooperative exercise of these new powers." Seen in this light, our tools not only serve users but also produce users.

What kind of user do today's architectural tools produce? And what kind of architectural knowledge do they propagate? Today's architecture students are expected to be conversant with the realms of statistics, animation, robotics, mathematics, machine operation, and behavioral psychology. This is not simply a response to the demand that we broaden our existing base of specialized knowledge; rather, our tools ask us to understand how we, as architects, know what we know and how we acquire that knowledge.

While each generation of new architects considers itself an agent of radical change within the profession, the ascendency of digital tools has not in itself changed the architect's primary role: we remain, above all else, communicators, synthesizers, team builders, and spatial visionaries. Ultimately, what architects are expected to master is not only a formidable range of digital tools but a critical understanding of the forms and protocols underlying the design of these tools. Is knowledge of the limitations of particular tools, and hence their possibilities, enough? Or must the user of a tool be an expert? Who designs and develops these tools? Who learns and operates these tools? How long does it take to learn to use these tools effectively? And does the a priori assumption of particular tools during the concept phase narrow the possible outcomes?

Digital tools in architecture fall into four broad categories: generative design tools, representational tools, information management tools, and fabrication tools. Over the past twenty years we have witnessed a convergence take place in which all of these types of tools now permeate education and practice. As educators, we need to ensure that the dissemination of specialized computational instruments in schools of architecture enables students to work at the cutting-edge of the profession. As administrators, we must balance our curricula so that students learn the technical skills required to do their work and obtain employment while protecting a space for intellectual inquiry and disciplinary discourse. When architecture becomes solely about how, rather than why, it becomes devoid of intellectual and educational content. As practitioners, we want to know the advantages we gain from the application of these tools in the design process and in the design outcome. How are the users of the buildings affected by new design instruments? What is the effect on building performance, construction time and cost? What are the intentions and values that drive the design of the tool? How and who defines the expectations for the design and the tools? Without this knowledge, we cannot call ourselves architects. We remain users produced by our tools.

At Woodbury School of Architecture, our goal is to graduate students who are facile with a wide range of software, including "official" commercial packages and DIY open source platforms. As the rich offerings of tools continues to expand, and others inevitably become obsolete, our students develop not just a set of specialized drawing and fabrication skills but also an intellectual engagement with computing and light fabrication machines, indifferent to big vendors and aligned with open-source and distributed intelligence. Rather than emphasizing specialized techniques, we teach continuing education practices. Our students, reflecting the vitality and diversity of our community and distinguished by an exceptional degree of comfort in our making spaces, are engaging technology in novel ways. To encourage this, we are rethinking our core classes to include theory of computation and the design of information systems associated with the design professions. Rather than architects produced by their tools, this shift means that our students will in fact become architects producing their own tools. Therein lies the future of architectural practice.

LA's BADdest

Best Architecturally Designed

by Michael Franklin Ross, FAIA
Photography by Douglas Hill

Everyone knows the stunning works of architecture that symbolize our city worldwide. We all admire these buildings, but FORM wanted to uncover the hidden gems, "the unusual suspects" that influenced design and were game changers in architectural discourse.

1890s

Bradbury Building
George Wyman, 1893; Brenda Levin, 1991
304 South Broadway, Los Angeles, California 90013

1900s

Gamble House
Charles and Henry Greene, 1908
4 Westmoreland Pl, Pasadena, California 91103

1910s

Los Angeles Herald Examiner
Julia Morgan, 1914; 146 W. 11th St.
Los Angeles, California 91105

Horatio West Court
Irving J. Gill, 1919; 140 Hollister Ave.
Santa Monica, California 90405

1920s

Schindler House
R.M. Schindler
833 N. Kings Rd, West Hollywood, California 90069

Ennis House
Frank Lloyd Wright, 1924
2607 Glendower Ave., Los Angeles, California 90027

Lovell Beach House
R.M. Schindler, 1926; 1242 West Oceanfront
Newport Beach, California 90027

L.A. Central Library
Bertram Goodhue, 1926; Hardy Holzman Pfeiffer, 1993; 630 West 5th St.
Los Angeles, California 90071

Hollywood Bowl
Myron Hunt, 1922; Lloyd Wright, 1928; Frank Gehry 1970, 1980; Hodgetts+Fung, 2004; 2301 North Highland Ave., Los Angeles, California 90068

Los Angeles City Hall
John Parkinson, Albert C. Martin, John C. Austin, 1928; 200 North Spring St.
Los Angeles, California 90012

Lovell House
Richard Neutra, 1929; 4616 Dundee Dr.
Los Angeles, California 90027

Wilshire Blvd. Temple
A.M. Apelman, S. Tilden Norton, David Allison 1929; Brenda Levin, 2013; 3663 Wilshire Blvd.
Los Angeles, California 90010

1930s

Eastern Columbia Building
Claud Beelman, 1930; Killefer Flammang Architects, 2006; 849 South Broadway
Los Angeles, California 90014

Hollywood Pantages Theatre
B. Marcus Priteca, 1930; 6233 Hollywood Blvd.
Los Angeles, California 90028

Neutra VDL Research House II
Richard Neutra, 1932; Dion Neutra, 1964
2300 Silver Lake Blvd., Los Angeles, California 90039

Griffith Observatory
John Autin and Frederick Ashely, 1935
Brenda Levin & Pfeiffer Partners, 2006
2800 E. Observatory Rd., Los Angeles, California 90027

Dunsmuir Apartment Building
Gregory Ain, 1937; 1281 South Dunsmuir Ave.,
California 90019

Union Station
John and Donald Parkinson, 1939
800 North Alameda St., Los Angeles, California 90012

Sturges House
Frank Lloyd Wright, 1939
449 North Skyewiay Rd., Los Angeles, California 90049

1940s

Eames House
Charles & Ray Eames, 1949; 203 North Chautauqua Blvd. Pacific Palisades, California 90272

1950s

Wayfarers Chapel
Lloyd Wright, 1951; 5755 Palos Verdes Dr.
South Rancho Palos Verdes, California 90275

Watts Towers
Simon Rodia, 1954; 1727 East 107th St.
Los Angeles, California 90002

1960s

Malin House "Chemosphere"
John Lautner, 1960; 7776 Torreyson Dr.,
Los Angeles, CA 90046

Great Western Savings and Loan
Paffard Keatinge-Clay for Skidmore Owings & Merrill 1961; 2501 Rosecrans Ave.
Gardena, California 90249

LAX Theme Building
Paul Williams and Pereira & Luckman, 1961
209 World Way, Los Angeles, California 90045

Robert Frost Auditorium
Flewelling and Moody, 1964
Hodgetts + Fung, in progress
4601 Elenda St., Culver City, California 90230

Kappe House
Raymond Kappe, 1967
715 Brooktree Rd., Los Angeles, California 90272

Stevens House
John Lautner, 1968
7144 Hockey Trail, Los Angeles, California 90068

Saint Basil's Catholic Church
A.C. Martin, 1969
3611 Wilshire Blvd., Los Angeles, California 90005

1970s

Century Plaza Towers
Minoru Yamasaki, 1975; 2049 Century Park East
Los Angeles, California 90067

Pacific Design Center
Cesar Pelli/Gruen (Blue Building) 1975
(Green Building) 1988, (Red Building) 2008
8687 Melrose Ave.
West Hollywood, California 90069

ArtCenter College of Design
Craig Ellwood, 1976; 1700 Lida St.
Pasadena, California 91103

2-4-6-8 House
Morphosis, 1978; 932 Amoroso Pl.
Los Angeles, California 90291

1980s

World Savings and Loan Bank
North Hollywood, Frank O. Gehry, 1982
10064 Riverside Dr., Toluca Lake, California 91602

Donald C. Tillman Water Reclamation Plant
Anthony J. Lumsden/DMJM, 1984
6100 Woodley Ave., Van Nuys, California 91406

1990s

Beverly Hills Civic Center
Charles Moore/ULG, 1990
455 North Rexford Dr., Beverly Hills, California, 90210

Chiat/Day (Binoculars) Building
Frank O Gehry, 1991; 340 Main St.
Venice, California 90291

Getty Center
Richard Meier, 1996
1200 Getty Center Dr.
Los Angeles, California 90049

Vermont/Santa Monica Metro Station
Mehrdad Yazdani, 1999
Los Angeles, California 90029

2000s

Hayden Tract
Eric Owen Moss, 2000-2010
Culver City, California 90034

Walt Disney Concert Hall
Frank O. Gehry, 2003
111 South Grand Ave., Los Angeles, California 90012

Central Los Angeles Area High School #9 for the Visual and Performing Arts
Wolf D. Prix/Coop Himmelb(l)au, 2008
450 North Grand Ave., Los Angeles, California 90012

2010s

Emerson College
Thom Mayne/Morphosis, 2014
5960 Sunset Blvd., Los Angeles, California 90028

Star Apartments
Michael Maltzan 2014
240 East 6th St., Los Angeles, California 90014

The Broad
Diller Scofidio + Renfro, 2015
221 South Grand Ave., Los Angeles, California 90012

United States Courthouse-Los Angeles
Skidmore, Owings & Merrill, 2016
312 North Spring St., Los Angeles, California 90012

We convened a jury of true notables:

Barbara H. Bouza, FAIA, Carlo Caccavale, Hon. AIA Anthony Fontenot, PH.D, Ming Fung, FAIA, Lawrence Scarpa, FAIA, Ingalill Wahlroos-Ritter, FAIA and Kulapat Yantrasast facilitated by Michael Franklin Ross, FAIA.

more information on the jury visit www.formmag.net

Needless to say, this task created a heated dialogue.

There are numerous beautiful buildings throughout Southern California. Many of them are not included on our list. There are some very famous architects who have designed multiple buildings for LA, but we chose not to include them all. We were looking for the buildings that were influencers. I hope the ghost of Mies Van der Rohe will forgive me when I say we decided that our guide was, "Less is More". We decided our selections had to be; innovative, groundbreaking, aesthetically beautiful, sustainable, paradigm shifting, iconic, contextual, and timeless. The jury agreed that any building designed by a jury member or their firm be removed from consideration and that any building to be considered must still be standing. What follows is an abbreviated discussion.

Find out more about these fabulous buildings on www.formmag.net

The Early Years

We agreed to begin with the landmark Bradbury Building (1893). The exterior is a typical nineteenth-century commercial office building. The interior is a light-filled wonder of wrought iron railings, multiple stairs climbing toward a atrium. It created a paradigm shift for commercial office design half a century before John Portman.

The twentieth century brought us the elegantly detailed Gamble House (1908) by Charles and Henry Greene. One of the finest examples of California Arts and Crafts, it is also influenced by traditional Japanese design in the carefully detailed interlocking wood members and truly contextual in the way it integrates architecture and landscape.

The Teens

Two very influential architects left their mark on Southern California during this period. Julia Morgan, famous for the elaborate Hearst Castle in San Simeon, was in 1904 the first woman to obtain an architecture license in California. William Randolph Hearst selected her to design downtown Los Angeles' Herald Examiner Building (1914). Irving J. Gill completed the design of the Horatio West Court (1919) in Santa Monica, one of the finest examples of courtyard housing. It influenced the development of courtyard complexes throughout Los Angeles.

The 1920s

This era brought an explosion of creative architectural design to the LA region from the many seminal houses to large public buildings. The city was booming, growing at an unprecedented rate. Gordon Whitnall, director of the City Planning Commission, said in 1922, that "a new residence was completed every 26 minutes of the working day."

Frank Lloyd Wright completed four of his concrete block houses; The Millard, Storer, Freeman and Ennis. The Ennis House, 1924, was the last, the largest, and the most dramatic, sitting up on the hill overlooking the city. The interplay of natural light and the rhythm of the textured columns flowing from outside to inside create one of the most memorable images of residential architecture in Los Angeles.

The R.M. Schindler House in West Hollywood (1922) became a prototype for Los Angeles residential design with interlocking spaces, patios and gardens. It was sustainable before we were even thinking about sustainability. The house ultimately served as the launching pad for both Schindler and his Viennese friend, Richard Neutra.

In 1925, after crossing the Atlantic and working for Frank Lloyd Wright at Taliesin in Wisconsin for a year, Richard Neutra and his wife Dione moved to Los Angeles. Neutra soon began designing his own groundbreaking projects including the Lovell Health House (1929) in Los Feliz. Historian Thomas S. Hines called this "his masterpiece". It remains one of the purest and finest examples of the International Style in America.

The 1920s also saw a boom in the design of iconic public buildings several of which have come to symbolize our city. The Los Angeles Central Library by Bertram Goodhue (1926) and the Los Angeles City Hall by John Parkinson, Albert C. Martin and John C. Austin (1928) have bold exterior designs and dramatic interior spaces that are recognized around the world. The Hollywood Bowl is another symbol of LA that began life in 1926 designed by Myron Hunt, later modified by Lloyd Wright and Frank Gehry, and recently completely replaced in 2004 with a new shell and state-of-the-art technology by Hodgetts+Fung.

1930s
There were additional iconic buildings erected in the 1930s like John C. Austin and Frederick M. Ashley's Griffith Observatory (1935) visible high above the city on the crest of the Hollywood Hills, but what captured the imagination of the Jury more was the work of Gregory Ain. The Dunsmuir Flats (1937) in mid-Wilshire was what Anthony Fontenot called "a major game changer". It was exhibited at the Museum of Modern Art in New York and captured the imagination of the design cognoscenti.

The work of John and Donald Parkinson was critical in the growth and image of the city most literally with Union Station (1939) downtown which became the gateway to Los Angeles for people arriving by train. The interior spaces are magnificent and timeless to this day. "I could talk endlessly about why Union Station is included," said Fontenot.

Parkinson and Parkinson also gave us Bullock's Wilshire (1929) a refined design of the Art Deco period that was the first building to accommodate the car. It had a pedestrian entrance on Wilshire Boulevard and an auto court in the back, linked by an elegant interior circulation spine. It also shifted the center of gravity of the city westward.

The Sturges House in Brentwood (1939) was designed as one of Frank Lloyd Wright's "Usonian" houses. This 900 s.f. gem was a model of a house for "Everyman". The jury called it extraordinary

This era celebrated the performing arts with projects like the Hollywood Pantages Theatre (1930). The Egyptian Theatre, the Million Dollar Theater and the entire theater district on Broadway. The craftsmanship, lighting and interior detailing have never been equaled.

1940s
This period was heavily populated by the Case Study Houses, many beautifully photographed by Julius Shulman. Each was unique in their own way. We chose to celebrate the Eames House (1949), also known as Case Study House #8, by Charles and Ray Eames. It is the quintessential mid-century modern building. Exploring concepts of mass production, this design used basic industrial steel frames and simple geometric forms. The Eames House is a three-dimensional Mondrian painting welcoming inside the outdoor climate of Pacific Palisades.

1950s
It's not easy being the son of a famous architect. Lloyd Wright carried that burden with dignity and grace. Many of his houses are works of design excellence, but the project that truly established him as an extraordinary talent was Wayfarers Chapel (1951) in Rancho Palos Verdes. It's a spiritual space that welcomes the outside inside right through the roof, and gives the visitor a sense of floating above the ocean. It's a building that's a sculpture you can walk into.

Another Sculpture that's large enough to walk into is Simon Rodia's Watts Towers, (1954). It's art made of found objects: broken tiles, soda pop bottles, plaster, concrete and steel. Barbara Bouza said, "it meets every criterion; it's innovative and aesthetically beautiful... we have to have a few on the edge."

1960s
"L'enfant terrible" of Los Angeles architects who constantly pushed the envelope was John Lautner. Two of his most memorable houses are the Malin House AKA "The Chemosphere" (1961) and the Stevens House (1968). Both explore unusual structure, bold forms and exuberant spaces.

A lesser known modernist, "hidden gem" is the Great Western Savings and Loan (1961) by Paffard Keatinge-Clay at SOM. Clay who apprenticed for a year with Le Corbusier in Paris and for a year with Frank Lloyd Wright, developed his own modernist aesthetic at the Great Western building. The large cantilevered roof seems to simply float above the main volume creating a large open column-free space.

There are two buildings designed about the same time that both project an iconic image. One everyone knows, the other is one of LA's best kept secrets. The LAX Theme building (1961) designed by Paul Williams with Pereira/Luckman is instantly recognizable. The lesser-known Robert Frost Auditorium at Culver City High School (1964) by Flewelling and Moody with structural engineer Andrew Nasser, has a gently curved roof that maximizes the sculptural qualities of reinforced concrete. The LA Conservancy called it, "one of the most breathtaking Modern buildings ever designed."

1970s
The Pacific Design Center is a composition of three boldly colored buildings designed by Cesar Pelli at Gruen Associates. The initial structure is a 530-foot long extruded cobalt blue contemporary warehouse. Completed in 1975 it was quickly dubbed "the blue whale". The PDC transformed West Hollywood into a forward-looking commercial design hub. Over the next thirty years Pelli added the Green and Red Buildings completing his colorful composition.

A much smaller, but equally powerful design, is the 2-4-6-8 House by Thom Mayne and Morphosis (1978) which also employs bold colors. Brightly painted yellow window frames increasing in size from 2-foot square to 4-foot, then 6-foot, and finally 8-foot square play tricks with the visitor's sense of scale. "It makes architecture out of a single room," said Larry Scarpa. It also won AIA/LA's 25-Year Award, standing the test of time, and providing a harbinger of the creativity to come from Mayne in the future.

1980s
The single building that created the greatest discussion was an early design by Frank Gehry for World Savings and Loan, in North Hollywood (1982). At first glance it's just a simple two-story rectangular volume. Upon more careful examination we discovered the façade was painted with lines creating a false perspective. He used the façade as a canvas to create an abstract painting. It was the first time Gehry integrated art into his architecture. Ming Fung said, "It was Frank before he became Frank".

1990s
Making buildings as art and making buildings with artists has become a hallmark of Gehry's work. At the Chiat/Day "Binoculars" Building (1991), he integrated a giant binocular sculpture by Claes Oldenberg and Coosje van Bruggen into the front façade that cars drive right under.

Another project that integrates art with its architecture is the Getty Center (1996) by Richard Meier & Partners. Set high above the city in the Santa Monica Mountains this cultural acropolis is a six-building museum and research complex with framed vistas and magnificent landscaping by the Olin Partnership, Dan Kiley and Robert Irwin.

2000s
The Hayden Tract, in Culver City is not a single building, but rather a whole neighborhood. A former industrial zone, it's been totally reinvented by its developers, Frederick and Laurie Samitaur Smith, and their architect, Eric Owen Moss. The buildings are adventuresome, idiosyncratic and always dynamic. The Smiths and Moss helped launch the reinvigoration of Culver City.

The Walt Disney Concert Hall (2003) by Frank Gehry has supplanted the LAX theme building as the 21st-century symbol of Los Angeles. Its façade constantly in visual motion, is architecture as a performing art. It's a building within a building with bright curved metal petals on the outside and warm Douglas fir on the inside, and superb acoustics thanks to acoustician, Yasuhisa Toyota.

2010s
A huge picture frame with a sculpture inside appeared on Sunset Boulevard in 2014. "It's an idea that we haven't seen before" said Ming Fung. It is the west coast campus of Boston's Emerson College by Thom Mayne & Morphosis. Within the frame is an outdoor courtyard for students and faculty to mingle and to capture the view of the Hollywood sign. Welcome to Los Angeles.

Summary
After a lively, dynamic discussion, there was agreement about a few things. Los Angeles has many beautiful, uplifting buildings, some that broke the mold, and some that set a new design direction. The city has gained a reputation over the last 125 years of being a place that inspires creativity. Larry Scarpa said, "Southern California is a place of innovation, of experimentation and a place of ground-breaking work". Ming Fung agreed saying, "LA has always been a place of 'misfits', a place that supports invention." We look forward to bringing you the next groundbreaking design ideas in future issues of FORM.

Find these BAD Buildings on Timothy Robert Smith's Map of Los Angeles at formmag.net

a **Emerson College - 2014**
Thom Mayne/Morphosis
5960 Sunset Boulevard
Los Angeles, California 90028

b **Robert Frost Auditorium - 1964**
Flewelling and Moody,
Hodgetts + Fung, in progress
4601 Elenda Street
Culver City, California 90230

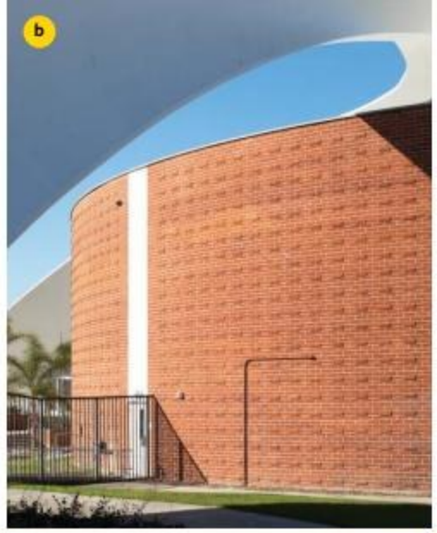
c **Central Los Angeles Area High Scool #9 for the Visual and Performing Arts - 2008**
Wolf D. Prix/Coop Himmelb(l)au
450 North Grand Avenue
Los Angeles, California 90012

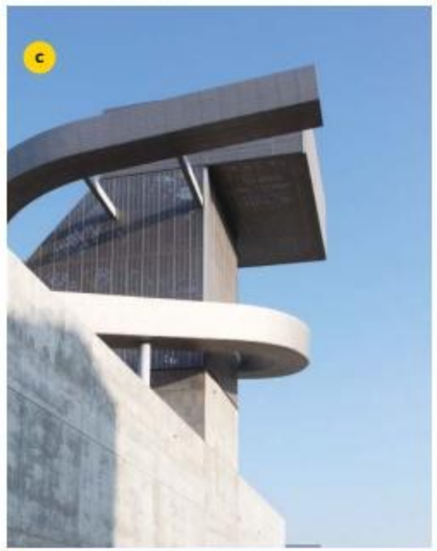
d **Walt Disney Concert Hall - 2003**
Frank O. Gehry
111 South Grand Avenue
Los Angeles, California 90012

e **LAX Theme Building - 1961**
Paul Williams and
Pereira & Luckman
209 World Way
Los Angeles, California 90045

f **Union Station - 1939**
John and Donald Parkinson
800 North Alameda Street
Los Angeles, California 90012

g **Wayfarers Chapel - 1951**
Lloyd Wright
5755 Palos Verdes Drive
South Rancho Palos Verdes
California 90275





The Maker Space supports the building, testing, and repairing of robotics, and features writable surfaces, storage space accessed by barn doors, architect-designed movable tables, and overhead track to support expensive robots as they learn to maneuver on their own.

Photo: Tom Bonner

California Institute of Technology (Caltech) Labs Pasadena, California

Since 2013, CO Architects has delivered a series of highly customized laboratory renovations and office interior fit-outs for the California Institute of Technology (Caltech) in Pasadena, California, to accommodate a broad range of research activities in multiple buildings.

The repurposed labs and offices serve researchers in the fields of aeronautical engineering, biology, bioengineering, neuroscience, and materials science. By working as an integrated member of the contractor's design-build team, CO Architects has executed design, coordination, and pricing activities, while simultaneously ensuring these complex renovations are completed on budget, and often, ahead of schedule.

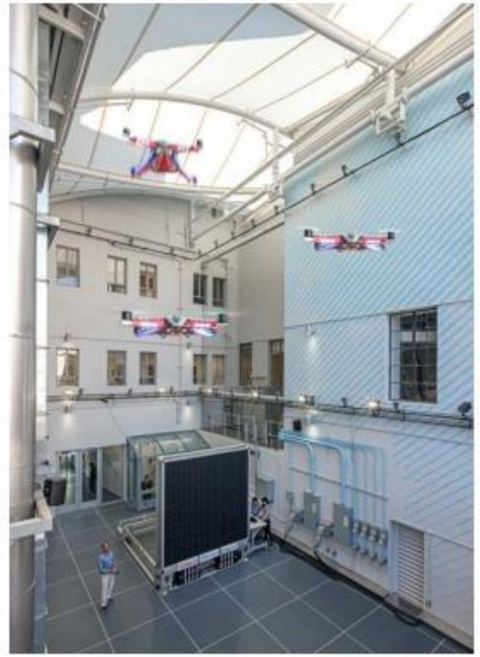
"These highly specialized laboratories serve as arenas where innovative ideas may be translated into reality," said Andrew Labov, FAIA, LEED AP, Principal at CO Architects. "In addition, the labs are designed to provide engaging spaces to facilitate collaborative work among faculty, researchers, and students."

CAST Lab

The Center for Autonomous Systems Technology (CAST) stimulates interdisciplinary research and the open exchange of ideas in the expanding area of autonomous drones, robots, and satellites for use in science, industry, and medicine. Its goal is to improve sensing, control, vision, and learning in self-operating machines, leading to a future where machines and humans interact in the workplace, where autonomous vehicles navigate in adverse terrain and weather conditions, and where medical robotic components are integrated within the human body, aiding diagnosis and rehabilitation. It also serves as an arena for these ideas to be translated into reality and demonstrated to academic researchers as well as to the general public through educational outreach. Unusual for Caltech, it is a shared facility that enables testing of projects developed throughout campus by faculty and students, and by industry partners.

CAST unites research in engineering, neuroscience, computation, biomedicine, and more, with the goal to teach autonomous systems to think independently, preparing them for the rigors of life outside the lab. Key to meeting these goals was the creation of a new type of space on campus, where different types and sizes of machines could fly, walk, and crawl safely within a contained outdoor environment. CAST is located on the first floor of the 1940 Kármán Building, which was selected primarily because of the three-sided, three-story-tall courtyard it formed with the Guggenheim Building. After the architects removed existing liquid nitrogen and fuel storage tanks from what had become a service yard, they created an open-air drone Testing Arena and observation deck.

Taking inspiration from TV sound stages, the architects covered the existing three-story-tall courtyard with a new translucent fabric canopy, creating a highly flexible, semi-outdoor, day-lit facility for the "in-vivo" testing of autonomous devices built in the lab. At the center of the Testing Arena is a custom-designed, open-air modular fan wall consisting of 1,296 independently controllable fans. The first of its kind, it allows researchers to study how drones can fly autonomously under severe atmospheric conditions, such as rain, hail, sandstorms, turbulence, and gusts. Drones flying within the open-air wind tunnel, or flying within the larger Testing Arena, are observed from inside a crash-proof glass control booth protruding into the courtyard, providing both visibility and protection. The drone's movement is precisely monitored by a grid of infra-red motion-capture cameras mounted along the perimeter. Testing is supported by an indoor Maker Space for troubleshooting both hardware and software, shared by researchers and students working on special projects and team competitions.



The testing area is used to observe drones flying under severe atmospheric conditions simulated by an open-air modular fan wall of 1,296 independently controlled fans.

Photo by Tom Bonner

The Maker Space supports the building, testing, and repairing of robotics. Writable surfaces cover barn doors that open to reveal storage space and close to keep the lab area tidy and streamlined. CO Architects designed movable tables made from aluminum tubing supports and resin tops, which collapse and nest for easy storage. vAn overhead track is used as support to which expensive robots are tethered as they learn to maneuver on their own. Separate wet and dry lab areas for machine tools and 3-D printers are each glassed in to maintain control of dust and other atmospheric elements.

A new entrance to introduce CAST was designed with wind in mind. A custom-designed ceiling system of undulating linear baffles recall wind flow, and a mural piece is based on turbulent airflow generated when drones are tested. Glass walls contribute to the open flow of ideas-both literally and metaphorically. The glass-enclosed Marker Space-with views to the Testing Arena and Maker Space- is used for troubleshooting autonomous control software, and designed to morph into additional workspace when needed.

The original building was called the Kármán Hydrodynamics Building. A bas relief wing and propeller motif seen on the building's sandstone entrance surround is abstracted into the pattern of a new fullheight custom perforated aluminum gate.

A two-story-tall basement laboratory that had once contained water tunnels used to design and test submarine hull shapes throughout WWII and the Cold War was renovated into a new satellite flight controls simulation laboratory. In it, mock-ups of satellites float on a thin cushion of compressed air above a super-flat floor-somewhat like a reverse air hockey table-allowing them to simulate autonomous navigation in zero-gravity. The five-inch-thick epoxy resin is poured in increasingly flat and level layers resulting in a final flatness of

Mock-ups of satellites float on a thin cushion of compressed air above a super-flat floor to simulate autonomous navigation in zero gravity

Photo courtesy Caltech

3/1,000 inch, while the satellites' movement is tracked with infra-red motion-capture cameras. Satellites are operated from the main research laboratory, whose all-glass bay window overlooks this testing space.

Functional improvements include code upgrades and accessibility/ADA improvements, along with new HVAC, plumbing and sanitary systems, lighting, telecommunications, and security and fire/life safety systems.

Los Angeles-based CO Architects is nationally recognized for architectural planning, programming, and design in the higher education, science and technology, and healthcare sectors, and works with leading institutions from coast to coast. CO Architects' specialized expertise includes transformative schools of medicine and health professions, advanced research and teaching laboratories, and innovative clinical facilities on higher education, healthcare, and urban campuses. CO Architects is the recipient of the American Institute of Architects, California Council's prestigious 2014 California Architecture Firm of the Year Award.

2019 AIA|LA Architectural Photography Awards

Announced by the American Institute of Architects Los Angeles

Honor Award-Winners

Photographer: Michael Moser
Title: *Ragnarock - Museum of Pop, Rock & Youth Culture*
Roskilde, Denmark
Architects: Cobe, Copenhagen & MVRDV, Rotterdam

Photographer: Darren Bradley
Title: *Steel City*
Pittsburgh, Pennsylvania
Architect: Smithfield-Liberty Garage designed by Mr. Phillips B. Bown (Altenhof & Bown)

Photographer: Luis Ayala, AIA
Title: *Park Here!*
Weil am Rhein, Germany
Architect: parking lot of the Vitra Design Center designed by Herzog & de Meuron

Photographer: Florian W. Mueller
Title: *Singularity No. 18*
Cologne, Germany
Architect: Planungsgruppe Stieldorf

Photographer: Paola Maini
Title: *Clap Clap*
Itsukushima Temple, Hiroshima, Japan
Architect: built c. 1170 by Taira-no-Kiyomori, rebuilt c. 1571 by Mori

Photographer: Saide Serna
Title: *To the Moon*
Los Angeles, California

The American Institute of Architects Los Angeles chapter (AIA|LA) is delighted to announce the 2019 AIA|LA Architectural Photography Awards (APA). The eighteen recipients were culled from over four hundred submissions of stellar quality, a three-fold increase from the 2018 program.

"This particular group of submissions was excellent and one of the markers of it that struck me, was its diversity of approach," said 2019 AIA|LA APA juror Matthew Rolston. Rolston's renown initially derived through his images photographed for Interview magazine; today, Rolston's practice includes work as an artist, photographer, director and creative director. Of the breadth of APA submissions, he noted, "We've seen aerials, black and white, narrative, non-narrative, abstract, we've seen things we've never seen before – that's always refreshing."

"Most images, 452, in total were darn-good to extraordinary," observed 2019 AIA|LA APA juror, architect Michael Lehrer, FAIA. In addition to heading his critically successful architectural practice, Lehrer's creative output includes drawings, paintings and photography.

The 2019 winning entries continue the APA's celebration of the use of architecture as a subject to make art, rather than a photograph as a documentational tool. Whether Luis Ayalla's arial monogromatic-patterned parking lot–"It's not quite Rothko, it's not quite Kline, it's not quite Diebenkorn, but it's familiar as an abstract piece" noted the jury – or a couple ascending a tunnel through an escalator – Saide Serne's almost extraterresteral take on the interior of the Broad Museum. "We're all familiar with this building, but without that context it's just this image of people entering into the unknown," said Laure Joliet, the architectural photographer and third jury member. "I think that's something we can all relate to, and has a visceral effect which is again, what architecture can bring."

Of the winning photographs, six were earmarked **Honor** award recipients, the highest recognition level, six with **Merit** awards, and six at the **Citation** level.

The awards ceremony for the 2019 AIA|LA APAs and concurrent cocktail party was hosted by the MAK Center for Art and Architecture, Los Angeles at the Schindler House. Winners, APA entrants, and jurors, mingled on the iconic property, celebrating awardees and discussing the art of being a photographer. ARC Document services printed a beautiful array of note cards, each with a unique APA winner on the front, space for personal, handwritten letters on the back. The AIA|LA established the Architectural Photography Awards program to recognize individuals who communicate a designer's work. Through the awards, we celebrate the photographer's eye, skill, and talent expressing the transcendent nature of space.

The AIA|LA thanks its generous annual sponsors for supporting dynamic Chapter programs and initiatives throughout the year.

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:form Launch Party

January 26, 2019

A huge thank you to all of those who came out to help

:Form Pioneering Design Magazine

celebrate their relaunch on the evening of January 26, 2019. In tandem with Coagula Curatorial Art Gallery in Chinatown, artist Timothy Robert Smith presented his original painting/assemblage 'Map of Los Angeles', which accompanied Michael Franklin Ross' January/February feature LA's BADdest and was the focus of this first print issue.

Images clockwise from top left:
Form returns LA Edition
Outside Coagula, night of the event
Michael Franklin Ross & Ingalill Wahlroos-Ritter
Ann Gray
Meagan Goold, Carol Bishop, Jerri Levi & Jeff Urdank
Mat Gleason & Guests
Roland Wahlroos-Ritter, Anthony Morey
Timothy Robert Smith signing map

Kyle Bergman and the ADFF

By Michael Webb

As an undergraduate at the University of Colorado Kyle Bergman was torn between his love of film and architecture, but, after launching his career as an architect in NewYork, he found a way of combining both passions. Over the past decade he has directed the Architecture and Design Film Festival, and this year's selection will be presented in Los Angeles, March 13-17. "The driving force was communication," says Kyle. "Architects are generally very bad at explaining what they do to non-professionals and I thought that films might bridge the gap, because there are many similarities between these two collaborative art forms. Raise public awareness and architects will be encouraged to do better work, which would be good for society."

In 2014 *My Architect*, Nathaniel Kahn's documentary on his father, was nominated for an Oscar and had wide theatrical exposure. Kyle saw that the film appealed to his peers for its exploration of Louis Kahn's masterworks, and to much wider audience as the story of a man discovering his elusive parent's secret life. He started searching for other documentaries that tell a good story, capturing the elements of design while having a strong human dimension. Personal favorites from past years include *Unfinished Spaces*, which chronicles the creation and decay of the Cuban Art Schools while tracking the rise and fall of idealism in Castro's revolution. Another choice was *Strange and Familiar*, which explores the vision of Zita Cobb for her native Fogo Island, and the buildings she commissioned from Todd Saunders to restore its economy and sense of worth.

Plans to launch the festival in NewYork in 2008 were canceled when the economic crisis wiped out funding. Kyle looked around for a less costly venue and settled on a theater with two screens and a bar in Waitsfield, a small town in the Mad Valley of Vermont. It boasts a vibrant arts community, and the neighboring town of Warren has (according to local lore) the highest concentration of architects per capita of any place in the U.S. The event drew a thousand locals plus aficionadoes from as far afield as NewYork and Montreal. Like an out-of-town try-out of a Broadway production this success ensured that the festival would become an

annual event in Manhattan. Over the past ten years it has become a road show, traveling to accompany the AIA National Convention in Washington DC, New Orleans, and Chicago, to LA and Tippet Rise in Montana, as well as to Sofia and Athens, where the films were subtitled in Bulgarian and Greek to give them broader appeal. "Chicago audiences were the most enthusiastic," says Kyle. "It's a city that's so proud of its architecture."

Kyle and his associates spend much of the year viewing up to 350 digital submissions from around the world. "When we started I wasn't sure there would be enough good films to sustain an annual festival, and it was a struggle for the first few years," Kyle recalls. "Now there are so many that a good title may have to be held over for the next festival."

It's easier and cheaper to make a professional quality movie than ever before, thanks to light-weight video equipment. Back in the 1970s, when I was programming director for the American Film Institute at the Kennedy Center, feature-length documentaries were rarer and it was hard to draw an audience. Now they are abundant but there is more competition for content as film festivals and internet outlets proliferate. Kyle doesn't demand exclusivity, insisting that "it's a different experience seeing a film on a big screen with other people than viewing it at home"

Nothing beats the experience of exploring a building in person, responding to its mass and scale, the shifts of perspective and the movement of its occupants. But many important buildings, especially private houses, can be accessed only by their owners. Even the best photographs merely hint at the spatial drama of an interior. "Films can give a better representation than still images," argues Kyle. "They can introduce the human element, and the way the light changes from one room to another, through the day and in different seasons. Computer fly-throughs are nauseating, and most drone shots are gratuitous. But film allows you to tell the story of a building as well as move through it."

I've previewed the best of this year's festival in Formmag.com, so go on-line for suggestions of what to see in the five-day run at the LA Theater Center on Spring Street downtown, plus screenings of shorts at the Helms Bakery in Culver City on March 9.

Kyle has lost none of his fervor over the years, and will be introducing programs and interviewing filmmakers on stage during the festival. There will also be panel discussions; I'll be moderating one following the screening of *Mies Barcelona* on Saturday March 16th.

The Home of The Future is So Mid-Century

by Josh Cooperman

Mid-Century Modern in Palm Springs, California

Richard Neutra's vision of a modern kitchen built in 1963 Neutra VDL House

All photos courtesy of Josh Cooperman

I recently found a video that was made in the 1950s the Westinghouse Total Electric Home. It is a fascinating film hosted by Betty Furness, an actress, consumer advocate and special assistant in consumer affairs tp President Lyndon B. Johnson. Furness turned a less than stellar acting areer into a significant role as a consumer advocate and brand ambassador.

Westinghouse was founded in 1856 by George Westinghouse. In 1888 Nikola Tessla patented the alternating current motor and went to work for Westinghouse, which might explain a few things. In 1893, Westinghouse beat out Thomas Edison to win the contract to power the Chicago World's Fair. Then in 1914, Westinghouse aquired the Copeman Electric Stove Company allowing them to enter the home appliance market. They were all in on electric. Westinghouse imagined a fully integrated electric home and then demonstrated the amazing things it could do.

The home contained a full compliment of devices for every member of the family and every need imaginable. It compartmentalized the kitchen, home entertainment, outdoor lighting and landscape watering with light and ground sensors. There was home security in the form of a camera system that televised visitors at the door and a full weather station.

Some of the same basic ideas incorporated into the Westinghouse Total Electric Home are relevant today and are even being reintroduced, like the Ring doorbell. The tablet has replaced the need for such things as weather station or entertainment system... Or has it? Imagine the integrated smart home with speaker sound that followes the user through the home or tells the resident what the weather is in the front yard and on the route to work, by street.

So, why didn't The Total Electric Home take? The idea was genius. The reason it didn't work was due to many factors, not the least of which was the competetion in the marketplace and to perhaps to an even larger extent, the proliferation of other power sources like nat-gas. But that isn't the entire reason.

Technology is great and they had a superior idea, but it lacked long-term vision. The idea behind the Westinghouse Total Electric Home was one of convenience, yes. But it was all about electricity without what surely would have put it over the finish line, solar panels for commercial use.

There is a lesson here about an amazing idea promoted by a forward thinking company that worked too hard to go it alone. At the same time, missing a major piece of the puzzle. Think this is an isolated incident? Think about Tesla, Apple, and Google. Think about how challenging it is to interlace the available technologies and fear of purchasing now when ideas run on a three month cycle, or less. George Santayana is credited with saying, "Those who cannot remember the past are condemned to repeat it." Or in this case, perhaps rebuild it.

The Future. The Human Experience.

A conversation with Brian Boyl

By Meagan Goold

Brian Boyl is a professor at ArtCenter College of Design, and an expert on designing for health/ wellness/fitness and the quantified self, the Internet of Things, digital systems, design for sustainability, design for kids and play.

Meagan Goold: You've been working on a book over the last three years. Can you tell us about that?
Brian Boyl: So, the name of the book is Interaction for Designers: *How to Make Things People Love* and it comes out in late April, early May of this year. I've got to say, it's placed me into a whole new mindset of how to address teaching. The book is designed in such a way so that students can read it and do their assignments outside of the classroom. And then when we are back in the classroom setting, we focus specifically on their designs and their content. It's a concept that's called 'flipping the classroom'. It allows us to really focus on their specific problems. Addressing the issues that they're looking at. I've been testing the book in my classes and we've had just amazing projects coming out because of it.

MG: Is it strictly a textbook?
BB: Absolutely not. Certainly it's for educators who want to teach their students the process of designing interactive systems, but it's also for professionals and anyone who had an idea of an app or interactive system they want to create. The book will take them from absolute nothing to a well-considered and beautiful something. It's a roadmap for designing interactive systems.

MG: Where do you as an educator, as someone who has built these roadmaps for interactive design, see the future of design going?
BB: That's a great question. Design always evolves. The tools evolve. When I'm talking to my students, I look at the future in two ways. There are things that are evolutionary and there are things that are revolutionary. We as designers especially in the university system, we're training people to deal with the future.

I think there are two fundamental things that are going to face us that are more revolutionary than evolutionary, and those are the things that I really like to look at.

The first one is the idea of experience design. This is nothing new. But really, what it is, is looking at someone's experience with a designed object or system and you design for that experience. At the core, you have to have really good storytelling skills. You almost have to put yourself in the shoes of someone and try to understand the experience of that individual and how they're going through their emotional life.

MG: And so what does that mean for the future of designers?
BB: It means that there will be more and more cross pollination if you will. Design programs need their classwork and coursework, what we call Transdisciplinary Studies here at ArtCenter, to talk to each other. If students don't know how to address the experience of someone with some sort of interface or product or designed object, they're not going to be as successful. I really think it comes down to understanding storytelling. Understanding how someone experiences the product through their life.

MG: What challenges do you see as an educator?
BB: I think the challenge will be that some people, some institutions are going to realize they have to adapt and some are not. This is what happens when you're looking at a revolution as opposed to an evolution. Some are going to be dinosaurs that don't survive and they're not going to be around.

MG: With emerging technologies, it would seem you just naturally lose a little bit of the human experience. How do designers today hold onto that?
BB: Actually, I think the human experience is going to become the most important thing, because if you cannot tap into the human experience, you cannot do good experience design. We are going to have to be more humanistic in our design. Architecture for example. You might make that beautiful building, but can it house people?

So, experience, you have to become empathetic. Designers need to become way more empathetic.

MG: You mentioned earlier that there were two fundamental things that we will face. The first was this idea of experience design. What is the second thing?
BB: The second one is AI, Artificial Intelligence. We might think AI is off in the distance, it's not anything that we really have to worry about. AI and robotics that have been used quite effectively to replace blue collar workers in automobile manufacturing, product manufacturing, manufacturing in general. So, I'm training white collar workers, people who do design. But they also should be concerned about AI. Not necessarily like, "Oh my gosh, there's this robot that's going to take over the world." What they should be concerned about is this: their competition for their next job is not only going to be the designer sitting next to them in that studio class, but it's going to be a computer. It's going to be AI.

MG: So how do designers prepare to deal with AI?
BB: Focus on the intensely creative things that digital devices have a hard time doing. But to be really successful, be the one to create this stuff.

MG: What do you hope the future of design holds?
BB: I hope it does get more empathetic, and I see that happening. I think all of these things; experience design, the threat of AI, all of this points in the direction of being more human and understanding people. People are going to understand people better than machines are going to understand people. For designers, understanding people and their experiences is becoming much more important than understanding how to create certain artifacts. So, we need to train designers to observe people, to be really sensitive to issues or problems that people might be having, to tap into those little speed bumps or pain points in people's lives that can be smoothed out, even in a little way. Experience, not artifact, that's what's becoming really important.

It's those little nuances, those little nudges, that are going to help people out. The discipline of design is changing so rapidly that designers need to live in the future to some degree. They need to know what's coming and how to leverage that in their designs.

These are the things we need to train our emerging designers to do: Live in the future. Focus on experience. Be humanistic.

Read the entire conversation with Brian Boyl at www.Formmag.net

Sugar Press

Form Magazine would like to extend a special thank you to Anne Martin owner/curator at Sugar Press for their beautiful printing of Timothy Robert Smith's "7th and Main". Their generous contribution made it possible for all monies earned from sales of "7th and Main" to be directly donated to the Woodbury University School of Architecture scholarship fund. You can find out more about Anne and Sugar Press at www.sugarpressart.com.

:by_the_numbers

Thank you to Woodbury University School of Architecture's Dean Ingalill Wahlroos-Ritter and Ewan Branda educator, architectural historian, software designer and former architect for their compilation and presentation of Form's Mar/Apr :by_the_numbers.
https://woodbury.edu/program/school-of-architecture/

:We Stand Corrected

On page 13 of the January/February 2019 issue, Form Magazine incorrectly referred to ScottBaker as a "notable author and architectural critic". While we do not doubt Scott Baker's many talents, the correct title should have read President of RELM and champion of urban landscapes. We regret this error.

On page 25 of the January/February 2019 issue, Form Magazine credited the artists incorrectly on this page. The top image should have read "Ruben Esparza, Lucy, 2018, Photographic print. Courtesy of the artist. Will be on view at the Tom of Finland Art Festival. The sculpture on the bottom of this page should have read "Linda Vallejo, La Victoria, 2016, Painted figurine. Courtesy of the artist." We regret the error and apologize for any confusion.

Timothy Robert Smith

A Los Angeles oil painter, muralist and multi-media artist, using observational tehniques to investigate the nature of perception. His work fuses together multiple perspectives into a kaleidoscopic vision, playing with our understanding of time and space, and blurring the line between personal and collective experience.

7th & Main

Fine artist Timothy Robert Smith is pleased to donate his Limited Edition prints of '7th & Main' to the Woodbury University School of Architecture Scholarship Program.

24"x 36" Sugar Press paper
(100% recycled and archived). $250

"formshop"/www.formmag.net

Woodbury School of Architecture by the numbers

3
locations = Burbank + San Diego + Hollywood

400
undergraduate and graduate STUDENTS studying architecture, interior architecture and real estate development.

2 Nationally Ranked Programs
Interior Architecture is ranked
12th
Architecture is ranked
18th
2018 DesignIntelligence rankings

A majority minority institution.
70%
of students identify as minority.

41
Number of students working toward licensure in the Integrated Path to Architectural Licensure (IPAL) program.

76°
Average temperature at all locations.

95%
of alumni surveyed are working within 6 months of graduation.

14:1
Average student faculty ratio.

61
student scholarships given to students in 2018-19, funded by friends of the School of Architecture.

5
FAIA

Impact of the Agency for Civic Engagement (ACE)
30 Communities | **12** Built Projects | **800** Students

$23,000
average amount of grants and financial aid more than 75% of students receive each year.

39
national and local awards and competitions Woodbury students won in 2018.

60%
of MS Arch Real Estate Development alumni have built projects incubated in our program.

92
exhibitions at Woodbury's WUHO gallery since 2010.

WSOA Woodbury School of Architecture